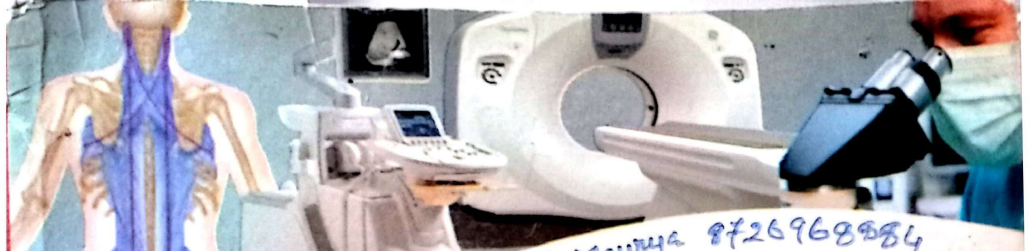

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A Text Book For

Roga Nidana And Vikruthi Vijnana

AyuTech

Dr. Nisha Kumari

CHAUKHAMBHA ORIENTALIA
VARANASI

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Chapter-1

DOSHA DUSHYADI VIGYANA

1. Definition and Importance of Roganidana

The history of medicine is at the same time very old and very young field of study. It is not a mere history concerned of only historians, but is equally important for medical professionals too. Medical history tells us where we have come from and where we stand, in the art of heeling at present. Several generations of philologists and historians have made source available to us. Truely speaking, medical history is the compass that guides us into the future and shows the direction in which we are marching.

विघ्नभूता यदा रोगाः प्रादुर्भूताः शरीरिणाम्। तपोपवासाध्ययनब्रह्मचर्यव्रतायुषाम् ।।
तदा भूतेष्वनुक्रोशं पुरस्कृत्य महर्षयः। समेताः पुण्यकर्मणः पार्श्व हिततवतः शुभे ।।

(च.सू. १/७)

Ancient acharyas were always with following of rituals, religious duties like performing of homa, tapa, adhyayana, upavasa and so on. This needs high concentration, strong determination and a sharp vision which was deteriorating gradually. The destraction or deterioration in human ability started once suffering or disease evolved. The physical strength, stamina, life span and overall performance was totally decreased in human which became a big obstackle for their achievement. That obstacle was called as ROGA which gave pain, suffering, and unusual death.

व्याधयो हि समुत्पन्नाः सर्वप्राणिभयंकर। तद् ब्रूहि मे शमोपायं यथावदमरप्रभो।। (च.सू.१/२२)

Roga or vyadhi was prevalent among all living creatures which created havoc and all creation was in verge of complete destruction. Then Maharshi Bharadwaja approached Lord Indra and receieved knowledge of trisutra ayurveda which is the only remedy for all sorts of suffering, pain or roga.

हेतुलिंगौषधानां स्वस्थानुपरायणम्। त्रिसूत्रं शाश्वतम् पुण्यं बुबुधे यं पितामहः।। (च.सू. १/२४)

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Definition of Roga

रुजतीति रोगः शरीरयात्रां मृद्नातीति

The one which gives pain or let the body suffer from pain is called as roga. The science which describes roga by means of its cause, pathogenesis, signs, symptoms, the means to diagnose and prediction of prognosis is called as Roga nidana and vikruti vijnana.

The fascinating history of vikruti vijnana/pathology & its many magnificent personalities with their out standing contributions in the opening pages of history of medicine is meant to pay our obeisance to those great personalities who have laid glorious foundations of our specialty.

Life & works of those whose names are seen in history are linked to some disease process-the aim being to stimulate the inquisitive beginner in pathology as to how this colorful specialty emerged.

Every aspect of disease says to know its nature before treatment and for prevention.

"Disease is very old, nothing about it has changed. It is we who changed, as we learn to recognize what was formerly imperceptible."

"Jean Martin Charcot"

Importance of roga nidana

The clinical significance of morphologic & functional changes together with results of other investigations help to arrive at an answer to what is wrong (diagnosis) what is going to happen (prognosis) what can be done about it (treatment) and finally what can be done to avoid a disease, its complication & spread (prevention). Therefore before treatment there are lot many steps to go where knowing rogavijnana becomes really essential.

रोगमादौ परीक्षेत ततो अनन्तरमौषधम्। ततः कर्म भिषक् प्राज्ञानपूर्वं समाचरेत्।। (च.सू.२०/२०)

A disease has to be examined first and then based on the examination appropriate treatment has to be administered. A treatment can be successful only if disease diagnosis is right.

यस्तु रोगमविज्ञाय कर्माण्यारभते भिषक्। आथौषधविधानज्ञस्तस्य सियिहच्छया।। (च.सू.२०/२१)

After knowing the science of disease i.e. that is, its etiology, pathogenesis, form, severity and its components the treatment has to be planned. The selection of drug, procedure, dosage, duration etc are all planned after knowing everything about the disease.

नास्ति रोगो विना दोषैर्यस्मात् तस्माद् विचक्षणः। अनुक्तमपि दोशाणां लिंगैर्व्याधिमुपाचरेत्।।

A disease will not manifest without involvement of doshas. The disease will present based on nature of dosha vaishamya. Again doshavaishamya is manifested in the form of lakshanas. A complete knowledge in roga vijnana will pave a way for right diagnosis.

भिषजा प्राक् परीक्ष्यैवं विकाराणां स्वलक्षणम्। पश्चात्कर्मसमारम्भः कार्यः साध्येषु धीमता।।
साध्यासाध्यविभागज्ञो यः सम्यक् प्रतिपत्तिमान्। (च.सू. १०/२१)

A physician should know to examine any disease throughly by its features and later plan the treatment on the basis of its curability. The classification of 8 branches of ayurveds is based on disease forms, disease varieties or mere roga vijnana.

The treatment explained in our classics are to correct the dosha vaishamya. The pathology of dosha vaishamya should be understood before correcting it. Therefore perfect knowledge on roga nidana is required to understand the disease cure the disease & provent the disease.

2. Samanya Nidana and Samany Lakshana of Dosha Vriddhi, Kshaya and Prakopa

Introduction

Doshadi vijnana is the fundamental and most essential science of Ayurveda. The dushti of dosha manifest in various forms i,e : Vriddi, Kshaya, Prakopa, Pradosha, Utlishta, Hrushta, leena avastha of dosha dhatu and, mala in various intensities in various ashayas produce disease.

Various avastha of dosha, its combination with respective dhatu, association with mala, in an ashaya and involvement of srotas that triggers sroto dushti and avayava dushti. Gamana of doshas to various sites, spreading the pathogenesity. All these gives rise to various symptoms. Therefore before knowing any vikruti or vyadhi one should know all viktuta avastha of components of disease. Amongst them Dosha is the primary component.

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Dosha Nirukti

- दूषयन्तिमनःशरीरचेतिदोषाः। (सिद्धान्तनिदान, तत्वदर्शिनी)
  One which does dushti of mana and shareera
- "शरीरदूषणाद्दोषाः" (शा.पू.ख्)
  Which undergo vikruti due to any cause and affects shareera
- दूषयन्तिइतिदोष।
  Which does the dooshana of shareera
- दोषाइत्यर्थदुषवैकृत्येइतिदोषधातोर्दृष्यन्त्येभिरितिवाक्येन.....(भा.प्र.पू.ख.)

Dosha Sankhya

- तत्रयःशरीरदोषावातपित्तश्लेष्माणः, तेशरीरंदूषयन्तिः, द्वे पुनःसत्वदोषौरजस्तमश्च, तौसत्वंदूषयतः। ताभ्यांचसत्वशरीराभ्यांदुष्टाभ्यांविकृतिरुपजायते, नोपजायतेचाप्रदुष्टाभ्याम्। (च.शा. ४/३४)
- वायुःपित्तंकफश्चेतित्रयोदोषासमासतः। विकृतअविकृतादेहंघ्नन्तितेवर्तयन्तिच। (अ.ह.सू. १/६)
- रजतमश्चमनसोद्वे च दोषावृदाहृतौ। (अ.ह.सू. १/२१)
- वायुःपित्तंकफश्चोक्तःशरीरोदोषसंग्रहः। मानसः पुनरुद्दिष्टोरजश्चतम एव च। (च.सू. १/५७)
- वातपित्तश्लेष्मण एव देहसम्भवहेतवः। (सु.सू. २१/३)

Shareerika dosha

1. Vata 2. Pitta 3. Kapha

Manasika dosha

1. Satwa 2. Raja 3. tama

General concept of dosha

- विसर्गादानविक्षेपैःसोमसूर्यानिलायथा। धारयन्तिजघद्देहंकफ़पित्तानिलातथा। (सु.सू.२१/७)
- पित्तंपन्गुकफ़ंपन्गुपन्गवोमलधातवः। वायुनायत्रनीयन्तेतत्रगच्छन्तिमेघवत्।। (शा.स.पू.५/२५)
  Visarga- destruction, separation, going away
  Adana- creation, coming together, addition
  Vikshepa- circulation
- All functions in universe are carried out by moon, sun and wind. Similarly kapha, pitta and vata are performing all the functions in living body.
- Pitta is immobile, Kapha dosha is also immobile. Thus the Vata dosha carries Pitta & Kapha where ever necessary just like cloud is carried by wind.

1. विकारोधातुवैषम्यंसाम्यंप्रकृतिरुच्यते। सुखसंज्ञकमारोग्यविकारोदुःखमेवच।। (च.सू. ९/३)
   Disease is caused by dushti or abnormal fluctuation of dosha

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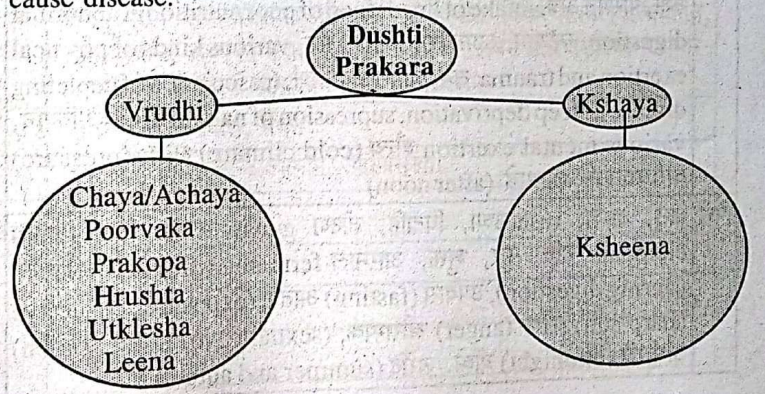
beyond physiological limitation. Dosha dushti causes dhatu vaishamya & lead to disease. On the other hand if doshas are in equilibrium then dhatus functions properly leading to health.

2. रोगस्तुदोषवैषम्यंदोषसाम्यमरोगता।। (अ.ह.सू. १/२०)
   Dosha vaishamya causes disease dosha samya causes health.
3. दोषा एव हि सर्वेषां रोगाणां एक कारणम्। यथा पक्षि परिपतन् सर्वतः सर्वमप्यहः।। छायामत्येति नात्मीयां यथा वा कृत्स्नमप्यदः। विकारजातं विविधं त्रीन् गुणान् नातिवर्तते।। (अ.ह.सू. १२/३२)

Vaishamya of dosha is always required for the formation of disease. Dosha dushti and vyadi are always associated and dependent just like the flying bird is always followed with its shadow.

- दुष् वैकृत्ये। (अ.को. ३/४/६)
  Any abnormalcy is called as dushti
- वैकृतं च यस्य यथा स्वरूपं तत् वैपरीत्यम्।
  Fluctuation from normal quality, exhibiting fluctuation from normal quality or exhibition of opposite quality is vikara or vipareeta. This is seen when there is dushti of any component in the body.
- दुष्टत्वम् अशुद्धत्वम् च। (वाचस्पत्यम् १/३६४८)
  Any component in its impure and abnormal form is dushta
- दोषाणामेव अयं स्वभावो यत् दूषकत्वं न धात्वान्तराणाम्। (च.वि. ५/९)

It is the very basic quality of dosha to undergo dushta and cause disease.



Dosha Prakopaka Hetu

- **प्रकोपः क्षोभे । चांचल्ये।** (वैद्यकशब्दसिन्दु/६९८)
  The one which is aggressive, and having tendency to move is prakopa
- **दुष्टं प्रकर्षेण।** (च.चि.१९/८) The one which is in bad form
- **प्रकृष्टः कोपः प्रकोपः।** (च.सु. १७/११२) The one which tends to move out of anger
- **प्रकृष्टमेव जनयन्तीति प्रकोप हेतवः।** (सु.सु. २१/२०)
- **क्रुद्धं प्रकोपं गतम्।** (सु.सु. २१/३८) Going away with anger or aggression.
- **कुपिता विकृतिमापन्ना।** (मा.नि. १/१४)
  Dosha in prakopavastha have tendency to produce vikruti.
- **विलयन रूपा वृद्धिः प्रकोपः।** (सु.चि. ३३/३)
  It is the avastha in which the doshas increase in quality and quantity so that it gets dissociated from its normal site.
- **स्वस्थानं त्यक्त्वा दोषस्य यत् पुनः मार्गान्तरगमनं स कोप इत्युच्यते।** (अ.ह. १२/२३)
  Prakopa is that stage of dosha which increases and then spills out from its original place and circulate through channels as result of overflow
- **उत्क्लेश्य प्रकोप्य।** (सु.सु. २०/२०)
- **उदीरणं अधिकं दोषाणाम्।** (सु.उ. १०/४)
- **कोपस्तु उन्मार्गगमिता।** (अ.ह. १२/२३) gets aggressive and goes else where
- **प्रकर्षेण कोपः स्थानान्तर गति लक्षणः।** (अ.ह.३/४४) gets aggressive & mores to another place.

दोष प्रकोप कारणा (Causes of dosha prakopavastha)

वात	कषाय, तिक्त, कटु, Rasa रूक्ष, परिणत अन्ने, intake of dry or food of poor nutrition at abnormal digestion, व्यायाम, अपतर्पण, प्रपतन, भंग, various kinds of physical exertion and trauma. क्षय, जागर, वेगधारणं, (association of depleting disease), sleep deprivation, supression of natural urges अतिशुच, various mental exertion शैत्य (cold climare) क्षोभ, (pressure) वारीधरागमने, अपराह्ने (after noon)
पित्त	कटु, अम्ल, rasa उष्ण, विदाहि, तीक्ष्ण gunas. लवण, तिल, अतसि elements. दधि, सुर, शुक्त, आरनाल fermented fluids. भूक्तेजीर्यति, (during digestion), उपवास (fasting) आतप, (exposure to excesive sharp sun) क्रोध (anger) स्त्रीसम्पर्क, (sexual trive) मध्यान्ने, (noon) अर्धरात्रि (midnight) ग्रीष्मे, शरदि (summer and autumn).

कफ	गुरु, (heavy to digest) मधुर (sweet) अतिस्निग्ध, दुग्ध, इक्षु, दधि milk, milk products, sugar cane products, anoopa mamsa सर्पि (clarified butter) प्रपूरै, दिननिद्र, (sleep during day time) तुहिनपतनकाले, दिवसादौ, भुक्तमात्र, वसन्ते (day time, during food ingestion and during spring).

Aaharaja Nidana

वात	रस	कटु, कषाय, तिक्त
	गुण	रूक्ष, लघु, शीत
	द्रव्य	मसूर, कलाय, यव
पित्त	रस	कटु, अम्ल, लवण
	गुण	तीक्ष्ण, उष्ण विदाहि
	द्रव्य	कुलत्थ वाराहिकन्द लशुन दधि
कफ	रस	मधुर, अम्ल, लवण
	गुण	गुरु शीत स्निग्ध पिच्छिल अभिष्यन्दि
	द्रव्य	कदलीफलं नारिकेलं दधि

Sevana Vidhi

काल	अतिद्रुतं, अतिविलम्बितं
मात्र	अतिमात्र, हीनमात्र, अतियोग of पिप्पली, लवण, क्षार
प्रयोग	भय, शोक, क्रोध, लोभ, मोह, मान इर्ष्या, दुःख शय्या, प्रजागरै, अनभ्यास - दधि, माष, गव्य, माहिषमांस, मत्स्यं, अपथ्यतम in each वर्ग

Viharaja Karana

वात	वातमूत्रपुरीष शुक्रछर्दिक्षवथुउद्गारवाष्प वेगविघात विषमचेष्टाबलवत्विग्रहात्, अति व्यवाय, अध्ययन प्रपतन प्रधावन अभिघात लंघन प्रतरणरात्रिजागरणभार-हरणगजरथपदातिचर्या अनशन विषमशन अध्यशन
पित्त	आतप सेवा, उपवास, मैथुन
कफ	दिवास्वप्र, आलस्य, अव्यायाम, आस्यसुखा।

Manasika Karana

वात	चिन्ता, त्रास
पित्त	क्रोध
कफ	अचिन्ता

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Kala as cause of prakopa:

हेमन्त	शीत, स्निग्धं	कफ चय
वसन्त	उष्णं, स्निग्धं	कफ प्रकोप
ग्रीष्म	लघु, रूक्ष	वात चय
वर्ष	शीतं, रूक्ष अम्लता	वात प्रकोप पित्त चय
शरत्	उष्णं, तीक्ष्णं	पित्त प्रकोप

Aagantuja Karana (External cause)

- ये भूतविषवाय्वग्निक्षतभंग्रादि संभवाः। रागद्वेषभयाद्दाश्च ते स्युरागन्तवो गदाः।
  आगन्तवोऽपि रोगा दोषकोप अन्तरेणैव उत्पद्यमाना दृश्यन्ते ।
  तस्मात् रोगसम्भवादपिदोषकोपो अयं निश्चितः।। (अ.ह.सू. १२/२३)

External physical agents, toxins or poisonous substances, thermal injuries, injury due to fall or accident, psychological trauma all these can produce dosha prakopa.

चिकित्सा व्यापत् Improper (Improper treatment)

उच्चैः भाष्यं रथक्षोभं अतिचंक्रमणासने। अजीर्णाहितभोज्ये च दिवास्वप्नं स मैथुनम्। ।(च.सि.१२/११)

Speaking loudly, travelling in unevenroad or jerky movement, too much mobilization of body, abnormal food habits, sleep during day time. All these if done during panchakarma therapy then it causes dosha prakopa especially vata.

General Features of Prakopa

- तेषां प्रकोपात् कोष्ठतोद सन्चरणं अम्लिकापिपास परिदाह अन्नद्वेष हृदयोत्क्लेदाश्च जायन्ते।
  (सु.सू. २१/२७)

Pricking pain in the koshta, gurgling sound due to movement, sour taste in mouth, excessive thrist, burning sensation in the body, aversion towards food, nausea are samanya prakopa lakshanas.

Vata Vriddi lakshana

- .....वृद्दस्तुकुरुतेऽनिलःकार्श्यकाष्ण्योष्णकामित्वकम्पानाहशकृद्ग्रहान् ।
  बलनिद्रेन्द्रियभ्रंशप्रलापभ्रमदीनताः।। (अ.ह.सू. ११/५-६)

Increased vata causes physical weakness or turns the body lean. Dark color of skin, patients longs to have warm or hot food. Presence of fine to course tremors, abdominal destension, dryness of stool and thus constipation, the capasity of sense organ decrease. There will be diminision of higher mental function, therefore irrelevant talk and behavior due to disorientation are seen.

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Vata Kshaya Lakshana

- लिङ्गंक्षीणेऽनिलेऽङ्गस्यसादोऽल्पंभाषितेअहितम्।
  संज्ञानाशस्तथाश्लेष्मवृद्युत्कामयसम्भवः।। (अ.ह.सू. ११/१५)

Features of decreased vata are: physical debility, general malaise. Patient hates to talk or speaks less, poor sensory function and feature of kapha dosha vriddi are seen.

Pitta Vrudhi and Kshaya Laxanas

- पीतविण्मूत्रनेत्रत्वक्क्षुत्तृड्दाहाल्पनिद्रताः। (अ.ह.सू. ११/७)

Discoloration of urine, conjunctiva, skin into yellow color. Excessive hunger and thirst. Burning sensation all over the body. Due to all these discomfort there is less sleep in the patient. These are pitta vriddi lakshanas.

- पित्तेमन्दोऽनलःशीतंप्रभाहानिः। (अ.ह.सू. ११/१६)

Pitta kshaya causes diminision of agni, diminision in function of vayu. Cold and clamy body, loss of complexion

Kapha Vrudhi and Kshaya Laxanas

- श्लेष्मऽग्निसदनप्रसेकालस्यगौरवम्।।
  श्वैत्यशैत्यश्लथाङ्गत्वंश्वासकासातिनिद्रताः। (अ.ह.सू. ११/७)

Sleshma vriddi causes decrease in quality, intensity and function of agni, excessive salivation, lazyness and heaviness of body. Color of skin turns pale, cold on touch, compact joints. Symptoms of respiratory distress like cough, dyspnoea. Excessive sleep. Are seen in kapha vriddi lakshana.

Kapha Kshaya lakshanas

.....कफेभ्रमः। श्लेष्माशयानांशून्यत्वंहृद्रवःश्लथसन्धिता।। (अ.ह.सू. ११/१६)

Giddiness, emptiness of sleshma sthana, palpitation loose joints.

3. Dosha Dhatu Ashraya Ashrayi Bhava

Introduction

The body is Organised due to permulation and combination or methematical configuration of Pancha Mahabutas. The tridoshas Originated following with utpatti of Dhatus. Later there is a need of interaction between dosha, dhatus for the functional integrity of

the body. The doshas stay in dhatus that means the dhatus provide ashraya to doshas (ashrayi) in specefic areas or sites. The selectivity of ashraya and ashrayi is purely based on sharing similar qulities of mahabhootha between ashraya and ashrayai (dhatus and doshas respectively) eg:- Kapha is predominant of jalamahabhootha, thus naturally it has intimacy towards rasa dhathu which is also predominant of jala mahabhootha.

वायुवाकाश धातुभ्यां वायुः, आग्नेय पित्तम् । अम्भः पृथिवीभ्यां श्लेष्मा । (A.San.Su. 20)

Vata is originated from combination of Vayu and Aakasha mahabuta. Pitta is originated from Agni and Sleshma is originated from Jala and Pritwi.

तत्र वायोर्वायुरेव थोनिः पित्तस्याग्निः कफस्यापः, रक्तं तेजोजलात्मकं मांस पार्थिवं, मेदो जलपृथिव्यात्मकम्, अस्थि पृथिव्यनिलात्मकं मज्जा शुक्रं चाप्यं, मूत्र जलानलात्मकं, पुरीषं पार्थिवम् आर्तवमाग्नेयं, स्वेदः स्तन्यं चाप्यम् (चक्रपाणि- Su.Su. 24/8)

Among the saptha dhatu Rasa is predominant of Apmahabuta, Rakta by agni and jala, mamsa predominant of jala and prithvi mahabootha, Asti made by pritwi and vayu, Majja and Shukra is predominant of jala mahabootha. Mootra predominant of jala, Pureesha by pritwi, Artava and sweda is predominant of agni, Sthanya is dominated by jala mahabuta.

Ashraya; Ashrayi Sambandha

तत्रास्थिनी स्थितो वायुः पित्तं तु स्वेदरक्तयोः श्लेष्मा शेषेषु तेनैषामाश्रयाश्रथिणां मिथः यदेकस्य तदन्यस्य वर्धनक्षपणौपधम् अस्थिमारुतयोनैवं प्रायो वृद्धिहि तर्पणात् । श्लेष्मानुगता तस्मात् संक्षयस्तद्विपर्ययान् । वायुनानुगतः । (A.Hri.Su. 11/26-28)

There is mutual interactin, dependence and influence between ashraya (dhatus) and doshas (ashrayi). It can be eloberated as follows:

1. Vata dosha stays in Asthi Dhatu. (as vayu and Aakasha is common)
2. Pitta dosha stays in Rakta Dhatu (as agni is common)
3. Kapha dosha stays in rasa, mamsa, meda, majja, sukra, mutra and purusha (as jala is common)

This relation will be maintained during the normal physiology. Since the doshas and dhathus are related in the form of adheya and adhara, any changes in any of them will reflect on other in same fashion.

Vriddi (Qualitative and Quantitative increase) is caused due to over nourishment (atisantarpana) and usually associated with kapha. Kshaya (quantitative decrease or qualitative decreases) is caused due to depletion (apatarpana) which is associated with vata dosha. Vriddi of doshas will causes Vriddi of dhatus in which they reside. Similarly kshaya of doshas will also influence dhatus.

1. Vata Vriddi will cause Asthi kshaya.
   Vata Kshaya will cause Asti Vriddi
2. Pitta Vriddi will cause Sweda and Rakta Vriddi
   Pitta Kshaya will cause Sweda and Rakta Kshaya.
3. Kapha Vriddi will cause Vriddhi of rasa, mamsa, meda, majja sukra, mutra, purusha and kshaya of kapha will cause kshaya of the same.

Usually Vriddi of Dosha will cause Vriddi of its dependent dhatus, kshaya of Dosha will cause Kshaya of its dependent dhatus. But there is an exeption to this Rule. Even though vata is residing in asthi, Vriddi of Vata causes Asthi kshaya, and vice Versa. So Vriddi of Vata should be treated with Brunhana and Kshaya of Vata with Langhana with respect to Asthi.

4. Dhatu Kshaya Vriddhi Lakshana

Introduction

- **पूर्वः पूर्वोऽतिवृधत्वाद्वर्धयेधिपरंपरम्। तस्मादतिप्रवृधानांधातूनांह्रासनंहितं।** (सु.सू. १५/२३)

Increased quantity of a bodily principle gives rise to a similar increase in the quantity of immediately succeeding component in the order of enumeration, hence an increase in any of the fundamental principles of the body should be checked and reduced to its normalcy or normal quantity.

- **तेषांयथास्वंसंशोधनःक्षपणञ्जक्षयादविरुधैःक्रियाविशेषैःप्रतिकुर्वीत।** (सु.सू.१५/१७)

The abnormal excess of the humors and principles etc. of the body should be checked and remedied with cleansing or pacifying measures that would be indicated by their respective natures, so as not to reduce them.

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- दोषः प्रकुपितोधातून्क्षपयत्यात्मतेजसा। इद्धः स्वतेजसावन्हिरुखागतमिवोदकम्।(सु.सू.३६/६)

The aggrevated dosha diminishes dhathus by its innate power as kindled fire dries up the water kept in a sauce pan by its own heat.

- दोषादीनांत्वमतामनुमनेलक्षयेत्। अप्रसन्नेन्द्रियंवीक्ष्यपुरुषंकुशलोभिषक्। (सु.सू. १५/३९)

An expert physician should know the disequilibrium of doshaadi (dosha, dhathu, mala) by inference on observing the person's feelings & symptoms.

- क्षपयेद्बृंहयेच्चापिदोषधातुमलान्भिषक्तावद्यावदरोगः स्यादेतत्साम्यलक्षणं (सु.सू. १५/४०)

The healthy should be preserved and in unhealthy the physician should diminish or promote doshas, dhathus, and malas till he becomes free from disorders which is the indicator of equilibrium.

- अतऊर्ध्वंईषत्परिहार्णिर्यावत्सप्ततिरिति। सप्ततेरूर्ध्वंक्षीयमाणधात्वेन्द्रियबलवीर्योत्साहमहन्यहनि।

The dhathus are by themselves incapable of any functions and are made to function by the tridoshas vata, pitta, kapha which are normally residing in them. Thus tridoshas are the activators of dhathus.

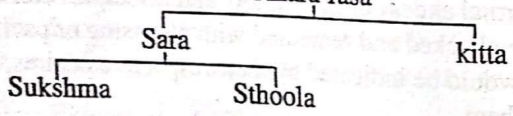
Dhathus

In our body the dhathus are found in two states.

- Asthayi- unstable/circulating.
- Sthayi - Stable/static

1. Asthayi- Essence of food which are required for the nourishment of the dhathus.

Poshakamsa of saptha dhatu present in the Sara paka
↓ reaches
Other dhathus by circulating with rasa dhathu
↓
That is the Ahara rasa
↓
Dhatwagni
↓
Ahara rasa



The poshakamsa is called as poshaka dhathu

1. They are the sthoola dhathus or the gross tissues and they are the poshya dhatus or the one which gets nourishment.

Dhathu Vaishamya and Dhathu Samya

The condition in which the dhathus have normaley in their specific pramanas (quantity), gunas (quality), and karma (functions) is known as dhathu samya. Where as vridhi and kshaya in respect of any of these three aspect is known as dhathu vaishamyatha.

Beyond these 2 aspect of vaishamyatha one more form exists that is vyapath.

If dhatus are neither increase nor decreased. If any presence of visha, krimi and others are found, it is not coming under vrudhi and kshaya

Vrudhi and kshaya is abnormal.
Upachaya and apachaya is normal

Karanas for Vaishamyatha

Dhatu Vaishamya → Doshavaishamyatha
Dhatu Vaishamya → Ahithaahara vihara

धातुः धारणात्धातव्: ।। पुरुषधारणात्धातव्: ।।

- Dhathu means one which supports or withholds the body is called dharana.
- They are the principles of our body and are seven in number - Rasa, raktha, mamsa, meda, asthi, majja, sukra
- They are also called as dushyas because they get dushti by the doshas.
- All the dhatus are getting nourishment from the food. Then they maintain themselves in respect of their Pramana, Guna, Karma.

Dhathu	Lakshanas	Charaka	Sushrutha	Vaghbata
रसक्षय	रौक्ष्य			✓
	भ्रम			✓
	ग्लानि			✓
	शब्दासहिष्णुताहृत्पीडा			✓
	कम्पा		✓	
	शून्यता	✓		

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Dhathu	Lakshanas	Charaka	Sushrutha	Vaghbata
	उष्णा	✓		
	क्षीणा		✓	
	हृदयताम्यता by स्वल्पचेष्ट		✓	
रक्तक्षय	अम्लशिशिरप्रीतिसिराशैथि			✓
	ल्य			
	रूक्षता			✓
	त्वचपारुष्यता	✓		
	स्फुटितत्वचा	✓	✓	
मांसक्षय	अक्षग्लानि		✓	✓
	गण्डिस्फकशुष्कतासन्धिवेद	✓		✓
	ना	✓		✓
	ओष्टशुष्कता		✓	✓
	उपस्थ		✓	
	उरुकक्षवक्षशुष्कता		✓	
	पिन्डिकशुष्कता		✓	
	उदरशुष्कता		✓	
	ग्रीवशुष्कता		✓	
	तोद		✓	
	गात्राणांसदनं	✓	✓	
	धमनीशैथिल्य	✓	✓	
मेद	स्वपनंकटिप्लीह्नोवृधिक्रुशा		✓	✓
	न्डुतासन्धिशून्यतारौक्ष्यंमेदूर			✓
	मांसप्रणीतसन्धिस्फुट्नग्ला-	✓	✓	
	निरक्षणंआयसतनुउदरक्षीणता	✓	✓	
	ता	✓	✓	
अस्थिक्षय	अस्थितोद			✓
	दन्तशतन	✓		✓
	केशशतन	✓	✓	✓
	नखशतन	✓	✓	
	लोमशतन	✓		
	शम्श्रुशतन	✓		
	श्रमा			
	रूक्षता	✓		

Dhathu	Lakshanas	Charaka	Sushrutha	Vaghbata
	सन्धिशैथिल्य			
मज्जक्षय	अस्थिसौषी			✓
	भ्रम			✓
	तिमिरदर्शनंअल्पशुक्रता		✓	
	पर्वभेद		✓	
	अस्थितोद		✓	
	अस्थिशून्यता		✓	
	दुर्बल	✓		
	लघुनि	✓		
	वातरोगिणि	✓		
शुक्रक्षय	चिरातप्रसिच्येत		✓	✓
	शुक्रशोणितं		✓	✓
	तोद in व्रुषण			
	मेढ्रधूपन			
	दौर्बल्यं	✓		
	मुखशोष	✓		
	पाण्डुत्वं	✓		
	सदन	✓		
	श्रमं	✓		
	क्लैब्य		✓	
	शुक्रविसार्गक्षीण		✓	
	मेढ्रवेदना		✓	
	अशक्तिमैथुने		✓	
रसवृद्धि	अग्निसदन		✓	✓
	प्रसेक			✓
	आलस्य			✓
	गौरवं			✓
	शैत्यं			✓
	श्वैत्यं			✓
	श्लथांङ्ता			✓

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Dhathu	Lakshanas	Charaka	Sushrutha	Vaghbata
	श्वास			✓
	कास			✓
	अतिनिद्रताहृदयोत्क्लेशता		✓	✓
रक्तवृद्धि	विसर्प			✓
	प्लीह			✓
	विभ्रतीन्			✓
	कुष्ठ			
	वातास्र			✓
	गुल्म			✓
	उपकुश			✓
	कामल			✓
	व्यङ्ग			✓
	अग्निनाश			✓
	संम्मोह			✓
	रक्तत्वक्			✓
	रक्तनेत्र			✓
	रक्तमूत्ररक्ताङ्ग			✓
	सिरापूर्णत्वं			
मांसवृद्धि	गण्डार्बुद			✓
	ग्रन्थि			✓
	गण्डा			✓
	उरुउदरवृधि		✓	✓
	कण्ठअतिमांसवृधि			✓
	सिक्कवृधि			✓
	ओष्ठवृधि		✓	✓
	उपस्थबाहुजन्घवृधिगुरुगात्र		✓	✓
	ता			
मेदोवृद्धि	श्रमं			✓
	अल्पचेष्ट gets श्वास		✓	✓
	सिक्कस्तनलम्बनं		✓	✓
	उदरलम्बनं			

Dhathu	Lakshanas स्निग्धाङ्गतापार्श्ववृधि	Charaka	Sushrutha ✓	Vaghbata
	कास		✓	
	दौर्गन्ध्य		✓	
अस्थिवृद्धि	अधिदन्त		✓	✓
	अध्यस्थि		✓	✓
मज्जावृद्धि	नेत्रगौरवं		✓	✓
	अङ्गगौरवं		✓	✓
	पर्वसुस्थूलमूलानिअरुंषि			✓
शुक्रवृद्धि	अतिस्त्रिकामताशुक्राश्मरी			✓
	अतिप्रातदर्शनं			✓

Till the age of 60 years, life is best with all the dhathus having full complement and abundance of strength, conferring upon the person the full capacity to withstand every sort of trouble and lead a healthy and active life. With the setting of old age 60 years , the dhathus begin to undergo slow depletion, becoming poor in their quantity, qualities and function.

Significance of Dhathu Vrudhi and Kshaya

- Knowledge of vrudhi, kshaya of dhathus are needed in knowing many diseases

Eg:-1) In pandu, rasa kshaya lakshanas are seen.
2) In arbuda, mamasa vrudhi lakshanas are seen.

- In every disease there will be dosha dushti and dhatu dushti lakshanas. There for knowing a disease is knowing dosha, dhatu vrudhi kshaya lakshanas
- It implies dosha kshaya cannot produce a disease where as dhathuvrudhi as well as dhathu kshaya can produce disease.

Chikitsa Aspect

- Vridha dhatu should be treated with kshapana karma (like ruksha, shodhana, apatharpana)
- Ksheena dhathus are treated by dhathu vrudhikara karma (like tarpana, preenana, rasayana)
- By the pancha karma treatment one can maintain the level of dosha, dhathu that can prevent the disease on set.

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5. Mala Kshaya Vriddhi Lakshana

Introduction

- दोष धातु मल मूलं हि शरीरम्।। (स.सू. १५/३)

Like दोष's and धातु's, मल's also help in the maintenance of health. Therefore it is considered as moola of sareera.

Definition

मलिनीकरणान्मला

One which contaminates the शरीर is मल.

मल in प्रकृतिअवस्था ⟶ leads to धारणा of शरीर।

If they are contaminated , then leads to वृद्धि/क्षय and causes मलिनीकरणा of शरीर।

मल can be -

1. ब्रहत्मल 2. खमल 3. धातुमल

ब्रहत्मल

1. ब्रहत्मल–घनमल; पुरीष द्रवमल, स्वेद, मूत्र
2. खमल-नेत्र विट् (Nasal mucosa, ear wax)
3. धातुमल– पित्त (pitta) is mala of रक्त, कफ is mala of rasa

धातुमल

कफंपित्तंमलंखेषुप्रस्वेदोनखरोमच। नेत्र विट्त्वक् चक्षुषस्नेहधातुनां क्रमशोमल।।(अ.ह.शा.३/६३)

- रस-कफ
- रक्त-पित्त
- मांस-नासिक, कर्णमल
- मेद-स्वेद
- अस्थि-नख, रोम
- मज्जा-नेत्रविट्
- शुक्र-ओजस्

According to वाग्भट ⟶ ओजस् is the मल of शुक्रधातु

According to शारङ्गधर ⟶ He explained मल for all धातु

According to भावप्रकाश ⟶ शुक्र does not have मल

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Because as is acted by different अग्नि. At last when formed it is pure, so there is absence of मल for शुक्र

In शरीरपक्रिय ⟶ परिणाम of आहार

- सारभाग → उत्तरोत्तर धातु पोषण → If वृद्धि or क्षय leads to → रोग
- किट्टभा → eliminated through 13 vegas → if not eliminated leads to आम → आम which combines with दोष and धातु → Leads to आम दोष ⟶ रोग

Elimination of मल through 13 vegas

- वात-अधोवात-flatus उर्ध्ववात-belching
- विट-feces
- मूत्र-urine
- क्षवथु-sneeze
- तृट्-thirst
- क्षुधा-hunger
- निद्रा-Sleep
- कास-cough
- श्रमश्वास-breathing on exertion
- जृम्भा-yawning
- अश्रुज-tears
- च्छर्दि-vomiting
- रेतस्-ejaculation of शुक्र

Contents of elimination

- Undigested food material
- Residual products
- Toxins, other bio-chemical and microbial waste
- Heat

क्षय of खमल

- मलानंअतिसूक्ष्माणांदुर्लक्ष्यंलक्षयेत्क्षयम्। स्वमलायनसंशोषतोदशून्यत्वलाघवैः।।(अ.ह.सू.११/२३)
- Decrease of मल's which are सूक्ष्म are to be assessed from शोष, तोद, शून्यत्व, लाघवता- felt in their respective मलायन's

वृद्धि of खमल

- ....एवंचलक्षयेत् । दूषिकादीनापिगलान्बाहूल्यगुरुतादिभिः।। (अ.ह.सू. ११/१४)

The state of increase of other malas such as दूषिक (विट् of eye) are to be assessed from their increase and heaviness felt along the respective मलायन's

क्षय of pureesha :-

पुरीष-हृदयपार्श्वपीडःसशब्दवायोरुर्ध्वगमनंःकुक्षोसंचरणम् (सु.सू. १५/११)

Produces pain in chest planks, flatus, upwardmovement of vayu, circulation of vayu in Kukshi.

According to अ.हृ.सू. ११/२१

- **पुरिषेवायुरन्त्राणीसशब्दोवेष्टयन्निव । कुक्षोभ्रमतियात्यूर्ध्वंहृत्पार्श्वेपीडयन्भृशम्।।**

According to सु.सू. १७/७०

- **क्षीणोशकृतिचान्त्रणिपीडयन्निवमारुतः। रुक्षस्योन्नमयन्कुक्षिंतिर्यगूर्ध्वंचगच्छति।।**

मूत्र kshaya lakshana :-

- **मूत्र क्षये बस्तितोदो अल्पमूत्रता च।।** (सु.सू. १५/१५) Decrease of मूत्र causes pricking pain in bladder ans seanty micturition.

According to अ.हृ.सू. ११/२२

- **मूत्रअल्पंमूत्रयेत्कृच्छ्राद्विवर्णांसास्रमेववा।।** Seanty urine, difficulty in passing urine due to pain discoloration of urine, blood in urine.

According to च.सू. १७/७१

मूत्रकृच्छ्र	तृष्णाधिक्यत
मूत्रविवर्णाता	मुखशुष्कता

स्वेद (सु.सू. १५/१५) Kshaya Lakshana

स्तब्धरोमकुपता	स्पर्शवैगुण्य
त्वक्शोष	स्वेदनाश

According to अ.सू. ११/२१

- **स्वेदोरोमच्युतिःस्तब्धरोमतास्फुटनंत्वचः।।**

पुरीष वृद्धि :-

- **पुरीषमाटोपंकुक्षोशुलंच।।** (सु.सू. १५/२०)

According to अष्टाङ्ग हृदय ११/१३

आध्मानआटोपगौरव वेदनाशकृत्

मूत्र वृद्धि :-

मूत्रवृद्धिमुहुर्मुहुप्रवृत्तिबस्तितोदआध्मान

According to- astanga

मूत्रंतुबस्तिनिस्तोदंकृतेअप्यकृतसंज्ञताम्। (अ.हृ.सु. ११/१३)

स्वेद-Vriddi lakshana

स्वेदस्त्वचोदौर्गन्ध्यंकण्डूंच।। सु.सू. १५/२०

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According to- (अ.हृ.सू.११/१४)

अतिस्वेददौर्गन्ध्यकण्डू

चिकित्सा

- Diseases due to पुरीषवृद्धि ⟶ pacified by अतिसारचिकित्साक्रिया
- Diseases due to पुरीषक्षय ⟶ pacified with meat taken from middle part of the body of मेष, अज and intake of यव, माष, राजमाष
- Diseases due to मूत्रवृद्धि ⟶ treated in the lines of प्रमेहचिकित्सा
- Diseases due to मूत्रक्षय treated by इक्षुरस, मण्ड, द्रव, मधुररसअम्ल-लवणरस leads to उपक्लेद
- Diseases due to स्वेदक्षय ⟶ treated through व्यायाम, अभ्यङ्ग, स्वेद
- Diseases due to स्वेदवृद्धि ⟶ शीतवीर्ययुक्तद्रव्य's

Importance

मल also acts as media for elimination process like -

- In विरेचन where the पूरीष acts as media for expulsion of dushta dosha
- In स्वेदन where sweat acts as media for elimination of dosha
- **वृद्धिमलानांसङ्गाच्चक्षयंचातिविसर्गतः।**
- **मलोचितत्वाद्देहस्यक्षयोवृद्धस्तुपीडनः।।** (अ.हृ.सु. ११/२५)

The decrease of mala can be accessed through excess elimination and increase can be identified by undesirable accumulation.

The increase is not considered as trouble as the decrease because the body being accustomed to accumulation of waste products.

6. Hetu, Bheda and Lakshana of Agni Dushti

Agni is the principal component of the body for every physiology. The metabolism, catabolism, transformation, digestion, destruction of toxins all are brought about by agni. In short agni is life, when agni is lost there will be an end of life. Its functions at various levels and intensities bring normal continuity of life.

आयुर्वर्णो बलं स्वास्थ्यमुत्साहोपचयौ प्रभा। ओजस्तेजोऽग्नयः प्राणाश्चोक्ता देहाग्निहेतुकाः।।१।। शान्तेऽग्नौ म्रियते, युक्ते चिरं जीवत्यनामयः। रोगी स्याद्विकृते, मूलमग्निस्तरुमान्निरुच्यते।।२।।

(ca. chi. 15)

As long as agni functions normally inside the body the person continues to live. Normal and optimized property of agni provide good health, life span, strength, nourishment. The goodness of agni is expressed by proper prabha, varna and right functioning of ojus. Ojus gives vyadhikshamatwa, utsaaha and good growth of body with energy. If the functioning of agni is deteriorated, all the goodness in the body will be lost. The body gets open to various diseases and lifc ends due to deterioration.

अन्नस्य पक्ता सर्वेषां पकृणामधिपो मतः। तन्मूलास्ते हि तद्वृद्धिक्षयात्मकाः।।३।।
तस्मात्तं विधिवद्युक्तैरन्नपानेन्धनैर्हितैः। पालयेत् प्रयतस्तस्य स्थितौ ह्यायुर्बलस्थितिः।।४।।

Agni digests the food when in optimum stage. Due to various reasons there may be fluctuation in nature or intensity of agni in the form of vriddi, kshaya or agni vishamata. Therefore to compensate these fluctuation one has to follow proper anna sevana vidhi to maintain agni.

A good agni only can provide energy, good health and long life.

Hetu of Agni Dushti

अत्यम्बुपानाद्विषमाशनाच्च संधारणात्स्वप्नविपर्ययाच्च।
कालेऽपि सात्म्यं लघु चापि भुक्तमन्नं न पाकं भजते नरस्य।।५।।
ईर्ष्याभयक्रोधपरिप्लुतेन लुब्धेन रुग्दैन्यनिपीडितेन।
प्रद्वेषयुक्तेन च सेव्यमानमन्नं न सम्यक्परिपाकमेति।।६।।

Following are the causes of alteration in the intensity, quality and functioning of agni:

1. **Excessive water intake:** Jala is drava guna and sheeta which posses opposite quality of agni. Therefore excessive water intake before and soon after meal is contraindicated.
2. **Untimely food intake:** Agni has its biological time to get intensified. Otherwise it stays latent or inert. Food intake, quantity, quality of food all must be in accordance to agni. Otherwise the quality of agni changes. For example if one takes more food when agni is in less intense then there will be incomplete digestion as the available agni is not sufficient to digest huge or bulk quantityof food. Similarly consuming food before digestion of previous food, late consumption of food all these causes agni dushti.
3. **Vegadharana:** Suppression of natural urge especially kshudha, pipaasa, nidra causes agni dushti.

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4. **Nidra viparyaya:** sleep is body's natural compensatory mechanism to revitalize the body from fatigue and exhaustion. The body needs time for relaxation from continuous work. This is achieved from sleep. Sleep deprivation decreases the quality of agni.
5. Psychological causes like hatredness, anger, fear, grief

Dosha vaishamya causes disease and the same causes agni vaishamya. Long standing disease will also deteriorate the quality of agni.

Classification of Agni Dushti

मन्दस्तीक्ष्णोऽथ विषमः समश्चेति चतुर्विधः। कफपित्तानिलाधिक्यात्तत्साम्याज्जठरोऽनलः।।७।।

There are 4 varieties of agni

1. Mandagni - Dominated by kapha dosha
2. Tikshnagni - Dominated by Pitta dosha
3. Vishamagni - Dominated by Vata dosha
4. Samagni - A normal agni doing proper pachana with the involvement of all the three doshas in samavastha

विषमो वातजान् रोगान् तीक्ष्णः पित्तनिमित्तजान्। करोत्यग्निस्तथा मन्दो विकरान् कफसंभवान्।।८।।

Vishamagni leads to vata vikaras, tikshnagni leads to pittaja rogas and mandagni causes diseases of kapha dosa.

आमं विदग्धं विष्टम्भं कफपित्तानिलैस्त्रिभिः। अजीर्णे केचिदिच्छन्ति चतुर्थं रसशेषतः।।९।।
अजीर्णं पञ्चमं केचिन्निर्दोषं दिनपाकि च। वदन्ति षष्ठं चा जीर्णं प्राकृतं प्रतिवासरम्।।१०।।

The disease caused by agni dushti is primarily named as ajeerna. Ajeerna is a state of abnormal incomplete digestion. This ajeerna causes formation of ama. Ama is moola for all rogas. Ama jeerna, Vidagdhajeerna, Vishtabdajeerna is caused by Kapha, Pitta, Vata respectively 4th variety is Rasasheshaajeerna 5th variety is दिनपाकी अजीर्ण 6th variety is Normal jeerna.

Lakshanas of Amajeerna

तत्रामे गुरुतोत्क्लेदः शोथो गण्डाक्षिकूटगः। उद्गारश्च यथाभुक्तमविदग्धः प्रवर्तते।।१०।।

Amajeerna is dominated by kapha dosha there fore there is incomplete digestion and stasis of food particals. This leads to gurutwa, or fullness. Excessive accumulation of kleda, manifestation of sotha in ganda and akshi koota are present in amajeerna. Due to stasis of food in stomach the udgara smells like that of ingested food

Lakshanas of Vidagdhajeerna

विदग्धे भ्रमतृण्मूर्च्छाः पित्तात्च्च विविधा रुजाः। उद्गारश्च सधूमाम्लः स्वेदो दाहश्च जायते।।११।।

Giddiness, thirst, loss of consciousness and various pittaja lakshanas like osha, chosha. Patient will have sour and fuming sensation in belching, excessive sweating and burnig are features of vidagdhajeerna.

Lakshanas of Vishtabdhajeerna

विष्टब्धे शूलमाध्मानं विविधा वातवेदनाः। मलवाताप्रवृत्तिश्च स्तम्भो मोहाङ्गपीडनम्।।१२।।

Pain and abdominal distension, features of vata prakopa like toda, bedha. Absence of elimination of mala, adhovata due to sthambha or stagnation. Diminished higher mental functions, pain all over body are features of vistambhajeerna.

7. Definitions and Samanya Lakshana of Ama

- परिणामतस्त्वाहारस्त गुणाः शरीरगुणभावमापद्यन्ते यथास्त्वामविरुद्धाः।
  विरुद्धाश्च विहन्त्युर्विहिताश्च विरोधिभिः शरीरम्।। (च.शा. ६/१६)

Digestion is nothing but the process of transformation. During the process of transformation the gunas of ingested aahara should turn homologous with shareera gunas and turn as part of shareera bhavas if they are not having viruddha gunas. If they are viruddha to shareera gunas then they act against dhatus during the process of transformation.

This results in the onset of various abnormal decaying process in the body. This decaying process is nothing but impact of ama production. In the process of digestion pitta takes active roll where as others passive roll. Pitta can be taken as ushma

If ushma diminishes then the undigestion, maldigestion, improper and incomplete digestion, absorption, excretion takes place.

- जाठरेणाग्नि रसः कट्भावेन कृत एव। किंतु धात्वग्निभिरपाकादाम इत्युच्यते।।
  (डल्हण) (सु.सू. १४/३२)

When the food is not digested completely the nutrient remain in large chains or large molecular weights. They are non permissible through villi and hence remain unabsorbed. The undigested diet fibers may pass as loose stools but the dhatwagni mandhya produces biochemical wastes which are non homologous to body, but does not get excreted. This stasis causes various kinds of ailments. The component that stays undigested and non excreted is called as Ama.

दुष्यत्यग्निः, स दुष्टोऽन्नं न तत् पचति लघ्वपि ।अपच्यमानं शुक्तत्वं यात्यत्रं विषरुपताम् ।।
(Ca.Chi. 15/44)

The agni in Koshta will undergo dushti and convert the ingested anna into dushta anna. This type of agni and anna will not undergo further digestion and does not attain finality. This undigested anna will stay in amashaya to undergo fermentation. After this procers the anna attains visharupa.

It is a state where a substance undergo process of paaka or transformation improperly or incompletely without attaining finality; either in the form of catabolism or anabolism. The remnant residual bye product of improper digestion can be names as ama.

ऊष्मणो अल्पबलत्वेन धातुमाध्ययमपचितम्। दुष्टमामाशयगतम् रसमाम प्रच्क्षते। (a.hru.Su13/25)

Pitta which is in ushma roopa attains alpabala and agni diminishes. This results in incomplete digestion. If digestion is not proper or complete the ahara rasa is not produced which causes diminision of adhya rasa dhatu. This undigested improperly digested compound is no more fit for further transformation or absorption. Thus it is called as dushta which stays in amashaya to associate with dosha, dhatu, mala, avayava and produce various diseases. This is called as Ama.

- न तु आमाशयस्थ कायाग्नेर्दौर्बल्यदविपाचितः।
- .....इत्यादिनोक्तः तस्य रोगहेतुतथा आमशयत्वेन च।
- एतवता धातुभूताग्निनां मान्द्यत्वे अनामसम्भवात्।
  शोषवृणविद्रध्यादि रोगाणां तज्ज्यत्वमुक्तं भवति।। (वाचस्पति)

Interpretation of Ama

- Ahaara which is not properly digested. Which is stagneted.
- Annarasa not properly formed in amashaya due to impaired kaayagni
- Imperfectly digested intestinal contents
- Residual aahara rasa after absorption.
- The first phase of dosha dusti or dosa dushhya sammorchana.
- Vrina or vidhradhi until it gets pakwavastha (inflammatory process)

Causes of Production of Ama

1. **Agnimandhya:-** Impaired kayagni, dhatwagni. Agni not merely digests the ingested food but also transforms them into such state where the body has to accept the absorbed food into tissue elements. There may be thousands of

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properties in ingested food but all are converted into single form that is homologous to body. The foreign particles, micro organisms, toxins are all detoxified at every level of the gut. When agni diminis has ama can be produced.

2. Dosha avastha:- state of doshas

समप्रकोपौ दोषाणां सर्वेषामग्निसंश्रितौ तस्मादग्निं सदा रक्षेत्। (Ca.chi.5/156)

1) Vaata:
- Stimulation to nervous system
- Closure and opening of sphincters
- Initiation of peristaltic waves
- Muscular contraction of stomach
- stimulation to glands to secrete secretions
- Absorption of digested material and separation of waste.

2) Pitta : HCL, bile, pancreatic juice, gastric enzyme, salivary enzyme, all that is responsible for breakdown of food partials from complex to simple and homogenous state called Chyme is done by pitta.

3) Kapha: Gastric mucosa to compensate high acidic or alkaline nature of digestive juices and prevent corrosion.

- It also felicities food propulsion by lubrication.
- Change the consistency of food
- Felicitate transportation and absorption
- Thus the dushta avastha of any single above dosha or their combination definitely interrupts the mechanism of digestion.
- Vriddi, kshaya, dushti of doshas may bring up formation of Ama leading to toxic manifestation from the end products of digestion.
- This toxic undigested harmful product leads to agnimandhya and produce Ama.

3. Status of avayava

Structural abnormality of site of digestion- Grahani, amashaya

e.g - stricture of CBD, gallbladder, obstructed gall stones, Ca of head of pancrease, duodenal ulcer, inflammation etc. Any structural or functional disturbance in stomach, duodenum disturbs the normal digestion & results in production of undigested substance.

4. Previous excess accumulation of metabolites

The anabolic and catabolic phenomenon goes on continuously among the dhatus and avayavas. As a result large amount of waste

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products in the form of sthoola and sookshma malas are produced. Every biochemical reaction ends up with byproduct with bio waste which has to be excreted or disposed off regularly and efficiently . If person does vegadharana they remain inside the body which are harmful and toxic taking the form of Ama.

- Stages of Ama :-

अपच्यमानं शुक्तत्वम् यावत्यन्नं विषरूपताम् (च.चि. १५/४४)

Ingested food
↓
Mandagni
↓
Apakwa Ahara rasa
↓
Stasis : as it is unabsorbable & not transportable to next phase
↓
gets shuktatwa on stasis
↓
Ama rasa

combines with dosa to cause disease | **on further stasis**

↓
Ama Dosha

acquires toxicity | getting more shuktatwa, visid on stasis

(Concentrated form)
Ama Dosha
↓
Ama Visha

यथान्नमपि तेनैव अग्निना पक्कममृततां याति अपक्कम् च विषताम्।

Mode of formation & Ama Swaroopa

1. Undigested annarasa will have Dravatwa (fluidity)
↓
Attain Gurutwa + Snigdhatwa

↓

Piccilatwa (increassed viscosity)

↓

(further stasis)

↓

Tantumaya (further increased visidity)

↓

The tantumat anna rasa (ama) does not undergo further transformation. Hence it remains apakwa

↓

Undigested and Asamyukta (non acceptable or does not get combined with any for transformation)

↓

Further increased viscosity & Putrification causing Dourgandya

↓

Fermentation & Putrification

↓

continues to attain Abhishyanda(murtha rupa)

↓

Sarva Shareera sanchara + Combination with avayava

↓

SROTORODHA leading to →VYADHI

Stasis of anna rasa leads to fermentation and increased concentration with impact of time, enzymes, secretions and abnormal chemical reactions. The matter turns unacceptable to tissue ellement. The continuation of stasis causes toxicity. "Thus undigested Annarasa possessing odor with high viscosity causing gatra, shaithilya is called "Ama" which produce-

- Dosha dushti first
- Dhatu pradosha next
- Combine with element and circulates in srotas
- Srotodushti
- Manifestation of vyadhi

Ama can take place in bhootagni level or jataragni level or dhatwagni level.

Location of Ama & Manifestation of Symptoms

1.	Amashaya	Chardi, hrillasa, amlapitta ajeerna, sula, aruchi
2.	Pacchamanashaya	Grahini, sula, adhmana, atopa, alasaka, kaamala
3.	Pakwashaya	Atisara, pravahika, vishuchika, anilamoodata
4.	Asthi Sandhi	Amavata, vata rakta krostuka-sheersha
5.	Twak, Maamsa	Sheetapitta, udardha, kota, kusta, visarpa
6.	Marma	Pakshagata (पक्षाघात), stroke, embolism (shiras)
		Hridroga, pulmonary embolism (hridaya)
		Ashmari, Avila motra (basti)
7.	Sira Dhamani	Dhamani praticaya therosclerosis), varicose veins
8.	Higher mental function	Cerebral hypoxia, poor concentration, lethargy, drowsy, un satisfaction
9.	Respiratory system	Kaphaja kasa, shwasa
10.	Haemopoitic system	Paandu, Kaamala
11.	Reproductive system	Loss of libido, infertility
12.	Muscular system	SLE, rheumatic fever, myopathy

General features of Ama

- **क्षुन्नशो हृदयाशुद्धिः तन्द्राजटर गौरवै दोषप्रवृत्तिर्नो यक्ष्मव्याधिभ्यान्वितं वरेत्** (वन्नासेन २२/५३१) **स्त्रोतोरोध बलभ्रंश गोग्रवानिलमूढताः। आलस्य अपक्ति निष्ठीव मलसंघारुचि क्लमाः।।**

Loss of hunger, unclear chest, lassitude, slow bowel and heaviness, dushti of dosha causes various disease. Absence of dhatu poshana.

Srotorodha : Due to piccila, abhisyandi and tantumat swabhava amd sticks to the wall of circulation and slows down circulation initially. Later on there is manifestation of obstruction. Sroto rodha causes many disease and discomfort.

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Balabramsha : Due to agni mandhya and ama the ahara rasa and adhya rasa dhatu is not properly produced. Due to lack of uttarottara dhatu poshana there is balakshaya or decrease in strength and stamina.

Gourava : Due to stasis of past food in incomplete form, sluggishness in circulation, obstruction of srotas and of doshas, malasanchaya there is increase in heaviness of body along with alsaya.

Anila moodhata : Cala guna of vata gets hyper activated and disoriented.

Apakti : Agni mandhya and presence of previously ingested and undigested food will cause indigestion further. The mixture of such compound leads to abhishyandi and utklesha. This results to nisteevana or excessive salivation.

Agni dushti also causes aruchi, abnormal incomplete stool formation. Absence of nutrition and Accumulation of ama causes klama.

8. Sama and nirama Dosha, Dushya Lakshana

Ama produced in amashaya gets associated with doshas independently or coolectively. This condition is called as Sama doshavastha.

Sama Vata Lakshana

वायु सामोविबन्धो अग्निसादस्तन्द्रान्त्रकूजनैः। वेदनाशोफनिस्तोद क्रमशो अंगानिपीडयन्।।
विचरेद्युगपच्चापि गृह्णाति कुपितो भृशम्। स्नेहाद्यैर्वृद्धिमाप्नोति सूर्यमेघादयो निशि।। (अ.स.सु. २१)

Due to anila moodhata and rookshata there is vibhanada or non excretion of malas and gurgling sound in abdomen. Agni dushti and indigestion continues. Vata in dushta avastha with ama circulates haphazardly and aggressively in srotas. It reaches asthi and sandhi to produce pain, stiffness and swelling. There is aggravation of symptoms if oil massage, or snehana karma is done. It also aggravates during early morning time, cloudy climate and during night hours.

Nirama Vata Lakshanas

निरामो विशदो रूक्षो निर्विबन्धो अल्पवेदनः। विपरीतगुणैः शान्तिं स्निग्धैर्य।

The normal functions of vata are clearly seen, dryness of body,

less pain or less sick symptoms. The quality opposite to vayu that is snehanadi karma can be administered in nirama vata stage.

Saama Pitta Lakshana

दुर्गन्धम् हरितं श्यावम् पित्तम्लम् सरम् गुरु। अम्लीक कण्ठ दाहकरम् साम विनिर्दिशेत्।।

Foul smell from body, oral cavity, feces emerge. The discoloration of stool, vomitus will be green or dark color. There is increase amlata or acidity in the stomach. Stasis of undifested food gives guruta (heaviness). Sour belching, burning epigastrium are features of sama pitta.

Nirama Pitta Lakshana

आताम्रपीतमत्युष्णं रसे कटुकमस्थिरम्। पक्वम् विदग्धम् विज्ञेयं रुचिपक्तिर्बलप्रदम्।।

The normal color of pitta is gained that is peeta varna from harita, haridra varna. Pitta attains its ushmata. Amlata is optimized from excessive sourness. Atiamlata is now replaced by katuta. The accumulated pitta during amavastha starts to move or sarata is achived. Vidagdhata due to ajeerna is repaired by samyak pachana. When pachana is attained aruci disappears. Patient feels ruchi and consumes food. Consumed food is digested normally and this leads to normal dhatuposhana. When there is poshana to the body by dhatus, bala is naturally gained.

Saama Kapha Lakshana

आविलस्तन्तुलः स्त्यानः कण्ठदेशेअवतिष्ठति। सामे बलसो दुर्गन्धो क्षुदुद्गार विघातकृत्।। (मधुकोष)

Kapha turns abnormally sticky, gumy and thready. Such kapha goes to kanta desha (throat or laryngeal region). This produces durgandha of oral cavity and obstruction to hunger reflex (because stomach is full of ama and kapha), obstruction to belching.

Nirama kapha lakshana

फेनवान् पिण्डितः पण्डुनिःसारो अगन्ध एव् च। पक्वः स विज्ञेयश्छेदवान् वक्त्रशुकृित्।।
(मधुकोश व्याख्या)

The hard and dense form of kapha is turned to light and frothy form which is its natural form. It achieves its original mass form, original pale color (mucoid form turns to mucus form) and clear non polluted form. There is clear throat, due to which there is absence of foul smell. Person regains normal digestion and no accumulation or excessive saliva is seen. Thus there is vaktra shuddi.

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Conclusion

- In ahara parinamakara bhavas pridominently agni is essential for paka of aahara, visha, oushada.
- Agnimandya leads to apaka of all above.
- The reminant, residual bye product of improper digestion is Ama
- Ama stasis brings shuktatwa and undergoes putrifaction, combines with body elements.
- Ama with dosa dhatu circulates all over body. Where there is weakest point in the body it stays there to produce disease.
- Ama not only brings disease but also fastens the aging process, decreases immunity, hampers normal wel being.

9. Dosha Paka and Dhatu Paka Lakshana

दोषपाक

It is a form of vyadhi avastha where doshas attain pakwata and reverse to their prakrutavastha with the advent of samagni.

दोषपाक अवस्था : It is a stage favorable to treatment of disease because aama gets separated from doshas.

- दोषप्रकृतिवैकृत्यं लघुताज्वरदेहयोः। इन्द्रियाणांचवैर्मल्यं दोषाणांपाकलक्षणम्। ।(मा.नि.२/६६)

This condition is stated to be nirama stage of dosha as a result, diseases either cures completely or symptoms start diminishing gradually or agitated doshas starts coming towards koshta. It is essential stage of recovery of disease.

During dosha paka, certain symptoms will manifest.

- The symptoms of the doshas involving in the development of disease start diminishing.
- In case there was fever or incresed temperature of affected part, it starte subsiding.
- As the doshas and aama starts separating from dhatus and srotases, the body is releived from heaviness and laghuta or sense of relaxation is produced.
- In the dusta state of doshas and aama, the desire of sense organ to respond to sensation remain depressed, but in the stage of dosha paka, this depression is removed. The sense organ gets refreshed and become ready to respond to the sensation.

धातुपाक

On the contrary dhatupaka is pathological and worsening stage of disease.

- धातुपाकाद्धन्ति, मलपाकाद्विमुञ्चतीतिव्यवस्थितविकल्पः, धातुमलपाकविकल्पेचदैवमेवहेतुः। उत्तरोत्तरोगवृद्धिबलहानिभ्यांशुक्रादिधातुसहितमूत्रादीनांचधातुपाकोज्ञेयः, अन्यथातुमलपाकः; यदुक्तंनिद्रानाशोहृदिस्तम्भोविष्टम्भोगौरवारुचि । अरतिर्बलहानिश्चधातूनांपाकलक्षणम्। ।

(मा.नि. २/६६-७३ (मधुकोश)

धातुपाक & दोषपाक are the two different process responsible for the prognosis of diseases. in dhatupaka the symptoms manifested are sleep deprivation, depression of cardiac activity. sluggishness in circulation and slow eleminination due to abnormal metabolism. the bstasis of metabolic waste produces heavyness and pain in the body. As the dhatus are diseased the poshana karma to the body is absent. hence there is balakshaya.

In dhatu paka all the preceeding dhatus cause increase in symptoms of disease. Due to dhatu paka the poshana to be produced by dhatus are absent. Therefore there is bala hani.

10. Concept, classification, diagnosis and general complications of Avarana

आवरियते देह चैतन्य आवरणे आच्छादन साधन मात्रे। (VACHASPATI)

- The word 'Avarana' means to envelop, to mask, to obstruct, to overlap or to cover.
- Entity which gets obstructed is called Avarya which obstructs the Vata is Avaraka.
- In Avarana process either visible or invisible entities are in Avaraka form.
- Avarya is always invisible i.e. Amoorta Vayu.
- The obstructing entity (Avaraka) will be strong enough to diminish the functions of obstructed entity (Avarya).

Synonyms of Aavarana

- Anvita
- Baddhamarga
- Pratighata
- Samanvita
- Samishraha
- Samyukte
- Samvita
- Uddhuya
- Upastambhita

Charectars of Avarana

''यस्य यस्य कर्मवृद्धिः स आवरको, यस्य यस्य च कर्महानिः स आवृत'' इति।
अतः प्रकोपानन्तरं वायुः आवरणं करोतीति संबद्यते। (जेज्जट च.चि. २८/२१८)

The dosha which enhances its karma is the avaraka, by virtue of which the avruta wil have diminished functioning. So as to say, vata after its prakopa causes avarana.

Pathophysiology of Avarana

धातुक्षयात् इति सारक्षयात्। मार्गावरणेन वेगप्रतिबन्धात् एव कुपितो भवति।
अथ भवतु मार्गावरोधात् वातकोपः, आवरकेण तु पित्तेन कफेन चास्य कथं न संबन्धो भवतीत्याह-वातपित्तेत्यादि। त्रितयमेलकेऽपि वायोः प्रधान्यमाह-वायुरेव हि सुक्ष्मत्वात् इति; सुक्ष्ममार्ग अनुसारितया प्रेरकत्वात्। (चक्र.च.चि. २८/५६-६०)

Dhatu kshaya refers to sara kshaya, there will be vata prakopa due to marga avarana.

Sequele of Avarana

एषां स्वकर्मणां हानिः वृद्धिः आवरणे मता। (च.चि. २८/२१६)

Whenever there is increased or decreased functioning of vata, avarana may be inferred.

Due to overpowering of avaraka dosha, avruta dosha functioning will be limited or reduced, on the other hand, avaraka dosha wil exhibit vriddi lakshanas.

Classification of Avarana

According to	Amoorta	Moorta	Paraspara	Total
Charaka	20	11	11	42
Vagbhata	20	12	10	42

Charaka - 42+5 types of pittakapha (mishra) avarana = 47

1. Anyonya varana (Amurta Avarana) - (20) 12 vata by vata.
2. Samanya avarana (Murta avarana) - (22) vata by pitta, kapha, dhatus, malas & anna.

Doshavrita vata -	2
Doshavrita pancha vata -	10
Dhatwavrita vata -	6
Sarvadhatwavrita vata -	1
Malavrita vata -	1
Mutravrita vata -	1

Annavrita vata - Innumerable (Cha. Chi.28/227, As. Hri.Ni.16/30).

Samanyavarana

1. Pittavruta vata
2. Kaphavruta vata
3. Raktavruta vata
4. Mamsavruta vata
5. Medavruta vata
6. Astavruta vata
7. Majjavruta vata
8. Sukravruta vata
9. Sarva dhatwavruta
10. Annavruta vata
11. Mootravruta vata
11. pittavruta prana
12. pittavruta udana
13. pittavruta samana
14. pittavruta vyana
15. pittavruta apana
16. kaphavruta prana
17. kaphavruta udana
18. kaphavruta samana
19. kaphavruta vyana
20. kaphavruta apana
22. purishavruta vata

Anyoonyavarana

1. Pranavruta udana
2. Pranavruta vyana
3. Pranavruta samana
4. Pranavruta apana
5. Udanavruta prana
6. Udanavruta vyana
7. Udanavruta samana
8. Udanavruta apana
9. Vyanavruta prana
10. Vyanavruta udana
11. Vyanavruta samana
12. Vyanavruta apana
13. Samanavruta prana
14. Samanavruta udana
15. Samanavruta vyana
16. Samanavruta apana
17. Apanavruta prana
18. Apanavruta udana
19. Apanavruta vyana
20. Apanavruta samana

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Lakshanas of Avarana

Avarana	Lakshana	Treatment
Pittavruta vata	Daha,trishna,sula, bhrama, tama,vidaha by taking katu amla lavana ushna and sita kamita	Shitamushna kriya, Jivaniya ghrita, Dhanvamamsa, yava, Shali, Yapana ksheera Basti, Virechana, Panchmoola sidhha ksheera.
Kaphavruta vata	Saitya, gourava, shoola, katvadhyaupashyo, langhanayasa usnakamita	Swedana, niruha, vamana, virechana, tila, purana ghrita, sarshapa
Raktavruta vayu	Daha, arati, pain in between mamsa and tvaka, saraga swaythu.	Vatrakta treatment
Mamsavruta vayu	Kathina vivarna, pidikas and swaythu, harsa, pipeelika sanchara.	Sweda, abhyanga, Rasa ksheera sneha
Medavruta vayu	Chala, snigdha, mridu, sita, sophanga, Aruchi.	Medohara chikitsa and prameha chikitsa
Asthiavruta vayu	Feeling comforte while pressing and hot touch pidana, priking type of pain	Mahasneha
Majjavruta vayu	Vinama, jrumbhana, parivesh tana, shula, Feeling comforte while pressing	Mahasneha
Sukravruta vayu	Avega and ativega, Nisphaltvam	Mahasneha
Annavruta vayu	Shula after intake pf food, during jirana avstha,	Ullekhana, Pachana, Dipana, Laghu ahara
Mutravruta vayu	Apravruti and vsti adhmana.	Sweda, Uttar basti
Vidavruta vayu	Vibandha, parikruntati, anaha, Shuska dukha chirat pidita while defecation, pain in shroni, vakshana and prishta and discomforte in hridaya.	Eranda taila, Snigdha and Udavarta chikitsa

Clinical types of Avarana

1. Avarana of Sama Vata by Vriddha Dosha and or Dooshya
2. Avarana of Vriddha Vata by Sama Dosha and or Dooshya
3. Avarana of Vriddha Vata by Vriddha Dosha and or Dooshya

Diagnosis of Avarana

Diagnosis of avarana can be done by differentiating with the kshaya, vriddhi, gata vata with profound knowledge of lakshanas. It is done by exclusion & reasoning.

Exclusion by Nidana:

E.g.

- Madhumeha - due to avarana. Cha.Su.17/78-79
- Madhumeha - of kevala vatajanya. Cha.Ni.4/36
- Though the disease is of vata there is no vata nidanas or dhatu kshaya.
- But the history of indulgence in nidanas of avaraka is appreciable.

Exclusion by Lakshana

- In kevala vatajanya madhumeha- mootra is kashaya and madhura rasa, pandu in varna.
- In avaranajanya madhumeha- Dhatu kshaya lakshanas are absent in intial stages. (Cha. Su. 17/81)

Exclusion by Upashaya

- The condition of avarana will not respond to upashaya of vata rather he feels sukha with the upashaya of the avaraka.

E.g.

- In pittavruta vata - upashaya is sheeta but not the ushna.
- In kaphavruta vata - upashaya is katu etc & he feels preeti to langhana, aayasa rukshoshna kamita. (Cha Chi 28/61-63)

Upadrava of Avarana

- Hridroga
- Vidradhi
- Pleeha
- Gulma
- Atisara

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Saadhya- asadyata of avarana

- श्लेष्मपित्तावृत प्राण उदान गम्भीर (प्राण जीवन, उदान बलाश्रय)

  Life lies in prana vata, strength in udana.

- परि संवत्सर उपेक्षित आवरण दुरुपक्रम

  Among dhatu avarana medavruta vata is gurutara to treat.

Importance of Avarana

- क्षयं वृद्धि समत्वं च तथैवावरणं भिषक् विज्ञेय पवनादीनां न प्रमुह्यति कर्मसु। (Ch.Chi.28/47)
- The concept of avarana forms the route of pathogenesis for many diseases. It mainly help us to understand the actual samprapti and to do the samprapti vighatana thus helping for treatment.
- Chakrapani has made great effort in better understanding of different configuration of Doshas, Dooshya and Malas in process of Avarana.
- Understanding Avarana will enhance the quality of the treatment in various diseases forms and take to better prognosis.
- Bringing back the doshas from its unmatched marga turning its direction to the prakrita either by increasing or decreasing, optimizing the speed one can regulate doshagati.
- In modern science, doshagati can be measured by sphygmomanometer, Galvanometer, Stethoscope, EEG, ECG, EKG which are expressed in the form of osmotic pressure, threshold, impulse, conduction etc.
- The objective understanding of Doshagati is possible today by using advanced imaging techniques (USG, 3D Doppler study etc.)
- The concept of svamargaharana treatment, pratimargaharana treatment all are built up on Doshagati and Rogamarga.
- The concept of aavarana is not only conceptual and hypothetical but also practically evident.
- If the conventional treatment fails the reconsideration of the case w.r.t avarana has to be made
- Setting of objective parameters for aavarana is a task of challenge.

11. Doshagati and Rogmarga

Introduction

Chalatva or gamana/movement, motility and locomotion is a chief expression of life from unicellular organism to multicellular organism, where gati signifies the presence of life, hence differentiating living from non-living.

Gati is required for sanchara of prana, sanchara of nutrition, sanchara of sanjna, sanchara of mala and such essential factors. The above concept is totally based on doshagati. The doshas are principle aspects of life, if at all gati have to exist.

The doshas travel carrying respective dhathus and corresponding elements along the margas/srotas. Therefore, for the physiological continuity how much doshagati is essential similarly for the vikritotpatti the association of doshagati is mandatory. In whichever marga the vikrita dosha moves that becomes Rogamarga

- गतिर्बहिर्निस्सरणम् तद्वन्ति गतिमन्ति पुरीषादीनि (च.सु. १८/४९)
- मार्गेण गच्छन् (च.वि. ५/९) any thing that moves in a marga is gati
- शरीरगतस्य वातेर्गतिः (अस.नि. १५/३१)

Prakrita Karma of Vata W.R.T. Gati

- प्रवर्तकचेष्टानामुच्चावचानां- Stimulant, initiator of any movement or reflex
- सर्वशरीरधातुव्यूहकर - Projected to all parts of body
- क्षेप्ता बहिर्मलानां - Quality of throwing or oozing
- नियन्ता प्रणेता च मनसः - Connects mind and body
- समीरणो अग्नि - Influences and maintains agni
- सन्धानकरः शरीरस्य - Connects and communicates with various organs and systems. (च.सू. १२)

उत्साहोच्छवास निश्वास चेष्ट धातुगतिः समाः। समो मोक्षो गतिमतां वायोः कर्माविकारजम्।।
(च.सू. १८/४९)

Vata maintains gati of other dosha, other dhatu and body in the optimized form. If there is any change in speed, velocity, pressure, of movement of vata than normal (abnormal gati) then it causes changes in its physiological function leading to disease.

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Causes of Vaikruta Dosha Gati

- Vegadarana
- Srotodushti
  - (a) Atipravritti
  - (b) Sanga
  - (c) Vimargagamana
  - (d) Siragranti
- Dosha Vaishamya– Various doshaavasta (vriddi, kshaya, hrushta, utklesha, leena, pradosha, prakopa)

Classification of Dosha Gati

क्षयः स्थानं च वृद्धिश्च दोषाणां त्रिविधा गतिः। ऊर्ध्वं चाधश्च तिर्यक् च विज्ञेया त्रिविधाऽपरा।।
त्रिविधा चापरा कोष्ठशाखा मर्मास्थि संधिषु। इत्युक्ता विधिभेदेन दोषाणां त्रिविधा गतिः।।
(च.सू.१७/११३)

There are three primary varieties of dosha gati as per charaka.

1. Kshaya (decreased), Stana (normal), Vriddi (increased)- Based on speed.
2. Urdwa (upward), Adha(downward), tiryak (sideward)- Based on direction.
3. Koshta (trunk, abdominal and pelvic organs), Shaka (exposed or external surface of body) Marmasthi sandhi (vital organs, bones and joints- Based on structures.

I. Based on Normalcy-Prakruta Dosha Gati

1. Vata : सर्वा हि चेष्टा वातेन स प्राणःप्राणिनां स्मृतः। तेनैव रोगा जायन्ते तेन चैवोपरुध्यते।।

The cala guna is from vata dosha. All kinds of circulation, locomotion, conduction of normal elements is brought by vata. If the element to be transported is diseased then by doshagati disease can also be carried to other organs or disease can be spread all over

2. Pitta : पित्तादेवोष्मणः पक्तिर्नराणामुपजायते। तच्च पित्तं प्रकुपितं विकारान् कुरुते बहून्।।

The radiation type of gati is done by pitta. Majority of its movement is in association with vata. As pitta is ushma the heat radiation is a method of homeostasis. The heat is produced as result of digestion, breakdown or metabolism. Due to abnormal pitta abnormal metabolism and chemical reaction takes place which does heat imbalence. The abnormal heat can be carried to bring various diseases.

3. Kapha : प्राकृतस्तु बलं श्लेष्मा विकृतो मल उच्यते।
स चैवोजः स्मृतः काये स च पाप्मोपदिश्यते।। (च.सु. १७/११६-११८)

The normal gati of sleshma builds up the body and provides or supplies strength and energy to various cells. Otherwise it causes accumulation of waste in the body.

II. Ritu Bedha Based Dosha Gati

चय प्रकोप प्रशमाः पित्तादीनां यथाक्रमम्। भवन्त्येकैकशः षट्सु कालेष्वभ्रागमादिषु।।
(च.सू. १७/११४)

Chaya, prakopa, prashama of three dosha takes place with respect to six ritus.

III. Based on Abnormality- Vaikruta Dosha Gati

There are 8 kinds of primary varieties of samprapti . Hence there are 8 chapters mentioned in charaka nidana stana, rest of the samprapties are derived from these primary 8 samprapties. It is elaborately explained in charaka chikitsa stana as 30 chapters. Again methodically enormous samprapties can be derived upon it based on permutation and combination of:

a) Doshavasta
b) Doshagati
c) Srotojanya vikriti
d) Sthaana samshraya w.r.t khavaigunya
e) Ashayapakarsha

Types of Dosha Gati (Vriddi, kshaya, sama)

१. वृद्धि

वृद्धिः स्वप्रमाण आधिक्यम्। (अ.हृ.सू. १/१३)

Vriddi is qualitative or quantitative increase of doshas and other elements.

eg: - Vata Vrudhi Laxanas

- .....वृद्दस्तुकुरुतेऽनिलःकार्श्यकार्ष्ण्योष्णकामित्वकम्पानाहशकृद्ग्रहान्।
बलनिद्रेन्द्रियभ्रंशप्रलापभ्रमदीनताः।। (अ.हृ.सू. ११/५-६)

Increased vata causes physical weakness or turns the body lean. Dark color of skin, patients longs to have warm or hot food. Presence of fine to course tremors, abdominal destionsion, dryness of stool and thus constipation, the capisity of sense organ decrease. There will be diminision of higher mental function, therefore irrelevant talk and behavior due to disorientation.

वर्धनम् वृद्धि हेतुः। (अ.हृ.सू. ११/२८)

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२. क्षय

Kshaya is is qualitative or quantitative decrease of doshas and other elements. in this decreased function of respective component is seen. absence of normal performance.

Eg ; pitta kshaya lakshanas.

- पित्तेमन्दोऽनलःशीतंप्रभाहानिः। (अ.ह.सू. ११/१६)

Pitta kshaya causes diminision of agni, diminision in function of vayu, cold and clamy body, loss of complexion.

क्षीणानां प्रकृतिलिंगं क्षय व्यतिरिक्तं विकारकर्तृत्वं नास्तीति दर्शयति।
स्वयमेव दुस्थितत्वात्। (च.सू. १७/६२)
यतो वृद्धो उन्मार्गगामिनो दोषा दूष्योदूषयन्तो ज्वरादीन्कुर्वन्ति न क्षीणाः।।

Vridda doshas can proceed to prakopa of doshas causing to get deviated to other marga than normal. (unmarga gamana) This produce various diseases. But ksheena doshas itself lose its presence and cannot make any disease as the doshas are weak by itself.

Based on direction dosha gati (urdwa, adha, tiryak)

1. **Urdwa gati ; Tendency of doshas moving in upward direction**

Eg; Rakta pitta

Pitta and rakta dushtikara Nidana
↓
Vridhi of drava guna
↓
Increase in volume
↓
As rakta is its ashraya, it goes to raktotpatti stana (yakrit & pleeha)
↓
Both rakta and pitta undergoes dushti
↓
Dushta rakta remains unutilized
↓
Further increase in volume
↓
Increased production of dushta rakta and decreased excretion or utility
↓
Association of Kapha dosha Urdwa gamana of Dosha.
↓
Urdwaga Raktapitta

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2. **Adho gati : Tendency of dosha moving down wards:**

Eg ; Adhoga Amla pitta

Nidana
↓
Pitta dushti
↓
Agnimandya
↓
Pitta vidagdata and Ama formation
↓
Annavahasrotodushti
↓
Apakva anna reaches Adho amashayaVidagda anna as such will get excreted adho pravrutti of vidagda anna
↓
Adhoga amla pitta

3. **Tiryak gati : To in sideward direction**

Eg : Kushta

Ukta nidana
↓
Vatadi dosha prakopa
↓
Utklesha of saptavidha kushta dravyas
↓
Gamanapravritti of kushta dravyas
↓
Obstruction/avarodha of urdva & adho marga (supression of vegas or structural sanga)
↓
Tiryak gamana of dosha
↓
Gets lodged in tvacha
↓
Dushti of other dhathu's like rakta, mamsa etc (stanika dosha dushti)
↓
Mandalotpatti and vaivarnya etc
↓
Kushta

samavasta and pitta is brought back to its normal ashaya. Then symptoms automatically pacify.

Conclusion

- Gati can be self motivated or altered by intervention. Maintaining the speed in gati, direction of gati, pathway of gati is all about maintainence of health.
- Doshas may move in abnormal speed but in normal direction. Eg: high blood pressure.
- Doshas may move in normal speed but in abnormal direction Eg: Urdvaga amlapitta where pitta should move from amashaya to pachyamanashaya thus forward, but instead in amlapitta it moves in upward direction.
- Both speed and direction may be normal but the pathway/ Rogamarga may be altered. Eg: Kushta.
- Bringing back the doshas from its unmatched marga turning its direction to the prakrita either by increasing or decreasing, optimizing the speed one can regulate doshagati.
- In modern science, doshagati can be measured by sphygmo-manometer, Galvanometer, Stethoscope, EEG,ECG, EKG which are expressed in the form of osmotic pressure, threshold, impulse, conduction etc.
- The objective understanding of Doshagati is possible today by using advanced imaging techniques (USG, 3D Doppler study etc.)
- The concept of svamargaharana treatment, pratimargaharana treatment all are built up on Doshagati and Rogamarga.
- The concept of आशयापकर्ष is not only conceptual and hypothetical but also practically evident.
- If the conventional treatment fails the reconsideration of the case w.r.t आशयापकर्ष has to be made.
- Setting of objective parameters for आशयापकर्ष is a task of challenge.

Rogamarga :-

Introduction

Movements of doshas are called as dosha gati. But the channels which they select for their movement and finally settle in new abode is called as Marga. The pathway in which dushta doshas move and carry disease producing agents with them is called as Roga Marga. They are three in number. Generally srotas are the margas. But to understand the sthana of disease it can be catagorised under three divisions

1. Shakha: (external pathway.) Also called as bahya roga-marga
2. Marmasthi sandhi: (middle pathway) Also called as madhyama roga marga
3. Koshta: (Internal pathway) Also called as abhyantara roga marga

त्रयो रोगमार्गा इति-शाखा मर्मास्थिसन्धयः कोष्ठश्च।

Shaka roga marga: The superficial body components or uttana dhatus are part of bahya roga marga. It lies in the most pheripheral or external surface of the body. Rasa and twak, rakta, mamsa dhatus are components of shaka marga. The diseases of shakhamarga are manifested mostly in twak

तत्र शाखा रक्तादयो धातवस्त्वक् च, स बाह्यो रोगमर्गः

Marma asti, sandhi: The middle compartment of body which consists of marma(specially shira, hrudaya, basti), asti, sandhi (musculoskeletal system - muscle, tendon, ligaments, bones, joints) is madhyama roga marga

मर्माणि पुनर्बस्तिहृदयमूर्धादीनि, अस्थिसन्धयो अस्थिसंयोगास्तत्रोपनिबद्धाश्च स्नायु कण्डराः, स मध्यम रोगमार्गः

Koshta marga: This is the inner most compartment of the body. This comprised of all the organs of thorasic, abdominal, pelvic region. Shareeramadhya, Mahanimna, antaraani are synonyms to koshta. Thus it forms abhyantara roga marga.

कोष्ठः पुनरुच्यते महास्रोतः शरीरमध्यं महानिम्नमामपक्वाशयश्चेति पर्याय-शब्दस्तन्त्रे, स रोगमार्गा आभ्यन्तरः।

Diseases pertaining to particular roga marga

Shakaanusari Roga

The diseases of bahya roga marga are:

Ganda (mumps) pidaka (popular rash) alaji (smaller than pidaka) apaci (oozing ulcer) Charmakeela (warts) adhimaamsa (mass formation) mashaka (macula popular rash) kushta (skin diseases), visarpa (eryseples) shwayathu (local oedema), gulma (swelling) arsha (external pile), vidhradhi (abscess). Vyanga (skin discoloration).

तत्र गण्डपिडकालज्यपची चर्मकील अधिमांस मषक कुष्ठ व्यङ्गदयो विकारा बहिर्मार्गजाश्च विसर्प श्वयथु गुल्म अर्श विद्रध्यादयः शाखानुसारिणो भवन्ति रोगाः।

Madyamaroganusari Roga

The diseases pertaining to madhyama roga marga are :

Pakshagata (hemiplegia) paksha graham (hemiparesis), apatanaka (tetanus), ardita (facial palsy), sosha (degenerating diseases) rajayakshma (depleting disease) asti sandhi shoola (arthralgia) gudabramsha (prolopse rectum) diseases of shiras and basti.

पक्षवध ग्रह अपतानक अर्दित शोष राजयक्ष्म अस्थि सन्धिशूल गुदभ्रंशादयः।

Koshtanusari Roga

The disease pertaining to inner most compartment of the body is called as abhyantara roga marga. They are: jwara (fever) atisaara (diarrhea) chardi (vomiting), alasaka (stagnant compound of ama) vishuchika (cholera) kasa, (cough) shwasa (dyspnoea) hicca (hiccups) anaha (abdominal distension) udara (ascitis) pleeha (spleenomegaly) visarpa (erysepeles) shwayathu (local oedema), gulma (swelling) arsha (pile), vidhradhi (abscess).

ज्वरातिसार च्छर्दि अलसक विसूचिक कास श्वास हिक्का आनाह उदर प्लीहादयो अन्तर्मार्गजाश्च विसर्प श्वयथु गुल्म अर्शोविद्रध्यादयः कोष्ठानुसारिणो भवन्ति रोगाः।

12. Detailed study of Srotomoola and Srotodushti Samanya andVishishta Hetu Lakshana of all Srotas, Differences between Sroto Dushti and Kha Vaigunya

ntroduction

The physiological and anatomical pathways that carry all the mponents, elements, signals, reflexes come under srotas. In some ntexts the srotas can be traced anatomically and hence understood s channels or passages eg: annavaha srotas, pureeshavaha srotas. Whereas in some anatomical traces may not be found instead they re identified by physiological pathways eg: manovaha srotas, wedavaha srotas. Every srotas has one ugama sthana or moolasthana om which transportation or transmission begins and one prabhava sthana from which the transported matter finally reaches its destiny. Srotas carry dosha, dhatu, upadhatu, mala in it. Therefore dosha ushti can produce srotodushti and vice versa.

efinition

स्रवणात् स्रोतान्सि। (च.सू. ३०/१२)

It is the path which helps for transformation of substance.

स्रोतांसि खलु परिणामम् आपध्यमानानाम् धातूनां अभिवाहिनि भवन्त्ययनार्थेन। (च.वि. ५/३)

मूलात् खातान्तरम् देहे प्रस्तुतम् तु अभिवाहियत् स्रोतस्तदिति विज्ञेयम् सिरा धमनि वर्जितम्। (सु.शा. ९/९३)

Channels which carry the transformed dhatus to different destinations through the network to nourish the cells and tissues.

Srotas is defined as empty spaces spread to entire body which originates from root space except sira and dhamani.

roto Paryaya

स्रोतांसि सिराः धमन्यः रसायन्यः रसवाहिन्यः नाद्यः पन्थनः मार्गाः शरीरच्छिद्राणि-संवृतासंवृतानिस्थानानि आशयाः निकेताश्चेति शरीर धात्वावकाशानां लक्ष्यालक्ष्याणां नामानि भवन्ति।। (च.वि. ५/९)

Srotamsi, sira, dhamani, rasayani, rasavahi, nadya, panthana, margasareera chidrani, samvruta asamvritani, sthanani, ashaya, niketha based on the context and element that is carried inside srotas, apt term for srotas is used.

Structure of Srotas

imp

- अहित सेवनात् तानि दुष्टाय रोगाय विशुद्धानि सुखस्य च । (अ.ह.शा. ३/४२)

Orifices of the srotas are minute spreaded long and far away like lotus stalk. Through such channels 'rasa' circulates and nourishes cells and tissues.

Sroto Pramukhyata / Importance -

imp

- अहित सेवनात् तानि दुष्टाय रोगाय विशुद्धानि सुखस्य च। (अ.ह.शा. ३/४२)

Improper foods, erratic behaviour and such other things which are not conducive to the body brings abnormality in srotas leading to manifestation of disease. Adoptance of normal foods and actions leads to happiness and sound health.

- वातपित्तश्लेषमाणां पुनः सर्व शरीर चराणां सर्वाणि स्त्रोताम्सि अयन भूतानि तद्वदतीन्द्रियाणां पुनः सत्वादिनां केवलं चेतनावतच्छरीरमयनभूतमधिष्ठानभूतं च।
  तदेतत् स्त्रोतसां प्रकृति भूतत्वान्नविकारैरूपसृज्यते।। (च.वि. ५/७)

The doshas vata, pitta and kapha moves inside the srotas to perform their normal functions at different places similarly things which are beyond perception of sensory organs like mind etc. move inside the srotas and are located in each part of the body. Healthy srotases perform their normal functions as a result body is free from diseases and unhealthy srotas become root cause for the development of pathogenesis.

Sroto Bheda

Srotas : Bahya and Abhyantara

1. According to Susruta

Srotas :– Bahya-Male- 9; Females- 12; Abhyantara- 11 pairs

2. According to Sarangadhara

Bahya Srotas- Male- 10, Female- 13

3. According to Charaka

Abhyantara Srotas- 13 in Number.

Bahir Mukha Srotas

Nasal cavity- 2
Ear path- 2
Eye opening- 2
Genital path-I
Anal canal- 1
Oral cavity- 1

Total nine channels are described as bahir mukha srotas.

Sarangadhara included one more to above nine ie, mastaka randra (brain canal)

In case of female three more srotas are included.

Breast channels- 2

Uterus path- 1

Abhyantara Srotas

According to Charaka

1. Pranavaha Srotas
2. Udadavaha Srotas
3. Annavaha Srotas
4. Rasavaha Srotas
5. Rudiravaha Srotas
6. Mamsavaha Srotas
7. Medovaha Srotas
8. Asthivaha Srotas
9. Majjavaha Srotas
10. Sukravaha Srotas
11. Mutravaha Srotas
12. Pureeshavaha Srotas
13. Swedavaha Srotas

According to Susruta

1. Pranavaha Srotas
2. Udakavaha Srotas
3. Annavaha Srotas
4. Rasavaha Srotas
5. Rudiravaha Srotas
6. Mamsavaha Srotas
7. Medovaha Srotas
8. Sukravaha Srotas
9. Mutravaha Srotas
10. Pureeshavaha Srotas
11. Artavavaha Srotas

Sroto Dushti Prakara

- Atipravrutti– Excessive action
  Eg:- excessive urination - prameha
  excessive watery stools - atisara
- Sanga- Excessive Obstruction
  Eg : - jwara
- Sira Granthi– Tumurs inside the srotas or new growths tortuous vessels.
  Eg :- arsas
- Vimarga gamanama– Leaving its own path and entering into other path.

Avitech

Eg :- entrance of mala into mutra marga

Sroto Vidda Laxana (A.H.Sar. 3/47)

Clinical features that develops due to injury to srotas are called as vidda. Their lakshanas are unconsiousness, tremors, distention of sabdomen, vomiting, fever, delirium, obstruction of urine and stool and even leads to death. That is why it is said that physician should inform to the attender about its poor prognosis and then plan the treatment and manage the wounds as per its treatment.

1. Pranavaha Srotas

Pranavaha Sroto Moola : प्राणवहानां स्रोतसां हृदयंमूलं महास्रोतश्च

- Charaka-The channels which carry prana vayu are originated from hrudaya and mahasrotas (GIT)
- Susruta-They are two in number

  It originates from hrudaya and rasa vahini dhamani - प्राणवहे द्वे तयोर्मूलं हृदयं रसवाहिन्यस्य धमन्य:।

Dushti Nidana

क्षयात् संधारणात् रौक्ष्यात् व्यायामात् क्षुधितस्य च। प्राणावाहिनी दुष्यन्ति स्रोतस् अन्यैश्च दारुणै:।

- Decrease of dhatus
- Suppression of natural urges
- Intake of dry food
- Doing exercise when one is feeling hungry
- These causes dusthi & malfunctioning of pranavaha srotas

Laxana According to Charaka

तत्र प्राणवहानां स्रोतसां हृदयं मूलं महास्रोतश्च प्रदुष्टानां तु खल्वेषामिदं विशेषविज्ञानं भवति तद्यथा–अतिसृष्टमतिबद्धं कुपितमल्पमभीक्ष्णं वा सशब्दशूलमुच्छ्वसन्तं दृष्ट्वा प्राणवहान्यस्य स्रोतांसि प्रदुष्टानीति विद्यात् (Ca. ni. 5/8)

- Prolonged respiration
- Obstructed respiration
- Short breath with increased frequency
- Loud respiration associated with pain, overall respiratory distress.

Viddha Laxana According to Susruta

- Injury to pranavaha srotas leads to groaning
- Bending down of body

- Illusion
- Giddiness
- Tremors
- Ultimately leads to death

Pranavaha Sroto Vikara

- Kasa
- Svasa
- Hridroga
- Rajayakshma
- Swarabheda

The Cardio Vascular System :-

It is the system of heart and blood vessels that circulates blood through out the body.

The blood circulating the body transports nutrients and oxygen to the tissues and removes Co_2 and waste products from the tissues.

Heart is the central pump and blood vessels the series of distributing and collecting tubes.

CVS constitute one of the major coordinating and integrating systems of the body.

Heart

It is a muscular organ that pumps blood through out the circulatory system.

Its situated in between two lungs in the mediastinum

Its made up of two atria and two ventricles.

The force of contraction of heart depends up on muscles of heart.

Layers of Walls of Heart

- Outer pericardium
- Middle myocardium
- Inner Endocardium

Right Side of Heart

Right side has upper atrium and lower ventricle.

Right atrium is a thin wall and low pressure chamber

It has a pace maker known as sino atrial node that produces cardiac impulses and atrio ventricular node that conducts the impulses to ventricles.

It recieves deoxygenated blood through two large veins

A. Superior venacava that returns the blood from upper parts of the body.

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B. Inferior venacava that returns blood from lower parts of the body

- Right atrium communicates with right ventricle through tricuspid valve.
- From right ventricle pulmonary artery arises which carries blood from right ventricle to lungs.
- In the lungs the blood is purified(oxygenated)

Left Side of Heart

- Left side of the heart has upper left atrium and lower left ventricle
- It is thin walled and low pressure chamber.
- Left atrium recieves oxygenated blood from lungs through pulmonary veins.
- This is one of the exception in the body where we can see artery carry deoxygenated blood and veins carry oxygenated blood.
- Blood from left atrium enters left ventricle through bicuspid valve.
- Left ventricle pumps oxygenated blood to different parts of the body through aorta.

The Respiratory System:-

- It can be divided into upper and lower respiratory tracts
- Functionally it can be divided into conducting and respiratory portion.
- The conducting portion consist of a series of inter connected tubes that circulate air through, nose, pharynx, larynx, trachea, bronchi and bronchioles till terminal bronchioles
- The respiratory zones consist of alveolar ducts, alveolar sacs and alveoli that take part in gaseous exchange.

Bronchial tree

- The trachea divided into right and left bronchi
  Primary bronchus (2 to left and 3 to right)
  Secondary bronchus
- Tertiary bronchi
  Bronchioles
  Terminal bronchioles
  Respiratory bronchioles
  Alveoli

ew Pathological Condition

ronchiectasis

Persistent and irreversible dilatation and distortion of medium zed bronchi by more than 2 mm. Types are cylindrical, saccular, ricose and fusiform. Clinical features includes persistent, recurrent ough and large quantity of purulent sputum production; aemoptysis; persistent coarse leathery crackles with or without onchial breathing. Clubbing of fingers and toes present.

opd (Chronic obstructive pulmonary disease)

It is characterized by airflow limitation that is not fully eversible. Usually both progressive and associated with an abnormal nflammatory response of the lungs to noxious particles or gases. Diagnosed by cough, sputum production, dyspnoea, ,H/O exposure to risk factors for the disease.

Emphysema

It is defined as distension of the air spaces distal to the terminal bronchiole with destruction of alveolar septa. Types include centriacinar, panacinar, paraseptal and irregular.

Bronchial Asthma

It is an inflammatory disease of the small airways, characterized by episodic, reversible bronchial obstruction due to hyper responsiveness of tracheobronchial tree to a multiplicity of intrinsic and extrinsic stimuli manifested clinically by paroxysms of polyphonic wheeze, dyspnoea and cough which may be relieved spontaneously or as a result of therapy.

2. Udakavaha Srotas :-

- Udaka– Jala, ambu, vaari, salila, water
- Vaha– Carrying, bearing, bringing, flowing
- Srotas– Channel, stream, processing
- Udakavaha srotas is the one which carry or controls the water in the body tissues

Definition

- The channel, passage or duct which transport the liquid substance of the body from one place to other for development and nourishment of the body.

Synonyms

- Ambuvaha
- Jalavaha

Mula

- उदकवहानांस्रोतसांतलुमूलंक्लोमं च। (च.वि. ५/८)

  Udakavaha srotas mula are taalu and kloma

- उदकवहेद्वेतयोर्मुलंतालुक्लोम च। (सु.स. ९/१२)

  Udakvaha srotas originate from talu and kloma

Dusti Karana

- औष्ण्यादामादभयात्यानदतिशुष्कान्नसेवनात्। अम्बुवहिनिदुष्यन्तिन्नुष्णाश्चतिपिडनात्।। (च.वि. ५/१२)

Udakvaha gets vitiated by exposure to heat, indigestion, fear, encess intake of alcohol, excess intake of dry food and who is suffering from excessive thirst.

Dusti Lakshana

- प्रदुष्टानांतुखल्वेषमिदंविशेषविज्ञानं भवतिः तध्यताजिह्वातल्वोष्ठक्लोमशोषपिपा प्रन्नुध्दांदुष्टोदकवहान्यस्यस्त्रोतांसिप्रदुष्टानितिविध्यत्। (च.वि. ५/८)

Characteristics of udakvaha srotus are dryness in tongue, palate, lips and kloma along with excessive severe thirst.

- तत्रविद्दस्यपिपासासध्योमरणंच।

  Injury to udakavaha srotus develops thirst and patient dies instantaneously.

Vikara

Trushna, Shopha, Prameha

Water Balance in the Body

Decreased water content gives Stimulation to thirst center. Osmoreceptors in hypothalamus answers the reflex and express to increase water intake. On the other hand Increased ADH secretion from post pituitary orders to increase water retention by kidney to conserve normal water content.

Hypothalamus regulates water content of the body by two mechanisms.

Thirst Mechanism

- Thirst center present in lateral nucleus if hypothalamus
- There are some osmorecepters in the areas adjacent to thirst ceter

- When the ECF volume decreases the osmolality of ECF increases.
- If the osmolarity increases by 1-2% the osmoreceptors are stimulated.
- Osmoreceptor in turn activate the thirst center thirst sensation is initiated now person feels thirsty and drinks water.
- Water intake increased ECF volume and decreases osmolality.

ADH mechanism

- When the volume of ECF decreases with increased osmolality the supra optic nucleus is stimulated and ADH is released.
- ADH causes retention of water by facultative re absorption in the renal tubules. It increases the ECF volume and brings the osmolality to normal level.

Pancreas

- Histology of pancreas-

  Made up of small clusters of glandular epithilial cells.

  About 99% of the cluster called acini constitute exocrine portion of the organ these secrete pancreatic juice.

  1% of the cluster called pancreatic islets from the endocrine portion of the pancreas these secret glucogon, insulin, somatostanin and pancreatic polypeptide.

- Role of insulin and glucogon-

  Insulin decreases blood sugar level it is the only antidiabitic hormone available in the body.

  Glucogon increases blood sugar level.

What are Talu and Kloma

- Talu can be considerd as palate because the description of structure of talu resembles to palate exatly.

  But kloma is the very controversial organ

- By seeing various reference we can tell that kloma the pancreas.
- Acharyas like charaka, vagbata, bela and kashyap have consider kloma as koshtanga therefore it should found in trunk that is thoracic or abdominal cavity.

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By considering above view we can tell that kloma not present in head and neck.

Some classical references

- तस्यवामपार्श्वेप्लिहाफुफ्फुसदक्षिणतोयक्रुत्क्लोमच।। (अ.स.शा. ५/७१)

  Tells about hrudaya which arises from the prasada bagha of rakta. In left lateral is pleeha and lung are present and in the right we have yakrut and kloma.

- तस्याधोवामतः प्लीहफुफ्फुसाश्च दक्षिणतोयक्रुत्क्लोमच। (सु.शा. ४/३०)

  This shloka explains kloma present below hrudaya to left pliha and pupusa to the right kloma and yakrut.

- कालखण्ड (यक्रुतादधस्तात्) स्थितंदक्षिणपार्श्वस्यंतिलकमितिप्रसिद्धम्।
  अधस्तुदक्षिणभागोहृदयात्क्लोमतिष्टति। (डल्हण सु.नि. ९/९८)

  Kloma is the one which is present below the yakrut and which has shape of tila. Situated in right side below hridaya.

- By seeing all the references we can conclude that kloma is nothing but the pancreas.

3. Annavaha Srotas :-

Channels carrying अन्न is called as अन्नवहस्रोतस्

- अन्नवहानां स्रोतसो आमशयोमूलम् वामम् च पार्श्वम्। (च.वि. ५/८)

  चरक considered the मूल of अन्नवहस्रोतस् as- आमाशय and वामपार्श्व; stomach and left side of Abdomen.

- अन्नवहेद्वेतयोर्मुलम्आमाशयोअन्नवाहिन्यश्चधमन्यः। (...९)

  सुस्रुत told अन्नवहस्रोतस् are two in number and their मूल as आमाशय and अन्न वाहिनी धमनि।

निदान

- अतिमात्रस्य च अकाले च अहितस्य च भोजनात्।
  अन्नवाहिनिदुष्यन्तिवैगुण्यात्पावकस्यच।। (....५)

  अतिमात्र आहार - Excess intake of food
  अकाल आहार - Eating during improper time
  अहित आहार - Consumption of unwholesome food
  वैगुण्यात्पावकस्य- Due to dushti of agni.

According To Modern Science : Stomach (आमाशय)

- A muscular bag forming the widest & most distensible part of the digestive tube.

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Dr. Hemant Kumar Maurya

- Connected above to the lower end of the oesophagus & below to the duodenum.
- Acts as a reservoir of food & helps in digestion of carbohydrates, proteins & fats.

Location

- Lies obliquely in the upper & left part of abdomen.
- Occupying epigastric, umbilical & left hypochondric region.

Shape & Size

- When empty - J shaped
- When partially distended - pyriform in shape
- In obese persons - more horizontal
- 25 cm long
- At birth- 30 ml capacity

External Features

- Stomach has 2 orifces
- 2 curvatures or borders
- 2 surfaces

Layers of Stomach

- Wall of the stomach is formed by four layers-

  Outer serous layer
  Muscular layer
  Submucus layer
  Inner mucus layer

  Serous Layer– formed by peritoneum which covers the stomach except at the lesser and greater curvatures.

  Muscular Layer– made up of three layers of smooth muscle fibres-

  Inner oblique, middle circular, outer longitudinal

  Submucous Layer– Formed by areolar tissue, blood vessels, lymph vessels and Messner's nerve plexus.

  Inner Mucous Layer– Lined by mucus secreting columnar epithelial cells, gastric glands are situated in this layer.

Glands of Stomach

- Glands of stomach are gastric glands
- These are tubular structures made up of different types of cells
- Open into stomach cavity through gastric pits

Classification of Gastric Glands

- Fundic glands
- Pyloric glands
- Cardiac glands

Secretory Functions of Cells in Gastric Glands

- Chief cells
- Parital cells
- Mucus cells
- G cells
- Enterochromaffin cells
- Enterochromaffin like cells

Secretory Products

- Pepsinogen,renin,lipase,gelatinase,urease
- HCL, intrinsic factor
- Mucin
- Gastrin
- Serotonin
- Histamine

Functions of Gastric Juice

- pepsinogen $\xrightarrow[\text{to}]{\text{breaks}}$ pepsin

  pepsin - activated form, proteolytic enzyme
- Proteins $\xrightarrow[\text{to}]{\text{breaks}}$ proteases+peptones
- Gastric lipase- lipolytic enzyme

  Tributyrin (butterfat) $\xrightarrow[\text{to}]{\text{breaks}}$ fatyacid+glycerols
- Gelatinase degrades Type 1 & Type 5 gelatin & Type 4 & 5 collagen into peptides
- Urase- urea $\xrightarrow[\text{to}]{\text{breaks}}$ ammonia
- Gastric amylase degrades starch
- Renin- curdles milk, only in animals

Functions of HCL

HCL present in gastric juice-

- Activates pepsinogen into pepsin
- Kills some of the bacteria entering the stomach along with food substances. This action is called bacteriolytic action.
- Provides acid medium which is necessary for the action of hormones.

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bdominal Aorta (वामपार्श्व)

- It is a region of descending aorta , originating superiorly as a ***continuation of Thoracic aorta,*** as it passes through an opening in diaphragm & terminating inferiorly as the abdominal aorta bifurcates into left & right common iliac arteries.
- It is a large lumened , unpaired arterial vessel that is a part of the main trunk of the systemic arterial system.
- As such the abdominal aorta supplies oxygenated blood pumped by the left ventricle of heart, to the abdominal & pelvic organs & structures via visceral & parietal arterial branches.
- The abdominal aorta & its major arterial branches are highly elastic.
- During systole the aorta & arterial walls expand & accommodate the increased blood flow.
- Correspondingly, the vessels contract during diastole & elastin fibres assure that this contraction also serves to drive blood through the arterial vessels.
- As the thoracic aorta passes through the aortic hiatus it becomes abdominal aorta.
- The abdominal aorta , ultimately branches into lft & rt common iliac arteries.
- The common iliac arteries then branch into internal & external iliac arteris to supply oxygenated blood to the organs & tissues of the lower abdomen, pelvis & legs.
- Major branches of the abdominal aorta include the coeliac branches & superior & inferior mesentric arteries.
- On the dorsal side of the aorta are the lumbar & median sacral branch arteris.
- Lateral to the aorta are the inferior phrenic, middle suprarenal, renal & ovarian or testicular arteries.
- Bcoz the branches from the abdominal aorta are large, the aorta rapidly decreases in size as it courses downward through the abdomen.
- The coelic trunk divides into 3 major branches;

Left gastric artery to stomach

Hepatic artery to lobes of liver

Splenic artery to -surrounded by a plexus ofnerves that ultimately Terminates in branches

Entering the hilus of spleen.

Superior mesentric artery

- Supplies oxygenated blood to small intestine below the duodenum & portions of the caecum & colon

Branches

Inferior pancreatoduodenal artery, jejunal & ileal branches, ileocaecal artery & right & middle colic arteries.

Inferior mesentric ar Supply the transverse colon, descending colon & rectum.

Branches: left colic artery, the sigmoid arteries

अन्नवहस्रोतोदुष्टिलक्षण

- प्रदुष्टानामुखल्वेषामिदमिदम्विशेषविज्ञानम्भवति। तथ्यथाअनन्नभिलाषम्अरोचकम्अविपाकोछर्दिंच। दुष्ट्वाअन्नवहान्यश्चस्रोतांसिप्रदुष्टानिनिविध्यात्। (च.वि. ५/८)

अनन्नभिलाष- Lack of interest towards food — अरुचि - Tastelessness

अविपाक - Indigestion — छर्दि - Vomiting

अन्नवहस्रोतोविद्दालक्षण

- तत्रविद्दस्यआध्मनाश्शुलोअन्नद्वेषछर्दिः पिपसस्आन्ध्यम्मरणम्च। (सु.शा. ९/२)

शुल – Pain in abdomen — आन्ध्य – Blindness

अन्नद्वेष – Lack of interest towards food — मरण – Death

छर्दि – Vomiting — पिपास – Thirst

अन्नवहस्रोतोदुष्टिविकार

- छर्दि
- अतिसर
- अजीर्ण
- अग्निमान्ध्य
- क्रिमि
- अरोचक
- गुल्म
- मुखरोग
- अम्लपित्त
- विसुचिक
- विलम्बिक

4. Rasa Vaha Srotas :

Introduction

Rasa is the first dhatu among the seven dhatus to be formed from the ahaara . The main function of Rasa dhatu is the nourishment

of tissues. Hence it could be understood that, it is present in each and every part of the body. That is why its function have been told as a rasa.

Of the seven Dhatus, Rasa & Raktha Which have the function of Preenana & Jeevana karya's are continuously ejected into circulation by the Hridaya.

रस निरुक्ति

रस गतौ धातुः, अहरहर्गच्छतीत्यतो रसः।। (सु.सू. १४/१३)

The word rasa is derived from the term 'ras' means movement, since it is moving constantly it is called rasa. Ahar Ahar Gachati, if this character has to be fullfilled in the body only one organ can satisfy it i.e. Hridhaya, which never stops till the deathof the person. That's why Acharyas haveconsidered the Hridhaya as Moola of Rasa vaha Srotas. Rasa is the first and earlier part of garba, formed from ahararasa of the mother and circulates in hridaya and siradhamanies repeatedly in a cyclic manner.

यत् सादमादौ गर्भस्य यत् गर्भ रसात् रसः। संवर्तमानं हृदयं समाविशति यत् पुराः।।
(Ch.Su. 30/10)

Rasa Swabhava

- स खलु द्रवानुसारी स्नेहन जीवन तर्पण धारणादिभिर्विशेषैः सौम्य इति अवगम्यते।
(सु.सू. १४)

1. Dravanusari 2. Saumya (jalatatvatmak/kaphamaya)

Moola Sthana of Rasavaha Srotas

- रसवहाना स्रोतसां हृदयं मूलं दश धमन्याः।। (च.वि. ५/८)
- रसवहे द्वे, तयोर्मूलं हृदयं रस वाहिन्यश्च धमन्यः।। (सु.शा. ९/२१)

The moola of rasavaha srotas is hridaya, dashadhamani, rasavaha dhamani. It has been said by Sushruta that the word Dhamani, has to be related with Arteries only. As we have seen previously the circulatory system starts with Arteries continues as Capillaries and ends inVeins. So the structures before Capillaries can be considered as Rasavahini Dhamanis.

1. Hridaya

- हृदस्ताः हृदय संबद्धाः।
- रसवतादि मार्गाणां सत्वबुद्धिन्द्रियात्मनाम्।
प्रधानस्यौजसश्चैव हृदयं स्थानमुच्यते।। (च.चि. २४/३५)
- रस वातादिवहनां हृदयं स्थानम्। (चक्रपाणि)

Ayutech

- शोणित कफ प्रसादजं हृदयं– यदाश्रयाहि धमन्यः प्राणवहा (सु.शा. ४/३१)
- Hridaya as one among pranayatana.
- As pratyanga and koshta.
- As madyama rogamarga.
- As matruja bhava.
- As trimarma.
- As chetanadhishtana.

2. Rasavahavaha Dhamani and Dasa Dhamani

रसवाहनं कुर्वन्ति धमन्यः सततं तथा। (सु.शा.)
रसवहधमनीनां तु हृदयं स्थानं, तदुपघाताच्च मोह उपपन्न एव। (च.सू. २४/२५)

हृदय दश धमनी

- दशमूल सिरा हृत्स्ताः सर्वं सर्वतो वपुः। रसात्मकं वहन्योजस्तन्निबद्धं हि चेष्टितम्।। (अ.ह.शा. ३/१८)

There are 10 important siras in our body in relation to hridaya. It transports rasa to all angapratyangas in our body. All the cheshtas of the body are taken care by these siras.

The Circulatory System

Transports substances including oxygen, nutrients and wastes to and from cells responding to changing demands by diffusion (from high to low concentration along concentration gradient). Humans have a closed circulatory system. (cardiovascular system).

The human circulatory system consists of:

- The heart
- A series of blood vessels
- Blood that flows through

Types of Circulation

- Pulmonary circulation = from right side of the heart to lungs where carbon dioxide leaves the blood and oxygen is absorbed
- Systemic circulation = from left side of the heart to organs
- Coronary circulation = through heart tissue

Blood Vessels- They are network of tubes

Arteries: arterioles move away from the heart

- Elastic Fibers
- Circular Smooth Muscle

Capillaries: where gas exchange takes place.

One cell thick
- Serves the Respiratory System

ins: Venules moves towards the heart

Skeletal Muscles contract to force blood back from legs

od: Composed of plasma and blood cells

pes of Cells are:

Red Blood Cells
- White Blood Cells

Platelets

Plasma: they are straw yellow colored fluid that is mixed with lood. It contains 90% of water and 10% of elements. The elements are Organic, inorganic elements and dissolved gases.

Organic elements - albumin, globulin, fibrinogen, prothrombin

Inorganic elements - calcium, potassium, magnesium, sodium, iron, zinc

Gases- oxygen, nitrogen, carbon dioxide.

Others like:

- Glucose
- Amino acids
- Proteins
- Minerals
- Vitamins
- Hormones
- Waste materials like urea.

Lymphatic system: It is the One way system to the heart. There is Return of collected excess tissue fluid and Return of leaked protein

- "Lymph" is this fluid
- Edema results if system blocked or surgically removed
- Transports dietary lipids- Lymphatics vessels transport lipids and lipid soluble vitamins (A, D, E and K) absorbed by the gastrointestinal tract.
- Carries out immune response.

Sequence of lymph formation-

↓

Fluid flow in the blood capillaries

↓

Interstitial spaces (interstitial fluid)

↓

Lymphatic capillaries

↓

Lymphatic vessels

↓

Lymphatic ducts

Junction of internal jugular and subclavian vein

Absorption of nutrients in GI– 90% of all absorption of nutrients takes place in the small intestine. Absorption of Monosaccharides, Absorption of Amino acids, dipeptides and tripeptides, Absorption of lipids, Absorption of electrolytes (Caloium ions, iron, potassium, Magnesium and phosphate- active transport) Absorption of vitamins, Absorption of water takes place via osmosis.

Hepatic Portal Circulation:

- Carries venous blood from the gastro intestinal organs and spleen to the liver.
- After a meal hepatic portal blood is rich in nutrients absorbed from the gastrointestinal tract.
- Liver stores some of them, modifies others (converts glucose to glycogen) before entering into the general circulation.
- The superior mesenteric and splenic vein unite to form the portal vein.
- In this way liver receives nutrient rich deoxygenated blood which gets mixed with oxygenated blood from hepatic artery in sinusoids of liver and then bloods leaves the sinusoids through hepatic veins, which drains into inferior venecava.

दश धमनिs can be taken as

1. Superior Vena cava
2. Inferior Vena cava
3. Rt & Lt Pulmonary Arteries
4. Pulmonary Veins (4),
5. Aorta
6. Coronary Sinus.

The explanation of Dhamanis, Srotas, Siras, indicating that these ten vessels are initially ten Dhamanis, & its branching behave as Srotas. This provides nutrition to nourish Dhatus. Siras are the channels which collects metabolic waste products from tissue back to circulation. It can be concluded that, anatomically Rasavaha srotas along with its moola can be correlated to Circulatory system. Rasa is all the components of food like protein, carbohydrates, fat, mineral,

tamines which are present in the plasma as a whole i.e., erystructure can be nourished by rasa and all dhatus can be formed om rasa dhatu tonly.

Continuous nourishment is necessary for the tissues by the pply of prana and rasa for the sustenance of life. For this hridaya the only sthana which plays a role as moolasthana for rasa and anavaha srotus. The difference between Caraka and Sushruta in asa vaha srotas moola sthana is Rasavahinya Dhamanis and Dasha hamanis respectively.

The blood vessels which carry blood and nurients like hepato ortal system with its tributaries, lymphatic vessels, the venacavas nd umbilical vein can be considered as rasavaha srotas.

In short, prana and rasa are 2 essential nourishment factors volved in growth of other dhatus, as they circulate in a closed rcuit, where they nourish all other dhatus.

The second moolasthana mentioned is rasavahi dhamani ccording to susruta, by which it is very clear that prana ,rasa and kta move together through dhamani that is facilitated by heart hich is nothing but circulatory system.

रसवहस्रोतो दुष्टि कारण

गुरुशीतमतिस्निग्धमतिमात्रं समश्नताम्।
रसवाहीनि....ष्यन्ति चिन्त्याननां चातिचिन्तनात्।। (च.वि. ५/१३)

Causes of dushti of rasavaha srotas are :

Excessive consumption of heavy, cold, oily food. Consumption of wholesome and unwholesome food together, grief, stress or worry.

रस प्रदोषज रोग

अश्रद्धा चारुचिश्चास्यवैरस्यमरसज्ञता। हृल्लासो गौरवं तन्द्र सांगमर्दो ज्वरस्तमः।। पाण्डुत्वं स्रोतसां रोधः क्लैब्यं सादः कृशांगता। नाशोऽग्नेरयथाकालं वलयः पलितानि च।। रसप्रदोषजा रोगाः, (च.सू. १८/९-१०)

While explaining Dhatu gata Jvara Charakacharya gives explanation about rasa Dhatu gata Jvara lakshana-

Nidana: गुरुत्वं दैन्यमुद्वेगः सदनं छर्दिरोचकौ। रसस्थिते बहिस्तापः साङ्गमर्दो विजृम्भणम्।।(च.चि. ७६)

Nidana Sevana leads to Agni Dusti which produces Ama form of Rasa. This Ama Rasa in one hand disturbs the normal functioning

of Vayu in Amasaya and on other hand blocks Swedavaha Srotasa. Due to blocking of the natural path in Amasaya, Vayu spreads in the whole body taking Agni (Amasayastha Pitta) with it. Blockage of Swedavaha Srotas creates Aswedanam. Thus overall Santapa increases which is termed as Jwara.

अन्न अश्रद्ध अरोचक अविपाक अङ्गमर्द ज्वर हल्लास तृप्ति गौरव हृत् पाण्डुरोग मार्गोपरोध काश्र्य वैरस्य अङ्गसाद अकालज वली पलित दर्शन प्रभृतयो रसदोषज विकाराः।(Su.Su. 25)

Here he added the Avipaka, Angamarda, Trpti. And he used the word Anna Asraddha instead of Asraddha, Pandu Roga instead of Pandutva, Margoparodha instead of Srotorodha. Along with this patient suffers from wasting or karshya, loss of interest in food, pain all over body, premature wrinkling of skin, and graying of hair.

रसवह स्रोतस् विद्ध लक्षण

तत्र विद्धस्य शोषः प्राणवहविद्धदच्च मरणं तल्लिङ्गानि च।।

Prana vaha sroto viddha lakshana- aakroshana, vinaman, mohana, bhramana, vepana and marana.

5. Raktavaha Srotas

The channels which carries शोणित is called as रक्तवह स्रोतस्

It can be correlated to the circulatory system & Haemopoietic system.

स्रोतो मूल

1) According to Caraka:

शोणितवहानां स्रोतसां यकृत्प्लीहा च। (च.चि. ५/८)

The Moola of Raktavaha srotas is Yakrut and pleeha

2) According to Susruta:

रक्तवहे द्वे तयोर्मूलं यकृत् प्लीहनो रक्तवाहिन्यस्च धमन्यः। (सु.सु. ९/१२)

The moola of raktavaha srotas is Yakrut, (Liver) Pleeha (spleen) and Raktavahi dhamani (Blood vessels).

Ayurvedic Understanding of प्लीह and यकृत्:

यकृत्

- It is one among the koshtangas.
- It is considered as a मातृज अवयव

- Its sthana is below the हृदय in right side and occupies most of the righthypochondrium and epigastric region. It is also considered as the seat of ranjaka pitta.

Synonyms:

ज्योतिस्थान, कलाखण्ड, अग्निस्थान

प्लीहा:

- Considered as one among the koshtangas. (acco. to Caraka and Vagbhata).
- Involved in the production of the blood during intra uterine life.
- It is located in the left side of the abdomen and is related with the production and destruction of blood.

Rakta Production

रसात् रक्तं प्रजायते। (च.चि. १५/५)

That is raktadhatu is formed from rasadhatu. The प्रसादभाग of rasa which is watery in colour reaches यकृत् and प्लीह acted upon by ranjaka pitta gives red colour to it and thus rakta dhatu forms. Sthana of ranjaka pitta is यकृत्, प्लीहा, आमाशय and हृदय।

Modern Aspect

- Related with haemopoiesis

Definition:

The production and maturation of the formed elements of the blood is known as haemopoiesis.

The formed elements are:

- RBC
- WBC
- Platelets

It starts from the third week of intra uterine life.

In the fifth month it takes place in red bone marrow (RBM); mainly in humerus and femur.

Haemopoietic stem cells are present in these bones which can renew themselves and can give birth to new cells.

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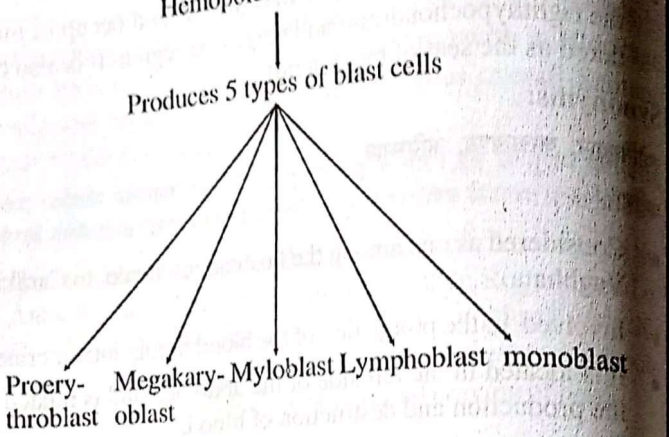

The proerythrpblast differentiates and produces erythroblast (RBC).

- Myeloblasts differentiates and forms Neutrophils, oesinophils and basophils.
- Lymphocytes differentiates and produces mature lymphocytes.
- Monoblast differentiates to form monocytes and
- Megakaryoblast produces platelets.

Factors Required for Hemopoiesis

1) Colony stimulating factors
2) Interleukins

RBC Production ——→ Erythropoiesis

1) Production ——→ bone marrow
2) Growth and maturation ——→ by liver and spleen

Hemopoietic stem cells
↓
Proerythroblast
↓
Basophilic erythroblast
↓
Polychromatophilic erythroblast
↓

Acidophilic erythroblast
↓
Reticulocyte
↓
Red Blood Cells

KTA FUNCTION:

- जीवनं It is life of the living body.
- रक्तं वर्ण प्रसादं मंस पुष्टिं च करोति। (सु.स. १५/५)

It gives complexion to the body and increases the bulk of the body.

- धातूनां पूरणं वर्ण स्पर्शज्ञानं असंशयम् ।

It does poorana to dhatu's, gives complexion and sensation of touch.

- It gives nourishment to mala (malaroopi pitta) and upadhatu (kandara and sira) of it.

dern Aspect

1) Nutrient function
2) Transport of respiratory gases.
3) Excretory function.
4) Transport of hormones and enzymes.
5) Regulation of water balance.
6) Acid base balance.
7) Regulation of body temperature.
8) Helps in the defense mechanism.

ह स्रोतो दुष्टि निदानः

विरुद्धान्नपानानि सिग्धोष्णानि द्रवाणि च।रक्तवाहिनी दूष्यन्ति भजता चातपानलौ।।(च.वि.५/१४)

- Intake of substances which induces burning sensation inside the body.
- Excessive consumption of .....
- Excessive exposure sun fire
- Injury by burn, heat, physical trauma.

लक्षण

न्ते रक्तदोषजाः। कुष्ठविसर्पपिदका रक्तपित्तमसृग्धरः।।

गुदमेढ्रास्यपाकश्च प्लीह गुल्मोऽथ विद्रधिः। नीलिका कामला व्यङ्गाः पिप्लुवस्तिलकालकाः
दद्रश्मर्दलं स्निग्धं पाना कोठखमण्डलं रक्तप्रदोषाजायन्ते। (Cha.Su. 28)

The lakshanaas like kushta, visarpa, pidaka, raktapitta, asrukdara, gudapaka, medrapaka, asyapaka, pleeha, gulma, vidradhi, kamala, neelika, kamala, vyanga, pipplava, tilakalaka, dadru, charmadala, shwitra, paamaa, kota and asramandala will be observed.

विद्ध लक्षण

तत्र विद्धस्य श्यावावङ्गना शोणितागमनं रक्तनेत्रता च इति। (सु.स. ९/१२)

Blue colour to the body, fever, burning sensation, anaemia, bleeding, reddish discolouration to the eyes will be seen.

शोणितवह स्रोतो विकार:

मसूरिका, विसर्प, रक्तपित्त, रक्तधातुगतज्वर, विद्रधि, रक्तगुल्म, दाह, अर्श, कामला।

Conclusion

- Each dhatu is nourished by its on srotas only and each srotas will synthesis its own dhatu only.i.e,
- यदा स्वेदनोष्मणा यावं शरीरा यान्ति यवतः स्रोतसा च यथास्वेन धातुः पुष्यन्ति धातू (च.चि. ८/३

Without the existence of srotas there will not be any synthesis or desruction/transportation of any biological elements in the body and thus nourishment.

6. Mamsavaha Srotas :-

- रसाक्तक्ततोंसंप्रजायते।

Rakta is formed from rasa dhatu and maamsa from rakta dhatu

- वायवाम्बुतेजसाक्तस्यभूम्याच अभिसंदुतस्थिरतांप्राप्यमांसंस्यद्। (च.चि. १५/२४)

Some portion of the rakta dhatu becomes solid by the effect of vaayu, teja and jala and this stira amsha is called as maamsa.

मांसवहस्रोतोमूल

- मांसवहानां स्रोतसां स्नायुमूलं त्वक च। (Ch.Vi. 5)
- मांसवहेद्वे दवौमूल स्नायुत्वचौरसवहस्यच धमनयः। (Su.sh. 9)

स्नायु

- These are the rope like structures.
- They are the binding material in the body to bind maamsa and asthi.
- As it helps in the function of maamsa like aakunchana and prasarana it is considered as one of the moola.

धमनि

- It is the structure in which rakta flows along with rasa.
- This helps in the nourishment of the maamsa.
- Hence, it is considered as one of the moola stana.

त्वक्

- मूलस्थानं इति प्रभावस्थानम्!
- As the seventh layer of twacha is maamsadhara and its continuation is maamsa in anatomy.
- The dusti of maamsa is expressed through twak.
- Therefore it is one among the moolasthana.

मांसस्वरूप:

• बहुल - large	• पृथु - flat	• स्थिर - firm
• पेलव - small	• वृत्त - round	• मृदु - soft
• स्थूल - thick	• ह्रस्व - short	• श्लक्ष्ण - slippary
• अणु - thin	• दीर्घ - long	• कर्कश - hard

मांसवहस्रोतो दुष्टिकारण

अभिष्यन्दिनि भोज्यानिस्थूलानिगुरुणिच। मांसवाहिनिदुष्यन्तिभुक्त्वावास्वपतंदिवा।। (Ch.vi.5)

Intake of abhishyandi aahara, heavy food. After heavy meal sleeping during day time causes dushti of Maamsavaha srotas.

मांसवहस्रोतोदुष्टिलक्षण

अधिमांसार्बुदं कीलं गलशालूकशुण्डिके पूतिमांसालजीगण्डवाण्डमालोपजिह्विकाः वेद्यान्मांसात्रयान्
(Ca.Su. 28/14)

Excessive growth or mass formation, warts, fleshy projections, growth in root of tongue and palate, necrosed mass, sloughing, lymphadenitis, mumps, ranular growth.

मांसवहस्रोतोविद्दलक्षण

तत्रविद्दस्यश्वयथुर्मांसशोषःसिराग्रन्थयोमरणंच!

Symptoms of injury to mamsa vaha srotas are- oedema, piles, dystrophy, vascular tortion, cyst and death.

Functions of मांसवहस्रोतस

- Conduction Function
- Movement
- Tonicity

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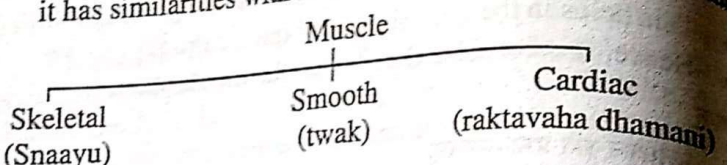
Formation of Muscle

it has similarities with moola sthana of maamsavaha srotas



7. Medovaha Srotas :-

- मेदोवहस्त्रोतस् is one of the स्थूलस्त्रोतस् and also अन्तर्मुखस्त्रोतस् explained in the ayurvedic treatise.
- Both charaka & sushrutha opines it as the 7th strotas in the order.
- It is the strotas which nourish & maintain the मेदधातु

स्त्रोतोमूल

मेदोवहनांस्त्रोतसांवृक्कौमूलंवपावहनं च। (Ch.vi.5/8)

१. वृक्क २. वपावहन

मेदोवहेद्वेतयोर्मूलं कटी वृक्कौ च। (Su.sa.9/12)

१. वृक्क २. कटी

स्त्रोतोविद्धलक्षण

तत्रविद्धस्यस्वेदागमनंस्निग्धाङ्गतातालुशोषःस्थूलताशोफःपिपासाच। ।(su.sa.9/12)

a. स्वेदागमन : Excess sweat production
b. स्निग्धाङ्गता : More slimyness/oilyness of body parts
c. तालुशोष : Dryness of talu/palate
d. स्थूलता : Excess of fat deposition/obese
e. शोफ़ : Oedema (obstrustion in venous &lymphatic circulation)
f. पिपासा : Excess thirst/polydypsia

स्त्रोतोदुष्टिलक्षण

"निन्दितानिप्रमेहाणांपूर्वरुपाणि यानि च"। (Ch.su.28/15)

Ailments that cause decrease of ayu as told in atisthooladi asta nindita purusha, manifestation of prameha poorvarupa are the features of Medovaha Srotas dushti.

स्त्रोतोदुष्टिकारण

अव्यायमाद्दिवास्वप्नान्मेध्यानां चातिभक्षणात्। मेदोवाहीनिदुष्यन्ति वारुण्याश्चातिसेवनात्।।

- अव्यायमा : No exercise
- दिवास्वप्न : Day sleep

- अतिभक्षणात् : Excess intake of food like mamsa, and rich in fat
- वारुण्यतिसेवना : Excess intake of liquid items like madhya

What is vrukka, kati, vapavaahana? :-

Vrukka वृक्कौकुक्षिगोलकौमांसपिण्डब्दयंएकःवामपार्श्वश्चदक्षिणपार्श्वम्

Vrukka are two round structures made up of mamsa & it is present in पार्श्व ie; in lumbar region.

According to sharangadhara: vrukka is made up of प्रसादभाग of रस & मेद it nourishes the मेदधातु (mainly present in udara (abdomen).

Vapavaahana : Is a sheet like structure present in & around all the organs of body mainly in udara pradesha.

Kati: it is the region particular to the lower back part of abdomen.

Anatomical & physiological View

Assesment of Vrukka

- By above references we can say vrukka as kidney along with suprarenal glands.
- Kidney helps in the regulation of salts like sodium, potassium which are main component of bile juice secreated from liver, and does emulcification of fat which is digested and absorbed.
- Suprarenal gland secreates mineralocorticoids which acts on renal tubules in maintaining the level of sodium & potassium salts.

Assesment of Vapavaahana

- It is a sheet that is present in skin, blood, muscle, around umbilicus, heart & other internal organs which is made up of fat molecules & its function is to protect the under lining structures, this can be said as adipose tissue present in this area mainly omentum (policeman of abdomen), true & false capsule of internal organs.

Assesment of kati

It is a storage bag of fat present in lower back region .

8. Asthivaha Srotas :-

The channels which carries the substances which nourish asthi is called asthivahasrotas.

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Which stays for long time, not easily get destroyed.

Formation of Asthi

Asthidhatu is formed by the medodhatu. In medodhatu so asthidhatusamanagunas are present. When medas comes and com with asthidharwagni. Those qualities are digested and convert into asthi, with the effect of agni, prithvi, app and vayu qualities medas become solid to form the asthidhatu.

Asthisankhya

Charaka-360 Sushruta-300 Modern classification-20

Asthivahasrotas is mentioned by charaka.

मूल

अस्थिवहानांस्रोतसांमेदोमूलंजघनंच।

The moola of asthivaha srotus is meda & jaganam

स्रोतोदुष्टिलक्षण

अध्यस्थिदन्तौदन्तास्थिभेदशूलाविवर्णता। केशलोमनखस्मश्नुदोषाश्चास्थिप्रदोषजा।।

Extra growth of bones, more growth in teeths, cracking pa in teeth and bones discolouration, deformities in kesha, loma, na

स्रोतोदुष्टिकारण

व्यायामातिसंक्षोभादत्यघातविधट्टनात्। अस्थिवाहिनीदूष्यन्तिवातलानांचसेवनात्।।

The karanas are excess indulgence in exercise, intake of va aggravating aharas,excessive exhaustion, excess of friction in bon due to injury.

Asthivaha Srotho Vikaras

Amavata	Sandhivata	Rajayakshma
Kushta	Jvara	Dantaroga
Vatarakta		

Bones

Bones are specialized types of connective tissues undergoi various changes and consist of cells and solid inter-cellular substan containing calcium salt.

Structure of Bone

Periosteum-outer covering
Compact part-outer part

Spongy part-inner
Medullary cavity-inner cavity or interior of long bones lined by endosteum

Composition of Bone

Organic Inorganic

Fibres, calcium and megnisium ions, crystals, carbonates, phosphate (fine collagen).

Ossification

Process of formation of bone and it includes proliferation of collagen and ground substance with subsequent deposition of calcium salt.

Cell Types

Osteoblasts- concerned with bone formation
Osteocytes- maintaince of bone
Osteoclast- concerned with bone resorption

Medas as a moola of asthivaha srotus– Formatiom of asthi is from meda, so can be considerd as moola. i.e. the compact bone has a large marrow cavity called as medullary or marrow cavity which contains yellow bone marrow. The main function of this is in storage of fats. The spongy one has the bone marrow inside called saraktameda, site for production of blood cells.

Jaganam as moola of asthivaha srotus– The word meaning is pelvis or hip region. Jaganam in body has a main role in weight bearing. The function of asthi is also dharana and is controlled by this region. For a man to stand erect this region is very important and must be strong. Any injury makes it difficult to be erect.

9. Majjavaha Srotas :

Channels which carry the substance to nourish majja dhatu is called majjavaha srotas.

मूल

- मज्जावहानांस्रोतसामस्थिनिमूलंसन्ध्यश्च।। (च.वि. ५/८)

The moola of majjavaha srotas is asthi and sandhi.

Majjavaha sroto moola is only explained by Acharya Charaka. Acharya Sushruta haven't explained because each asthi is

AyuTeer

मूर्च्छा- unconsciousness
तमदर्शन- darkness of eyes; अरुषं = Small wounds above joints
Kapha is ashrayee to majja, increased kapha causes tama'
And also the smaller/bigger joints are prominat.

मज्जवहस्रोतोविकार	आमवात	पक्षाघात
सन्धिवात	कुष्ठ	राजयक्ष्म
वातरक्त	मसूरिका	विषमज्वर
प्रमेह		

Modern co-relation of Majjavaha srotas:

Structure of Bone Marrow

The bone marrow measures about 4000ml in adults, 50% of this is RBM and the remaining is yellow bone marrow.

RBM:- The epiphysis of the femur, humerus and spongy bone of the skull bone and vertebra are filled with RBM.

YBM:- All the other parts like the shaft of the long bones contain YBM.

Functions of Bone Marrow

1. Destruction of old RBC's:- The old RBC's are destroyed by macrophages of RBM and the iron content of Hb of the destroyed Rbc's is split into two compounds i.e,Haemozederin and Ferretin. These 2 compounds are stored in liver, spleen and bone marrow for the re-synthesis of Hb.
2. Formation of blood cells:- All the 3 types of blood cells i.e, erythrocytes, leucocytes and platelets are formed by the RBM.
3. Storage of iron:- Iron in the form of haemosederin is stored in the RBM.
4. Macrophages destroy the toxins circulating in the blood.
5. Nourishment to the bone:- All the 3 types of bone cells i.e, osteocytes, osteoclasts and osteoblasts are produced from the bone marrow itself.

10. Sukravaha Srotas :-

शुक्र

It is one among the 7 dathus, it is a drava dathu.

"Majjath Sukram Prajaayate"

The prasada bhaga or essence of majja oozes out through small pores in bones & goes to the gonads, this later forms sukra.

According to Sushruta

सप्तमी शुक्रधरानाम, या सर्वप्राणीनां सर्वशरीरव्यापिनी।।

The 7th kala; sukradharakala is present all over the body. So that sukra is also considered to be present all over the body. He gives a simily like ghee is present in milk & jaggery in sugarcane, the sukra is present in our body.

Only difference he said was that in purusha it's in sthoola form & sukshma form in stree.

Sukravaha Srotas

Moola

शुक्रवहानां स्रोतसां वृषणं मूलं शेफश्च। (चरक)

He says that since vrishna helps in storage of sukra & shefa for the ejaculation these can be considered as moola.

शुक्रवहे द्वे तयोर्मूलंस्तनौ मूलं वृषणं च।। (सुश्रुत)

Vrishna has the same explaination for being the moola as above. Sthana even though not directly related to sukra its said to be a sensitive part & believed to stimulate the ejaculation.

शुक्रवहानां मूलः स्तनौ मुष्कौ मज्जा च। (वाग्भट)

Vaagbhatta adds majja to the list as its said that sukra is originated from majja. Mushka is another term for vrishna.

दुष्टि कारण

अकालयोनिगमनान्निग्रहादतिमैथुनात्। शुक्रवाहीनि दुष्यन्ति शस्त्रक्षाराग्निभिस्तथा।।(Ca.vi.5/19)

अकालयोनिगमनं– Intercourse at improper time

निग्रहाद– Veghadhaarana of shukra

अति मैथुनात्– Exessive coitus

शस्त्रक्षाराग्नि– Trauma due to instrument (shastra), kshaara karma, (alkalics or corrosives) agni karma (burn, thermal injury)

Also exess intake of अम्ल, तिक्त कटु रस, worry, grief, oldage, fear, anger, toxin etc. can cause morbidities of shukra.

विद लक्षण

तत्र विहस्य क्लीबता चिरात् प्रसेको रक्त शुक्रता च।। (सु.शा. ९)

Injury to moola cause,Impotancy,delay in ejaculation&some times blood mixed shukra is ejaculated.

दुष्टि लक्षणा

फेनिलं तनु रूक्षं च विवर्णं पूति पिच्छिलं। अन्यधातु उपसृष्टं अवसादि तथाऽष्टमम् ।। (च.चि. ३०/१३९-१४०)

Mainly 8 types of दुष्टि लक्षणाल are told

फेनिलं -frothy semen

तनु -thin semen

रूक्षं -dry

विवर्णं -discoloured

पूति-with putrid/offensive odor

पिच्छिलं - very much slimy (prostatic secretion-milky)

अन्यधातु उपसृष्टं -mixed with other dhatus like raktha mamsa etc.

अवसादि -semen sinking to bottom when placed over water.

Due to suppression of manifested urge for sex, semen get obstructed by aggravation of vayu, form knotty (grathitha) and अवसादि (ejaculated with difficulty) may be density increases.

Acc. to susruta, in shaareera sthana. 2nd chapter.:

Men with shukra vitiated with tridoshas, will have

Semen with cadaveric smell, knot formation, pus mixed (पूय शुक्र) deficient, smell of urine or faeces. Such people will be sterile and impotent.

शुद्ध शुक्र लक्षणा

स्फटिकाभं द्रवं स्निग्धं मधुरं मधु गन्धी च। शुक्रमिच्छन्ति के चित्तु तैलं क्षौद्रं निभं तथा।।

स्फटिकाभं– Crystal clear like quarts

द्रवं– fluid

स्निग्धं– Unctous

मधुरं– Sweet

मधु गन्धी– Smells like honey

शुक्रमिच्छन्ति के चित्तु तैलं क्षौद्रं निभं तथा– Also resemble like clear oil or honey in appearance.

Modern Co-Relation

- Vas deference
- Prostate

Vas deference: It is about 45 cm long. Ascends along the posterior border of epididymis, passes through inguinal canal & enters pelvic cavity.

Passes posterior to the uterus & forms a dilated part called Ampulla.

It joins with end of seminal vesicle to form the ejaculatory duct without terminating in prostate urethra, where sperm is ejected with the seminal vesicle, secretion & semen moves from urethra to exterior

Prostate: It is a cloughnut shaped gland, inferior to urinary bladder&surrounded by prostate urethra Secretions: milky-citric acid -sperm use it for ATP production.

Seminal plasma -antibacterial action

Spermatogenesis

(Spermatogonia A) Germ cell (2n diploid) [44+x+y]

↓ Mitotic division

Sprmatogonia B (2n) [44+x+y]

↓ Mitotic division 2

Primary spermatocytes [44+x+y]

↓ Meiotic division 1

Spermatocytes(22+x) (22+y)

(22+x) (22+x) (22+y) (22+y) [spermatid]

↓ Mature into

Spermatozoa or sperms

11. Aartavavaha Srotas :

A channel which carry the aartava is called आर्तववहस्रोतस्. It is explained by sushruta only, giving two mula sthana for it.

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Charaka did not explain as he already told about shukravaha srotus which include both shukra and aartava.

मुलस्थान

आर्तववहेद्वेत्योर्मुलंगर्भाशयआर्तववाहिन्यश्च धमन्यः (सु.शा. ९/१२)

1. गर्भाशय
2. आर्तववाहिन्यस्धमन्य

Uterus (गर्भाशय)

Uterus is child bearing organ in female and which protects and provides nutrition to a fertilized ovum.

Location

के Pelvis , between bladder and rectum.

Menstrual Cycle

It is a cyclic changes taking place in the structure of female reproductive tract, notably in ovary and endometrial wall of the uterus by the influence of progesterone and estrogen.

It consists of 3 phase:
1. Bleeding phase
2. Secretory
3. Proliferative

This phase occurs due to decline of both the hormons. It is also called as weeping of uterus as during this phase ovum is going to be released.

Duration: 5 - 7 days.

The functional layer of the endometrium is going to shed off i.e, from the endometrium becomes ischaemic and starts being shed. The vessel wall gets necrosed and blood enters the stroma and menstrual flow start.

So garbhashaya provide the pathway for the removal of menstrual of blood.

Fallopian Tube (Arthava Vahini Dhamani)

These are the hollow tubes present in female.

They carry ova from ovary and sperm from uterus to the tube for fertilization.

Location

Free upper border of broad ligament.

Parts

1. Uterine part
2. Isthmus
3. Ampula
4. Infundibulam

Physiologically

At the 14th day of menstrual cycle i.e. at ovulation day,there is the release of ovum from ovary, this ovum is carried through this fallopian tube and if sperm enters it is also carried through this for fertilization but if there is no entrance of sperm, then the released ovum degenarates and sheds down as a menstrual blood.

विन्दलक्षण

तत्रविन्धायावन्ध्यत्वंमैथुनासहिष्णूत्व.....(सु.शा.९)

वन्ध्यत्व- sterility or incapable for reproduction

मैथुनासहिष्णूत्वं- unbearable pain during coitus (dysperunia)

.....loss of aartava (amenorrhea)

For the वन्ध्यातव, Harita Samhita has told mainly 6 reasons:

1. गर्भक्रोषभंग - It can be considered as acquired disease
2. धातुक्षय - General condition of the body,due to improper nutrition, rakyashya,panduroga, vrdha avastha etc.
3. काकवन्ध्य - One child sterility i,e one child borne and got sterility due to infection after 1st delivary or any other disorder in fallopian tubes.
4. अनपत्या - Absolute sterility i,e those who have not conceive at all or lose the capiblity to reproduce from the young time,mainly as congenital disease.
5. गर्भस्राव - Delivary times come at 4th or 5th month of pregnancy.
6. ..... - At the 7th month of pregnancy delivary occurs of a dead baby. Or after delivary, there is no proper functioning of the heart of the baby.

12. Mutravaha Srotas

मूल

"मूत्रवहानां स्त्रोतसां बस्तिर्मूलं वंक्षणौ च"।। (च.वि. ५/२८)

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The moola of the muthravaha srothas are basthi , vankshana

दुष्टि लक्षण

"अतिसृष्टं अतिबद्धं प्रकुपितं अल्पाल्पं अभीष्णं वा बहलं सशूलम् मूत्रयन्तं दृष्ट्वा मूत्रवाहिन्यस स्रोतांसि प्रदुष्टानि इति विद्यात्।।" (च.वि. ५/३२)

The dushti lakshanas of the muthravahasrothas are,

अतिसृष्टं - Increased frequency of urination

अतिबद्धं - Difficulty in urination

प्रकुपितं - change in the normal quality of the urine

अल्पाल्पं -Very less flow of the urine

बहलं - Large quantity of the urine flow

सशूलं -Painful micturition

मूत्रवह स्रोतोदुष्टि कारण

"मूत्रितोदक भक्ष्य स्त्रीसेवनान्मूत्रनिग्रहात्। मूत्रवाहिनी दुष्यन्ति क्षीणस्य अभिक्षतस्य च।।"

The dushti factors of the moothravahasrothas are,

- मूत्रितोदक भक्ष्य स्त्री सेवनं -A person who has a desire to void the urine, when he drinks the water, eats the food and during sexual intercourse.
- मूत्रनिग्रहात्–If suppress the urge for micturition
- क्षीण– Those who are very weak
- अभिक्षत्–Those who are subjected to injuries

मूत्रवहस्रोतस् as per सुश्रुत,

मूत्रवहेद्वेतयोर्मूलंबस्तिमेढ्रंच।।

According to susrutha the moolas of moothravaha srothas are Basthi and medra

विद्दलक्षण of मूत्रवहस्रोतस् (सुश्रुत)

"तत्रविद्दस्यान्अनद्दबस्तितामूत्रनिरोधः स्तब्धमेद्रताच।।"

If any injury happen to moothravahasrothas leads to,

- अनद्दबस्तित– Distention of the bladder
- मूत्रनिरोध– Obstruction to the flow of urine
- स्तब्धमेद्रता– Stretching of penis

Anatomical Elaboration of Kidney

The paired kidneys are reddish, bean shaped organs located just above the waist between the peritoneum and posterior wall of the abdomen, and it is a retroperitonial organ.

EXTERNAL ANATOMY OF THE KIDNEY

Length=10-12 cm Thickness=3 cm

Width=5-7 cm Mass=135-150g

There is a deppression in the medial side of the kidney known as renal hylum (Through which the blood vessels and ureter emerges out).

Kidney is having 3 layers.

1. Renal capsule 2. Adipose tissue 3. Renal fascia.

Internal Anatomy of the Kidney

The frontal portion of the kidney consists of 2 regeons,

1. Renal cortex 2. Renal medullae

Renal medullae consists cone shaped ranal pyramids.

Physiological Aspects of the Kidney

The ranal system or urinary system is the one having maximum capacity of excretory function and so it plays the major roll in.

Homeostasis

Renal system includes,

- A pair of kidneys
- Ureters
- Bladder
- Urethra

Nephron

Nephron is the structural and the functional aspect of the kidney it is having 2 parts.

- Renal corpuscle
- Renal tubule

Renal corpuscle- It is the first part of the nephron.

Filteration of the blood or the first phase of the urine formation is taking place here.

It is having 5 parts.

1. Efferent arteriole
2. Afferent arteriole
3. Glomerulus
4. Visceral layer
5. Parietal layer

Ayuteen

Based on the position of the ranal corpuscle the nephron divided into 2.

- Cortical nephron
- Juxta medullary nephron

Cortical nephron- Renal corpuscle lies on outer cortex near the periphery.

Juxta medullary nephron - Renal corpuscle lies on the inner cortex near to the medullae.

Structure of the Renal Corpuscle

It is having 2 parts, • Glomerulus • Bowman's capsule

Glomerulus-Tuft of cappoillaries enclosed by the Bowman's capsule, connected to the afferent and efferent arterioles.

Bowman's capsule-Capsular structure encloses the Glomerulus. It has 2 layers,

- Inner visceral
- Outer parietal

Tubular portion of the nephron consists of 3 parts,

- PCT (Proximal convoluted tubule)
- Loop of Henle (Hairpin bend)
- DCT (Distal convoluted tubule)

Loop of Henle-

Descending limb
Ascending limb

Descending limb- Thick and thin
Ascending limb- Thick and thin

Juxtaglomerular Apparatus

Juxta glomerular apparatus is a specialised organ situated near to the glomerulus of the each nephron. It consists of-

- Macular densa
- Extra glomerular messengial cells
- Juxta glomerular cells

Function- Secretion of the hormonal susbstances
Regulation of the glomerular blood flow.

Functions of the Kidney

1. Roll in homeostasis

- Excretion of the waste products
- Maintanace of the water balance
- Maintanace of the electrolyte balance
- Maintanace of acid-base balance

2. Haemopoetic function.
3. Endocrine function

- Erythropoetin • Calcitriol
- Thrombopoetin • Prostaglandins
- Rennin

4. Regulation of the blood pressure.
5. Regulation of the blood calcium level.

Urine Formation

According to Ayurveda

मूत्राशयमलाधारप्राणायातनमुत्तमं। पक्वाशयगतस्तत्रनाड्योमूत्रवहासिषु।।
तर्पयन्तिसदामूत्रंसरितः सागरंयथा। सूक्ष्मत्वान्उपलभ्यन्तेमुखन्यासांसहस्त्रशः।।
नाडिभिः उपनीतस्यमुखस्यामाशयान्तरात्। जाग्रतः स्वपतैश्चैवसनिस्यन्तनेनपूर्यते।।
आमुखात्सलिलेन्यस्तः पार्श्वेभ्यः पूर्वन्तेनवः। घटोयथातथाविद्दिबस्तिमूत्रेणपूर्यते।। (सु.नि.३/२९)

Vessels arising from large intestine, called moothravahini nadi, fill the urinary bladder like rivers feed water to ocean, oceans on earth. They are so minute and not to be perceived. These vessels arise from amasaya and convey fluid to bladder day and night. Thousands of these vessel provides water. which exudes from vessels to inside bladder.

According to Modern Science

Urine formation is a blood cleansing function.

Normally about 26 % of cardiac output enters the kidneys to get rid of unwanted substances, kidneys excretes the unwanted substances along with water as urine.

About 1-1.5 litres of urine is formed everyday.

Urine formation consists of 3 stages.

- Glomerular filteration
- Tubular re- absorption
- Tubular secretion

1. Glomerular Filteration

The process by which blood passes through glomerular capillaries is filtered through filteration membrane.

Process of glomerular filteration :

Blood passes through glomerular capillaries

↓

Plasma filtered into the Bowman's capsule

↓

All the substances of the plasma filtered exept plasma protein

↓

This filtered fluid is **glomerular filterate.**

Ultra filteration : The glomerular filteration is also called as Ultra filteration.

Glomerular filteration rate : Total quantity of filtrate formed in all the nephrons of the each kidney in the given unit of the time.

Normal GFR =125ml/min

2.Tubular re-absorption

In this process by which water and other substances transported from renal tubules to the blood.

While the filterate is passing through the tubular portion of the nephron both quantitative and qualitative changes of the blood will be occur.

↓

Large quantity if water (99%) and electrolytes absorbed by tubular epithelial cells.

↓

The re absorbed substances will go to the renal medullae.

↓

From there it will move to the blood in peritubular capillaries

- Since the substances are taken back into the bllod from the glomerular filterate, the entire process is known as TUBULAR RE-ABSORPTION.
- Tubular re-absorption by PCT = About 7/8 of the filtrate is reabsorbed by PCT.

The substances which are re absorbed by the PCT are- Glucose, Amino acids, Na, K, Ca, Bicarbonates, Chlorides, Phosphates, Uric acid and water.

- Substances are absorbed from the Loop of Henle -Na, Chloride.
- The substancesare absorbed from the DCT- Na, Ca, Bicarbonate, water.
- Collecting duct- Na, HCO, K

3. Tubular secretion

The process by which the substances are transported from blood into renal tubules.

In addition to re absorption from the renal tubule some substances are also secreted into the lumen of the renal tubules.

The substance swhich are usually secreted out are,

- Para amino hippuric acid
- Diodrast
- Hydroxy indole acetic acid
- Amino derivatives
- Pencilline.

Substance sescreted in different segments of the renal tubule

- Active escretion of potassium by sodium-potassium pump in PCT, DCT, Collecting duct.
- Ammonia is secreted in the PCT
- Hydrogen ions by PCT and DCT

Ureter/ गाविनि

According to atharvaveda

"यथात्रेषुगविन्योर्यत्वस्तावधिसंश्रितं।।"

The fluid which is conveyed by 2 vessels called gavini , from intestine to urinary bladder and remains there is called mutra.

According to Modern

Each of the 2 ureters transports the urine from the renal pelvis of 2 kidneys towards the urinary bladder.

Length = 25-30 cm

Ureters are thick walled narrow tubes that vary in diameter from 1 mm to 10 mm.

It is a retroperitoneal organ.

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It is connected to urinary bladder posteriorly.

Peristaltic contractions of the muscular walls of the ureter push urine towards the urinary bladder, but hydrostatic pressure and gravity also contribute.

Urinary Bladder/बस्ति

- मूत्राशयोबस्तिर्नाम। (सु.शा.)

Organ which stores urine is called basthi.

According to Modern

The urinary bladder is a hollow, distensible muscular organ situated in the pelvic cavity posterior to the pubic symphysis.

In males it is directly anterior to the rectum and in females it is anterior to thevagina and inferior to the uterus. And it is smaller in females.

Capacity =700-800 ml

Anatomy and physiology of the urinary bladder

In the floor of the urinary bladder there is a small triangular area called as TRIGONE.

posterior to this there will be two ureteral openings

In the Anterior corner there is oppenig to the urethra.

There are 3 coatings for urinary bladder.

1. Deep layer mucosa 2. Transitionalepithelium
3. Lamina propria

Rugae are also present. (To permit expansion of the urinary bladder)

Around the opening of the urethra the circular fibres form an

- Internal urethral sphincter
- External urethral sphincter (inferior to the above one.)

These structures helps for the elimination of urine to out.

Function of the Urinary Bladder

Collection and storage of the urine.

Urethra/मूत्रप्रसेक

मूत्रप्रसेकोनाममूत्रम्येनबस्तिमुखाश्रयेणास्रोतसाक्षरति। (डल्हण com. on सु.चि.)

From the moothravaha srothas urine is expelled from opening of the urinary bladder, the channel through ahich this is done is named as moothrapraseka/urethra.

According to Modern

It is small tube leading from the internal urethral orifice in the floor o the bladder to the exterior of the body.

In both males and females it is the terminal part of the urinary system, and passageway for the discharge of the urine, in males discharge of semen as well. Length = 4 cm.

Micturition

Micturition is the process of voiding of the urine.

Filling of the urinary bladder.
↓
Stimulation of the stretch receptors
↓
Afferent impulses via pelvic nerve
↓
Sacral segment of the spinal cord
↓
Efferent impulses via pelvic nerve
↓
Contraction of the detrusor muscles and relaxation of internal sphincter
↓
Flow of urine into urethra and stimulation of stretch receptors
↓
Afferent impulses via pelvic nerve
↓
Inhibition of the pudental nerve
↓
Relaxation of the external sphincter
↓
Voiding of the urine

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Clinical Conditions Related to the Urinary System

1. Renal Calculi

- Its due to the accumulation of the mineral salts.
- It can lodge anywhere along the course of urinary tract
- Accumulation of uric acid, phosphate and calcium oxalate as salts
- Occurs crystal formation

2. Hydronephrosis

- It is the swelling of the kidney
- Due to the accumulation of the water inside the kidney
- Distention and dilation of pelvis and calyxes caused by obstruction of free flow of urinefrom the kidney.

3. Glomerulo Nephritis

- Damage to the glomerulus
- Cause-streptococcal infection of throat leads to this.
- It can be due to hereditary, or due to high BP. .

4. Pylonephritis

- It is the kidney inflammation or infection
- Inflammation of the pelvis and calyx
- Cause-E.choli (bacteria)

5. Renal Failure

- Occurs when excretory function of the kidney failures
- Cause-Diabetes mellitus and also due to hypertension

6. Nephrotic Syndrome

- Occurs when the filters in the kidney leaks the protein

13. Pureeshavaha Srotas :-

विण्मूत्रमाहरमलः।। (सु.सू. ४६/२३)

The pureesha and mootra are formed by the food, after the digestion of food, the saara bhaga gets absorbed and the remaining undigested and indigestible food becomes solid and that is called as pureesha.

पक्वाशयंतुप्राप्तस्यशोष्यमाणस्यवह्निना। परिपिण्डितपक्वस्यवायुःस्यातकटुभावतः।।(च.चि.२५/२०)

With the help of vaayu, the remaining undigested and indigestible food comes to pakvasaya (large intestine) in the pakvasaya that part become solid by the effort of agni and vayu, this paka is called as paripinditapakwa.

Function of Pureesha

पुरीषमुपस्तंम्भवाय्वाग्निधारणश्च।। (सु.सू. २५/८)

Pureesha is called as upasthambha, that which bears the body, along with this function pureesha also bears the vayu, which is very essential for life. Susruta also says avashtambha pureeshasya, means its maintains the bearing capacity of body.

The pureesha vega means desires/urge to pass the faecal matter, is one of the adhaaraneeya vega, one should not suppress this vega, it suppressed it leads to abdominal pain, head ache, constipation, pain in the calf muscle etc.

पुरिषवह स्त्रोतो मूल

- **पुरीषवहानं स्त्रोतसां पक्वाशयो मुलं स्थुलं गुदं च** (च./वि)

  पक्वाशयं : Large intestine

  स्थुलं गुदं : Anus/rectum

- **पुरीषवहेद्वेतयोर्मूलंपक्वाशयंगुदंच।** (सु.शा. ९)

  Moola of pureesha vaha srotas is

1. Pakwashaya : Production of पुरीष
2. Guda : Exeretion of पुरीष

वाग्भट : स्थूलान्त्र instead of **स्थूल गुद**

दुष्टिकरण

संधारणादत्यशनादजीर्णाध्यशनात्तथा। वर्चोवाहिनीदूष्यन्तिदुर्बलाग्नेःकृशास्यच।। (ch.vi.5)

The dushti janaka factors of pureeshavaha srothas are,

संधारणा : Holding the urge of vegas

अत्यशन : Over eating

अजीर्ण : Due to indigestion

अध्यशन : Eating before the digestion of previous food

दुर्बलाग्ने : Due to weak digestive power

दुष्टिलक्षण

प्रदुष्टानांतुखलुएषामिदंविशेषविज्ञानंभवतितद्यथाकृच्छ्रेणाल्पाल्पसशब्दशूलमतिद्रवमति-ग्रथितमतिबहुचोपविशन्तंदृष्ट्वापुरीषवहान्यस्यस्त्रोतांसिप्रदुष्टानितिविद्द्यात।। (च.वि./५)

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When the moolas are undergoing dushti it leads to,

कुच्छेण : With difficult

अल्पाल्पं : Less quantity

सशाब्दं : Bowels passing with sounds

शूलं : Bowels passing with pain

अतिद्रव : Very watery stool

अतिग्रथित : Hard stool

अतिबहु : Large quantity of stool will be expelled out

विद्धलक्षणा

तत्रविद्धस्यानाहोदुर्गन्धिताग्रन्थितान्त्रताच।। (सु.शा.)

आनाह : Distention with obstruction ग्रथितान्त्रता : Fecoliths

दुर्गन्धता : Foul smelling stool

चिकित्सा

स्वेदाभ्यंगावगाहखवर्तयोबस्तिकर्मच।। (च.सू. ७/९)

स्वेद : Sadation अवगाह : Bath to the body

अभ्यङ्ग : Oil anointing बस्तिकर्म : Inserting wicks in to the rectum

Large Intestine

The large intestine is also know as colon . it extends from ileocecal valve up to anus . it consists

- Cecum with appendix
- Ascending colon
- Transverse colon
- Descending colon
- Sigmoid colon/pelvic colon
- Rectum
- Anal canal

Functions of Large Intestine

1. Absorptive Function

Large intestine plays an important role in the absorption of various substances such as,

- Water
- Electrolytes
- Alcohol
- Drugs like anesthetic agents, sedatives & steroids
- Organic substances like glucose

2. Formation of Feces

After the absorption of nutrients, water & other substance, the unwanted substance in the large intestine from feces this is excreted out.

3. Excretory Function

Large intestine excretes heavy metals like mercury, lead, bismuth, & arsenic through feces.

4. Secretory Function

Large intestine secretes mucin and inorganic substance like chlorides and bicarbonates.

5. Synthetic Function

The bacterial flora of large intestine synthesizes folic acids, vitamin B_{12} and vitamin K by this function large intestine contributes in erythropayotic activity and blood clotting mechanism.

Formation of Pureesha

- By the time chyme has remained in the large intestine 3-10 hrs it has become solid/semisolid because of water absorption and is now called feces.
- Chemically, feces consists of water, inorganic salts, epithelial cells from the mucosa of the gastro intestinal tract, bacteria, products of bacterial decomposition, unabsorbed digested materials and indigestible parts of food.

Although 90% of water absorption occurs in the small intestine, the large intestine absorbs enough to make it an important organ in maintaining the body's water balance, of the 0.5-1L of water that enters the large intestine, all but about 100-200ml is normally absorbed via osmosis. the large intestine also absorbs ions including sodium, chloride, and some vitamins.

Faeces

The feces are derived;

I. Mainly from the intestinal secretions and

II. Partly from the ingested food

(feces in starving animals are decreased in bulk differ comparatively little in composition from those of normally fed animals).

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If vegetables and coarsely ground cereals are excluded fro diet, the feces have fairly constant composition.

Composition of Feces on an Average Diet

- Water : 75% of total fecal matter weight
- Solids : 25% of total fecal matter weight Percent of total solid

Cellulose and other indigested fibers. -30%

Ash ie inorganic material mostly compounds of ca, iron mg -15%

Fat and fat derivatives (fatty acids, neutral fats, cholic acid etc. -5%

Desqumated mucosal cells, mucus and small amounts o digestive enzymes (most which are dead).

Pathological Significance

- Increased bulk of this undigested residue stimulate intestina peristalsis which in turn increase the passage of food throug the intestine.
- Similarly, increased cellulose content of food increase the bul of the feces ie. Feces contain more water, solids, and more o ingested food. Thus high fiber diet plays an important role i prevention and treatment of constipation.
- High fiber diet helps reducing the sudden increase in blood glucose level after a meal.
- Reduce blood- cholesterol level by binding it with bile salts.

Dietary fibers

It helps to control all metabolic disorders associated with over nutrition such as obesity, atherosclerosis, hyper cholesterolaemia and diabetes mellitus.

In humans there is no appreciable digestion of dietary fibers

Eg: cellulose, hemi cellulose and lignin etc. due to absence of certain micro organisms in GIT which breaks down these substance.

Defecation

Voiding of feces is known as defecation.

Feces is formed in the large intestine and stored in sigmoid colon by the influence of an appropriate stimulus , it is expelled out through the anus. This is prevented by tonic constriction of anal sphincters in the absence of the stimulus.

Defecation Reflex

The mass movement drives the feces in to sigmoid/pelvic colon. In the sigmoid colon the feces is stored. The desire for defecation occurs when some feces enters rectum due to the mass movement . usually the desire for defecation is elicited by an increase in the intra rectal pressure to about 20-25cm water.

The usual stimulus for defecation is intake of liquid like coffee/ tea/water but it differs from person to person.

Pathway for Defecation Reflex

The afferent impulses travel in pelvic nerves and induce reflex parasympathetic discharge over the pelvic splanchic nerve to cause:

a) Inhibition (relaxation) of internal anal sphincter and,

b) Inhibition of discharge in somatic pudendal nerve this relaxes the external anal sphincter.

Voluntary Defecation

- Before the pressure that relaxes the external anal sphincter is reached, voluntary defecation can be initiated by voluntarily relaxing the external anal sphincter and contracting the abdominal muscles. thus aiding the reflex emptying of the distended rectum.
- Defecation reflex therefore a spinal reflex that can be voluntarily facilitated by relaxing the external anal sphincter and contracting the abdominal muscle.

(Here excitatory sympathetic innervations of internal anal sphincter are not involved, only the sacral segment of the spinal cord is concerned.)

In infants, defecation is a simple spinal reflex.

Anal sphincters

1) Internal 2) External

Internal/Involuntary Anal Sphincter

It consists of thickening of circular smooth muscle at pelvic-rectal flexure and is inverted by,

a) Parasympathetic pelvic splanchnic nerve are inhibitory.

b) Sympathetic nerves are excitatory. This sphincter relaxes when the rectum is distended.

External/voluntary Anal Sphincter

- It consists of somatic skeletal muscle it is inverted by pudendal nerve and is maintained in a state of tonic contraction. mild to moderate distention of rectum increases the force of its contraction, where as moderately severe distention of rectum relaxes it.
- The first urge to defecation occurs when rectal pressure increase to about 20mmHg by stimulation of receptors in the rectal wall. when the rectal pressure increase to about 55mmHg, both the anal sphincters relaxand the contents of the rectum are expelled.

14. Swedavaha Srotas :-

Acc to charakacharya it is the 13th srothas.

As we all know sweda is considered as one of the waste product of the body.

It is formed because of the meda which is undergoing paka inside the body.

It is important to eliminate the sweda thus formed out of the body.

Mula

स्वेद वहानां स्रोतसां मेदो मूलं लोमकूपश्च

Adipose tissue and hair follicle are the sites of origin of sweda vaha srothas.

Dushti Lakshana

प्रदुष्टानां तु खल्वेषामिदं विषेश विज्ञानं भवति तथ्यथा अस्वेदनमतिस्वेदनं। पारुष्यमतिश्लक्ष्णतामन्गस्य परिदाहं लोमहर्षश्च च दृष्ट्वा स्वेदवहन्यस्य स्रोतांसि प्रदुष्टानिति विध्यात्। (Cha vim)

The symptoms manifested due to vitiation of channels of sweda is-

Asweda	: No perspiration
Atisweda	: Excessive perspiration
Parushya	: Roughness of the skin
Athislakshna	: Excessive smoothness
Angasya paridaham	: Burning sensation of body part
Lomaharsha	: Falling of hair

Dushti Karana

व्यायामादतिसंतापाच्छीतोष्णाक्रम सेवनात्। स्वेदवाहिनि दुष्यन्ति क्रोधशोकभयेस्तथा।। (च.वि.)

Sweda vaha sroths get vitiated due to following causes-

Ati vyayama: Excessive exercise

Ati athapa sevana: Excessive exposure to sun

Thiksna ushna anna sevanath: Intake of corrosive, hot stems.

Skin

We all know that skin is one of the important sensory organ.It is responsible for both protection and sensory perception.Skin is considered as the largest organ of our body. Also it plays an important role in the metabolic function of our body. Skin has got three layers. They are as follows epidermis, dermis and hypodermis. These three layers are formed one after other respectively. These layers have their own function to provide on the basis of both sensory and protection.

Epidermis

It is the outer most layer of the skin. It is avascular and it is nourished by diffusion from the dermis it contain four principle layer of cells. They are as follows keratinocyte, melanocyte, langerhans cell and merkel cell.

Epidermis layer of the skin is divided in to five sub layers they are-

- Stratum corneum
- Stratum lucidum
- Stratum granulosum
- Stratum spinosum
- Stratum basale

Dermis

It is the layer between the epidermis and the subcutaneous tissue that consists of- connective tissue and cushions the body from stress and strain. It consist of two layers the superficial area adjacent to the epidermis is called the papillary region and deeper thicker area is called the reticular dermis.

It is composed of three types of cell they are - matrix, elastin and glycosaminoglycans. The sebaceous gland and sweat gland present in the reticular layer of the dermis.

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Accesory Structures of Skin

The accessory structures of skin are the structures that develop from the epidermis of an embryo. They are- Skin gland, Hair and nail. Hair and nail protects the body and sweat gland helps in regulate body temperature.

Skin Glands: There are three types of skin gland they are sweat gland sebaceous gland and ceraminous gland.Sebaceous gland secretes sebum secretary protein. It is present in the dermis, usually opens in to the neck of hair follicle.

Sweat Glands: They are small tubular structures of the skin that produce sweat. They are of two types they are- eccrine and apocrine sweat gland.

Eccrine gland	Appocrine gland
Present throughout skin	Present in axilla, pubic region
It regulates body temperature	Stimulates during emotional stress and sex
Onset is soon after birth	
Function throughout life	Non functional till puberty
Functions under nervous control	Functions under hormonal control

Adipose Tissue

Derived from fibroblast that are specialized for storage of triglycerides as large centrally located drop let fills up with a single large triglyceride drop let and cytoplasm and the nucleolus are pushed to periphery. As a result of this the weight of the adipose tissue increases and a new blood vessel. Thus an observe person has many blood vessels then does a normal person.

It is the thick layer under the skin, around the kidneys and in the buttocks.

More generally it is found at the same locations throughout body areolar connective tissue.

Functions of Adipose Tissue

- It act as an insulating layer and help to reduce heat loss through skin.
- It also has protective functions, providing mechanical protection and support around some major organ.

- It is also meant for energy storage

Mechanism of Body Temperature Regulation

When body temperature increases, blood temperature also increases.

↓

Thermo receptors stimulates in the brain

↓

The heat center bring the temperature back to normal by 2 mechanism

↓

1. Promotion of heat loss, 2. Prevention of heat production

↓

It stimulates the sweat gland and increases the elimination of heat

15. Manovaha Srotas :-

The Manovaha Srotas has not been separately mentioned in Charaka Samhita. It is however stated that the entire sentient body represents the abode of the manas and therefore all srotases of the body can be considered as the manovaha srotases.The manovaha srotases transport either the manas or the information related to it.

- शिरस्तात्वन्तरगतम् सर्वेइन्द्रियपरम् मनः। (Bhe. chi. 8/2)

Since Bhela has clearly stated the location of the manas is the Shiras, hence it is to be assumed that these xîÎìÂiìxìcarry the information related to manas.

स्थान of Manas

- Acc. To chakrapani - हृदयाश्रितत्वान्मनस: Manas is located in the हृदय.
- Acc. To Bhela - शिरस्तात्वन्तरगतम् सर्वेइन्द्रियपरम् मनः। (Bhe.chi.8/2) It is located in the shiras.
- Acc. To Bhela - चित्तम् हृदयसम्श्रितम् Location of manas is in हृदय.
- The स्थान of manas as हृदय. requires further explanation.
- A close study of functions of manas clearly indicates that manas is located in the shiras only, but not in हृदय, and that it may function as हृदय in receiving information and transmitting that information to respective areas.
- The reference of Manovaha Srotas is found in the description of psychological disorders in the Ayurvedic Classics.

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- The Manovaha Srotas has been described as follows in the Madhukosha commentary of Madhava Nidana.

मनोवहानि स्रोतांस्मि यद्यपि पृथक्प्रोक्तानिदा धमन्यो मनोवहा अभिधीयन्ते।

उन्मर्गमागता विमार्गमागता मनोवह धमनीरनुप्राप्ताम्।।

Madhukosha stated that although the separate anatomical description of manovaha srotas is not found, dasha dhamanis might be considered as channels of manas.

i.e. Dasha dhamani which are rooted to the ṛËSrì may be considered as manovaha srotas.

मनोवहानाम् पुर्णत्वात् दोषैरति बलैस्त्रिभिः। स्रोतसाम् दारुणान् कालेपयति दारुणे।। (च.चि.५/४१)

When the manovaha srotas are filled with the exceedingly aggravated tri doshas, one sees terrific dreams in ominous situations.

- **Ref. in Charaka chikitsa sthana**

तैरल्पसत्वस्य मलाः प्रदुष्टा बुद्धेर्निवासम् हृदयम् प्रदूष्य।
स्रोतांस्यधिष्ठाय मनोवाहिनि प्रमोहयन्त्याशु नरस्य चेतः।। (च.चि. ९/५)

In the samprapti of unmada, charaka has mentioned about the manovaha srotas.

प्रकुपित वातादि दोष (अल्पसत्व व्यक्ति)

dushta doshas goes to hrdaya and travel up and gets

↓

lodged in manovaha srotas.

↓

Then it goes and affects the manas.

↓

Ultimately causes unmada.

मनोवहा स्रोतो दुष्टि कारण

- Affliction of the mind by the predominance of rajas and tamas
- Intake of unwholesome and unclean diet, viruddha aahara, or food touched by the unclean hands of the person suffering from contagious disease.
- Neglecting the prescribed dietic rules.
- When the manas is afflicted with emotional stress.

मनोवहा स्रोतो दुष्टि lakshana

- There will not be proper perception of knowledge.
- The person may suffer from dhi, dhriti, and smriti bhrama.
- The vitiation of manovaha srotases causes unmada and apasmara.
- The person sees terrific dreams.
- The vitiation of manovaha srotases may also cause disease related to pranavaha, annavaha, udakavaha etc. srotases. (psychosomatic diseases).

What is Mind?

- A mind is the complex of knowing or perceiving faculties that enables consciousness, thinking, reasoning, perception, and judgment. Some people think that the mind is the brain or some other part or function of the body, but it is not true. The brain is a physical object that can be seen with the eyes and that can be photographed or operated by surgery. While the mind on the other hand is not a physical object, it cannot be seen with the eyes, nor it can be photographed or repaired by surgery. Therefore the brain is not the mind but simply a part of the body. There is nothing within the body that can be identified as being our mind because our body and mind are different entities. E.g:- Sometimes when our body is relaxed, our mind can be very busy thinking about different topics. This indicates that our body & mind are not same entity.

In the Buddhist Scriptures, our body is compared to a guest house, and our mind as a guest who is dwelling in it.When we die our mind leaves our body and goes to the next life, just like a guest leaving a guest house and going somewhere else.So in simple words "Mind is a formless continuum that functions to perceive and understand objects.

Psychology

- "The scientific study of behavioral and mental processes is known as psychology.
- Here, behavior consist of wide range of observable actions, from simple movements like blinking, pointing, nodding etc. to a

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very complex activities like eating, writing, talking, driving etc. While the mental processes includes perception, thoughts, memories, expectations, desires and feelings etc.

Relation Between Physical & Mental Health

- Mental health and physical health are fundamentally linked. People living with a mental illness are at greater risk of experiencing a wide range of physical health problems. The reverse relationship is also true: people living with chronic physical health conditions may experience depression, anxiety etc.

Why do mental and physical health conditions co-exist?

Both mind and body are affected by biological and emotional changes, as well as by social factors such as income and housing. These three pathways of biology, illness experience, and the social determinants of health can increase the likelihood of someone living with a mental illness or chronic physical condition developing a co-existing condition.

Relation of doshas of mind and body

Acc. To sharangdhar Samhita.

- Satwa Pitta
- Rajas Vata
- Tamas Kapha

The Subconscious Mind

Think of the subconscious mind as the storage room of everything that is currently not in your conscious mind. The subconscious mind stores all of your previous life experiences, your beliefs, your memories, your skills, all situations you've been through and all images you've ever seen.

Conclusion

By this we can conclude that the दश धमनी which are located in हृदय can be considered as Manovaha Srotas. By the above explainations we can conclude that the mind and the brain are different entity.And by the Explanations given by the Acharya's like Charapani, bhela, shela etc. we can conclude that the sthana of manas is shiras or hrdaya, but a close study of functions of manas says that shiras is the sthana of manas, hence we can conclude that the

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Chapter- 2

VYADHI VIGYANA

1. Definition, synonyms and classification of Vyadhi & Vyadhi Ghatak

Introduction

इहखलु पुरुषोणनुपहतसत्वबुद्दिपौरुषपराक्रमेण हितमिह चामुष्मिंश्च लोके समनुपश्यता तिस्र एषणाः पर्येष्टिव्या भवन्ति। तद्यता-प्राणैषणा धनैषणा परलोकैषणेति। (च.सू. ११/१३)

Dharma, Artha, Kaama, Moksha are chaturvidha purushaarthas.

For attainment of above one should have desire towards three aspects viz Praana Dhana and Paraloka.

There are lot many interruptions on the path of fulfillment of above.

Disease or vyadhi manifestation is one such interruption.

To get through this there evolved Trisutra Ayurveda consisting of Hetu, Linga & Aushadha. Knowledge of hetu and linga comprises Roga Nidana or diagnosis of disease which helps Aushadha.

Definition of Vyadhi

Introduction

The different types of causitive agents enters the body and interact with dosha, dhatu, Mala. As result the body elements will undergo vriddi, kshaya, prakopa, pradosha etc type of dushti and leads to disease or Vyadhi which is expressed in the form of pain or suffering (symptoms)

विकारो धातुवैषम्यं साम्यं प्रकृतिरुच्यते। (Ca.Su. 1/4)

The stage of dis equilibrium of doshas and dhatus is called as Vikara which is abnormal, the stage of equilibrium is Prakruthi which is physiological.

तद् दुःखसंयोगो व्याधय उच्यते। (Ca.Su. 1/23)

The one which brings all the miseries is called as Vyadhi.

रोगस्तु दोषवैषम्यं दोषसाम्यमारोगता (A.Hu.Su. 1/20)

The abnormal fluctuation of dosha beyond the physiological limitation is called as roga, the normal state of dosha is arogya.

दोषदूष्यसम्मूर्च्छना जनितो व्याधि (One Ni.)

The interaction of abnormal dosha with abnormal dushya the resultant is called as Vyadhi.

तथाविध दोषदूष्यसम्मूर्च्छनावस्थाविशेषो ज्वरादि रुपो व्याधि (Ma.N.)

The nidana will produce various types of dushti of doshas. Doshas inturn exploit dushyas. Both dosha & dushya combine together and affect any organ of the body & dostroy its function. As a result various features or symptoms like jwara will manifest. Such entity is called as vyadhi.

विविधं दुःखमादधाति इति व्याधि।

The one which gives different types of pain & suffering is called as vyadhi.

Synonyms of Vyadhi

तत्र व्याधिरामयो गद आतङ्को यक्ष्मा ज्वरो विकारो रोग इत्यर्थान्तरम् (Ca.Ni.1/5)

आमय	: All diseases (Nija) are originated due to Ama.
गद	: Accumulation of toxins/poisons make disease.
आतङ्क	: That which produces fear of death, pain & suffering.
यक्ष्मा	: It may be very complex due to presents or association of too many symptoms.
ज्वर	: The first disease to evolve in mankind.
विकार	: Anything that brings abnormal
रोग	: That which gives pain

रोगः पाप्मा ज्वरो व्याधिर्विकारो दुःखमामयः।
यक्ष्मा आतङ्कगदाबाध शब्दः पर्यायवाचिनः।। (A.huNid.1/1)

पाप्म	: Resultant of पापकर्म or bad deeds done in past or present life.
दुःख	: The one which gives sorrow.
आबाध	: That which gives trouble.

Sushrutha has classified chiefly vyadhi in 3 broad classifications.

1. Adhyatmika : derived from Adi + Atmika that means disease originating from atma gunas (shareera, dosha, dhatu, mala, avayava, manas)

- Adibala pravrutta
- Janmabala pravrutta
- Doshabala pravrutta

2. Adiboutika : derived from bhoutika which means from physical injuries of external cause.

- Shastra krit
- Vyaala krit

3. Adidaivika : derived from those force which is beyond human influence or control.

- Kala bala pravrutta
- Daivabala pravrutta
- Swabhavabala pravrutta

Adibala Pavrutta Vyadhi:

तत्र आदिबलप्रवृत्ता ये शुक्रशोणितदोषान्वयाः।
कुष्ठार्शः प्रभृतयः तेऽपि द्विविधाः मातृजाः पितृजाः। (सु.सू. २४/५)

If both shukra and sonitha becomes nasta there is no praja but any part of either shukra or shonitha (beeja bhaaga) is diseased or roga grastha then there will be praja but with some pathological manifestations.

Which particular avayava of beeja bhaaga is abnormal the respective anga developing from that beeja bhaagavayava becomes diseased.

स्त्रीपुंसयोः कुष्ठ दोषाद दुष्टशोणितशुक्रयोः।
यदपत्यं तयोर्जातं ज्ञेयं तदपि कुष्ठितम्। (सु.नि. ५/२८)

Among stree or purusha in their shonita or shukra respectively if there is dushti that can produce kushta then the progeny also gets kushta. Therefore it is of two types.

1. Matruja - inherited from female or mother to progeny
2. Pitruja - inerited from male or father to progeny.

Janmabala Pravrutta Vyadhi:

जन्मबलप्रवृता ये मातुरपचारात् पङ्गु जात्यन्ध बधिर मूक मिन्मिन वामन प्रभृतयो जायन्ते।
तेऽपि द्विविधा रसकृत दौहृदापचारकृताश्च।

This disease will be present in the individual right from birth. It is caused due to garbhakaleena apachara by garbhini stree. i.e. mithyaahara and vihaara that cause garbha vyapath leading to inadequate nourishment and abnormal growth of the foetus giving rise to life long disease and disability. This may bring up with

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congenital anomalies. Some of the manifestations in janmabala pravrutta vyadhi are pangu (locomotor dysfunction), badira (deafness), mooka (dumb), minmina (stammering) vaamana (dwarf structure). As the name suggests it is inborn disorder that can be caused due to Teretogens. Teratogens can lead to agenesis, aplasia, hypoplasia to the foetus during intra uterine life.

It is again sub devided into

1. Rasakruta - The foetus gets oxygen and nourishment from Rasa of Matru (mother) through garbha nadi. If the rasa supplied by mother is less or inadequate and contaminated or poor in quality then the growing foetus suffers from growth retatdation.

मातुस्तु खलु रसवहायां नाड्यां गर्भनाभिनाडी प्रतिबद्धा सास्य मातुराहार रसवीर्यमभिवहति।
तेनोपस्नेहनास्याभिवृद्धिर्भवति असङ्घाताङ्गप्रत्यङ्गप्रविभागमानिषेकात् प्रभृति।
सर्वशरीरावयवानुसारिणीनां रसवहानां (तिर्यग्गतानण्) धमनीनामुपस्नेहो जीवयति।(सु.शा.३/३९)

2. Douhrudapacharaja - The condition during pregnancy where there are two functioning hearts (that is - one functioning heart of mother and one functioning heart of foetus) is called as douhrudavastha. During this stage various longings are expressed from mother. These longings represent the likes of foetus or nutritional need and demand from the body. Such longings are to be fulfilled by mother. If not it causes douhrudapachara or douhrudavamana leading to foetal distress and disease.

Dosabala Pravrutha Vyadhi

दोषबलप्रवृत्ता ये आतंकसमुत्पन्ना । मित्थ्याहाराचारकृताश्च तेऽपि द्विविधा।।
आमाशयसमुत्थाः पक्वाशयसमुत्थाश्च । पुनश्च द्विविधाः सारीरमानसाश्च।। (सु.सू. २४/५)

This is a variety of disease due to doshavaishamya caused by consumption of mithya ahara and vihara by an indivisual. This is acquired disease which is not based on heredity of regiemen of mother during pregnancy. It is again subdivided into

1. Amashaya samutta : Disease originating from amashaya (includes respiratiory, cardiovascular and upper GIT structures) eg; kasa, chardi, hridroga
2. Pakwashaya samutta : disease originating from pakwashaya (includes lower GIT, excretory, reproductive and nervous system.) eg; atisara, mutrakruchra, pakshagata.

Again Subdivided into

1. Shareerika - Somatic or physical disorders

2. Manasika- psychological disorder (eg unmade, apasmara, vishada)

All these are adhyatmika vikaras

Adiboutika

Sanghatabala Pravrutta Vikara

भूतेष्वधिकृत्य यत्प्रवर्तते तद् आदिभौतिकम्

Human being, animal, bird or such physical agents producing dhukka is adiboutika. The external factors causing injury to the body. It is also called as sanghatabala pravrutta vyaadhi i.e. due to injury. The injury may be due to agni, shastra from any prahara or attack and accident. It is again devided into shastrakrut and vyala krut.

आगन्तुरोगाः ये भूतविषवायु अग्निसम्प्रहारादिसम्भवाः नृणामागन्तवो रोगाः।

- Shastra krit - injury due to sharp instruments.
- Vyaala krit - injury due to bite of animals.

Adidaivika

This is becauses of those forces which are beyond human access, influence or control. The disease caused due to bad deeds done in present or past life are giving its effect back in the form of disease or suffering. It also due to effect of curse or wrath of Gods, elders, teachers or divine people. Adidaivika vikaras can also be produces as result of invasion of evil spirits.

निर्दिष्टं दैवशब्देन कर्मयत् पौर्वदैहिकम्।
हेतुस्तदपि कालेन रोगाणामुपलभ्यते। (च.शा. १/११६)
दैव प्राक्तनं कर्माधिकृत्य वर्तते इत्याधिदैवं तत्र भूतं इत्याधिदैविकमङ्ग। (डल्हण)
दैवबलप्रवृत्ता ये देवद्रोहादभिश्प्तका अथर्वणकृता उपसर्गजाश्च। (सु.सू. २४/७)
त्रयो मलाः भूताभिषङ्गात् कुप्यन्ति।

This can be classified into :

1. Vidyudadashanikruta- hit from thunder blot, electric injury
2. Pishachadi kruta- Invasion of evil spirits inside the body.

तेऽपि द्विविधा विद्युदशनिकृताः पिशाचादिकृताश्च। पुनश्च द्विविधा संसर्गजा आकस्मिकाश्च।

Again it is of two varieties :

1. Samsargaja- communicable disease from person to person transmitting from sexual contact, direct transmission, physical contact, inhalation, sharing utensils, cloths, jewels and cosmatics.

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प्रसङ्गात् गात्रसंस्पर्शात् श्वासात्सहभोजनात्। सहशय्यांऽऽसनच्चैव वस्त्रमाल्यानुलेपनात्।
कुष्टं जरश्च शोषश्च नेत्राभिष्यन्दव् एव च। औपसर्गिकरोगाश्च सङ्क्रामन्ति नरन्नरम्।।(सु.नि.५/३३-३४)

2. Aaakasmika - All of sudden, accidental, unexpected and unexplainable

आकस्मिकाः संसर्गजव्यतिरिक्त आधिदैविका। अपरिदृश्यमानहेतुतया आकस्मिका भज्यन्ते। (सु.सू. २४/७)

Kaala bala pravrutta

The disease caused due to climatic variations, weather impact, natural calamities due to excessive or inadequate seasonal manifestations.

कालर्थकर्मणां योगो हीनमिथ्यातिमात्रकः। सम्यग्योगश्च विज्ञेयो रोगारोग्यैककारणम्।।

It is due to hinayoga (inadequate manifestation of seasonal feature eg: less or no rainfall during rainy season), mithya yoga (abnormal seasonal qualities eg- rainfall in winter season), atiyoga (excessive seasonal manifestation eg ; too heavy rain fall in rainy season or too intence and sharp dry sun in summer).

कालबलप्रवृत्ता ये शीतोष्णवातवर्षातपप्रभृतिनिमित्ताः। (सु.सू. २४/७)
शीतोष्णवर्षलक्षणाः पुनर्हेमन्तग्रीष्मवर्षाः संवत्सराः। (च.सू. ११/४२)

This undue variation of sheeta, ushna climate during summer, rainy, winter season, movement of wind and intensity of sun gives kala bala pravrutta roga. It can cause Janapadodwamsa.

Swabavabala pravrutta

This is a variety of disease caused due to very human nature. There are few natural qualities which tend to cause disease without much outer influence. These disease are un avoidable.

स्वभावबलप्रवृत्ताः क्षुत्पिपासाजरामृत्युनिद्राप्रभृतयः। (सु.सू. २४/८)
तेऽपिद्विविधाःकाल्कृता अकालकृताश्च।

Those natural qualities or components are-

1. Kshut - hunger (if this kshut vega is not answeres or kshut is unmanifested it causes disease). It is due to kshut vega person eats food and hence gets nourished. If njo hunger then poor nourishment deplets the body.
2. Pipasa - thirst (to hydrate the body and maintain water balance and homeostasis). Absence of pipasa may give dehydration and death.

3. Jara - Oldage or aging process. Degeneration of tissues, organs, damage to vital physiology takes the patient to death.
4. Mruthyu - Death

तत्र परिरक्षणकृताः कालकृताः अपरिरक्षणकृताः अकालकृताः। (सु.सू. २४/८)

it is of two types again
1. Kalaja- according to time
2. Akalaja- untimely or prematurely (eg premature againg, death at young age before completion of life span).

क्षुत्- कार्श्यदौर्बल्यवैवर्ण्यमङ्गमर्दोऽरुचिभ्रम।
पिपास- कण्ठस्यशोषोबादियश्रमः सादो हृदि व्यथा।
निद्रा- जृम्भाऽङ्गमर्दस्तन्द्रा च शिरोरोगाऽक्षिगौरवम् निद्राविधाअणात्तत्र..... (च.सू. ७)

Santarpanajanya Vikara

The diseases caused due to over nourishment comes under ati santarpanajanya vikaras. Body needs energy for functioning or working. The energy is provided by carbohydrates, protein mainly through dietary supplement. Adequate food supply and apt breakdown of calories keeps the body sound. But when food supply becomes too much and no breakdown of ingested carbohydrates and proteins takes place then storage in the formof fat is the ultimate end. Fat storage continues and gives rise to various ailments called as santarpanotta vikaras.

Nidana of Santarpana janya vikaras:

संतर्पयति यः स्निग्धैर्मधुरैर्गुरुपिच्छिलैः।
नवान्नैर्नवमद्यैश्च मांसैश्चानूपवारिजैः।।
गौरसैर्गौडिकैश्चानैः पैषटिकैश्चातिमात्रशः।
चेष्टाद्वेषी दिवस्वप्नशय्यासनसुखे रतः।। (च.सू. २३/३,४)

Consumption of excessive oily, sweet, heavy, slimy foods. Freshly harvested rice, freach alcohol beverages, meat of marshy and aquatic in origin. Milk and milk products, Sugarcane products, baked foods. All these have high carbohudrates, proteins and fat in excess. They are high calorie food stuffs. If these calories are not burnt by metabolism and physical stress then they are stored as fats.

The sedentary life will not allow burning of calories. Less physical movements, day sleeping, always sitting or sleeping leads accumulation of fat. This will result in atisantarpana. The diseases causes due to atisantarpana are as follows:

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रोगस्तस्योपजायन्ते सन्तर्पणनिमित्तजाः। प्रमेहपिडकाकोटकण्डूपाण्डूवामयज्वराः।।
कुष्ठान्यामप्रदोषाश्च मूत्रकृच्छ्रमरोचकः। तन्द्रा क्लैब्यमतिस्थौल्यमालस्यं गुरुगात्रत।।
इन्द्रियस्रोतसाम् लेपः बुद्देर्मोहः प्रमीलकः। शोफश्चैवंविधाश्चान्ये शीघ्रमप्रतिकुर्वत।।(च.सु.२३/२६)

Prameha and prameha pidakas, various kinds of skin lesions, and rashes, pandu, jwara, kushta and other ailments of ama. Diseases of urinary system, loss of taste, lazyness, infertility, obesity, lethargy, heaviness of body. Unclear indriyas due to accumulation of mala in their patway, diminished alertness and diminished higher mental functions. Sluggish circulation and altered cutaneous sensorium. Oedema of various types.

Apatarpanotta Vikara

Disease caused due to under nourishment or poor nourishment. It can be caused due to inadequate dietary suppliments, chronic disease, usage of strong medecines.

वक्ष्यन्ते सौषधाश्चोर्ध्वमपतर्पणजा गदा। देहाग्निबलवर्णौजःशुक्रमांसपरिक्षयः।।
ज्वर कासानिबन्धश्च पार्श्वशूलमरोचक। श्रोत्रदौर्बल्यमुन्मादः प्रलपो हृदय व्यथाः।।
विन्मूत्रसंगः शूलं जंघोरुत्रिकसम्श्रयम्। पर्वास्थिसन्धिभेदश्च ये चान्ये वातजा गदाः।।
उर्ध्ववातादयः सर्वे जायन्ते ते अपतर्पणात्।। (च.सु. २३/२८-२९)

Any thing that cause kshaya of body, agni comes under apatarpana. Decreasing of bala due to dhatu kshaya and ojokshaya. The patient becomes lean and debilitated. Due to poor bala the immunity may decrease. Frequently patient becomes prone for jwara, kasa, parshwashoola, arocaka. Dourbalya of all the indriyas due to dhatu kshaya. This decreases satwabala of patient and cause unmada, pralapa and hrudaya vyatha. Less or dry stools and poor excretion. Pain in low back, thighs,pelvic region. Degeneration of asti causes pain in parva, sandhi and all bones. Patient is prone for any vata vikaras as Vata dosha dominates in क्षय (kshaya).

Samanya and Nanatmaja Vikara

The disease produced by dushti of one single dosha only. That dushta dosha will not combine with other dosha to produce disease or symptom. Such diseases are named as Nanatmaja roga.

It is derive from

Na + anatmaja

Atmaja gunas are Vata, pitta, kapha, manasika doshas. Anatmaja means devoid of atmaja. Therefore with combination of Na it again means absence of Anatmaja, which again is inferred as

Na+Anatmaja = Atmaja. From this equation Nanatmaja is evolved. Thus nanatmaja means kevala eka doshaja, originated from one singu dosha.

There are 80 vataja nanatmaja vikaras, 40 pittaja nanatmaja vikaras, 20 kaphaja nanatmaja vikaras.

तत्र सामान्यजा ये पृथक् समस्तैर्वा दोषैः क्रियन्ते, नानात्मजा विशेषजा ये नियतेनैव दोषेण क्रियते। (रत्नप्रभा तीक)
सामान्यजा इति वातादिभिः प्रत्येकम् मिलितैश्च ये जन्यते।
नानात्मजा इति ये वातादिभिर्दोषान्तरासंपृक्तैर्जन्यन्ते।। (चक्रपाणि च.सू. २०/११)

On the contrary there are diseases called Samanya vikaras which is produced by combination, mutual association of two or three doshas by permutation and combination (samsarga-dwidoshaja, sannipataja - tridoshaja). Thus one can say that samanya vikaras are due to association of two or three doshas together, but nanatmaja vikaras are produced by single and independent dosha (eka doshaja).

2. Criteria for nomenclature of Diseases in Ayurveda (Vyadhinamakarana)

The disease are known through their clinical features. But there are multiple clinical features in a disease. Therefore there is a need of naming a disease to identify. Vyadhi Namakaran Siddhanta means naming the vyadhi on certain criteria.

- त एवापरिसंख्येया भिद्यमाना भवन्ति हि। रुजावर्णसमुत्थानस्थानसंस्थाननामभिः।।
(च.सू. १८/४२)

The disease is named with certain paremeters or criteria E.g. Based on Prakriti, adhistana or samsthana, laxana, samuthana or hetu, varna, ruja, adrishya, aakriti etc.

- विकाराः पुनप्रिसंख्येयाः, प्रकृत्यधिष्ठानलिङ्गयतनविकल्प विशेषापरि-संख्येयत्वात्।।(च.सू.२०/३)

Based on Prakriti

It is the nearest cause for the Vyadhi (sannikrishta karana).

- On the basis of vyadhi prakriti - 1. Vataja vyadhi

Ex.
- Vata rakta,
- Vata kantaka,
- Pakshagata,
- Grudrasi
- Apabahuka,
- Ardita etc.

On the basis of vyadhi prakriti - 2.Pittaja vyadhi

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Ex. • Pittaja jwara, • Pittaja grahani,
• Pittaja arsha, Pittaja apasmara etc
• On the basis of vyadhi prakriti - kapha.

Ex. • Dhamani pratichaya, • Sthoulya,
• Granthi, • Kaphaja unmada,
• Kaphaja arsha etc. Based on Adhistana

2. The Naming can be done According to Sthana or Site of Manifestation

- Grahani
- Charmakila
- Manyastamba
- Hanugraha
- Hridroga
- Shira shoola
- Urusthambha

3. Based on Lakshana/linga or Clinical Features

Based on prathyatmaka lakshana naming can be done

- Athisara----गुदेन बहुद्रवसरणमतिसार
  It means the sarana which take place in the adhik pramana. The characterized features of athisara.
- Chardi--- छादयति मुखम् अर्दयति चाङगनीति छर्दि:
  Chardi that which comes out through mouth and which causes discomfort to sharira.
- Kasa---- "कासनं कास इति वा, भिन्नस्वर: कासति शुष्कमेव"
  One which makes the sound of the bhina kansya is called kasa, because of its featurers it is called kasa.
- Hikka--- "हिगिति कृत्वा कायति शब्दायते इति हिक्का"
  One which makes the sound like hikka.
- Alasaka---- आमाशयेऽलसीभूतस्तेन् सोऽलसक: स्मृत:
  Stasis in amashaya which neither moves upwards or downwards
- Mutrakruchra----मूत्रस्य कृच्छ्रेण महता दु:खेन प्रवृति:मूत्रकृच्छम।
  Passing of urine with great difficulty.

4. Based on Samuttana or Cause of the Particular Disease

A very particular causes leads to that particular disease only.

Ex.

- Krimija hrid roga is chiefly causes due to krimi.

- Saahas janya rajayakshma is caused due to excessive physical exertion or sahasa.
- Madhyaj trishna caused due to excessive and improper intake of madhya.
- Mritika janya pandu caused typically due to mrudbhakshana.

5. Based on Varna

Namakarana of vyadhi on the basis of varna that is color imparted on any of body parts like twak, nakha, nayana, mutra or pureesha.

Ex. • Haridra Meha • Manjistha meha

- Pandu----पाण्डुना वक्ष्यमाणहरितादिवर्णेभ्य: प्रधानेन वर्णेनोपलक्षितो रोग: पण्डुरोग:
  Pandu roga indicates varna pradhana roga like harithadi varna

6. Based on Ruja or Pain

Variety of disease depending on severity, intensity, nature of pain.

- Arsha----अरिवत् प्राणान् शृणाति हिनस्तीत्यर्थ:
  That which tortures body and mind just like enemies
- Sula----शङकुस्फोटनवत्तस्य यस्मात्तीव्रा हि वेदना।
  Pain experienced as if being pierced with of a cone or exploding nature.
- Visuchika----सूचीभिरैव गात्राणि भिनत्तीति विसूचिका
  Pricking type of pain experienced all over body

7. Based on Sadrusha or Simulation

Naming the vyadhi on the basis of resembalance of structure with any other material.

- Manjistha Meha- color of urine resembles to the color of Manjishta.
- Kroshtuka shirsha---क्रोष्टुकशीर्षवत शृगालमस्तकवत् स्थूल:
  The part of affected limb resembles similar to head of the fox.
- Gridhrsi---गृधवत चलति इति गृध्रसी
  The gait of the affected person resembles to the gait of the vulture.

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8. Based on Akruti or Shape

- Namakarana of vyadhi on the basis of aakriti.

Ex. • Masurika--- मसूरिकाकृति संताना: पिडका:स्युः मसूरिका:
Shape of the pidakas will be like masura dala

- Dhanu sthambha---धनुस्तुल्यं नमेद्यस्तु स धनु:स्तम्भसंज्ञक:
Body will bend like a bow in dhanu sthambha

3. Bija, Bija Bhaga and Bija Bhaga Avayava Dushti

यस्य यस्य अङ्गावयवास्य बीजे बीजभग उपतप्तो भवति।
तस्य तस्याङ्गवयवस्य विकृतिरुपजायते नोपजायते चतुपातापीतात्। (च.शा. ३/१८)

Which ever part in beja or beejabhaga gets abnormal, the structures originated from that abnormal beeja or beeja bhaga or beeja bhaga arayava will be in dusta valtha. If both shukra & shonita becomes nasta there is no praja.

- If both shukra and sonitha becomes nasta there is no praja but any part of either shukra or shonitha (beeja bhaaga) is diseased or roga grastha then there will be praja but with some pathological manifestations.
- If particular avayava of beeja bhaaga is abnormal the respective anga developing from that beeja bhaagavayava becomes diseased.

Interpretation

Hereditary disease or disease caused due to abnormal chromosomal structures or numbers may come under this group. Abnormalities of structure of chromosomes like deletion, translocation, inversion, ring formation.

It is an incurable but preventable disease

जातप्रमेही मधुमेहिनो वा। न साध्यः उक्तः स हि बीजदोषात्।
ये चऽपि केचित् कुलजा विकारा भवन्ति ताश्च प्रवदन्त्यसाध्यात्। (Cha. chi. 6/57)

Disease of beeja dushti is never curable. In jatapramehi there is beeja dushti. Such diseases run within the family.

4. Basic knowledge of Hereditary, Congenital, Acquired, Multifactorial, Traumatic and Environmental disorders

The word hereditary refers to transmission of genetic characters from parents to offsprings. Cells or organism acquire the characteristics of its parent cell or organism. It also transmits traits from parents and their ancestors. Many elements can associate transmission example-physical characters, mental attributes, behavioral patterns and also illness. It depends upon the segregation and recombination of genes during meiosis and fertilization which results in genesis of new individual similar to others of its kind but exhibiting certain varieties resulting from particular mix of genes and its interaction with the environment.

Genes are made from long molecules called DNA which is copied and inherited across generations. DNA is made up of simple units that line up in particular order of letters on page carries information. The language used by DNA is called genetic code which allows the genetic machinery to read the information in the genes in triplet sets of codons. This information is the instructions for constructing and operating a living organism.

This gene may possess error. Thus genetic disease is caused by single error in a single gene in our DNA. The effects of the disease depend upon what that gene was supposed to do. Everyone has two copies of each gene. One copy on each of the chromosome pair and some disease require both copies to be damaged(recessive gene) and some need only one gene copy damaged (dominant gene). In recessive disease genetic error usually needs to be inherited from both parents to get the disease and in dominant disease error need only be inherited from one parent in order to get the disease. The word carrier refers to an error in genes is present but the individual does not possess any symptoms.

Classification

1. X-linked disease : These are due to errors in genes in the X chromosomes.
2. Autosomal disaease : Caused by errors in genes on the non sex chromosomes (that is other 22 chromosomes)

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4. Major Classes of Genetic Disease with Different Inherent Patterns.

1. Autosomal recessive genetic disease: disease occurs when both copies of a gene on chromosome 1-22 is inherited from both parents eg: cystic fibrosis, phenyl ketonuria, sickle cell anaemia, albinism, taysachs galactosemia.
2. Autosomal dominant genetic disease: disease occurs when a single damaged copy of a gene on chromosome 1-22 inherited from either parent. The bad copy dominate the other good copy eg- huntongton's disease, achondroplasia (dwarfism).
3. X-linked recessive genetic disease : one gene error on X chromosomes cause disease n men(who have only one copy of X) eg- hemophilia, duchenne muscular atropy.
4. X-linked dominant genetic disease: A single gene error on the X chromosome cause disease in both men and women. Men have only 1 copy of X and in woman are XX. The bad copy dominates the good copy. X linked dominant are much rarer than X linked recessive gene.

Conclusion

Sometimes even an autosomal dominant disease can arise surprisely when neither parent has the disease. This can be due to mutation or germinal mosaicism.

All types of genetic disease occur at birth. It will be inherited from parents through DNA, cannot be caught later on in life. Genetic tests can determine whether or not a person has the disease, even as early as in fetus by antenatal testing for genetic disease.

Sickle cell anaemia, Down's syndrome, color blindness such 4,100 genetic diseases are identified. This has no treatment. Some are less burdensome. It is always associated with medical maladies and short life span.

Congenital Diseases

It is a condition tat exists right from birth and often before birth. The defect may develop during first month of life (neonatal disease). Of these disease those charecterised by structural deformities are called as congenital anomalies and involve defects in or damage to developing fetus. A congenital disorder may be the

result of genetic anomalies, uterine environment, errors of morpogenesis, infection or inherited metabolic disorder and rare disease a chromosomal abnormality. The outcome of disease may depend upon complex interaction between prenatal deficit and post natal environment. Eg; mucopoly saccharoidosis, down syndrome, phenyl ketonutria, osteogenesis imperfecta, hyperammonia.

Multifactorial Disease

They are caused not by a single gene mutation, but by a combination of genetic and environmental factor working together in wage. They involve variations in multiple genes often coupled with environmental causes. Eg; Alzheimers disease, obesity, hypertension, Diabetes mellitus, infertility, ischemic heart disease, irritable bowel syndrome.

Acquired Disorder

These are the disease incurred as result of factors acting from or originating outside the organism, not inherited. That develops after birth or develops in response to an antigen. Pertaining to characteristic, condition or disease originating after birth not caused by hereditary or developmental factors but caused by reaction due to environmental influences like food, air, human resources etc outside the organism.

Traumatic disease

These are the disease caused due to external factors that cause injury or trauma to the organism. Trauma can be due to physical agents like attack by sharp or blunt instrument, road traffic accidents, thermal or electric injury, chemical injury. A serious injury or shock to the body, as from violence or an accident. It may also cause post traumatic stress or neurosis. The range of disease may vary from disease to deformity or disability.

Environmental Disease

Environmental pathology encompass all such disease caused by progressive deterioration in the environment, most of which are man made. The causes may be population explosion, urbanization, deforestation, accumulation of waste and unsatisfactory disposal of radioactive waste, industrial effluents, automobile exhausts domestic wastes. Among them most affecting environmental cause to human health are use of tobacco, alcohol consumption and intoxicant drugs.

1. Environmental pollution : Air pollution due to various gases like carbon monoxide, sulphur dioxide, carbon dioxide, nitrous

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oxide, coal and so on produce asbestose lung, silicosis, pneumoconiosis, cancer of lung. This depends upon duration of exposure, dose of inhalation, and particle size (1-5mm) gases like carbon monoxide are produced by incomplete combustion of carbon. Its sources are automobile exaust, burning fossil, fuel industry, home and tobacco smoke. It causes accidental death due to systemic oxygen deprivation of tissues, it mixes with hemoglobin producing carboxyhemoglobin which leads to hypoxia, oedema and petechial hemorrhage.

2. Tobacco consumption: This causes coronary heart disease, cancer of oral cavity, aero digestive system, and lung. It also causes COPD, Peptic ulcer, vascular disease, cancer of pancreas, urinary bladder and kidney. In pregnant this leads to low birth weight of fetus, perinatal mortality and intellectual deterioration of new born in non pregnant woman it causes premenopausal and post menopausal syndrome.

3. Alcoholism: chronic alcoholism is defined as regular imbibing of an amount of ethyl alcohol that is sufficient to harm an individual physically, psychologically and socially. Acute alcoholism has impact on following organs.

   a. CNS: depression, disordered cortical function, motor ataxia, behavioral changes. These changes occur when blood alcohol levels not more than 100mg/dl. If it raches 100-200mg/dl the impacts are depression of cortical center, lack of coordination, impaired judgment, and drowsiness. Blood alcohol level at 300mg/dl causes stupor and coma. Blood alcohol at 400mg/dl can cause anesthesia, depression of medullary center and death due to respiratory arrest.

   b. Stomach : Vomiting, acute gastritis and peptic ulceration

   c. Liver : cirrhosis, fatty liver.

   d. Pancreas: chronic calcifying pancreatitis, acute pancreatitis.

   e. GIT : Gastriris, Peptic ulceration, esophageal varesis, massive GI bleeding.

   f. CVS : Cardiomegaly, beer drinkers myocardiosis, wit dialated cardiomyopathy.

   g. Endocrine system: testicular atropy, feminization, loss of libido and potency, gyenecomastia and decreased testicular levels.

   h. Hemopoietic system : Megaloblastic anemia, decreased efficiency of immune system.

4. Drug abuse: narcotics, sedatives, tranquilizers or barbiturates, psychedelics (enjoyable - perception giving) inhalants are few variants of drugs which are addictive. They cause effective adverse action on psychosomatic system of abuser. It causes focal glomerulonephritis, talc granuloma formation in lung. They are CNS depressants in long run causing significant degenerative changes in brain and nervous system. Dependence or withdrawal causes agitation, restlessness, tremors, insomnia and behavioral changes. Overdose will cause irreversible damage and also may turn fatal.

5. Environmental chemicals: Insecticides, pesticides, fertilizers of various forms are used for agricultural purpose and lots of synthetic food colors, flavors and preservatives are used in food industry. The accumulation of these chemicals in body can cause severe damage to consumer. Organo phosphorous compounds, voletile organic solvents, metals, aromatic hydrocarbons, cyanide, environmental dust all these can harm any system of our body to severe extend. Skin ailments, respiratory distress, premature aging, musculo skeletal weakness, sensory defecits, birth defects, mental retardation, physical deformity are various presentation of usage of such elements.

6. Thermal and electrical injury : Temperature below 35 degree centigrade is considered as hypothermia and above 41 degree Celsius as hyperthermia. Hazards due to hypothermia are focal injury as in frost bite, chill blaints, claudication, systemic injury and death. Hyper thermia can manifest in the form of thermal burns, heat exhaustion, heat stroke. Severe sweating, cramps, shock are some of its presentations.

7. Radiation injury : radiation injury can happen due to exposure to radiation by ultra violet rays, X rays, electromagnetic and infrared radiation. Among them hazards by X-ray and ultra violet rays are more significant. Acute cell killing, malignant transformation of cell, genetic damage by mutation which passes genetic defects to next generation or next progeny of

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cell. Ionizing radiation is widely used in diagnostic purpose as well as for radiotherapy of malignant tumors. Radiation induced cell death is mediated by radiolysis of water in the cell with generation of toxic hydroxyl radicals. During radiotherapy, some normal cells coming in the field of radiations are also damaged. In general radiation induced tissue injury predominantly affects endothelial cells of small arteries and arterioles causing necrosis and ischemia. Some of its hazards are seen as follows.

a. Skin : Radiation dermatitis, cutaneous carcinoma,
b. Lungs : interstitial pulmonary fibrosis
c. Heart : myocardial fibrosis, constrictive pericarditis
d. Kidney : Radiation nephritis
e. GIT: Strictures of small bowel and esophagus
f. Gonads : testicular atropy in males and destruction of ovaries in females.
g. Hemopoietic system : Bone marrow depression
h. Eye : cataract

Ultra violet rays : acute skin injury as sunburns, cutaneous cancer, solar keratosis. Non iodizing radiations like electromagnetic radiation produced by microwave ovens, radio, diathermy, ultra sound do not produce tissue damage.

5. Introduction to ICD Classification of Diseases of WHO and DSM classification

"A classification of diseases can be defined as a system of categories to which morbid entities are assigned according to established criteria. The purpose of the ICD is to permit the systematic recording, analysis, interpretation and comparison of mortality and morbidity data collected in different countries or areas and at different times. The ICD is used to translate diagnoses of diseases and other health problems from words into an alphanumeric code, which permits easy storage, retrieval and analysis of the data".

ICD-10 represents International Statistical Classification of Diseases and Related Health Problems.

It can, therefore, be used to classify data recorded under headings such as "diagnosis", "reason for admission", "conditions treated" and "reason for consultation", which appear on a wide variety of health records from which statistics and other health-situation information are derived.

Complexity and Importance

- International Classification of Disease has multi-dimensional purpose and usage. This has made the classification most complex.
- It has become the international standard diagnostic classification for all general epidemiological and many health management purposes.
- ICD helps in analysis of the general health situation of population groups and the monitoring of the incidence and prevalence of diseases and other health problems recorded on many types of health and vital records.

Development of ICD - 10

- Work on the Tenth Revision of the ICD started in September 1983 when a Preparatory Meeting on ICD-10 was convened in Geneva. The programme of work was guided by regular meetings of Heads of WHO Collaborating Centres for Classification of Diseases. Policy guidance was provided by a number of special meetings including those of the Expert Committee on the International Classification of Diseases
- Meeting for Tenth Revision was held in 1984 and 1987.

Arrangement of Volumes of ICD-10

- Volume 1: Main classifications
- Volume 2: Instruction/Guidance to users
- Volume 3: Alphabetical Index
- ICD-10 has 21 chapters against 17 Chapters in ICD-9

Chapters of ICD-10

- Chapters I to XVII : Diseases and other morbid conditions

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- Chapter XVIII: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified.
- Chapter XIX: Injuries, poisoning and certain other external causes.
- Chapter XX: External causes of morbidity and mortality
- Chapter XXI: Factors influencing health status and contact with health services.

Structure and Principles of ICD

- Originally conceived by William Farr
- The Classification is grouped as below:
- Epidemic diseases
- Constitutional or general diseases
- Local diseases arranged by site
- Developmental diseases
- Injuries.

The Arrangement of Chapters

1. Certain infectious and parasitic diseases
2. Neoplasms
3. Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
4. Endocrine, nutritional and metabolic diseases
5. Mental and behavioral disorders
6. Diseases of the nervous system
7. Diseases of the eye and adnexa
8. Diseases of the ear and mastoid process
9. Diseases of the circulatory system
10. Diseases of the respiratory system
11. Diseases of the digestive system
12. Diseases of the skin and subcutaneous tissue
13. Diseases of the musculoskeletal system and connective tissue
14. Diseases of the genitourinary system
15. Pregnancy, childbirth and the puerperium

16. Certain conditions originating in the perinatal period
17. Congenital malformations, deformations and chromosomal abnormalities
18. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
19. Injury, poisoning and certain other consequences of external causes
20. External causes of morbidity and mortality
21. Factors influencing health status and contact with health services
22. Codes for special purposes

WHO: Help-Line

There are nine WHO Collaborating Centres for Classification of Diseases, who assist countries with problems encountered in the development and use of health-related classifications and, in particular, in the use of the ICD.

Ref: Australia, England and USA for English knowing countries. Besides, there are at France, Russia, China, Venezuela Sweden, Brazil

Problem Encountered

- Size of the Classification
- No formal training
- No user-friendly software to guide
- No abridged Classification of Diseases based on Indian condition & requirement
- No Online Help-line system

Diagnostic and Statistical Manual of Mental Disorders

DSM-V Diagnostic and Statistical Manual of Mental Disorders is the planned fifth edition of the American Psychiatric Association's (APA)

In 1999, a DSM-5 Research Planning Conference; sponsored jointly by APA and the National Institute of Mental Health (NIMH), was held to set the research priorities. There were six workgroups, each focusing on a broad topic:

- Nomenclature,

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- Neuroscience and Genetics,
- Developmental Issues and Diagnosis,
- Personality and Relational Disorders,
- Mental Disorders and Disability, and
- Cross-Cultural Issues.

First Draft Diagnostic Criteria of Psychotic Disorders

1. The recommendation of new categories for learning disorders and a single diagnostic category, "autism spectrum disorders" that will incorporate the current diagnoses of autistic disorders, Asperger syndrome, childhood disintegrative disorder and pervasive developmental disorder (not otherwise specified). Work group members have also recommended that the diagnostic term "mental retardation" be changed to "intellectual disability," bringing the DSM criteria into alignment with terminology used by other disciplines.
2. Eliminating the current categories substance abuse and dependence, replacing them with the new category "addiction and related disorders." This will include substance use disorders, with each drug identified in its own category. Eliminating the category of dependence will better differentiate between the compulsive drug-seeking behavior of addiction and normal responses of tolerance and withdrawal that some patients experience when using prescribed medications that affect the central nervous system.
3. Creating a new category of "behavioral addictions," in which gambling will be the sole disorder. Internet addiction was considered for this category, but work group members decided there was insufficient research data to do so, so they recommended it be included in the manual's appendix instead, with a goal of encouraging additional study.
4. New suicide scales for adults and adolescents to help clinicians identify those individuals most at risk, with a goal of enhancing interventions across a broad range of mental disorders; the scales include research-based criteria such as impulsive behavior and heavy drinking in teens.
5. Consideration of a new "risk syndromes" category, with information to help clinicians identify earlier stages of some serious mental disorders, such as neurocognitive disorder (dementia) and psychosis.

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6. A proposed new diagnostic category, temper dysregulation with dysphoria (TDD), within the Mood Disorders section of the manual. The new criteria are based on a decade of research on severe mood dysregulation, and may help clinicians better differentiate children with these symptoms from those with bipolar disorder or oppositional defiant disorder.
7. New recognition of binge eating disorder and improved criteria for anorexia nervosa and bulimia nervosa, as well as recommended changes in the definitions of some eating disorders now described as beginning in infancy and childhood to emphasize that they may also develop in older individuals.

Dimensional Assessments

In addition to proposed changes to specific diagnostic criteria, the APA is proposing that "dimensional assessments" be added to diagnostic evaluations of mental disorders. These would permit clinicians to evaluate the severity of symptoms, as well as take into account "crosscutting" symptoms.

Careful Consideration of Gender, Race and Ethnicity

The process for developing the proposed diagnostic criteria for DSM-5 has included careful consideration of how gender, race and ethnicity may affect the diagnosis of mental illness.

Proposed changes to DSM-IV diagnoses

Asperger Syndrome

Asperger syndrome will be eliminated as a separate disorder, and merged under autism spectrum disorders (ASD). Under the new classification, clinicians would rate the severity of clinical presentation of ASD as severe, moderate or mild.

Attention Deficit Hyperactivity Disorder

There has been a proposal to increase the diagnostic criteria for the age when symptoms became present. The proposal would change the diagnostic criteria from symptoms being present before seven years of age to symptoms being present before twelve years of age. The new diagnostic criteria would be Several noticeable inattentive or hyperactive-impulsive symptoms were present by age 12

Bipolar Disorder

There have been proposals to include further and more accurate sub-typing for bipolar disorder. There have been proposals for more

stringent criteria for the diagnosis of bipolar disorder in children with a new diagnosis temper dysregulation disorder with dysphoria proposed.

Depression

While currently grief is only considered a sign of depression if two months have elapsed since the death of a loved one, the new version would allow for diagnosis within the first few weeks.

Dissociative Identity Disorder

Proposed changes to the controversial dissociative identity disorder diagnosis include adding a new diagnostic criterion: "C. Causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Gender Identity Disorder

Gender Identity Disorder (GID) will be renamed "Gender Dysphoria" in the DSM 5. Along with these changes comes the creation of a separate Gender Dysphoria in Children as well as one for Adults and Adolescents.

Hypersexual Disorder

Hypersexual Disorder is proposed as a new category to be added. The diagnosis would apply when a person experiences several of the indicated symptoms (extreme amounts of time spent in the sexual activity, using the sexual activity in response to low mood or stress, failed attempts to reduce the behaviors, etc. Moreover, it would apply only when the problem lasted six months or more, when person experienced significant distress or impairment in major life areas because of it, and when the problem was not directly caused by a medication or drugs, as well as other criteria. The label "hypersexual disorder" was reportedly chosen because it did not imply any specific theory for what causes hypersexuality, which remains unknown.

Oppositional Defiant Disorder

It is proposed that the eight symptoms of Oppositional Defiant Disorder should be divided into the following categories: Angry/ Irritable Mood; Defiant/Headstrong Behavior; and Vindictiveness. However, just as in the DSM-IV-TR, four of these symptoms need to be present to meet diagnostic criteria. The minimum four symptoms can come from all (or even just one or two) of the three

categories. It is proposed that a section be added to the diagnostic criteria for Oppositional Defiant Disorder stating that for children under 5 years of age, oppositional behavior "must occur on most days for a period of at least six months". For children 5 years or older, oppositional behavior "must occur at least once per week for at least six months".

Personality Disorders

Major changes have been proposed in the assessment and diagnosis of personality disorders. These include a revamped definition of personality disorder and a dimensional rather than a categorical approach based on the severity of dysfunctional personality trait domains (negative emotionality, introversion, antagonism, disinhibition, compulsivity, and schizotypy). In addition, patients would be assessed on how much they match each of six prototypic personality disorder.

Pica

It is proposed that Pica is reclassified from the "Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence" classification to the "Eating Disorders" classification. It is proposed that the wording of "non-food substances" be added alongside the current DSM-IV-TR wording of "non-nutritive substances". "Non-food" was added to further clarify that items consumed are not just merely lacking nutrients

Post Traumatic Stress Disorder

Various criteria changes are proposed.

Schizophrenia

The following Schizophrenia subtypes are proposed for removal from DSM-5. :

- 295.30 Schizophrenia - Paranoid Type
- 295.10 Schizophrenia - Disorganized Type
- 295.20 Schizophrenia - Catatonic Type
- 295.90 Schizophrenia - Undifferentiated Type
- 295.60 Schizophrenia - Residual Type

Somatoform Disorder

Additional proposed somatoform disorders are:

- Abridged somatization disorder - at least 4 unexplained somatic complaints in men and 6 in women.

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- Multisomatoform disorder - at least 3 unexplained somatic complaints from the PRIME-MD scale for at least 2 years of active symptoms.
  These disorders have been proposed because the recognized somatoform disorders are either too restrictive or too broad. In a study of 119 primary care patients.

Proposed New Diagnoses

The proposed DSM-5 new diagnoses include the following:

- Complex post-traumatic stress disorder
- Depressive personality disorder
- Compulsive hoarding
- Olfactory Reference Syndrome
- Negativistic (passive-aggressive) personality disorder
- Relational disorder
- Skin Picking Disorder
- Sluggish cognitive tempo
- Binge Eating

6. Samanyaja and Nanatmaja Vikara, Nidanarthakara Vyadhi, Hetu Sankara, Lingasankara, Vyadhisankara, Vyadhi Awastha

तत्र विकाराः सामान्यजाः नानात्मजाश्च तत्र सामान्यजाः पूर्वमष्टोदरीये व्याख्याताः नानात्मजांस्त्विहाध्यायेऽनुव्याख्यास्यामः तद्यथा–अशीतिर्वातविकाराः चत्वारिंशत् पित्तविकाराः विंशतिः श्लेष्मविकाराः १० (Ca. su. 20)

Samanya Vikaras

These are causes due to single dosha or by combination of two or three doshas depending on etiological factors and their interaction with dhatus.

Classification of disease having 8 types :

इह खल्वष्टावुदराणि अष्टौ मूत्राघाताः अष्टौ क्षीरदोषाः अष्टौ रेतोदोषाः

1. Eight types of udara- Vataja, pittaja, Kaphaja, sannipataja, Yakrut and pleehodara (together), baddagudodara, chidrodara, Jalodara.

अष्टावुदराणीति वातपित्तकफसन्निपातप्लीहबद्धच्छिद्रदकोदराणि

2. Eight type of mootraaghata- Vataja, Pittaja, Kaphaja, Sannipataja, Ashmarija, Sharkaraja, Shukraja, Shonotaja.

त्राघाता इति वातपित्तकफसन्निपाताश्मरीशर्कराशुक्रशोणितजाः अष्टौ

3. Eight types of ksheera doshas- Vaivatnya, Vaigandhya, Vairasya, paicchilya, Phenasanghata, Roukshya, gourava, Bahu sneha.

दोषा इति वैवर्ण्यं वैगन्ध्यं वैरस्यं पैच्छिल्यं फेनसङ्घातो रौक्ष्यं गौरवमतिस्नेहश्च अष्टौ रेतोदोषा इति तनु शुष्कं फेनिलमश्वेतं पूत्यतिपिच्छलमन्यधातूपहितमवसादि च।।१।।

4. Eight types of retadosha- Tanu, Shushka, Phenila, Ashweta, Pooti, Piccila, Anyadhatu upahita, Avasaadi.

Classification Based on Seven Types

1. Seven types of Kushtas- Kapala, mandala, Audumbara, Rushyajivha, Pundarika, kakanaka, Sidhma.

सप्त कुष्ठानीति कपालोदुम्बरमण्डलर्ष्यजिह्वपुण्डरीकसिध्यकाकणानि

2. Seven types of Pidakas- Sharavcika, Kacchapika, Jalini, Sarshapi, Alaji, Vinata, Vidhradhi.

पिड़का इति शराविका कच्छपिका जालिनी सर्षप्यलजी विनता विद्रधी च।

3. Seven types of Visarpa- Vataja, Pittaja, Kaphaja, Sannipataja, Agni, Kardama, Granti.

सप्त विसर्पा इति वातपित्तकफाग्निकर्दमकग्रन्थिसन्निपाताख्याः

Classification of disease having six types

1. Six types of Atisaara- Vataja, Pittaja,Kaphaja, Sannipataja, Bhayaja, Shokaja.

षडतीसारा इति वातपित्तकफसन्निपातभयशोकजाः षडुदावर्ता इति वातमूत्रपुरीषशुक्रच्छर्दिक्षवथुजाः।।३।।

2. Six types of Udavarta- Vataja, Mootraja, Pureeshaja, Shukraja, Chardi, Kshavathuja.

Classification of disease having 5 types

1. Five types of gulma : Vataja, Pittaja, Kapaja, Sannipataja, Raktaja.

पञ्च गुल्मा इति वातपित्तकफसन्निपातशोणितजाः।

2. Five types of Pliharoga - Vataja, Pittaja, Kapaja, Sannipataja, Raktaja.

वातपित्तकफसन्निपातशोणितजाः पञ्च प्लीहदोषा इति

3. Five types of Kasa- Vataja, Pittaja, Kaphaja, Kshataja, Kshayaja

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पञ्च कासा इति वातपित्तकफक्षतक्षयजाः।

4. Five types of Shwasa- Maha shwasa, urdwa shwasa, china shwasa, tamaka shwasa, kshudra shwasa.

महोर्ध्वच्छिन्नतमकक्षुद्राः पञ्च

5. Five types of hicca- Mahahicca, gambheera hicca, Vyapeta hicca, Kshudra Hicca, Annaja Hicca.

पञ्च हिक्का इति महती गम्भीरा व्यपेता क्षुद्राऽन्नजा च।

6. Five types of trushna - Vataja, Pittaja, Amaja, kshayaja, upasargaja

पञ्च तृष्णा इति वातपित्तामक्षयोपसंसर्गात्मिकाः।

7. Five types of chardi- Vataja, pittaja, Kapaja, Sannipataja, Dwishtarthasamyogaja

पञ्च छर्दय इति द्विष्टार्थ-संयो गजा वातपित्तकफसन्निपातोद्रेकोत्थाश्च

8. Five types of Arocaka- Vataja Pittaja, kaphaja, sannipataja, Dveshaja.

पञ्च भक्तस्यानशनस्थानामीति वातपित्तकफसन्निपातद्वेषाः

9. Five types of shiroroga - Vataja, Pittaja, kaphaja, Sannipataja, Krimija.

पञ्च शिरोरोगा इति पूर्वेद्दिशमभिसमस्य वातपित्तकफसन्निपातक्रिमिजाः

10. Five types of hridroga - Vataja, Pittaja, kaphaja, Sannipataja, Krimija.

पञ्च हृद्रोगा इति शिरोरोगैर्व्याख्याताः।

11. Five types of Pandu- Vataja, Pittaja, kaphaja, Sannipataja, Mrudbhakshanaja.

पञ्च पाण्ड रोगा इति वातपित्तकफसन्निपातमृद्भक्षणजाः

12. Five types of Unmada- Vataja, Pittaja, Kapaja, Sannipataja, Agantuja.

पञ्चोन्मादा इति वातपित्तकफ सन्निपातागन्तुनिमित्ताः

Classification of Diseases of Four Types

1. Four types of Apasmara- Vataja, Pittaja, Kaphaja, Sannipataja

चत्वारोऽपस्मारा इति वातपित्तकफसन्निपातनिमित्ताः चत्वारोऽक्षिरोगाश्चत्वारः कर्णरोगाश्चत्वारः प्रतिश्यायाश्चत्वारो मुखरोगाश्चत्वारो ग्रहणीदोषाश्चत्वारो मदाश्चत्वारो मूर्च्छाया इत्यपस्मारैर्व्याख्याताः चत्वारः शोषा इति साहससन्धारणक्षयविषमाशनजाः चत्वारि क्लैव्यानीति बीजोपघाताद्ध्वजभङ्गाज्जरायाः शुक्रक्षयाश्च।।५।।

2. Four types of netra roga- Vataja, Pittaja, Kaphaja, Sannipataja
3. Four types of karna roga- Vataja , Pittaja,Kaphaja, Sannipataja

4. Four types of prathishyaya- Vataja, Pittaja, Kaphaja, Sannipataja.
5. Four types of mukha roga- Vataja, Pittaja, Kaphaja, Sannipataja
6. Four types of madaroga - Vataja , Pittaja, Kaphaja, Sannipataja
7. Four types of grahani- Vataja , Pittaja, Kaphaja, Sannipataja
8. Four types of murcha- Vataja , Pittaja, Kaphaja, Sannipataja
9. Four types of Shosha- Sahasa, Vegadharana, Kshaya, Vishamashana.
10. Four types of Klabya- bijopaghata, dvajabhangaja, jaraja, shukrakshaya

Classification of Diseases of Three Types

त्रयः शोथा इति वातपित्तश्लेष्मनिमित्ताः त्रीणि किलासानीति रक्ताम्रशुक्लानि त्रिविधं लोहितपित्तमिति ऊर्ध्वभागमधोभागमुभयभागं च।।६।।

1. Three Shothas- Vataja , Pittaja, Kaphaja
2. Three types of Khilasa- Rakta, Tamra, Shukla
3. Thre types of Rakta pitta- Urdhwaga, Adhoga, ubhayaga

Classification of disease of two types.

द्वौ ज्वराविति उष्णाभिप्रायः शीतसमुत्थश्च शीताभिप्रायश्चोष्णसमुत्थः द्वौ व्रणाविति निजश्चागन्तुश्च द्वावार्शसाविति बाह्यश्चाभ्यन्तरश्च द्वे गृध्रस्याविति वाताद्वातकफाश्च द्वे कामले इति कोष्ठाश्रया शाखाश्रया च द्विविधमाममिति अलसको विसूचिका च द्विविधं वातरक्तमिति गम्भीरमुत्तानं च द्विविधान्यर्शांसीति शुष्काणायार्द्राणि च।।७।।(Ca.su.19)

1. Two types of jwara- Ushnabhipraya- Sheetabhipraya, sheetabhipraya- Ushna samutta.
2. Two types of vrunas- Nija, Agantu.
3. Two types of Ayaama- Antarayama, bahirayama.
4. Two types of Grudrasi- vataja, vatasleshmaja.
5. Two Ama- Alasaka, Vishuchika.
6. Two vatarakta- Uttana, Gambeera.
7. Two arshas- Sushka, Ardra.

Classification of disease of one type

एक ऊरुस्तम्भ इत्यामत्रिदोषसमुत्थः एकः संन्यास इति त्रिदोषात्मको मनः-शरीराधिष्ठानः एको महागद इति अतत्त्वाभिनिवेशः।।८।।

1. One Urusthambha- causes by Ama with tridosha
2. One Sanyasa- causes by tridosha in manas and sharira
3. One mahagada- Atatwabhinivesha

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Classification of disease of twenty types

1. Twenty krimi-

विंशतिः कृमिजातय इति यूका पिपीलिकाश्चेति द्विविधा बहिर्मलजाः

Raktaja krimi-Keshada, lomada, romadweepi, sourasa, audumbara, jantumar.

शतादा लोमादा लोमद्वीपाः सौरसा औदुम्बरा जन्तुमातरश्चेति षट् शोणितजाः

Sleshmaja krimi- Antrada, udaraveshta, hrudayada, curu, darbapushpa, sougandhika, Mahaguda.

अन्त्रादा उदरावेष्टा हृदयादाश्चुरचो दर्भपुष्पाः सौगन्धिका महागुदाश्चेति सप्त

Pureeshaja krimi- Kakeruka, makeruka, leliha, sasulaka, sausurada.

ककेरुका मकेरुका लेलिहाः सशूलकाः सौसुरादाश्चेति

and 2 types of bahya krime → यूक & लिक्षा → 20 types

2. Twenty types of prameha-

Ten types of kaphaja meha- udakameha, ikshubalika meha, sandrameha, sandraprasada meha, shukla meha, shukrameha, sitameha, sanaimeha, sikata meha, alala meha.

विंशतिः प्रमेहा इत्यदकमेहश्चेक्षुबालिकारसमेहश्च सान्द्रमेहश्च सान्द्र प्रसादमेहश्च शुक्लमेहश्च शुक्रमेहश्च शीतमेहश्च शनैर्मेहश्च सिकतामेहश्च

Six types of pittaja meha- neelameha, rakta meha, manjista meha, kaalameha, haridra meha.

नीलमेहश्च लोहितमेहश्च मञ्जिष्ठामेहश्च हरिद्रामेहश्चेति षट् पित्तनिमित्ताः

Four types of Vataja meha- Vasameha, Majja meha, hastimeha, madhumeha.

वसा मेहश्च मज्जामेहश्च हस्तिमेहश्च मधुमेहश्चेति चत्वारो वातनिमित्ताः

3. Twenty types of yoni rogas:

तिः प्रमेहाः विंशतिर्योनिव्यापद इति वातिकी पैत्तिकी श्लैष्मिकी सान्निपातिकी चेति चतस्रो दोषजाः दोषद्वन्द्वसंसर्गप्रकृतिनिर्देशैरवशिष्टाः षोडश निर्दिश्यन्ते तद्यथा रक्तयोनिश्चारजस्का चावरणा चातिचरणा च प्राक्चरणा चोपप्लुता च परिप्लुता चोदावर्तिनी च कर्णिनी च पुत्रघ्नी चान्तर्मुखी च सूचीमुखी च शुष्का च वामिनी च षण्ढयोनिश्च महायोनिश्चेति विंशतियोनिव्यापदो भवन्ति।।९।।

Vataja, pittaja, Kaphaja, Raktayoni, Arajaska, Acarana, Aticarana, Prakcharana, Upapluta, Paripluta, Udavartini, Karani, Putraghni, antarmukhi, suci mukhi, suska, Vamini, Shanda yoni, mahayoni.

Nanatmaja Rogas

1. Vataja Nanatmaja Roga:

तत्रादो वातविकाराननुव्याख्यास्यामः

तद्यथा---नखभेदश्च विपादिका च पादशूलं च पादभ्रंशश्च पादसुप्तता च वातखुड्डता च गुल्फग्रहश्च पिण्डिकोद्वेष्टनं च गृध्रसी च जानुभेदश्च जानुविश्लेषश्च ऊरुस्तम्भश्च ऊरुसादश्च पाङ्गुल्यं च गुदभ्रंशश्च गुदार्तिश्च वृषणक्षेपश्च शेफस्तम्भश्च वङ्क्षणानाहश्च श्रोणिभेदश्च विड्भेदश्च उदावर्तश्च खञ्जत्वं च कुब्जत्वं च नामनत्वं च त्रिकग्रहश्च पृष्ठग्रहश्च पार्श्वमर्दश्च उदरावेष्टश्च हृन्माहेश्च हृद् द्रवश्च वक्ष उद्धर्षश्च वक्ष उपरोधश्च वक्षस्तोदश्च बाहुशोषश्च ग्रीवास्तम्भश्च मन्यास्तम्भश्च कण्ठोद्ध्वंसश्च हनुभेदश्च ओष्ठभेदश्च अक्षिभेदश्च दन्तभेदश्च दन्तशैथिल्यं च मूकत्वं च वाक्सङ्गश्च कषायास्यता च मुखशोषश्च अरसज्ञता च प्राणनाशश्च कर्णशूलं च अशब्दश्रवणं च उच्चैः श्रुतिश्च बाधिर्यं च वर्त्मस्तम्भश्च वर्त्मसङ्कोचश्च तिमिरं च अक्षिशूलं च अक्षिव्युदासश्च भ्रूव्युदासश्च शङ्खभेदश्च ललाटभेदश्च शिरोरुक् च केशभूमिस्फुटनं च अर्दितं च एकाङ्गरोगश्च सर्वाङ्गरोगश्च पक्षवधश्च आक्षेपकश्च दण्डकश्च तमश्च भ्रमश्च वेपथुश्च तृष्णा च हिक्का च विषादश्च अतिप्रलापश्च रौक्ष्यं च पारुष्यं च श्यावारुणावभासता च अस्वप्नश्च अनवस्थितचित्तत्वं च इत्यशीतिर्वातविकारा वातविकाराणामपरिसंख्येयानामाविष्कृततमा व्याख्याताः।।१०।। (Ca. su. 20)

Nakhabeda, vipadika, vatasula, paadabramsha, paadasuptata, vatakhuddata, vatagulpha, pindikodweshta, grudrasi, janubedha, januvishlesha, urusthambha, urusaada, pangulya, gudabramsha, gudarti, vrishamkshepa, shephasthamba, vanshananaha, shronibedha, udaavarta, kanjatwa, vidbedha, vaamanatwa, trikagraha, katigraha, prusta graham, parshwashula, udaraveshta, hriddrava, hrinmoksha, vaksha toda, vakshaudgarsha, vakshoparodha, bahososha, greeva sthambha, manya sthambha, kantodhwamsa, hanubedha, ostabedha, akshibedha, talu bedha, danta bedha, danta shaitilya, mukatwa, gadgadatwa, vaakgraha, kashayasyata, mukhasosha, arasajnata, graananaasa, karnasula, ashabdata, ucchaishravana, badiryata, vartmasthambha, vartmasan-cocha, timira, astisula, akshisula, akshivyudasa, bruvyu-dasha, shankhabedha, lalatabedha, siroruk, kesabhumi sputana, ardita, ekangaroga/pakshavada, sarvangaroga, akshepa, dandaka/danda-patanaka, tama, brahma, shrama, vepatu, jrumbha, hikka, vishaada, pralapa, glaani, roukshya, parushya, shyavarunabhasata, aswapna, anavastita chittatwa.

2. Pittaja Nanatmaja Vikara

पित्तविकारांश्चत्वारिंशतमत ऊर्ध्वमनुव्याख्यास्यामः---ओषश्च प्लोषश्च दाहश्च दवथुश्च धूमकश्च अम्लकश्च विदाहश्च अन्तर्दाहश्च असदाहश्च ऊष्माधिक्यं च अतिस्वेदश्च अङ्गस्वेदश्च अङ्गगन्धश्च

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अङ्गावदरणं च शोणितक्लेदश्च मांसक्लेदश्च त्वग्दाहश्च मांसदाहश्च त्वगवदरणं च चर्मदलनं च रक्तकोठश्च रक्तविस्फोटश्च रक्तपित्तं च रक्तमण्डलानि च हरितत्वं च हारिद्रत्वं च नीलिका च कक्षा च कामला च तिक्तास्यता च लोहितगन्धास्य ता च पूतिमुखता च तृष्णाधिक्यं च अतृप्तिश्च आस्यविपाकश्च गलपाकश्च अक्षिपाकश्च गुदपाकश्च मेढ्रपाकश्च जीवादानं च तमः प्रवेशश्च हरितहारिद्रनेत्रमूत्रवर्चस्त्वं च इति चत्वारिंशत्पित्तविकाराः पित्तविकाराणामपरिसंख्येयानामाविष्कृततमा व्याख्याताः।।१४।। (Ca. su 20/14)

Osha, plosha, daha, dhava, davathu, dhumaka, dhumodgaara, malaka, vidaha, antardaha, amsadaha, ushmaadikya, atisweda angagandha, angaavadarana, shonitakleda, maamsakleda, twakdaha, twagavadarana, charmadala, raktakota, raktavispota, raktapitta, raktamandala, haritatwam, haaridratvam, neelika, kakshaa, kamala, tiktasyata, lohitagandhasyata, putimukha, trishnadhikya, atrupti, aasyavipaaka, galapaka, akshipaaka, medrapaka, jeevadaana, tamapravesha, harita haridra netra, mutra and varca

3. Kaphaja Nanatmaja Vikara

श्लेष्मविकारांश्च विंशतिमत ऊर्ध्वं व्याख्यास्यामः तद्यथा---तृप्तिश्च तन्द्रा च निद्राधिक्यं च स्तैमित्यं च गुरुगात्रता च आलस्यं च मुखमाधुर्यं च मुखस्रावश्च श्लेष्मोद्गिरणं च मलस्याधिक्यं च बलासकश्च अपक्तिश्च हृदयोपलेपश्च कण्ठोपलेपश्च धमनीप्रतिचयश्च गलगण्डश्च अतिस्थौल्यं च शीताग्निता च उदर्दश्च श्वेतावभासता च श्वेतमूत्रनेत्रवर्चस्त्वं च इति विंशतिः श्लेष्मविकाराः श्लेष्मविकाराणमपरिसंख्येयानामाविष्कृततमा व्याख्याता भवन्ति।।१७।।

Tripti, tandra, nidradhikya, sthaimitya, gurugaatrata, aalasya, mukhamadurya, sleshmodgirana, maladhikya, balasaka, apakti, hridayopalepa, kantopalepa, dhamanipratichaya, galaganda, atisthoulya, seetagnita, udarda, shwetavabhasata, shwetamutra-netra-varca.

Nija and Agantu Roga

चत्वारो रोगा भवन्ति--आगन्तुवातपित्तश्लेष्मनिमित्ताः तेषां चतुर्णामपि रोगाणां रोगत्वमेकविधं भवति रुक्सामान्यता द्विविधा पुनः प्रकृतिरेषाम् आगन्तुनिजविभागात् द्विविधं चैषामधिष्ठानं मनःशरीरविशेषात् विकाराः पुनरपरिसंख्येयाः प्रकृत्यधिष्ठानलिङ्गायतनविकल्पविशेषपरि-संख्येयत्वात्।।३।। (Ca. su. 20/3)

Every classification of disease has a purpose. Disease may be of one type because in every disease pain, or suffering is common. Based on prakruti it may be of two types that is.

1. Nija- Causes due to dosha dushti like vata, pitta, kapha. The dushti may be in the form of vriddi prakopa, leena, sthambhita and so on. Dosha dushti is out come of varios ahara and viharaja

nidanas with respect to prakruti. Disequilibrium of dosha and association with respective dhatus and malas in particular ashayas give particular niji vikara.

2. Agantu- it is causes due to external agents. Physical trauma by any sharp instruments, contact with poisons, bite of poisonous animals, invasion of evil spirits. Dosha dushti takes place after trauma. In nija vikaras dosha dushti takes place first and then disease manifestation.

Disease becomes innumerable due to variation or taratama in vriddi kshaya of dosha, involment of dhatu, mala. Variation again comes when multiple ashayas, multiple srotas with various dushti prakaras takes place.

Nidanarthakara Rogas

This is the state of progression of pathology where one disease becomes the cause of onset of another disease. In the initial stage the disease will manifest and later on the same disease act as causative factor for the other disease. The disease manifested first will continue to exist even after the manifestation of secondary disease.

निदार्थकरो रोगो रोगस्याप्युपजायते। तद्यथा ज्वरसन्तापाद्रक्तपित्तमुदीर्यते।
रक्तपित्तज्ज्वरस्ताभ्यां शोषश्चाप्युपजायते। प्लीहाभिवृद्ध्यजठरं जठराच्छोथ एवच।
अर्शोभ्यो जाठरं दुःखं गुल्मश्चाप्युपजायते। दिवास्वप्नादिदोषैश्च प्रतिश्यायादयो कासः कासात् सञ्जायते क्षयः।
क्षयोरोगस्य हेतुत्वे शोषस्याप्युपजायते।। (च.नि. ८/१६)

Some of the examples are : jwara when increases excessively in tapa it causes raktapitta. On the contrary Raktapitta cause jwara. Both jwara and raktapitta can cause sosha. Pleehodara or any other variety of udara will lead to jalodara and jalodara causes Sopha. On the other hand Arshas causes both gulma and udara (jatara). From divaswapna etc nidanas Pratishyaya can manifest which in turn lead to kasa. Kasa causes Kshaya. And Kshaya cause Sosha.

ते पूर्व केवला रोगाः पश्चाद्हेत्वर्तकारिणः। उभयार्थकरा दृष्टास्तथैवैकार्थकारिणः।(च.नि.८/२०)
कश्चिद्हि रोगो रोगस्य हेतुर्भूत्वा प्रशाम्यति। न प्रशाम्यति चाप्ययो हेतुत्वं कुरुतेऽपिच।

These disease at first manifest as single disease but in later progression the same disease causes manifestation of another disease. It is again subdivided into two types;

1. Ekarthakari- the primary disesease will discontinue when it

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causes the manifestation of next disease ex: jwara causes raktapitta. After raktapitta is manifested jwara disappears

2. Ubhayarthakari- The primary disease willalso continue after manifestation of another disease. Eg; Jwara causes raktapitta. After manifestation of raktapitta jwara continues to manifest.

Linga Samkara

Lingasamkara is combination of multiple symptom in one single disease. It can also be called as syndrome or symptom complex. Eg : Trirupa, Shad rupa, Ekadasharupa of Rajayakshma.

In this disease multiple systems are involved therefore the disease presents with symptom complex. Respiratory system symptoms like kasa, swarabedha. GIT system complaints like chardi, aruchi, atisara. Musculoskeletal system symptoms like amsa shoola, parvabedha. Hematological symptoms like raktapitta. All these are manifested in single patient from single disease. The number of symptoms may vary from patient to patient on the basis of roga bala and rogi bala.

Hetu, Linga, Vyadhi, Samkara

एको हेतुरनेकस्य तथैकस्यैव एवे हि। व्याधेरेकस्य चानेको बहूनां बहवो अपि च।।
ज्वरभ्रमप्रलापाध्या दृश्यन्ते रूक्षहेतुजाः। रूक्षेणैकेन चाप्येको ज्वर एवोपजायते।।
हेतुभिर्बहूभिश्चैको ज्वरो रूक्षादिभिर्भवेत्। रूक्षादिभिर्ज्वराध्याश्च व्याधयः संभवन्ति हि।।
लिंगं चैकमनेकस्य तथैवैकस्य लक्ष्यते। बहून्येकस्य च व्याधेर्बहूनां स्युर्बहूनि च।।
विषमारम्भमूलानां लिंगमेकं ज्वरो मतः। ज्वरस्यैकस्य चाप्यैकः संतापो लिंगमुच्यते।।
विषमारम्भमूलैश्च ज्वर एको निरुच्यते। लिंगैरेतैर्ज्वरश्चासहिक्काध्याः सन्ति चामयाः।।(च.नि.८/२४-२९)

The functional diversity of nidana or their productivity of disease can occur in 4 ways.

- Single causative factor can cause many disease. Eg : Ruksha guna can produce Jwara, Brama, Pralapa.
- Single cause can produce only one disease eg; Ruksha guna can produce jwara alone.
- Many causative factors can produce one disease- for example ruksha guna, bhotabhishanga, abhigata, vishada can produce jwara.
- Many causative factors produce many disease eg; ahitahara, ativyayama, chinta can cause Jwara, Atisaara, Pandu.

- Similarly one single symptom may be seen in one disease eg: संताप is chief symptoms of jwara.
- Multiple symptom can be seen in one disease eg: Aruchi, angasaada, dourbalya, santapa all can be seen in jwara.
- One common symptom can be seen in many disease ey: ज्वर is seen in Rajayakshma, pittaja vrina, Pittaja pandu, Raktapitta, Vidradhi.
- Many disease may have many manifestations ey: Jwara, shwasa, hicca are seen in Rajayakshma, Raktapitta, Udara, Kumbha-kamala.

Vyadhi Samkara

It is the complex condition where there is combination of many disease or overlapping of multiple disease in a single patient. Two basic causes are attributed to this complex combination. Basically it is due to improper management of existing disease which results in origin of another another disease. This makes treatment more difficult to cure. For example in Ama atisara if sthambana chikitsa is given then the ajeerna anna stays inside the body and later produces anaha, adhmana, shula, grahani roga. The disease has turned from atisara to various other GIT disease of severe form. The combination of atisaara with anaha, adhmana, shula, grahani all in a single patient together is vyadhi samkara. Instead in amatisaara anulomana should be given to eliminate ajeerna anna and ama. If done so there is no turning of disease into complex form. Rather it cures the disease and patient becomes free of symptoms.

एवं कृच्छ्रतमा नृणां दृष्यन्ते व्यधि सङ्करा। प्रयोगापरिशुद्दत्वात्तथा चान्योन्यसंभवात्।।
(च.नि.८/२०-२२)

प्रयोगः शमयेध्व्याधिं यो अन्यमन्यमुदीरयेत्। नासौ विशुद्धः शुद्धस्तु शमयेध्यो न कोपयेन्।।
(च.नि. ८/२२,२३)

Thus the combination of multiple disease together with its symptom is called as Vyadhi samkara.

Vyadhi Avastha

In the body during pathological state when दोष-दूष्य समुर्च्छन take place, it leads to formation of disease. It follows a path consisting of onset duration and progress or retrogression.

As the nidana enter the body it influences doshas and then dushyas. Based on the intensity of nidana and the nature of disease there may be various presentation in every disease. In the period of duration of disease differ rent stages appear due to several factors and they are called the stages of disease or व्याधि अवस्था.

व्याधि अवस्था denotes the changes that occur from time to time in a disease. These changes depend on two opposite force acting on the body.

1. The factors that are responsible for increasing the disease pathology.
2. The forces like व्याधिक्षमत्व and appropriate fulfillment of पादचतुष्य which are helpful in managing and curing disease.

Therefore during approach to the patient, for the diagnosis and treatment the various stages of the disease and its form has to be understood. Therefore a good physician should observe for दूष्यु देश, बल, काल, अनलं, प्रकृति, वयः, सत्व, सात्म्य, आहार and the व्याधि अवस्थ while determining the दोषs and mode of treatment to be adopted.

The factors like दूष्यु देश, बल, काल, अनलं, प्रकृति, वयः, सत्व, सात्म्य, आहार may favour either of these sides. When they are favourable for व्याधि the pathology that will progress and when they are helpfull for treatment disease will subside.

दूष्यं देशं बलं कालमनलं प्रकृतिं वयः । सत्वं सात्म्यं तथाहारमवस्थाश्च पृथग्विधाः ।
सूक्ष्मसूक्ष्माः समीक्ष्यैषां दोषौषधनिरूपणे । यो वर्तते चिकित्सायां न स स्खलति जातुजित् ।
(अ.ह.सू./१२/६६-६७)

Various Vyadhi Avasthas

1. Uttana and Ghambheera Avastha

This refers to the stage of disease that signifies at which dhatu level the disease stays. Does the disease stay in superficial dhatu level or deeper level.

* **उत्तान अवस्थः** Only the superficial dhatus are involved in the samprapti. That is the disease that lies between Rasa, Raktha, Maamsa, Meda dhatus are considered as uttana dhatus. The diseases in this level is called as Uttana dhatu avastha.
* **गम्भीरावस्थाः गम्भईरानुगता इति गम्भीरं मज्जाधातुगत इत्यर्थः ।** (च.सू.२८/७)

Deeper धातु s like meda, Asthi, Majja, Shukra are involved in the samprapti. Susruta said that this stage is called अवगाढ अवस्था. In this stage Massive destruction of deeper dhatus take place.

Eg: उत्तान एवं गम्भीर वातरक्त

When the pradhaana vyadhi limits at twak, it is called as uttaana vatarakta. In this vivarnataa of twak, as well as daha, peeda of twacha is seen. It is twak maamsa asrita.

When the vikruti of vaatarakta spread from mamsa ,meda and deeper dhatus as well as sandhi, it is called as Gambheera vatakta. In this shwayathu, sthabdha, daha, toda spurna, paka are seen.

2. Nava Avastha and Jeerna Avastha

नव or तरुणावस्थाः Newly manifested disease is called as nava. It may varies from disease to disease. In jwara 7 days from the time of manifestation is called as nava avastha.

जीर्णावस्थाः दौर्बल्यात् देहधातूनां ज्वरो जीर्णानुवर्तते । (च.चि. ३/२९१)

जीर्णावस्था is a chronic stage when weakness develop in the Dhatus. Deficient dhatus fail to perform their normal protective function leading to chronicity of the disease.

3. Dosha Paka and Dhatu pakavastha

दोषपाक अवस्था

It is a stage favorable to treatment of disease because aama separated from doshas.

दोषप्रकृति वैकृत्यं लघुता ज्वर देहयोः । इन्द्रियाणां च वैमल्यं दोषाणां पाक लक्षणम् ।।
(मा.नि. २/६६)

AyuTech

This condition is stated to be nirama stage of dosha as a result, diseases either cures completely or symptoms start diminishing gradually or agitated doshas starts coming towards koshta. It is essential stage of recovery of disease.

During dosha paka, certain symptoms will manifest

* The symptoms of the doshas involving in the development of disease start diminishing.
* In case of fever the increased temperature in affected person starts to subside
* As the Ama starts separating from Doshas, dhatus and srotases, the bodywill be relieved from heaviness. Laghuta or sense of relaxation will be produced.
* In the Dushta state of doshas and ama state, the quality of sense organ in response to sensation remain depressed, but in the stage of dosha paka, this depression is removed .The sense organ tends to respond to the sensation and clarity of sense perception is improved.

धातुपाक

धातुपाकाद्धन्ति, मलपाकाद्विमुञ्चतीति व्यवस्थितविकल्पः धातुमल पाकविकल्पे च दैवमेव हेतुः। उत्तरोत्तरोगवृद्धिबलहानिभ्यां शुक्रादिधातुसहितमूत्रादीनां च धातुपाको ज्ञेयः, अन्यथा तु मलपाकः; यदुक्तं निद्रानाशो हृदिस्तम्भो विष्टम्भो गौरवारुचि। अरतिर्बलहानिश्च धातूनां पाकलक्षणम् ।।

धातुपाक & दोषपाक are the two different process responsible for the prognosis of diseases

धातुपाक means worsening of the disease condition due to its advance stage along with loss of streangth (बलहानि) and elimination of शुक्रादि धातुs via मुत्रादि मलs

लक्षण

- निद्रानाश-loss of sleep
- हृदिस्तम्भ-unusual feeling in chest such as pressure, heaviness, constriction etc.
- विष्टम्भ-constipation
- गौरव-heaviness

- अरुचि-anorexia
- अरति-restlessness
- बलहानि-loss of streangth

Dhatupaka causes damage to cell and tissues. This stage is considered to be serious stage in progress of pathogenesis of diseases. Dhatus does not perform their normal function as a result dushti in disease. The physician should attempt to create doshapaka and prevent dhatupaka as much as possible.

Advanced devices of modern technology are very helpful in tracing the symptoms of धातुपाक for example, the presence of albumin in urine suggest मांसधातुपाक,

High level of SGPT in blood is suggestive of धातुपाक of liver tissue. Ketone bodies in urine suggests धातुपाक of मेधोधातु

4. Ama and Niramavastha

Presence of Ama with dosha or in the disease is called as amavastha, dissociation of ama from the same is called as niramavastha. General features of presence of ama in the body that are suggestive of amavastha are:

स्रोतोरोध बलभ्रंश गौखानिलमूढताः । आलस्यपक्तिनिष्ठीवमलसंगारुचिक्लमाः ।
लिङ्गं मलानां सामनं, निरामाणां विपर्ययः । (अ.ह.सू. १३/२३-२४)

* स्रोतोरोध- blockage in srotases
* बलभ्रंश-loss of streangth
* गौरव-heaviness of the body
* अनिलमूढता-blockage in functions of vaata
* आलस्य-laziness
* अपक्ति-indigestion
* निष्ठीव-spitting continiously
* मलसंगा-constipation
* अरुचि-loss of appettite
* क्लमा-weakness

निरामावस्थ

The symptoms are opposite to Amavastha. .ie.lightness of the body, प्रसन्नता of इन्द्रिया, vatanulomana, proper taste perception etc.

सामव्याधि

आमेन तेन संपृक्ता दोषा दूष्याश्च दूषिता। सामा इत्युपदिश्यन्ते येच रोगस्तुदुद्भवाः।। (अ.हृ.सू.)

Apakwa annarasa or apakwa rasadhatu when mixed with dosha and dooshya, it is said to be saama the disease arising due to this is called saamavyadhi.

निराम व्याधि

Lightness of body, प्रसन्नत of इन्द्रिया, वातनुलोमन, proper ruchi & appetite starts to manifest in a disease, such a disease is said to be निराम व्याधि।

5. Antarvegi and Bahirvegi Avastha

अन्तर्वेगी The disease runs within internal enviroments of the body symptoms are vaguely expressed.

अन्तर्दाहो अधिकस्तृष्णा प्रलापः श्वसनं भ्रमः। सन्ध्यस्थिशूलमस्वेदो दोषवर्चोविनिग्रः।। (च.चि. ९/३९)

* अन्तदार्ह-internal burning sensation
* अधिकस्तृष्णा-exessive thirst
* प्रलाप:-delirium
* श्वसनं-dyspnoea
* भ्रम:-gidiness
* सन्ध्यस्थिशूल-pain in bones and joints
* अस्वेद-absence of sweating
* दोषवर्चोविनिग्र:-difficulty in the passage of urine and feaces

Symptoms of pitta and vaata are predominant in this condition.

बहिर्वेगी

सन्तापो अभ्यधिको बाह्यतृष्णादीनं च मार्दवम्। बहिर्वेगस्य लिङ्गानि सुखसाध्यत्वमेव च।।

In this condition,burning sensation occures mainly on skin and not inside the body. All other symptomslike thirst,delirium etc. get diminished and disease become sukha saadhya the disease out busts the symptoms and gets manifested fully with all its intensity.

6. Aashukari and Chirakari

आशुकारी:– The condition of suddden onset and short duration of disease. The disease of Acute onset is called as ashukari.

Eg: visoochikaa, pitta raktaja pravaahika.

चिरकारी: The disease which are chronic in nature are called as chirakari.

चिरस्थित इति देहे विरकालवस्थेन कृतमूलत्वात् कष्टतमो असाध्यः। (च.सू. २८/७)

* Persistence of symptoms for longer period.
* That is why our achaaryas said that if disease become one year old is incurable.
* कृछ्रसाध्य
* **Eg:** kushta, jeernajwara, pakshaagadha, prameha

वृद्धिस्थानक्षयावस्थां रोगणामुपलक्षयेत्। ससूक्ष्मामपि च प्राज्ञे देहग्निबलचेतसाम्। व्याध्यवस्थाविशेषान् हि ज्ञात्वा ज्ञात्वा विचक्षण।

If treatment given after a comprehensive understanding of stage of doshas, condition of body and agni, the mental states and व्याधि अवस्था, vaidya will attain four fold success. The treatment must change according to व्याधि अवस्था . for example in vrina the surgical intervention should not be given in Amavastha. Aharuvadi upanaha is applied to the vrina and awaited for niramata or pakwavastha to undergo bhedana or visravana.

भैषज्यमनवस्थायं पथ्यमाप्यवचारितम्। गुणं न किंचित् कुरुते दोषयेव तु कल्पते।। (काश्यप)

Kashyapa says that if medicine and pathya are admininistered during improper avasthaas, then they produce greater form of dushti of doshas. Hense value and efficasy of treatment depend on a comprehensive and minute knowledge of various avasthaas

A proper knowledge of avasthaas are helpful in preventing the development of more severe stage of disease.

A knowledge of avasthaas also helps in determining the साध्यासाध्यता of the disease.

Treatment becomes successful only after the proper assessment of disease based on अवस्थाs

Treatment may change according to व्याधि अवस्थाs otherwise will leads to complication.

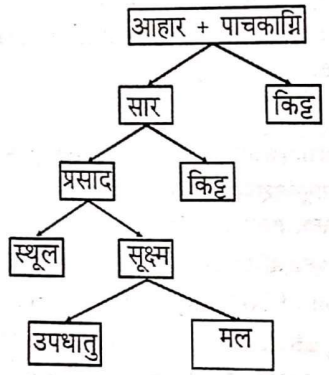
Avu Team

व्याधि अवस्था plays an inevitable role in diagnosis, treatment, as well as prognosis of the disease.

7. Dhatu, Updhatu, Mala and Indriya Pradoshaj Vikara

उपधातुः धातुभ्यश्च उपजयन्ते तस्मात् उपधातवः।

upadhatus are formed from dhatus.



Formation of Upadhatu

रस	स्तन्य	आर्तव
रक्त	कण्डरा	सिरा
मांस	वसा	षट्त्वचा
मेद	स्नायु	

कर्म धारण

- Sthanya provides nourishment and health to the infant
- आर्तव-capable of producing garbha.
- कण्डरा-helps in flexion and extension of the body.
- सिरा-contraction and expansion of bodily organs and vessels to supply essentials.
- वसा-provides lubrication maintain vitality, gives strength.
- त्वचा-covering and protection of body.
- स्नायु-it binds mamsa, asti and medas.

उपधातुप्रदोष विकार

स्नायौ सिराकण्डराभ्यो दुष्टाः क्लिक्ष्नन्ति मानवम्। स्तम्भसंकोचखल्लीभिर्ग्रन्थिस्फुरणसुप्तिभिः।।
(च.सू. २८/२१)

Dushita dosha move to the sthana of upadhatus and causes vikara like- sthamba, (stiffness), sankocha (spasm), khalli (contractures), granthi, (cysts and nodules) sphurana (pulsation or fasiculations) and supti (numbness or parasthesia).

उपधातु प्रदोषज विकार

स्नायौ सिराकण्डराभ्यो दुष्टाः क्लिक्ष्नन्ति मानवम्। स्तम्भसंकोचरवल्लीभिर्ग्रन्थिस्फुरणसुप्तिभिः।।
(Ca.Su. 28/21)

Dushita Doshas will move to sthana of upadhatus that is in snayu, sira, kandara (nerves, tendons ligaments) and cause sthambha (stiffness), sankoch (spasm) khalli (contractures), granthi (cysts and nodules) sphurana (pulsation and fasciculations) and supti (numbness of parasthesia).

Indriya pradoshaja Vikara:

इन्द्रियाणि समाश्रित्य प्रकुप्यन्ति यदा मलाः। उपधातोपतापाभ्यां योजयन्तीन्द्रियाणि।।
(Ca.Su. 28/2)

Dushita doshas will move to wards the sthanas of indriya and cause disease of sense organs in following ways:

1. इन्द्रिय उपघान-विनाश-Destruction
2. इन्द्रिय उताप-विकलाता/कष्ठ-Deformity
3. इन्द्रियाणीति-शरीरावयव गत व्याधि- Diseased sense organ

8. Concept of Ashta Mahagada

Maha roga or Mahagada are such disease which possess qualities like Durvijneya, duschikitsa, dustara, aristakaaraka, daaruna, ghora likewise. That means diseases having multiple symptoms, varied presentation, and association of complications often confuse physician. Thus disease becomes complex to understand and identify, due to complexity treatment and prognosis becomes poor.

Ayurtech

The disease having above features may be seen in arsha, gulma, grahani, vatavyadhi, raktapitta. All such diseases can be clubbed under one umbrella and can be called as MAHAGADA.

महागद इति मारणात्मकत्वादसाध्यावाच्च महत्वमेषामिति (दल) सु.सू. ३३/४)
महरोगाः सुदुस्तराः (अ.ह.नि. ८/३०)
महारोगाः सुदुस्तरत्वादेव तेषां महारोगत्वम्, (भेल.इ. ५/६)
महान् घोरानिष्टकारकः रोगः यद्वा महाजन्मान्तरीणमुक्तविशिष्टातिशयपातकेन जनितः रोगः पापरोगः महरोगेण वा भितप्तः.....

Those disease which are severe, aggressive, complicated and fatal are considered as Mahagada. Mahagada is outcome of papa karma done in past or present life. It is unfortunate to the parient to suffer from pathetic illness.

There are 8 varieties of mahagada and thus named as Astamahagada

वातव्याधिः प्रमेहश्च कुष्टमर्शोभगन्दरम्। अश्मरी मूढगर्भश्च तथेवोदरमष्टमम्।।
अष्टावेते प्रकृत्यैव दुश्चिकित्स्या महगदाः।। (सु.सु. ३३/४)

Neurological disease (vatavyadhi), prameha (urinary disease) kushta (skin diseases). Arsha (piles), bhagandara (fistula), ashmari (caliculi), moodha garbha (dead foetus), udara (ascitis). These 8 disease give hard suffering to patient and these are difficult to cure.

वातव्याध्याश्मरीकुष्टमेहोदरभगन्दराः। अर्शांसि ग्रहणीत्यष्टो महारोगाः सुदुस्तराः।। (अ.ह.नि. ७/३०)

Neurological disease (vatavyadhi), ashmari (caliculi), kushta (skin diseases) prameha (urinary disease) udara (ascitis). bhagandara (fistula) Arsha (piles) grahani (digestive disorders) are called as mahagada which are severe and difficult to cure.

अपस्मारः क्षयः कुष्ट रक्तपित्तमथोदरम्। गुल्मश्चमधुमेहश्च दीर्घरोगा भवन्ति ते।। (भे.इ. ५/६)

Epileptic disorder (apasmara) kshaya (depleting disorder), kusta (skin disease), rakta pitta (bleeding disorder, udara (ascitis) gulma (moveable mass) madhumeha (urinary disorder) and all chronic disease are mahagadas.

The upadravas of mahagadas make disease more worse :

प्राणमांसक्षयः शोषस्त्रुष्णा च्छर्दिज्वरस्तथा। अतिसारश्च मूर्च्छाच हिक्का श्वासस्तथैव च।।
एतैरुपद्रवैर्जुष्टान् सर्वानेव विवर्जयेत्। (सु.सू. ३३/५)

Rogas are associated with decrease of vital signs, muscle bulk, undergo degeneration and depletion, vomiting, fever and loose stools. Diminishion of mental awakeness or fainting, respiratory distress all are considered as complications that take the patient to fatality.

●

9. Introduction to Ashta Nindita

Introduction

- External appearance is gift of god. This gift is influenced by पूर्वजन्मकृत पाप कर्म, बीज, दोष, मातृज अहार विहार during गर्भिणी अवस्था.
- "Guilty should be punished" so the disease or health which we have imbibed is based on deeds done on the past, if any sympathy or concern is shown to the culprit, that person is also considered as criminal, so allow the culprit to receive the punishment which paves the way for karma kshaya.
- Nindita's are those who were not allowed to participate in auspicious ceremony, public gathering or any appearances in front of any community.

The word ninditha means

- ✓ Blamed
- ✓ Censured
- ✓ Abused
- ✓ Defamed
- ✓ Despire
- ✓ Revile
- ✓ Ridicule
- ✓ Strong disapproval

The word purusha means

- Men, mankind
- A member or representative of generation

Astonindita Purushas are

इह खलु शरीरमधिकृत्याष्टौ पुरुषा निन्दित भवन्ति तद्यथा---अतिदीर्घश्च अतिह्रस्वश्च अतिलोमा च अलोमा च अतिकृष्णाश्च अतिगौरश्च अतिस्थूलश्च अतिकृशश्चेति।। (Cha.Su. 21/3)

1. अति दीर्घ - Excessively tall
2. अति ह्रस्व - Excessively short
3. अति लोम - excessive hair in the body
4. अलोम - absence of body hair
5. अतिकृष्ण - excessively dark in skin
6. अति गौर - excessively fair
7. अति स्थूल - excessively stout
8. अतिकृश - excessively lean

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Effects of Atideerga (Gigantic Structure)

- ✓ Excessive oxygen demand due to tall structure
- ✓ Excessive nutritional demand
- ✓ Overload to cardiac function
- ✓ Psychological depression
- ✓ Circulatory failure.
- ✓ Early degeneration.

Effects of Atihruswa/Too Short Structure

- Growth retardation
- Inadequate growth and development of organs
- Poor health ststus.
- Psychological depression
- Short life span

Effects of Atiloma (Chromosomal or Hormonal cause)/ Excessive Hair

- Cosmetic disfiguration leading to psychological upset
- In the condition of Hirsutism due to the hormonal imbalance the fertility decreases.

Effects of Aloma/Seanty hair or absolutely no hair

- Alopecia universallis
- Congenital hypotrichosis
- Kleinfelter syndrome

Absence of body hair or minimal growth of body hair can also be seen in kleinfelter syndrome. Is caused by extra x-chromosome present in the male karyotype and occurs in about 1 in every 400 men. This is the most common sex chromosome syndrome marked by primary testicular failure affected persons have small firm testis, gynecomastia, minimal or complete absence of body hair and infertility.

Effects of Ati Gaura (Vitiligo/albinism)/Excessively fair skin

- The actual skin color of different humans is affected by many substance the single most important substance determining human skin color is the pigment melanin.

- Melanin is produced within the skin cells called melanocytes. And it is the main determinant of the skin color of darker skinned humans.
- Persons with the light skin is determined mainly by the bluish white connective tissue under the dermis and by the hemoglobin circulating in the veins of the dermis.
- The red color underlying the skin becomes more visible especially in the face when the person does physical exercise or stimulation of the nervous system (anger & fear) the arterioles dilate.
- Albinism– Genetic, non pathological, partial or total absence of melanin pigment in skin, hair and eyes. It is often accompained by-

  Astigmatism

  Photophobia

  Nystagmus

Effects of Atikrushna (hyper pigmentation)/Excessively dark skin

- Increased skin pigmentation or darkening of the whole body skin, directly due to an increased amount of melanin pigment in the skin.
- Generalized skin discoloration caused by either an increase in the production of melanin by the normal number of melanocytes or an increase in the number of melanocytes.
- Etiology– Excessive exposure to UV light(esp., sunlight)

  Genetic illness in some families

  Chronic renal failure

  Chronic pruritis
- They may also suffer from mental depression, social stigma

Effects of Atisthoulya (Morbid obesity)

- It can be defined as an excess of adipose tissue that imparts health risk; a body weight of 20% excess over ideal body weight for age, sex and height is considered a health risk.

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- Can be calculated by BMI=kg/m2
  The body mass index (BMI), or Quetelet index, is a measure for human body shape based on an individual's mass and height. In adults, damaging effects of excess weight are seen when the body mass index exceeds 25 kg/m2.
- Obesity is defined as having a BMI of >30 kg/m2

Causes of Obesity are as Follows:

- Causing over eating.
- Inactivity and sedentary life style.
- Diets largely derived from carbohydrates and fats than protein rich diet.
- Genetic predisposition.

Consequences of Obesity

- Hypertension
- Atherosclerosis
- Coronary Artery Disease and Stroke
- Cholelithiasis
- Osteoarthritis
- Fatty liver
- Diabetes mellitus

Effects of Ati Krusha

- Poor physical strature, poor strength and enJurence
- Poor or under nourished and under weight
- Poor physical stamina, some times poor immunity
  Early exhaustion and poor life expectancy.

10. Definition and classification of Vyadhikshamatva

Definition

व्यधिक्षमत्वं नाम व्यधिबलविरोधित्वं व्यद्युत्पादकप्रतिबन्धकत्वमिति। (च.सु. २६/८१ (चक्रपाणि)

It is the power of the body which prevents the development of disease or resists the onset of developed disease is called as vyadhikshamatwa. This resistive power of disease by the body differs from person to person.

It depends upon following factors :

1. Bala : The natural inherent strength, power of the body which is responsible for health.

बलाधिष्ठानमारोग्यम् ..... (च.चि. ३/१४१)

Bala depends upon the healthy status of dhatus. The factors which influence bala are:

बलवृद्धिकरस्त्वमे भावा भवन्ति/तध्यथा बलवत्पुरुषो देश जन्म, बलवत्पुरुषो काल च सुखच्च कालयोगः बीजक्षेत्रगुनसम्पच्च आहरसम्पच्च शरीरसम्पच्च सत्म्यसम्पच्च सत्वसम्पच्च स्वभवसम्सिद्दिस्च यौवनं च, कर्म च, सहर्षस्चेति।

2. **Prakruti :** The primary constitution of an individual. Vata prakruti person is said to be sada atura due to poor vyadhi kshamatwa, kapha prakruti with good bala and least number of disease.
3. **Desha :** People who dwell in jangala desha are said to be suffering from less disease
4. **Kala :** Visarga kala and yuva avastha is said to have maximum vyadhi kshamatwa.
5. **Ojus:** Dalhana opines that the abyantara bala is derived from oja. As bala is derived from excellency of healthy dhatus ojus also contributes bala and finally enhances general health and also vyadhikshamatwa.

अत्राभ्यन्तरप्राणो बलं तच्चौजोजनितम्। (सु.सू. १७/१३)

Classification

त्रिविधं बलमिति - सहजं कालजं युक्तिकृतं च।

(a) Sahaja : **सहजं वत् शरीरसत्वयोः**

It is the inherent bala attained due to excellence of components of shareera. It is formed from the time of formation of garbha based on excellence of shukra and arthava.

(b) Kaalaja : **प्राकृतं कालकृतमृतुविभागजं वयः कृतं च।**

The strength attained by the individual due to the impact of seasonal variation and aging phenomenon is kaalaja bala which is temporary. The best bala is seen during visargakaala and youvanaavastha and bala deteriorates naturally during adaanakaala and vruddavastha. The age of person बाल, मध्यम, वृद्ध and diurnal changes infuence dosa and that will again influence बल and Health.

(c) Yukti kruta : **युक्तिकृतं पुनस्तद्याहारचेष्टायोगजं।**

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It is an acquired bala gained by planned implimentation of combination of diet, medication and other regiemen by the patient as planned by the physician.

Methods of Improving Vyadhi Kshamatwa

- Garbadaana poorvaka shodana to couple
- Maasaanumaasika garbhini paricharya by mother
- Shodasha sishu samskaara
- Nitya shadrasopeta aahara
- Nitya sevana of shaali, mudga, maasha, maamsarasa, draksha, amalaki, pippali, saindhava, grita, ksheera, dadhi, sura etc
- Niyamita vyayama, non supression of adharaneeya vegas,
- Following dinacharya, ritucharya, sadvritta
- Avoiding janapadodwamsa & paryavaranapradoshana
- Periodic shodhana and Nitya rasayana.

11. Ojas- types of Ojo Visrimas- Vyapad & Kshaya & It's Disease

Introduction

The excellence of all dhatu or the best of all body constituents are segregated to produce a unique element called ojus. The word 'ओज' is said to arise from "ऊर्जतेवाउब्जतेवाइति।" can be said as the one which provides bala.

"ऊर्जबलप्राणयो:"

It means as the one responsible for 'बल' & 'प्राण'

Utpatti of Ojus

- तत्ररसादीनांशुक्रान्तानांधातुनांयत् परंतेजस्तत्खल्वोजस्तेवबलमित्युच्यतेस्वशास्त्रसिद्धान्तात्।। (सु.सू. १५/१९)

Ojus is the pure essence of dhatus from rasa to shukra which is said to be the 'BALA'.

- ओजस्तुतेजोधातुनांशुक्रतानांपरस्मृतम्।। (अ.ह.सू. ११/१७)
- Ojus is the pure essence of all the seven dhatus.
- सर्वधातुनां स्नेहमोजः क्षीरेघृतमिव तदेव बलमिति।। (भा.प्र. ३/१८१)

Like ghrita is sneha of milk, in the same way ojus is of all the seven dhatus and the same ojus is the 'BALA' of the body.

- यथा कृत्स्न क्षीर स्नेहाः तथैव ओजो अपि कृत्स्न धातुस्नेहः इत्यर्थः।। (डल्हण on सु.सू. १५/१९)

Ojus is that entity which is present in dhatus just like the sneha is present in milk.

Nourishment of Ojus

- प्राणिनां पुनर्मूलं आहार बेल वर्णौजसाम्।। (सु.सू. १/२८)

i.e. The food is the principle factor which nourishes strength, varna & OJUS.

- यदन्ने देह धात्वोजो बल वर्णादिपोषकम्। (च.चि. १५/५)

Food provides nourishment to dehadhatus, OJUS, strength & complexion.

Gunas of Ojus

- हृदितिष्ठति यत् शुद्धरक्तमीषत् पीतकम्। ओजःशरीरेसंख्यातं। (च.सू. १७/७४)

The one which dwells in the heart and is pure (shudha), slightly reddish yellow in colour is known as OJUS of the body.

- सर्पिवर्णंमधुरसंलाजगन्धिप्रजायते। (च.सू. १७/७५)

The ojus in the body is of the colour of Ghruta, in taste it is like that of honey and in smell it is like that of laja.

- गुरुशीतंमदुश्लक्ष्णंबलंमधुरंस्थिरम्। प्रसन्नंपिच्छिलंस्निग्धमोजोदशगुण स्मृतम्।। (च.चि.२४/३१)

The ten attributes of ojus are Guru (heaviness), seeta (cold), mrudu (soft), shlakshana (smoothness), bahala (dense), madhura (sweet), sthira (stable), prasanna (clear), pichilla (slimy) & snigdha (unctious).

Importance of Ojus

- दशैव आयतनान्याहुःप्राणाःयेषुप्रतिष्ठिताः।शंखमर्मत्रयंकण्ठोरक्तंशुक्रंओजसीगुदम्।।(सु.सू.१५/२१)

There are ten life sustaining vital components viz. two shankha, trimarmas, hrudaya, shira, basti, kantha, rakta, shukra, OJUS & guda.

- स्निग्धं सोमात्मकं शुद्धमीष्ल्लोहितपीतकम्। (अ.ह.सू. ११/३८)

Ojus is snigdha, shita, shudha (pure) & appears to be slightly reddish yellow in colour.

ओजःसोमात्मकं स्निग्धं शुक्लं शीतं स्थिरं सरम्। विविक्तं मृदु मृत्स्नं च प्राणायतनमुत्तमम्।। (सु.सू. १५/२१)

Ojus is somatmakam (cooling substance), snigdha, shukla,

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seeta, sthira, sara (mobile), vivikta (pure), mrudu, mrutsanna (pichila or slimy) and is the site of vitality.

देहः सावयवस्तेनव्याप्तोभवतिदेहिनाम्। तद्भावाच्चशीर्यन्तेशरीराणिशरीरिणाम्।। (सु.सू.१५/२२)

The whole body is permeated with ojus and loss or diminution leads to wasting, decay & destruction.

Classification of Ojus

- द्विविधमोजो दर्शयति परम् अपरंच। (चक्र. on च.सू. ३०/७)

There are two types of ojus:

1. Para Ojus 2. Apara Ojus

Quantity and Location of Ojus

1. Para Ojus

- प्राणाश्रयस्यौजसो ऽष्टौबिन्दवो हृदयाश्रिता। (चक्र. on च.सू. ३०/७)

Even minute kshaya of which can cause death , which is in the ashtabindu pramana and is located in the hrudaya is the Para Ojus.

2. Apara Ojus

- तत्र अर्धाञ्जलि प्रमाणमपरं यदुक्तं-"तावदेव परिमाणं श्लैष्मिकस्यौजसः"

(चक्र on च.सू. ३०/७)

Apara Ojus is in the ardhanjali pramana.

- तत्र अर्धाञ्जलि प्रमाणमपरं यदुक्तं–"तावदेव परिमाणं श्लैष्मिकस्यौजसः"।

(चक्र. on च.सू. ३०/७)

The ardhanjali pramana Ojus or the Apara Ojus is located in the heart and the vessels attached to it.

Functions of Ojus

- ओजस्तुतेजोधातुर्नांशुक्रान्तानांपरंस्मृतम्। हृदयस्थमपि व्यापिदेहस्थितिनिबन्धनम्।।

(अ.हृ. ११/३,७)

The essence of all the dhatus ending in shukra dhatu is termed as Ojus. Though it is located inhrudaya it spreads all over the body & maintains it.

Ojo kshaya Hetu

In AshtangaSamgraha the etiological factors are mentioned:

- ओजः क्षीयतेकोपक्षुद्व्यायामशोक श्रमादिभिः। (अ.सं.सू. १९/३८)

Anger, hunger, worry, grief, over exertion causes Ojo Kshaya.

According to Acharya Charaka:

- वातश्लेष्मक्षयेपित्तंदेहौजः स्रंसयच्चरेत्। ग्लानिमिन्द्रियदौर्बल्यंतृष्णांमूर्च्छांक्रिया क्षयम्।।

(च.सू. १७/६०)

When vata &kapha are in a state of diminution, the pitta while eliminating ojus causes depression, weakness of senses, thirst, fainting & loss of action.

Ojo Kshaya Lakshana

According toAshtanga samgraha:

- विभेति दुर्बलो ऽभीक्षणं ध्यायति व्यतितेन्द्रियः। दुश्छायोदुर्मनारुक्षोभवेत्क्षामश्चतत्क्षये।।

(अ.सं.सू. १९/३८-३९)

1) Fear
2) Constant weakness
3) Worry
4) Affliction or discomfort of sense organs
5) Loss of lustre
6) Cheerlessness
7) Roughness
8) Emaciation

Ojo Visramsa Lakshana

- सन्धिविश्लेषो गात्राणां सदनं दोष च्यवनं क्रिया सन्निरोधश्च विस्रंसे। (सु.सू. १५/२४)

Dislocation of joints, feeling tired, displacement of dosha's from its own sthana, restriction for shareerika manasika & vachika kriya's.

Ojo Vyapat

- व्यापत् अन्यथापत्तिः सा दुष्ट दोष दूष्य संसर्गात्। (Dalhana on सू.सू. १५/२४)

Vyapat means ojus gets vitiated by dushta dosha & dushya.

Lakshanas of Vyapat:

- स्तब्ध गुरुगात्रता वाताशोफो वर्णभेदो ग्लानिस्तन्द्रा निद्रा च व्यापन्ने। (सू.सू. १५/२४)

1) Stiffness & heaviness in body
2) Swelling due to vata
3) Discolouration or loss of complexion
4) Exhaustion

Summary of the Functions of Ojus:

- At the time of conception, it is the essence of shukra & shonita.
- In the second stage, i.e. the kalala avastha it is the essence of the rasa.
- In the third stage when there is formation of various organs ojus is present in its own form & manifests its own actions.

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Desa Saatmya

Desa means place of residence of asn individual

1. Deha (Body) 2. Bhumi (Land)

1. **Deha satmya:** Foods that are conducive to particular body is Deha satyma.
   Example- Ghee, milk and meat are satmya to some people. Rice, peya, yusa and wheat are satmya for other people.
2. **Bhumi satmya:** Foods that are conducive to particular land is Bhumi satyma.
   Example- Jangle desha- Ghee, milk

Roga Satmya

Foods that are conducive to particular disease is roga satyma.

Example- Milk is satmya in tumors, Honey is satmya in urinary disorders.

Oka Satmya

The continuous use of even asatmya will not cause disease due to habituation and this is known as oka satmya. Example-curd in night, ice creams in winter season.

Rutu Satyma

Food that are conducive to particular season is rtu satyma.

Example- Graisma rtu- Food and drinks should be liquid, sweet, cold.

Varsa rtu- old rice, wheat , Barley; Vasanta rtu- wheat, barley, Rice, yava

Importance in Roganidana

- It is the trial and error method for planning different therapeutic procedures.
- Upasaya stage signifies the curability or incurability of the disease based on observation of 18 subtype of upasaya.
- Knowledge of satmya helps to prevent disease and also to control disease
- Effect on body: Satmya always make good effect on the body in normal equilibrium stage of the dosha dhatu and mala, and helps to cure the disease in the abnormal stage.

Asaatmya Definition

विपरीतोऽनुपशयोव्याध्यस्त्रात्म्याभिसंज्ञितम्। (अ.ह.नि. १/७)

Opposite to the description of there upasaya is called anupasaya, which is not conductive to the body.

विपरीतोऽनुपशयइतिऔषधादीनांदुःखकरउपयोगोऽनुपशयइत्यर्थः। (मा.नि. १/९)

Medicines, food and regimen which are not conductive to the body and develop displeasure to the body is called Anupasaya. It is also called Asatmya.

Synonyms: Asatmya, Apathya, Dukha, Ahita, Viruddha.

Effect on Body: Asatmya make bad effect on the body. It causes bad effect on the dosha dhatu and mala, and causes diseases.

Difference Between Satmya and Asatmya

	Satmya	Asatmya
Desa	Simillar	Dissimillar
Kala	Simillar	Dissimillar
Roga	Good	Bad

Conclusion

Satmya has to be considered as-

- Treatment (chikitsa) and upashaya in diseased person.
- Wholesome for healthy individual.

Asatmya is the opposite of satmya.

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Chapter- 3

BASIC PATHOLOGY

1. Introduction to Pathology and its Sub-Divisions

It is derived from the word pathos which means suffering and logos means study. Thus pathology is scientific study of structure and function of body in the diseased. It consists of the abnormalities that occur in normal anatomy including histology and physiology owing to disease.

Pathophysiology. Study of disordered function or breakdown of homeostasis in diseased. Pathology explains Etiology (why) pathogenesis (how) and functional implications of the lesion felt by the patients (symptoms) and those discovered by the physician (through physical signs). All these will help a clinician to arrive at a particular diagnosis, prediction of future (prognosis) and the probable treatment. Hence the method of prevention and avoiding its spread and complications.

History of Pathology

The earliest concept of disease understood by the patient and the healer was the religious belief that disease was the outcome of "curse from god"or the belief in magic that the affliction had supernatural origin from"evil eye" of spirits that leads to disease. The link between medicine and religion became so firmly established throughout the world that different socities had their gods and goddess of healing.

For example-Mythological Greeks had "APOLLO" as the principal God of healing.

Dhanwantri as the diety of medicine in India and orthodox Indians belief in Mata Sheetala Devi as the Goddess.

Pre historic period. The period of ancient religious and magical belifs was followed by philosophical and rational approach to disease by observation. Greek philosopher Socretes, Plato and Aristotle introduced philosophical concept for all. Real practice of medicine

began after Hippocrates a clinical genius of 460 - 370 BC. His postulations and oath has created revolutionary landmark in history of medicine. He explained how disequilibrium of 4 humors water, air, fire and earth can cause disease. He explained doctrines of case taking known as Hippocrates aphorisms. They are-

- Observe all objectively
- Study the patient rather than disease
- Evaluate honestly
- Assist nature.

- Cornelius celsus (53 BC) first described signs of inflammation
- Cladius Galen (130-200AD) explained humoral theory as 4 humours which include Blood, Lymph, Black bile, and bile of Liver. Disequilibrium of these cause disease.

From Human Anatomy to era of gross pathology

- Italian painter Leonardo Da Vinci (1452-1519) explained human anatomy.
- Dissection of human body by Vesalius (1514) on executed criminals.
- Antony Van Leuwen Hook (1032-1723) invented microscope and observed male spermatozoa, blood corpuscles, introduced histological staining in 1714 using saffron to examine muscle fiber.
- Marcello Malpighi (1624-1694) used microscope extensively and observed the presence of capillaries, layers of skin, lymphoid tissues in spleen.
- Giovanni B. Morgagni (1682-1771) explained morbid anatomy, clinic pathological methods in study of disease. He introduced the concept of clinic pathologic co relation.
- Sir Percival pott (1714-1788) observed occupational cancer in chimney sweapers.
- William hunter developed first pathology museum.
- Richard Bright (1789-1858) explained nonsuppurative glomerulonephritis which is today known as Bright's disease
- Thomas Addision explained chronic adrenocortical insufficiency termed as Addison's disease.

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- Thomas Hodgkin (1798-1886) explained chronic enlargement of lymphnodes often with enlargement of liver and spleen termed as odgkin's disease
- Xavier Bichat (1771-1802) explained general and systemic pathology.
- RT Laennec (1781-1826) French physician described several lung disease like tuberculosis,caseous lesions, military lesions, pleural effusion, bronchiectasis. Also explained chronic sclerotic liver disease. He invented stethoscope

- **Era of technology development and cellular pathology**

Pathology started developing as a diagnostic discipline, in later half period the evolution of cellular pathology which has closely linked to technology advancements in machinery manufacture for cutting thin section of tissue improvement in microscopic and development of chemical industry and dyes for staining.

Rudolf Virchow in Germany is credited with the beginning of microscopic examination of diseased tissue at cellular level and thus began Histopathology as a method of investigation.

Classification of Pathology

Traditionally - (1) General pathology
(2) Systemic pathology

Some subbranches of pathology

1. Histo pathology- It is the classical method of study and includes structural changes observed by naked eyes examination referred to as gross or macroscopic changes.

Three sub division of histo pathology

- Surgical pathology- It is the study of tissues removed from the living body.
- Forensic pathology and autopsy work- It is the study of organ and tissues removed at post-mortem for medicolegal work for determining the underlying sequence and cause of death.
- Cytopathology- It is the study of cells shed off from the lesions and fine needle aspiration cytology of superficial and deep seated lesions for diagnosis.

2. Haemtology- It deals with diseases of blood and management of patient.
   - Laboratory haematology
   - Clinical haematology
3. Chemical pathology- It deals with the analysis of biochemical constituents of blood, urine, semen, csf. and other body fluids.
4. Immunology- It deals with detection of abnormalities in the immune system of the body comprises immunology and immunopathology.
5. Experimental pathology- It deals with production of disease in the experimental animal and its study.
6. Geographic pathology- The study of differences in distribution of frequency and type of disease in population in different part of the world.
7. Medical genetics- It is a branch of human genetics that deals with the relationship between heredity and disease important development in medical genetics.
8. Molecular pathology- The detection and diagnosis of abnormalities at the level of DNA of the cell.

Systemic pathology is deseribed beased in various Systems in the body.

(a) Cardiae System Pathology : Disease of Heart and blood vessels.
(b) Respiratory System Pathology: Disease of Lungs, Nose nasopharynx, throat, Bronchial tree.
(c) Nervous System Pathology: Diseases of Brain and Nerves.
(d) Gastro Intestine System: Disease of Ocsophagus, stomach, Hepatobiliary System, Intestines.
(e) Nephrology : Diseases of Kidneys.
(f) Urogenital System: Diseases of kidney, Ureters, bladder and genital and reproductive Organs.
(g) Gyenecology: Diseases of female reproductive organs.
(h) Musculoskeletal System: Disease of muscles, bones, connective tissues, tendons, ligaments.
(i) Dermatology: disease of skin, hair, nails.
(j) Onehology: The study of fumour or Neoplasia.

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2. Introduction to Cell Injury and Cellular adapations

Introduction to Cell

Cell is the basic structural and functional unit of body. Cells are basic units of tissues, which form organs and further systems in the body.

Body cell

Epithelial cell ⟷ Mesenchymal cell

Cell Structure

Cell is enclosed by a cell membrane that encloses nucleus and various subcellular organelles within the cytosol/cytoplasm.

The different cell structures are,

- Cell membrane/plasma membrane
- Nucleus with nuclear membrane enclosing nuclear chromatin and nucleolus
- Cytosol /cytoplasm
- Mitochondria
- Endoplasmic reticulum
- Lysosymes
- Cytoskeleton
- Ribosomes
- Golgi apparatus
- Centriole/centrosome

Injury

Definition

An injury can be defined as a damage inflicted on the body by an external force. It can also be explained as an accident that results in physical damage or hurt.

Synonyms

- Harm
- Hurt
- Trauma
- Wound etc.

Classification of Cell Injury

- By cause
- By location
- By activity

By Cause

- Traumatic injury.
- Injury due to radiation, burn or any other external physical cause.
- Injury from infection.
- Injury due to cancer.
- Injury secondary to other diseases.

By Location

- Sharp injury damaging dermis or skin
- Nerve injury
- Soft tissue injury
- Brain injury
- Spinal cord injury

By Activity

- Sports injury
- Occupational injury

Cell Injury

Definition

- A variety of stress a cell encounters as a result due to changes in its internal as well as external environment.
- In 1859, Virchow first established the cellular theory of disease. In his concept the disease occurs due to the abnormalities at the level of cell.
- Most forms of disease begins with cell injury followed by consequent loss of cellular function

Various cellular responses to cell injury

1. Cellular adaptations
2. Reversible cell injury
3. Irreversible cell injury
4. Sub- cellular changes
5. Intercellular accumulations

Cellular Adaptations

When there is an increased functional demand, the cell may adapt to the changes which are expressed morphologically and revert back to normal after the stress is removed.

Reversible cell injury: When the stress is mild to moderate, the injured cell recovers when stress is removed.

Irreversible cell injury: Persistent cell injury which results in cell death.

Sub- cellular changes: Persistence of the residual effect of reversible cell injury in a cell, as an evidence of cell injury at the sub- cellular level.

Intercellular accumulations: Accumulation of metabolites in the cell.

Pathogenesis

Pathogenesis of Reversible (eg)

1. Low oxygen supply

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↓

Aerobic respiration of mitochondria fails

↓

Glycolytic pathway-depletion of glucose & accumulation of lactic acid

↓

Decreases intracellular Ph

↓

Clubbing of nuclear chromatin
2. Reduced protein synthesis

↓

Continued hypoxia

↓

Membrane of ER & golgi apparatus swells

↓

Attachment of ribosome from RER

↓

Ribosomes in the cytoplasm inactivates its functions

Pathogenesis of Irreversible- (eg)

- In sustained ischemia→ excess Ca influx
  activation of phospholipases→ membrane degradation.
- Damage of lysosymal membrane→ release of lysosymal enzymes→ enzymatic digestion of cellular components cell death.

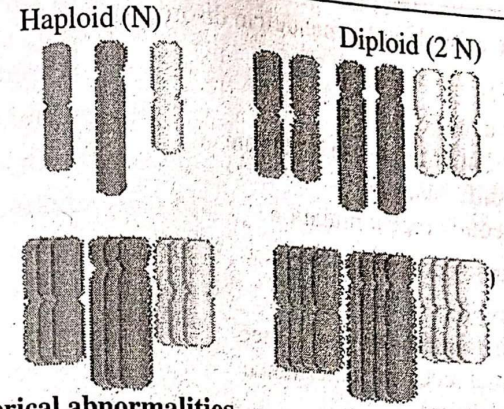
Etiology of Cell Injury

Cells may be broadly injured by two major ways,

- By genetic cause
- By acquired cause

Genetic Cause

1. Developmental defects- Group of abnormalities during fetal life, due to error in morphogenesis, due to some chemicals, drugs, physical agents (teratogens).
   Eg: cleft lip.
2. Cytogenic (karyotypic) defects- Chromosomal abnormalities



- **Numerical abnormalities**

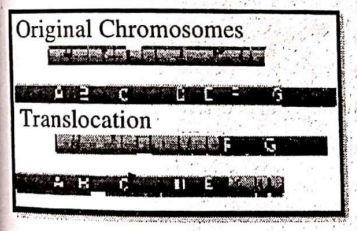
  Polyploidy-number of chromosome is multiple of haploid ie 3N-trploid-63 chromosomes & 4N-tetraploid-92 chromosomes, which occurs in megakaryocytes & liver cells.

  Aneuploidy- number of chromosome is not an exact multiple of haploid number.

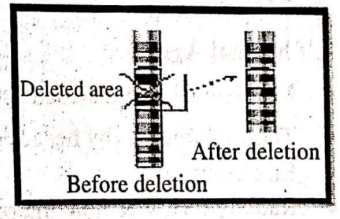
  Eg: Down's syndrome-trisomy of 21st chromosome
  Klinefelter's syndrome-trisomy of sex chromosome
  Turners syndrome-monosomy (45,x0)

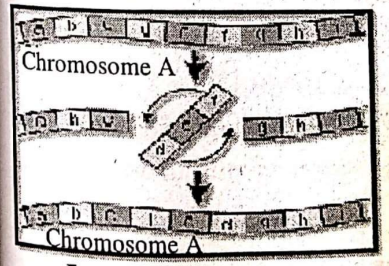
- Structural abnormalities

Translocation

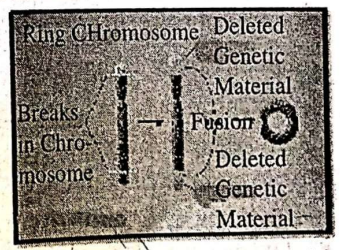


Deletion





Inversion



Ring formation

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3. Single gene defects (mendelian disorders)

- Mutations
  - ✓ Point mutation
  - ✓ Stop codon or nonsense mutation
  - ✓ Frame shift mutation
  - ✓ Trinucleotide repeat mutation
- Inheritance pattern
  - ✓ Dominant/recessive gene
  - ✓ Autosomal dominant inheritance
  - ✓ Autosomal recessive inheritance
  - ✓ X-linked disorders

4. Multifactorial inheritance - due to combined effect of genetic composition & environmental factors.

Eg: type two diabetic mellitus

Aquired Cause

1. Hypoxia

Cells require oxygen to generate energy and perform metabolic functions. The deficiency of oxygen is hypoxia. It occurs due to-

- Ischemia - reduced blood supply to blood cells due to interruption
- Disorders of oxygen carrying capacity of RBC's due to anemia, CO poisoning.

2. Physical Agents

- Mechanical trauma (road accidents)
- Thermal trauma (by heat & cold)
- Electricity
- Radiation (UV & ionizing rays)
- Rapid changes in atmospheric pressure

3. Chemicals & Drugs

- Chemical poisons such as cyanide, arsenic, Hg etc.
- Strong acid & alkalies
- Environmental pollutants
- Insecticides & pesticides
- Oxygen at high concentration

- Hypertonic glucose and salts
- Social agents like alcohol & narcotic drugs
- Therapeutic administration of drugs

4. Microbial agents

Infections by bacteria, virus, fungi, protozoa & other parasites.

5. Immunologic agents

Immunity protects host against various injurious agents but, in some cases it may turn lethal & cause cell injury.

Eg: hypersensitivity reactions, anaphylactic reactions, autoimmune diseases.

6. Nutritional derangements

Deficiency /excess

Eg: rickets, beri beri etc

7. Aging

Cellular aging (impaired ability of cell to undergo replication & repair which leads to cell death.

8. Psychogenic diseases

Due to drug addiction, alcoholism and smoking resulting in various organic diseases.

9. Iatrogenic causes

Owing to physician ie death or diseases due to wrong diagnosis by physician and bad effects of administered therapy.

10. Idiopathic diseases

Of unknown cause
Eg: hypomelanosis

3. Definition and brief description of inflammation- Healing/repair

The word meaning of inflammation is burning. The process inflammation is defined as local response of living mammalian tissue to injury due to any agent. It is a body's defense reaction in order to eliminate or limit the spread of injurious agent followed by removal of necrosed cell and tissue.

Causitiva agent: Infective agents, immunological agents (cell mediated, antigen-antibody), physical agent, inert material (foreign body) which can multiply, release toxin and are antigenic.

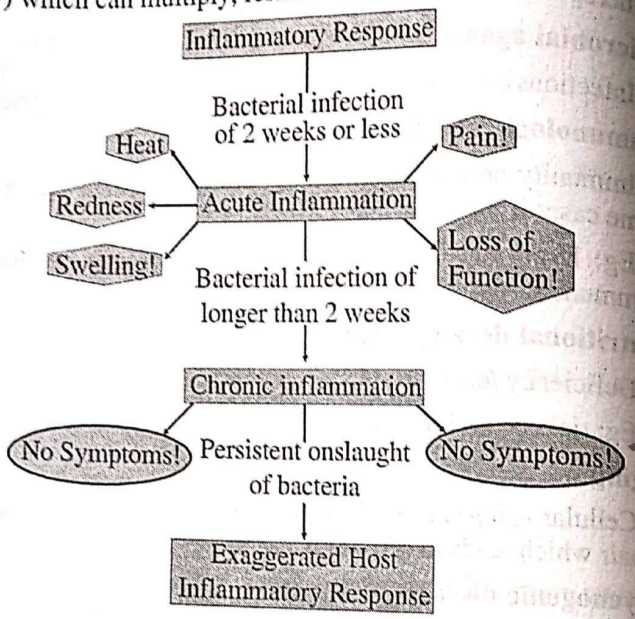
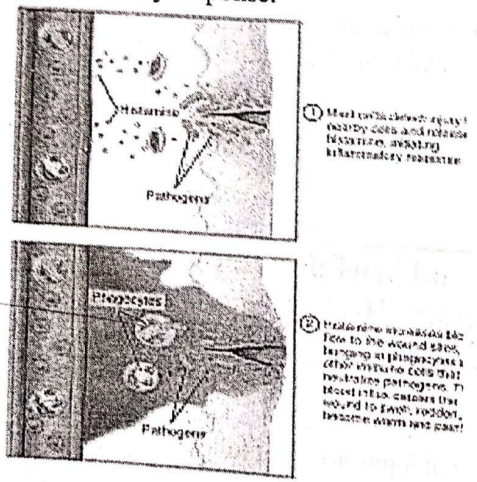
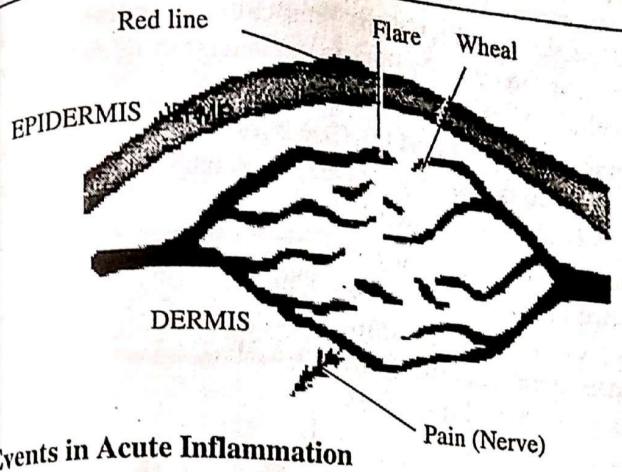


Figure 8.14 Two stages of Inflammation, Acute Inflammation is of short duration, wheres chronic inflammation is a long-lived inflammatory response.





Events in Acute Inflammation

Inflammation is the visible response to an immune reaction and activation of immune response is essential before inflammatory response appears.

Signs: Rubor (redness), tumor (swelling), calor (pain), dolar (fever or rise in temperature), functiono liesia (loss of function pertained to inflamed area).

Acute inflammatory feature: its features are

1. Accumulation of fluid and plasma at the affected site
2. Intravascular activation of platelets.
3. Polymorphonuclear neutrophils form as inflammatory cells

Chronic inflammation: shows presence of chronic inflammatory cells such as lymphocytes, plasma cells, macrophages and granulation tissue formation.

Events in acute inflammation:

1. Vascular Events

A. alteration in microvasculature (arterioles, capillaries, venules) hemodynamic changes like transient vasoconstriction of arterioles lasting for 5 sec - 5min.

B. Persistent vasodilatation: Within half an hour after injury vasodilatation occurs. This results in increased blood volume leading to redness and warmth at the site.

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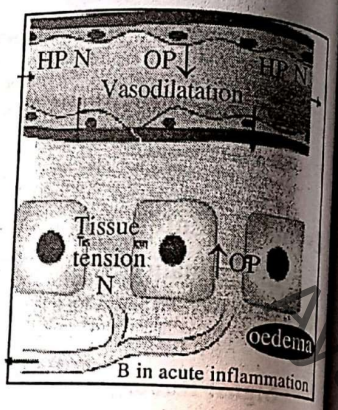
C. Progressive vasodilatation. This caused increased local hydrostatic pressure leading to transudation of fluid from intracellular to extra cellular space.

D. Slowing/stasis: The blood flow becomes slow so as to facilitate lucocytic migration or peripheral orientation of leucocytes along vascular endothelium.

E. Altered vascular permeability: in inflamed tissue the endothelial lining of microvasculature becomes more leaky that leads to exudative inflammatory oedema

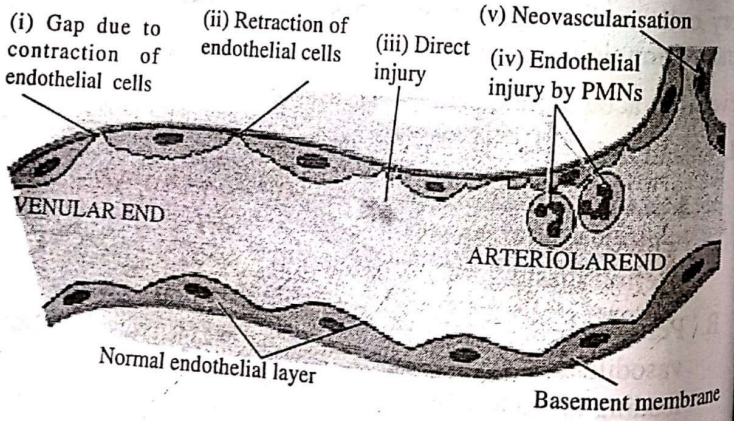
F. Neo vascularisation and leakage from new blood vessel

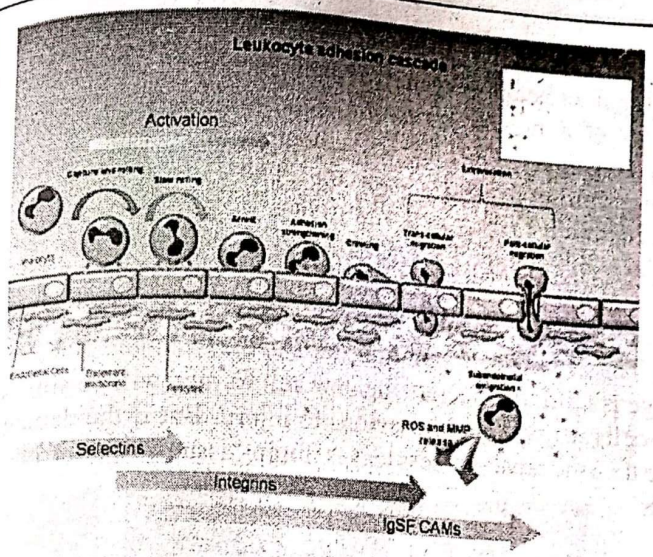


2. Cellular Events

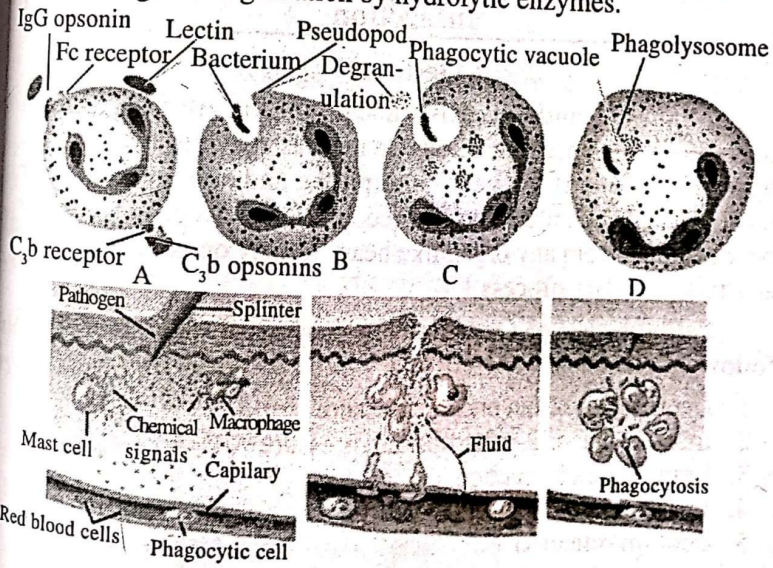
A. Exudation of leucocytes: escape of WBC from lumen of microvasculature to interstitial tissue. This includes Migration, Pavementing, Rolling and Adhesion, Emigration, Chemotaxis

B. Phagocytosis: It is the process of engulfing of solid polymorpho nuclear cells(microphages) and circulatory monocytes, macrophages. They produce protieolytic enzymes like lysosomes, protease, gelatinase, lipase, protiease, elastinase, collagenease and acid hydrolaeses. They degrade collagen and extracellular matrix.





1. The process involves : Recognition and attachment with help of mannose receptors and scavenger receptor, IgG opsonin, lectins.
2. Engulfment with the help of Cytoplasmic pseudopodes due to activation of filaments beneath the cell wall.
3. Killing and degradation by hydrolytic enzymes.



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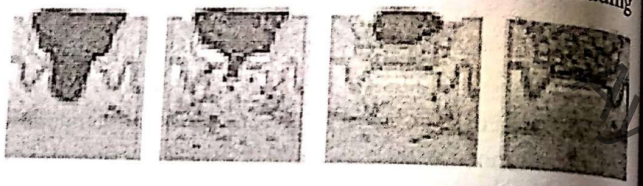
Repair and Healing

Repair or healing is a natural phenomenon which involves the recovery of damaged structure occurred during cell injury. Once the inflammatory response finishes by phagocytosis the repair or regeneration of new cell and tissues in the place of damaged area takes place. Depending on the extend of cell injury the new cells or replacement of new cells takes place. The new cell proliferation starts in the damaged place. If the damage is mild to moderate the new cell formed will be similar to those cells which existed previous to injury. But if the damage is severe then the repair process leaves fibrous tissue formation leading to scar.



4. Definition and brief description of edema-shock-hemorrhage, Thrombosis, embolism, Ischema and Infarction

"Oedema"

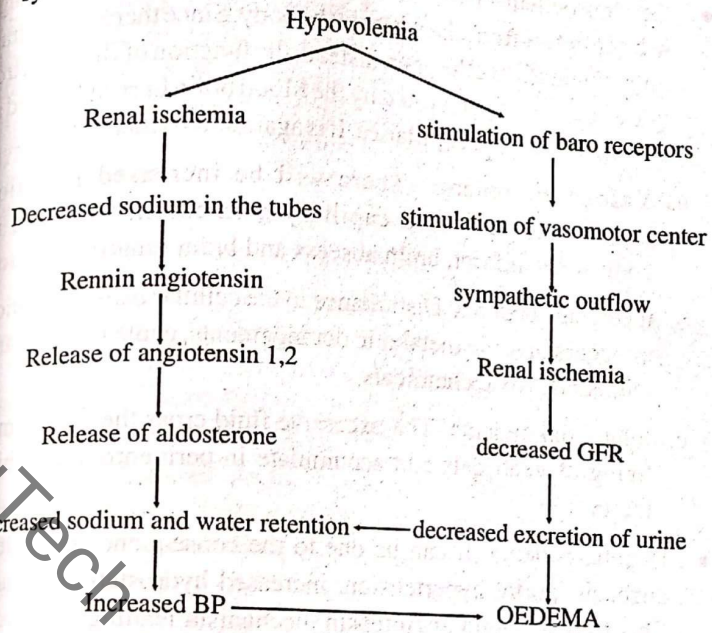
Abnormal and excessive accumulation of free fluid in interstitial tissue space and serous cavities (as in ascitis, hydrothorax, hydro pericardium). This can be of pitting and non pitting type or localized and generalized type of oedema. Contents of oedema may be transudate from any organ like heart, kidney or excudate due to any inflammatory process.

Pathogenesis of Oedema: The process of oedema requires following elements

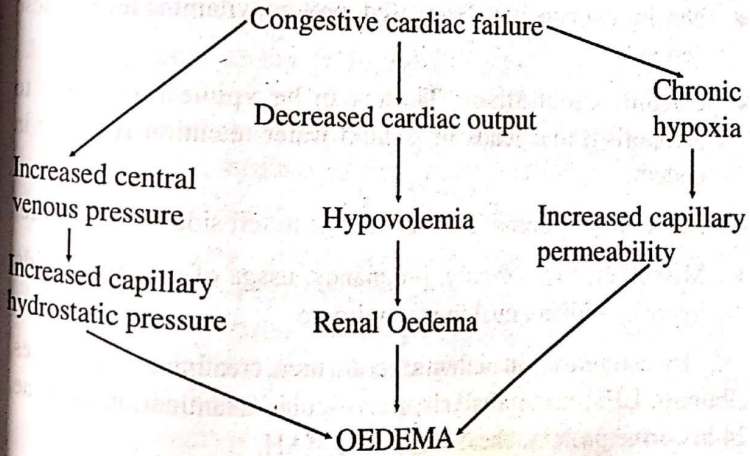
1. Decreased plasma oncotic pressure
2. Increased capillary hydrostatic pressure
3. Lymphatic obstruction
4. Increased capillary permeability
5. Sodium retention

Types of Oedema with Pathogenesis

- Renal oedema: Caused due to glomerulo nephritis, nephritic symdrome, renal failure.



- **Cardiac oedema**



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Caused due to congestive cardiac failure and may also progress as renal oedema.

- Cerebral oedema: It the most dangerous oedema as fluid exchange in brain defers from elsewhere in the body. Since there are no drai ning lymphatics in the brain instead, the function of fluid electro lyte exchange is performed by the blood brain barrier located a endothelial cells of capillaries. It is again subdivided into:

  a. Vasogenic oedema: There will be increased filtration pressure or increased capillary permeability as seen in contusions, infarct, brain abscess and brain tumors.

  b. Cytogenic oedema: Disturbance in the cellular osmoregulation as occurs in some metabolic derangements, acute hypoxia and with some toxic chemicals.

  c. Interstitial oedema: The excessive fluid cross the ependymal lining of ventricals and accumulate in periventricular white matter.

- Hepatic oedema: It can be due to the consequence of ascitis, cirrhosis, portal hypertension, increased hydrostatic pressure. This trigger rennin angiotensin mechanism leading to sodium and water retention that results in oedema.
- Nutritional oedema: Decreased protein, vitamins levels cause oedema
- Chronic alcoholism: There can be yponetremia due to alcoholism that leads to sodium water retention resulting in oedema.
- Pulmonary oedema: It is causes due to left sided heart failure.
- Miscellaneous : obesity, pregnancy, usage of glucocorticoids, hypothyroidism, cushing's syndrome

Investigations in oedema: serum urea, creatinine, electrolytes, albumin, LFT, urine analysis, microscopic examination of urine, 24 hrs urine protein, chest xray, ECG, TSH.

SHOCK

A condition of Acute circulatory failure. It is a clinical syndrome characterized by prolonged hypotension leading to inadequate tissue perfusion. It is a whole body event of complex series of changes which result from acute circulatory failure. All forms of shock result in reduction in effective blood flow (hypoperfusion /under perfusion) of vital organs so that there is reduced delivary of oxygen and nutrients to the tissue and subsequent cell dysfunction.

Compensatory Changes After Shock

Body is generally concerned with maintainance of adequate cerebral and coronary circulation. They are affected by redistribution of the blood in the body as whole by autoregulatory mechanisms.there will be peripheral vaso constriction and selective regional vaso constriction. There will be deviation of blood to vital organs

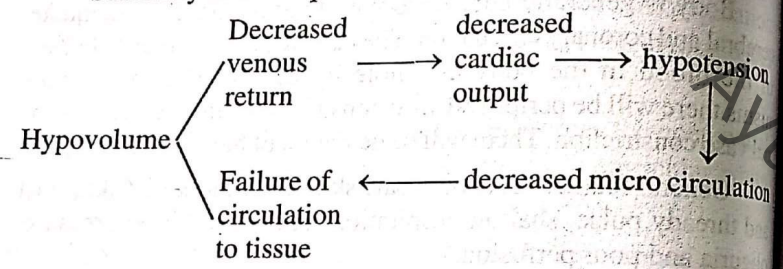
General features of shock: pale skin, cold and moist skin, fast and thready pulse, shallow respiration, decreased blood pressure, oliguria and poor perfusion.

Classification of Shock

1. Hypovolemic shock: Hypovolemia is total decrease in blood or fluid volume. It may be caused due to severe hemorrhage, fluid lossdue to vomiting and diarrhoea burns.
2. Cardiogenic shock: Decreased cardiac out put due to myopathy, myocardial infarction, pulmonary embolism, cardiac arrythemia, mitral regurgitation, cardiac tamponade, pump failure, mediastinal disease.
3. Anaphylactic shock/Neurogenic sock: Due to hypersensitivity reaction on any element manifests as shock. It may due to degranulation of mast cell and release of vaso dialators like histamine, elements causing hypotension as bradykinin contribute in circulatory failure leading to shock. Death occur due to broncho spasm or laryngeal oedema. Neurogenic shock is due to damage to spinal cord with peripheral vasodilation and pooling of blood.

4. Septic shock: Presence of sepsis in the body at any site due to organisms like E coli, pseudomonas, klebshella, strepto coccus aureus will invade into blood stream. These organisms release endogeneous mediators, plasma cells, macrophages, endothelial cells. All these initiate myocardial depressant factors causing organ hypoperfusion. This leads to multi organ failure resulting in acute respiratory distress syndrome. There can be necrosis of liver, pancreas and also haemorrhage or erosion and ulceration of GIT. Associated with ischemia of bowel and hypoperfusion of brain.

Summary of consequences of shock:



HAEMORRHAGE

It is the condition in which there is escape of whole blood. Bleeding may occur externally or into ollow vicera, serous cavity or tissue. The symptoms of hemorrhage depends upon quantity of blood loss and speed. Loss of blood over 30% within few hours is fatal. But loss about 50% of blood over 24 hrs and above is not necessarily fatal.

Early Changes of Hemorrhage: This occurs 48 hrs after hemorrhage. The condition is called as.

1. Vaso Vagal Syncope. There is slightly sweating, pallor, giddiness, decreased blood pressure and decreased pulse, ischemia, emotional stress, anxiety and fear. It is an alarming signal indicating that the safety margin is exceeded.

2. Cardiovascular Cange : Increased brerathing, tacchy cardia due to secretion of aderenalline, selective vasoconstriction to increase blood pressure.

3. Reaction of Blood: Increased platelet count, fibrinogen and ESR.

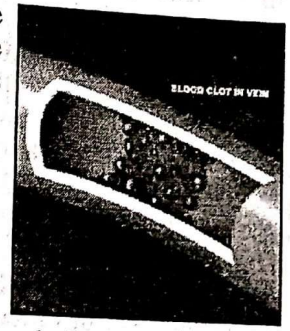
4. Restoration of Blood Volume : There will be withdrawl of fluid and electrolytes from interstitial compartment to plasma compartment. There is decrease in lymphatic flow, water is sequestrated in dense connective tissue is drawn upon. This can be associated with hemo dilution. As blood volume is restored vasoconstriction subcides and capillary pressure is brought back.

Late Changes (After 48hrs)

Regeneration of lost blood: Diluted blood and the resultant anorexia stimulates excess secretion of erythropoietin which stimulates marrow to erythropoietic activity. The hemoglobin production rate increases to 0.04-0.05 gram per day.

THROMBOSIS

Formation of solid plug from the constituents of blood anywhere in the intact cardiovascular tree during life is called as thrombosis.



Causes of Thrombosis

1. Changes in the endothelium: this may be due to physical trauma, burn, freeze, electric injury, chemical damage, bacterial toxins, inflammation of veins, atherosclerosis. Any neoplasia provokes platelet adhering and aggregation. This inturn initiates coagulation of blood and formation of fibrin
2. Alteration in the blood flow: slowing of the stream, turbulence and eddy currents, blood hyper viscosity state.
3. Alterations in the blood constituents

Patterns of Clot Formation

1. Common pattern : Platelet thrombus or white thrombus formed in moving blood stream which is progressive.
2. Uncommon pattern: Erythrocyte agglutination thrombus or hyaline thrombus formen only in capillaries as seen in mismatched transfusion, burns, frostbite and sickle cell disease. Its senn in slowed blood stream. It is followed with platelet coagulation thrombus.

3. Anatomical types:
   a. Occlusive thrombi: Artery or vein which obstruct the lumen of the vessel completely.
   b. Mural thrombi: This can be seen in Aorta or heart. There is no occlusion because of fast blood flow.
   c. Disseminated thrombi occur in micro vasculature.

Formation and growth of thrombus: Sticky endothelium damage invites platelet to adhere. Adherent platelets keeps on growing in the form of arborescent strands and fuse to form glossy clumps. Later it is accompanied by intrinsic thromboplast which clots the plasma trapped between the platelet clumps. The deposition of the fibrin strengthens the thrombus and anchors it to one side of the vessel wall. This small, flat, granular plaque is called as primary platelet thrombi.

Coralline Thrombus : The rough surface of developing platelet thrombus acts further stimulus for platelet adhesion in another fibrin layer and entrapped RBC. This forms platelet plug and then coagulation cascade is triggered. As the bold flow past the platelet thrombi red cells are trapped in mesh and thrombus grows in layers on the direction of blood flow producing the wavy elevated ridges of platelets called lines of Zahn.

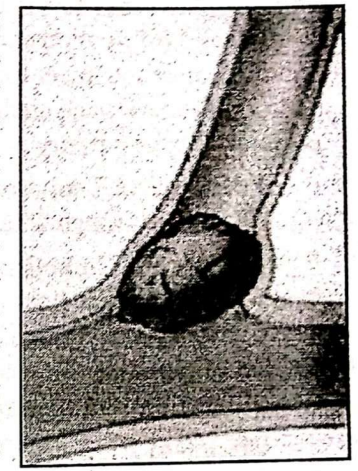
Occluding Thrombus: As the thrombus grows it encroaches the lumen and obstructs the blood stream. Once the vessel is completely occluded, the blood flow ceases and the stagnant column of blood clots without production of any lines of Zahn. This is consecutive clot which is adhered to vessel wall through original thrombus and likely can embolise.

Propagated clot is that which may continue to the point of entry of next tributary in which platelet may arrive and adhere to clot. There can be formation of single long consecutive clot due to stagnant of blood behind the clot which is anchored to the wall only by the initial platelet plug. Endothelium can initiate both thrombogenic and anti thrombogenic stimuli.

Fate of Thrombus:

1. Resolution : Small mural thrombi shrink by retraction and are reabsorbed after being slowly lysed by the fibrinolytic mechanism of blood and lytic enzymes from leucocytes incor-porated in their bodies. Large amount of enzymes, activators of plasminogen present in plasma. Te activated plasmin is proteolytic enzyme and fibrinolytic in action which can explode and destroy itself. Clots intended for temporary haemostasis are destroyed immediately after their utilization is over.
2. Organization : depending upon the size of thrombus ultimately converted into fibrous plaque or fibrous nodule which may show haemosiderin, cholesterol clefts and calcium salts.
3. Embolism : The clot may run along the circulation to other branches and can occlude elsewhere.

EMBOLISM



Embolism is the process consisting of the impaction in some part of the vascular system of any undissolved material brought there by blood current. The impacted abnormal mass is embolus (a plug).

The obstruction of a blood vessel by a foreign substance or a blood clot that travels through the bloodstream, lodging in a blood vessel, plugging the vessel. Foreign substances that can cause embolisms include air bubbles, amniotic fluid, globules of fat, clumps of bacteria, chemicals (such as talc), and drugs. Blood clots are the most common causes of embolisms.

Varieties of Embolism

1. Intra vascular: it can be produced by solid fragments of thrombi (septic/Aseptic) or atheromatous material.
2. Extra vascular: A solid extra vascular embolus may be from normal tissue like marrow fragments, trophoblastic, decidual tissue, pancreatic tissue, cancer cells, clumps of bacteria, parasites, ova, cyst, pigmented granules, foreign bodies like cotton, silk, talc. Extra vascular embolus an be from any liquid element like fat globules, oil, amniotic fluid. Embolus can also be produced from gases like any air or nitrogen.

Localization of emboli: undissolved material carried in direction of flowing stream impacts in the vessel through which it cannot pass further.

1. Emboli originating in systemic veins goes to right heart from there it turns in pulmonary artery. This reaches to lungs to cause pulmonary embolism.
2. Embolus originating in pulmonary veins goes to left heart to reach aorta. From there it can logue anywhere in systemic arteries.
3. Emboli from portal trunk lodge in liver.

Systemic Embolism: Cardiogenic emboli can block brain, kidney, spleen and lower limb. Ulcerated atherosclerotic plaque from carotid bifurcation can reach brain and from abdominal aorta embolus can reach lower limb. Such trash emboli often composd of atheromatus debris and cholesterol crystals are due to complications of major arterial surgery.

Paradoxical Embolism: Venous embolus that gains access to arterial side through a heart wall defect.

Retrograde Embolism: Carriage of an embolism in a direction reversed to the usual flow of lymph or blood. A sharp increase in pressure within cavities as during coughing or vomiting causes reversal of blood flow to enable blood from the lung to reach brain. Also from pelvic and abdominal region to reach spinal cord or brain.

Effects of Embolism: This depends upon nature of embolus, size of vessel, amount of collateral circulation available and nature of organ.

- Aseptic infarct or gangrene
- Septic infarct or mycotic aneurysm
- Metastasis if embolus contains tumor cells.
- Sudden death (if there is large sized artery block)
- Transient ischemic attack.

Pulmonary Embolism

One patient of every 5 with deep vein thrombosis may have pulmonary thrombosis. Large sized embolism leads to sudden death. Medium sized embolism cause pulmonary infarction. Silent micro emboli cause extensive patchy damage in lungs. This leads to chronic cor pulmonale pulmonary hypertension. Its clinical presentations are : dyspnoea, chest discomfort, syncope.

Fat Embolism: fat droplets of more than 8 micro metere can cause embolism. The force of surface tension which gives fat droplets their spherical shape can well counteract the capillary blood pressure. The droplets cannot be deformed or cannot be squeezed out of capillaries. Fat embolism can be caused due to long bone fracture (due to disruption of fatty marrow), severe injury of subcutaneous tissue, deep burns, injection of oily solutions, pelvic injury during child birth, liposuction, fat necrosis from acute pancreatitis, unsuccessful cardio thorasic bypass surgery, fatty liver, ether anaesthesia, gas gangrene. Fat globules enter torn vessels and give symptoms like respiratory distress, cerebral syndrome, petechiae in skin and mucosa.

Amniotic Fluid Embolism: Amniotic fluid contains mucin (meconium and foetal components), fat (sebaceous glands) desquamated epithelial cells (skin and lanugo hairs) they enter uterine sinusoids during labour and concealed accidental haemorrhage bypassing between the ruptured membrane wall to reach placental margine and produce pulmonary embolism, obstertetial shock and dessiminated thrombosis.

Gas embolism: The gas embolus may be produced during surgery in neck, chest when large veins open up. It can also occur during cardiac operations, angiographic operations, blood transfusion or intravenous therapy, vaginal douching, induced abortion, insuffulation of fallopian tubes, induction of artificial pneumothorax, pneumoperitonium or any laproscopic procedures. Air enter vein and carried to right heart. Here air and blood churn up into froth. This froth acts as air trap and block the entry of air into pulmonary artery. This leads to massive pulmonary embolism and sudden death. Nearly 100ml-150ml of air is required for this effect. Arterial air embolism leads to blockage of cerebral or coronary artery. In this small amount of air is sufficient to produce death.

'ISCHEMIA'

Inadequate blood supply to a part of the body, even to the point of complete deprivation is ischemia. The inadequacy may be relative, a sudden demand for blood because of increased functional activity. Ischemia primarily affects components of highest oxygen requirement.

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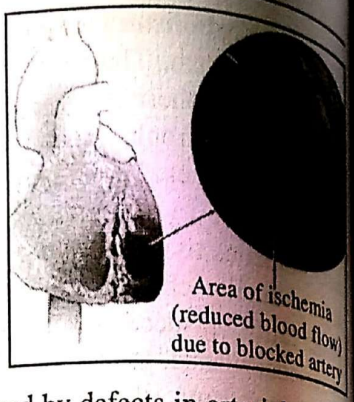


Causes: Atherosclerosis, thrombosis, embolism, vasculitis, muscular spasm of vessel wall and external pressure.

Generalized, diffused ischemia is caused by conditions such as hypovolemic shock and cardiac failure as a result of systemic hypotension. Ischemia of an organ or tissue may be caused by defects in arterial supply, the capillaries within that organ or the venous return.

The arterial cause of ischemia: Due to thrombosis, embolism, spasm of vessels as seen in Raynaud's disease, ergot poisoning, TAO, arteriosclerosis, polyarthritis nodosa, pressure from outside due to ligature,tourniquet, tight plaster

The venous cause may be due to all above causes along with hematoma, strangulation. Venous ischemia is rarer as veins have more extensive anastamosis than arteries.

The ischemia in capillaries may be due to frost bite, haemolytic anaemia (RBC agglutination), sickle cell disease, malaria, chronic myeloid leukaemia, disseminated intravenous coagulopathy, decubetus bed sore.

Brain and heart are more vulnerable for anoxia. Anoxia for more than few minutes leads to severe damage. Retina and smaller cerebral arteries are end arteries as they do not have any anastamosing branch. Therefore ischemia can be more dangerous to these organs than others.

Effects of ischemia: Ischemia produces damage to tisssues through

1. Anoxia/deprivation of oxygen
2. Deprivation of nourishment
3. Accumulation of waste products of metabolism.

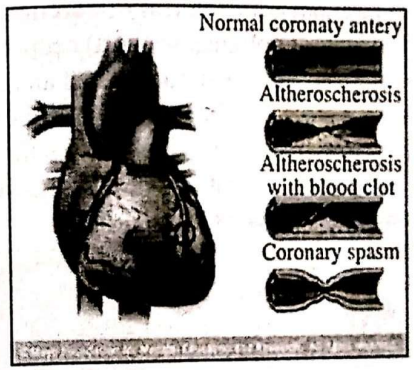
Changes After Ischemia

1. Functional damage: Angina pectoris, intermittent claudication

2. Degeneration, Atropy
3. Fibrosis
4. Infarction

Factors Determining Extent of Damage by Ischemia

1. Anatomy of vasculature of affected area (collateral circulation)
2. Nature of affected tissue.
3. Rate and degree of obstruction. Sudden obstruction has more severe effect than gradual obstruction. In gradual obstruction there is time for collateralcirculation to develop.
4. Generalised disease affecting circulation.



'INFARCTION'

This is usually due to sudden and complete deprivation of the blood supply. It is an area of necrosis produced by deprivation of blood supply. Non ischemic necrosis produced by physical, chemical, bacteria etc are not infarct. Putrifaction is absent in infarction.

Causes: It is due to arterial or venous obstruction, sudden blockage of artery, sudden fall of BP distal to the point of block. The resultant anoxia leads to atonic dilation of capillaries , venules and increased permeability of plasma and RBC that ooze out. Hence ischemic area becomes swollen and hemorrhagic. Attempt of collateral circulation may reduce some amount of infarct. Failure to circulation leads to increased anoxia. This causes chemical injury because of accumulation of metabolites and hence results in necrosis.

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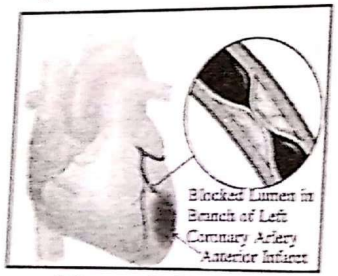
Microscopic Changes of Infarction

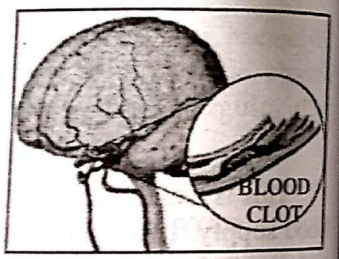
- Depletetion of muscle glucogan
- Clumping of nucleoplasm
- Myofibrils show transverse tears.
- Increase in lactic acid
- Swollen mitochondria
- Degenerative changes in parenchymal cell appear within few hours. Necrosis will be evident within 48hrs.

Gradually the excess of blood in capillaries and vein is drained away. The oozed red cells are lysed and their hemoglobin is removed by diffusion. With these events infarct become pale. Products from the necrotic tissue irritate the surrounding living tissue and set up a zone of inflammational at the periphery.

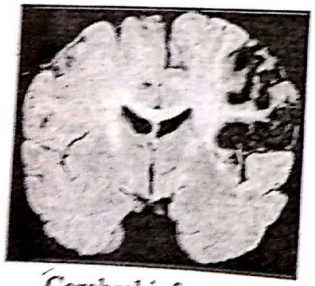
Nature of infarction: pathologically infarction is an area of either coagulative (firm) or colliquative (soft) necrosis. Infarcts are usually seen in periphery because the arteries of an organ generally branch out as fan like structure. Infarcts are commonly conical or pyramidal with base towards periphery and apex at the site of arterial obstruction. Various types of infarcts like red infarct, pale infarct, septic infarct, aseptic infarct can be found.



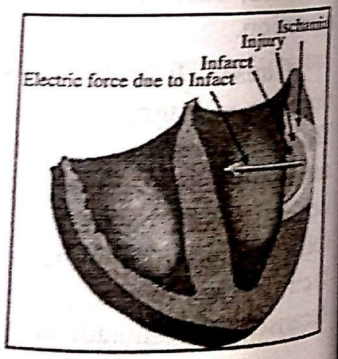
Myocardial infarction



Cerebral infarction



Cerebral infarction



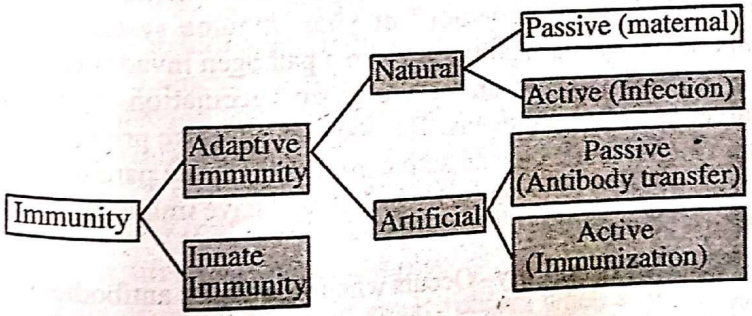
5. Types of Immunity- different types of immune responses in the body- Basic knowledge of auto immune diseases, Acquired immune deficiency disease and hypersensitivity

It is the defense mechanism in which body attains resistance against entry of antigen and prevent disease onset. It is evolved to recognize and to eliminate foreign molecules through an integrated network of cellular and molecular interactions and thus providing the protection against disease. The host defense mechanisms are:

1. Physical and chemical barriers: skin, mucus membrane, gastric acid, lysosome, lacto ferrin.
2. Mechanical removal: sneezing, coughing, secretion, ciliary action of respiratory system
3. Colonization resistance: normal flora preventing colonization with pathogenic organisms
4. Immune response : state of having sufficient biological defenses to avoid infection, disease, or other unwanted biological invasion. Immunity involves both specific and non-specific components. The non-specific components act either as barriers or as eliminators of wide range of pathogens irrespective of antigenic specificity. Other components of the immune system adapt themselves to each new disease encountered and are able to generate pathogen-specific immunity

Classification of Immunity

Innate immunity: it is an immediate response as infectious



agents enter the body, the inflammatory process directly activates. Eg : phagocytes like nutraphils, monocytes, eosinophils gets activated against parasites particularly nematodes. Basophils and mast cells contain histamine and other vassoactive amines. They bear high affinity IgG and participate in immediate hypersensitive reactions.

Specific or Adaptive immunity: If effective protection is not availed by innate immunity then adaptive immune system is induced. This response develops after period of days and is mediated by lymphocytes, which express antigen specific receptors. Features of specific immunity are as follows.

1. Specificity- Distant antigen generate specific response.
2. Diversity- Antigens are recognized by different lymphocytes.
3. Memory- Re exposure to antigen induces rapid and effective response.
4. Self regulation- Normal immune response regress with time.
5. Self and non self discrimination- during development the lymphocytes learn to distinguish between self and foreign antigens so that there is no unwanted mutual destruction.

Acquired Immunity– Its responses are antigen-specific responses in which the body recognizes a foreign substance and selectively reacts to it. This is mediated primarily by lymphocytes. Acquired immunity overlaps with the process of innate immunity. Acquired immunity can be subdivided into active immunity and passive immunity.

Active Immunity– occurs when the body is exposed to a pathogen and produces its own antibodies. Active immunity is active because it is the "activation" of your immune system. Active immunity can occur naturally, when a pathogen invades the body, or artificially, like when we are given vaccinations containing disabled or killed pathogens. The body does require prior exposure to an antigen to develop an active immunity. Some parents expose their children to some antigens so they will have immunity to these diseases later in life.

Passive Immunity– Occurs when we acquire antibodies made

by another human or animal. Passive immunity is passive because it requires no response from the person's immune system. In passive immunity you are not presenting the body with foreign antigens. Therefore your immune system will not need to use B cells, and we know that if the B cells are never introduced your body isn't making antibodies and it isn't making memory B cells. The transfer of antibodies from mother to fetus across the placenta is one example. Injections containing antibodies are another. Sometimes travelers going abroad may be injected with gamma globulin, but this passive immunity last only about three months. Passive immunizations are used to protect people who have been exposed to infections or toxins, like snake venom or tetanus.

Naturally Acquired Passive Immunity

Maternal passive immunity is a type of naturally acquired passive immunity, and refers to antibody-mediated immunity conveyed to a fetus by its mother during pregnancy. Maternal antibodies (MatAb) are passed through the placenta to the fetus by an FcRn receptor on placental cells. This occurs around the third month of gestation. IgG is the only antibody isotype that can pass through the placenta. Passive immunity is also provided through the transfer of IgA antibodies found in breast milk that are transferred to the gut of the infant, protecting against bacterial infections, until the newborn can synthesize its own antibodies.

Artificially Acquired Passive Immunity

Artificially acquired passive immunity is a short-term immunization induced by the transfer of antibodies, which can be administered in several forms; as human or animal blood plasma, as pooled human immunoglobulin for intravenous or intramuscular use, and in the form of monoclonal antibodies. Passive transfer is used prophylactically in the case of immunodeficiency diseases, such as hypogammaglobulinemia. It is also used in the treatment of several types of acute infection, and to treat poisoning. Immunity derived from passive immunization lasts for only a short period of time, and there is also a potential risk for hypersensitivity reactions, and serum sickness, especially from gamma globulin of non-human origin

Naturally Acquired Active Immunity

Naturally acquired active immunity occurs when a person is

Author

exposed to a live pathogen, and develops a primary immune response, which leads to immunological memory.This type of immunity is "natural" because it is not induced by man. Many disorders of immune system function can affect the formation of active immunity such as immunodeficiency (both acquired and congenital forms) and immunosuppression.

Artificially Acquired Active Immunity

Artificially acquired active immunity can be induced by a vaccine, a substance that contains antigen. A vaccine stimulates a primary response against the antigen without causing symptoms of the disease. The term vaccination was coined by Edward Jenner and adapted by Louis Pasteur for his pioneering work in vaccination. The method Pasteur used entailed treating the infectious agents for those diseases so they lost the ability to cause serious disease. Pasteur adopted the name vaccine as a generic term in honor of Jenner's discovery, which Pasteur's work built upon.

Defenses Against Infection

1. Innate Defense- first line of defense

Physical and chemical barriers are the body's first line of defense.

Physical or Mechanical Barriers

Skin

One of the bodies first line of defenses against bacteria and other harmful organisms is the skin. Our skin is a barrier which stops infection from entering the body. Millions of microorganisms live harmlessly on the skin and in the air around us. Sebaceous glands in the skin produce sweat and sebum, which, combined help to protect the skin. Both substances contain antiseptic molecules, primarily lysozyme which breaks down bacterial cell walls.

Mucus Membranes

The mucous membranes line various body cavities that are exposed to the external environment and internal organs. It is at several places continuous with skin: at the nostrils, the lips, the ears, the genital area, and the anus. The nose and mouth serve as passageways for air going to and from the lungs. As we inhale and

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exhale, the mucus membranes that line these passageways warm and humidify the air. Mucus membranes serve different functions, however, their more important job is to secrete mucus that traps bacteria and other foreign debris that irritates the lining of the respiratory tract. This mucus is produced and stored in the sinuses by other mucus membranes. We get congested when there is excessive fluid in the sinus cavities. This is a result of an increase in mucus secretions, as well as an increase in the amount of fluids that passes across the blood vessels of the mucus membranes that line the nose and sinus.

Mucociliary Escalator

The mucociliary clearance of the respiratory tract is an important defense mechanism against foreign debris and inhaled pathogens. The cilia that lines the upper and lower airways are lined with a thin layer of mucus. These beat rapidly to propel particles that are trapped in the mucus layer to the pharynx. Defective mucociliary clearance predisposes our respiratory tracts to recurrent infections. These cilial defects may be either congenital or acquired by infection, toxins or drugs.

Chemical Defenses

- Tears, saliva

Tears and saliva contain lysozyme, an antiseptic enzyme that attacks cell walls of bacteria and breaks them down.

- Stomach acids

Glands in the stomach lining produce hydrocloric acid. This acid kills most invading organisms that are swallowed and take up residence there.

2. Non-specific Responses to Infection - 2nd Line of Defense

The outermost defense our body has is our skin. The sebaceous glands produce sweat and sebum, which contain ANTISEPTIC properties which protect. This bacteria-killing substance called LYZOSOME is also found in tears and saliva. Acidic urine in the urinary tract and friendly bacteria in the genital tract prevent the multiplying of harmful organisms in these areas. Most invading organisms in the stomach are killed by gland production of

hydrochloric acid. These are a few examples of how the outer defenses protect us. All outer defenses work together as the body's first line of defense.

Inflammatory Response

Any break in the skin will allow bacteria to enter the body. These foreign microbes will cause swelling and reddening at the site of injury. This reaction by the body is called an inflammatory reaction or inflammatory response.

- **Swelling, redness, heat, and pain**

Inflammation is characterized by the following quintet: swelling (tumor), redness (rubor), heat (calor), pain (dolor) and dysfunction of the organs involved (functio laesa). When an injury occurs, a capillary and several tissue cells are apt to rupture, releasing histamine and kinins. These cause the capillaries to dilate, become more permeable, and leak fluid into these tissues. Dilation and fluid leaking into the tissues causes swelling, redness, and heat. The swelling and kinins stimulate nerve endings, causing pain. If there has been a break in the skin due to the injury, invading microbes may enter.

- **Phagocytosis by neutrophils and macrophages**

In the event of a break in the skin, neutrophils, monocytes (and macrophages) arrive and attempt to engulf and destroy the invaders. Phagocytosis is receptor-mediated event, which ensures that only unwanted particles are ingested. Stimulated macrophages can bring about an explosive increase in the number of leukocytes by producing Colony Stimulating Factors (CSFs). The CSFs pass by way of the blood to the bone marrow, where they stimulate the production and the release of white blood cells (WBCs), primarily neutrophils. Lymphocytes in nearby lymph nodes produce specific antibodies to attack the microbes. During the conflict, some neutrophils die and become mixed with dead tissue, bacteria, living white cells, etc. This thick yellow-white fluid is called pus. When a person has an illness, an examination of the numbers and types of WBC's in their blood can be very useful.

- **Complement System**

The complement system is a biochemical cascade of the immune system that helps clear pathogens from an organism, and promote healing. It is derived from many small plasma proteins that work together to form the primary end result of cytolysis by disrupting the target cell's plasma membrane.

Complement is activated by antigen-antibody complexes and causes holes to form in the plasma membrane of foreign microbes or cells (lysis). The complement system is considered a nonspecific defense, but it can be activated against specific microbes that have been marked with antibodies. Hemolytic transfusion reactions are caused by complement activation after a person expresses antibodies against the antigens found on the inappropriately donated blood. Hemolytic Disease of the Newborn (HDN) is due to maternal antibodies against the Rh factor crossing the placenta, binding to the baby's red blood cells, and stimulating the baby's own complement system to lyse its red blood cells.

3. Adaptive Defense (Specific Defense-third line of defense)

This part of the immune system directly targets invading microbes. Our specific immune defenses respond to antigens. An antigen is a protein (or polysaccharide) molecule, typically on the cell membrane, that the body recognizes as nonself. They are found on microbes, foreign cells, or on cancer cells. Normally our immune system does not respond to our own antigens (if it does, then this is an autoimmune disease). Sometimes we develop an immune response to a harmless antigen, such as pollen or cat dander (this is an allergic response).

- **Lymphocytes**

Specific immunity is dependent upon two types of lymphocytes, the B cells and the T cells. Their names are based on where in the body they mature. B cells mature in the bone marrow, and T cells mature in the thymus gland. In comparison, both B and T cells can recognize and target antigen-bearing cells, although they go about this in different ways. B and T cell lymphocytes are capable of recognizing an antigen because they have specific receptor

molecules on their surface which exactly fit individual antigens (like a lock and a key). Any B or T cell can only respond to one type of antigen. The body does not know ahead of time which antigens it will encounter, but rather makes receptor sites for a huge number of possible antigens. It is estimated that for the million or so antigens we encounter in our lifetime we have an equal number of specific lymphocytes for each possible antigen.

B cell lymphocytes are responsible for antibody-mediated immunity (humoral immunity). They produce antibodies, which are proteins that bind with and neutralize specific antigens. Antibodies do not directly kill bacteria, but mark them for destruction. When antibodies bind to viruses they can prevent the viruses from infecting cells. When antibodies bind to toxins they can neutralize the toxin (why we get immunized against the tetanus toxin). Humoral immunity works best fighting against target viruses, bacteria, and foreign molecules that are soluble in blood and lymph before the bacteria or viruses have entered into cells (extracellular bacteria and extracellular viruses).

B cells produce two different types of cells:

- Plasma cells
- Memory cells

Plasma Cells

As B cells mature during embryonic development, they develop surface receptors that allow them to recognize specific antigens. Then they travel in the bloodstream, distributing throughout the lymph nodes, spleen, and tonsils. Once B cells reach their destination, they remain inactive until they encounter a foreign antigen with an antigen that matches their particular receptor site (most B cells remain inactive for your entire life). The foreign antigen must be presented to the B cell directly, but usually macrophages and T cell lymphocytes (helper T cells) interact with B cells as Antigen Presenting Cells to bring about antibody production. Upon such an encounter, the B cell's receptors will bind to the antigen. The appropriate B cell is turned on or stimulated. It then grows bigger and rapidly multiplies into a large homogenous group (clone). Most of these cells are plasma cells, which actively secrete antibody that will bind with the original stimulating antigen. While most of these cells remain in the lymphatic system, the antibodies are secreted

into the lymph fluid which then enters into the blood plasma to circulate throughout the body. Although the clone cells only live a few days, their antibodies remain and circulate in the blood and lymph, gradually decreasing in number.

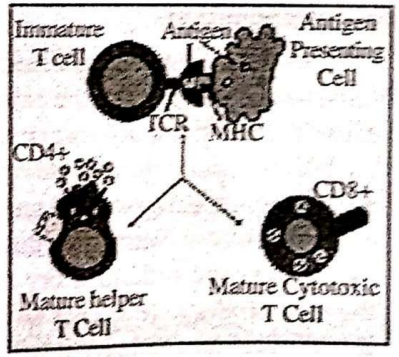
Antibody Structure and Function

There are different classes of antibodies, or immunoglobulins (Ig), such as IgA, IgG, IgE, and IgM. They can attach to the surface of a microbe and make it more easily phagocytized by neutrophils, monocytes and macrophages. Anything that simplifies phagocytosis is called an *opsonin*. The process of antibodies attaching to invaders can be termed 'opsonization.' Some antibodies can bind and inactivate certain poisons or toxins and are called antitoxins (tetanus immunizations stimulate your body to produce antibodies against the tetanus toxin rather than against the bacteria that produces the toxin). Still other antibodies can bind to the surface of microbes and prevent their attachment to the body's cells (thus preventing viruses from entering host cells). Also, some of them can stimulate nine proteins found in plasma, called complement.

Memory B Cells

At the time of activation some of the clones become memory B cells. These cells are long lived and have recorded the information about the foreign antigen so antibodies can be made more quickly, and in greater amount, in case a second exposure should occur. Since the second response is much stronger than the first and puts more antibodies into circulation, we often receive "booster shots" for immunizations.

T Cells Attack Infected Cells



Defending the body against intracellular pathogens is the role of T lymphocytes, which carry out cell-mediated immunity (CMI). Macrophages phago-cytize invading microbes and present parts of the microbe (antigens) to the T cell lympho-cytes. The appropriate T cell is turned on or stimulated. The

activated T cell rapidly multiplies into a large homogenous group (clone) of cytotoxic T cells (Tc cells).

- (a) Attack organisms directly, Also kill infected cells

These cytotoxic T cells migrate to the site of infection (or disease) and produce chemicals which directly kill the invader. Cytotoxic T cells release "perforin" that causes pores to form in the plasma membrane of the target cell, resulting in lysis.

- (b) T cells develop in the thymus gland from immature precursor cells that migrate there from the bone marrow.
- (c) Killer and helper T cells
- (d) Memory T Cells

A portion of these activated T cells become memory T cells (Tm). These cells record the information about the foreign antigen so T cells can respond more quickly, and more strongly, if a second exposure occurs. A portion of the T cells become T helper cells (TH) or T suppressor cells (Ts). TH cell stimulate other T cells and B cells by releasing cytokines and other stimulatory chemicals. Ts cells suppress the immune response. Experience has shown that cell mediated immunity is most useful to the body by: Protecting against microbes which exist inside of our body's cells (intracellular bacteria and intracellular viruses). Protecting against fungal infections. Protecting against protozoan parasites. Protecting against cancer cells.

Immune Response Pathways

The innate response starts first, and it is reinforced by the more specific acquired response. The two pathways are interconnected so cooperation and communication is essential.

- **Inflammation**

What happens when bacteria invade? If the first line of defense fails, bacteria can reach the extracellular fluid. There they usually cause an inflammatory response. This response coats antigens on the bacterial surface, with antibodies. Then in return the antibodies will ingest the antigens with phagocytic cells. This is characterized by a red, swollen warm area that is tender or painful. In addition to the nonspecific inflammatory response, lymphocytes attracted to the area produce antibodies keyed to the specific type of bacteria. If the infection continues it will produce a fever.

During an infection macrophages may release cytokines, such as interleukin-1, that travel to the hypothalamus and induce a change in the thermostat setting. When the thermostat is raised to a new normal temperature, the previous body temperature now registers as too cold. To increase the temperature to the new level, our body shunts blood away from the skin (leaving it feeling cold and clammy), the heart rate increases, and we shiver to generate heat until we reach the new set point. The hypothalamus may subsequently lower the thermostat, in which case we suddenly feel hot and start to sweat as our body attempts to cool off. A person may cycle between chills and sweats during the course of an infection. While a fever can be dangerous if it gets too high, or if a patient is weak or has heart trouble, there is some evidence suggesting that the body may overcome an infection faster if a fever is allowed to run its course.

'IMMUNE SYSTEM DISORDERS'

The immune system is a very complex and highly developed system, yet it has a very simple mission, that is to find and destroy the invaders. When the immune system does not function properly it leaves the body open for attacks from an vast array of diseases. This can be classified these into three broad categories; Autoimmunity, Immunodeficiencies, and Hypersensitivities.

"AUTO IMMUNITY"

Anything that can trigger the immune response is called an antigen. An antigen can be a microbe such as a virus, or even a part of a microbe.

Immune response against one's own antigen is called auto immunity. It is an endogenous immune response to an endogenous antigen. Body's immune system fails to distinguish between self and non self and reacts by formation of auto antibodies against one's own tissue antigens. This may turn fatal. The targets of auto immune reactions may be intracellular components, extracellular components, receptors, cell membranes components, plasma proteins or hormones. Both antibody and T cell response to self antigen cause disease.

1. Normal auto immunity. It is needed so as this allows the

clearance of self antigen debris from circulating and production of complex network of immune regulation called diotype network. It plays important role in wound healing and clearing cell debris.

2. Disease associated auto immunity. There is breakdown in the control mechanism of self tolerance that could lead to disease.

Fundamental Principles

- Results from failure from discrimination between self and non self, demonstration of immune response to an auto antigen.
- Certain HLA genes are associated with increased susceptibility of such tendency.
- There is loss of immunological tolerance in auto immunity.

Autoantigen → Auto antibody → Auto immune disease.

Tolerance is specific immunological unresponsiveness. That is immune response to a certain antigen does not occur although the immune system is otherwise functioning normally. Immune system distinguishes between antigen that is foreign and one that is normally present on the cell in the body by selection in the thymus during fetal life. Stem cells in the bone marrow produce prothymocytes which are attracted to thymus by the chemotaxic agent called thymotaxin. There they mature producing cells which recognize 'self' antigens as well as 'foreign' antigens. But self reacting T cells are eliminated or inactivated. This mechanism induces tolerance so that antigens that are exposed to the immune system during fetal life are not capable of eliciting an immune response in later life. Parts of the body that are not exposed to the immune system during fetal life can produce an immune response later on. Eg- lense protein, spermatozoa. Even antigens exposed during fetal life may provoke immune activation much later in life leading to group of diseases called auto immune disease.

Certain examples for auto immune diseases are. Rheumatoid Arthritis, Multiple sclerosis, immune mediated or type 1 diabetes, inflammatory bowel disease, systemic lupus erythematosus, psoriasis, scleroderma, auto immune thyroid disease, antisperm antibody leading to infertility.

For reasons we do not fully understand, sometimes the immune system attacks the body the way it normally would attack a germ or foreign substance. The genes some people inherit can contribute to their susceptibility to develop an autoimmune disease. Most autoimmune diseases affect woman more than men.

- In **Juvenile-onset diabetes** the immune system starts attacking and eliminating the cells in the pancreas that make insulin.
- **Multiple Sclerosis** is a chronic degenerative disorder of the central nervous system where the immune system starts attacking and destroying vital myelin in the brain and spinal cord. This causes multiple sclerosis (scars) on the myelin sheath resulting in loss of nerve function.
- Another fairly known disorder is **Rheumatoid Arthritis** this is when the immune system starts attacking the tissue inside your joints.
- In **Organ and Tissue Transplants,** foreign tissue are placed inside the body. These tissues do not perfectly match the surrounding cells. The body sees this as something that should not be there and sends messages to attack and kill it. This can make transplanting nearly impossible. This problem can not be completely prevented but it can be diminished by making sure the donor tissue is a close match to the recipient tissue. In addition, the recipient is placed on immuno-suppressing drugs to try and prevent the immune system from attacking and rejecting the new organ or tissue.
- **Vitiligo** is an autoimmune disorder in which the immune system destroys pigment-making cells called melanocytes. This results in irregularly shaped milky-white patches of skin on different parts of the body. This is the condition which Michael Jackson claims to have. Thus it is a state in which the body's immune system fails to distinguish between self and non self and reacts by formation of auto antibodies against one's own tissue antigen.

Immunodeficiency Diseases

When the immune system is presented with foreign antigens in association with dendritic cells, a vigorous immune response ensues. (Antigens are the molecules on the surface of invader cells that announce them as different from the body's cells.). Alternatively,

dendritic cells can be exploited during the development of many immune based diseases.

- **AIDS and HIV**

Acquired immunodeficiency disease (AIDS) is a well-known immune system disease. It is a collection of symptoms and infections resulting from the specific damage to the immune system caused by the human immunodeficiency virus (HIV).The late stage of the condition leaves individuals prone to opportunistic infections and tumors. HIV is transmitted through direct contact of a mucous membrane or the bloodstream with a bodily fluid containing HIV, such as blood, semen, vaginal fluid, preseminal fluid, and breast milk. This transmission can come in the form of anal, vaginal or oral sex, blood transfusion, contaminated hypodermic needles, exchange between mother and baby during pregnancy, childbirth, or breastfeeding, or other exposure to one of the above bodily fluids. AIDS is the most severe manifestation of infection with HIV. HIV is a retrovirus that primarily infects vital components of the human immune system such as CD4+ T cells (a subset of T cells), macrophages and dendritic cells. It directly and indirectly destroys CD4+ T cells. CD4+ T cells are required for the proper functioning of the immune system. When HIV kills CD4+ T cells cellular immunity is lost, leading to the condition known as AIDS. Acute HIV infection progresses over time to clinical latent HIV infection and then to early symptomatic HIV infection and later to AIDS, which is identified on the basis of the amount of CD4+ T cells in the blood and the presence of certain infections.

The median time of progression from HIV infection to AIDS is nine to ten years, and the median survival time after developing AIDS is only 9.2 months. However, the rate of clinical disease progression varies widely between individuals, from two weeks up to 20 years. Many factors affect the rate of progression. These include factors that influence the body's ability to defend against HIV such as the infected person's general immune function. Older people have weaker immune systems, and therefore have a greater risk of rapid disease progression than younger people. Poor access to health care and the existence of coexisting infections such as tuberculosis also may predispose people to faster disease progression. The infected person's genetic inheritance plays an important role and some people are resistant to certain strains of HIV.

"HYPERSENSITIVITY"

This is defined as exaggerated or inappropriate state of normal immune response with onset of adverse effects on the body. The lesions are called as hypersensitive response or immunological tissue injury. Reaction depends upon rapidity, duration and type of immune response.

1. Immediate type : reaction occurs immediately as antigen enters (within seconds or minutes) this is mediated by humoral antibodies (Bcell) 1,2,3
2. Delayed type : reaction is slower 24-48 hours. And effect is prolonged mediated by cellular response (Tcell) type 4

- Type 1 response : it is form of anaphylactic reaction. It is the state of rapidly developing immune response to an antigen to which an indivisual is previously sensitised. It can manifest in local irritation as seen by skin, nose, troat, lungs. This can be life threatening. The clinical presentation of type 1 hypersensitivity are itching,erythema,contraction of respiratory bronchioles, diarrhoes, pulmonary oedema, pulmonary haemorrhage shock and death.
- Type 2 response. This is cytotoxic reaction. They attack cell surface antigen on specific cells and causes lysis of target cells. This response is seen in autoimmune hemolytic anaemia, transfusion reaction,thrombocytopenic purpura, leucopenia. They are cytotoxic to tissue components. Some of the conditions are Grave's disease in which auto antibodies are produced against TSH receptors. In Myasthenia gravis autoantibodies are produced against acetylcholine receptors. Antisperm antibody can be produced against spermatozoa to cause male sterility. Autoantibodies against islets of pancreas can produce type 1 diabetes mellitus.
- Type 3 response. This is immune complex mediated reaction resulting from deposition of antigen antibody complex on tissue followed by activation of the complement system and inflammatory reaction. This leads to cell injury. The causes are persistant low grade microbial infection, extrinsic environmental antigen and auto immune process. Few of the examples are immunecomplex glomerulo nephritis, goodposture syndrome, SLE,Rheumatoid arthritis, farmers lung, poly arthritis.nodosa, wegener's granulomatosis, henoch-scholein purpura, Drug induced vasculitis.

- Type 4 response is delayed response. The tissue injury by cell mediated immune response without formation of antibodies. But it is instead slow and prolonged response of specifically sensitized T lymphocytes. The reaction occurs about 24 hrs after exposure to antigen.

6. Nomenclature and classification of tumors- difference between benign and malignant tumors

Neoplasia means new growth but not those which undergo process of embryogenesis, regeneration and repair, hyperplasia and hormonal stimulation. The proliferation and maturation of cells in normal adult is controlled.

- Liable cells - proliferate throughout
- Stable cells - limited proliferation
- Permanent cells - do not replicate.

The neoplastic cells lose control and regulation of replication and form abnormal mass of tissue. Thus it can be defined as "A mass of tissue formed as a result of abnormal, excessive, uncontrolled, uncoordinated autonomous and purposeless proliferation of cells even after cessation of stimulus for growth which caused it."

Components of Tumours

1. Parenchyma : The tissue
2. Stroma : fibrous connective tissue and blood vessels, it provides framework on which the parenchymal tumor cells grow.

Causes of Cancer

- Cancers are caused by abnormalities in the genetic material of the transformed cells.These abnormalities may be due to the effects of carcinogens, such as tobacco smoke, radiation, chemicals, or infectious agents.
- Other cancer-promoting genetic abnormalities may randomly occur through errors in DNA replication, or are inherited, and thus present in all cells from birth. The heritability of cancers is usually affected by complex interactions between carcinogens and the host's genome.

1. Mutation: Chemical Carcinogen

- The incidence of lung cancer is highly correlated with smoking.
- Cancer pathogenesis is traceable back to DNA mutations that impact cell growth and metastasis. Substances that cause DNA mutations are known as mutagens, and mutagens that cause cancers are known as carcinogens.
- Particular substances have been linked to specific types of cancer. Tobacco smoking is associated with many forms of cancer, causes 90% of lung cancer. Prolonged exposure to asbestos fibers is associated with mesothelioma

2. Mutation: Ionizing Radiation

- Sources of ionizing radiation, such as radon gas, can cause cancer. Prolonged exposure to ultraviolet radiation from the sun can lead to melanoma and other skin malignancies. It is estimated that 2% of future cancers will be due to current CT scans
- Non-ionizing radio frequency radiation from mobile phones and other similar RF sources has also been proposed as a cause of cancer.

3. Viral or Bacterial Infection

- Some cancers can be caused by infection with pathogens.
- Many cancers originate from a viral infection, this is especially true in animals such as birds, but also in humans, as viruses are responsible for 15% of human cancers worldwide.
- The main viruses associated with human cancers are human papillomavirus, hepatitis B and hepatitis C virus, Epstein-Barr virus, and human T-lymphotropic virus.

4. Hormonal Imbalances

- Some hormones can act in a similar manner to non-mutagenic carcinogens in that they may stimulate excessive cell growth. E.g; role of hyperestrogenic states in promoting endometrial cancer.

5. Immune System Dysfunction

- HIV is associated with a number of malignancies, including Kaposi's sarcoma, non-Hodgkin's lymphoma, and HPV-associated malignancies such as anal cancer, cervical cancer. Certain other immune deficiency states (e.g. common variable immunodeficiency and IgA deficiency) are also associated with increased risk of malignancy.

6. Heredity

- Most forms of cancer are sporadic, There are a number of recognised syndromes where there is an inherited predisposition to cancer, often due to a defect in a gene that protects against tumor formation. Famous examples are:
- Hereditary nonpolyposis colorectal cancer (HNPCC, also known as Lynch syndrome) can include familial cases of colon cancer, uterine cancer, gastric cancer, and ovarian cancer, without a preponderance of colon polyps.
- Retinoblastoma, when occurring in young children, is due to a hereditary mutation in the retinoblastoma gene

7. Other causes

- Transplacental transmission of acute leukaemia, lymphoma, melanoma and carcinoma from mother to fetus has been observed
- Diet :Reduced meat consumption is associated with decreased risk of colon cancer, and reports that consumption of coffee is associated with a reduced risk of liver cancer. Studies have linked consumption of grilled meat to an increased risk of stomach cancer, colon cancer, breast cancer, and pancreatic cancer, a phenomenon which could be due to the presence of carcinogens such as benzopyrene in foods cooked at high temperatures.

Pathogenesis :-

Stages of Cancer

- Stimuli: Achieved from above said causes
- Cell proliferation: Uncontrolled un coordinated cell division or replication
- Angiogenesis: New vascular tree grows for the mass and supply oxygen and nutrition for neoplastic cells.
- Growth: The continuous cell proliferation leads to mass or lump formation which is also called as tumors.
- Spread (metastasis): both Benign and malignant forms of tumors grow in the stroma among them malignant tumors spread to distant new area and produce new mass.
- Growth : The new mass called secondary tumour in the new place derived from primary tumor after metastasis make a new beginning in another mass formation due to cellular proliferation.

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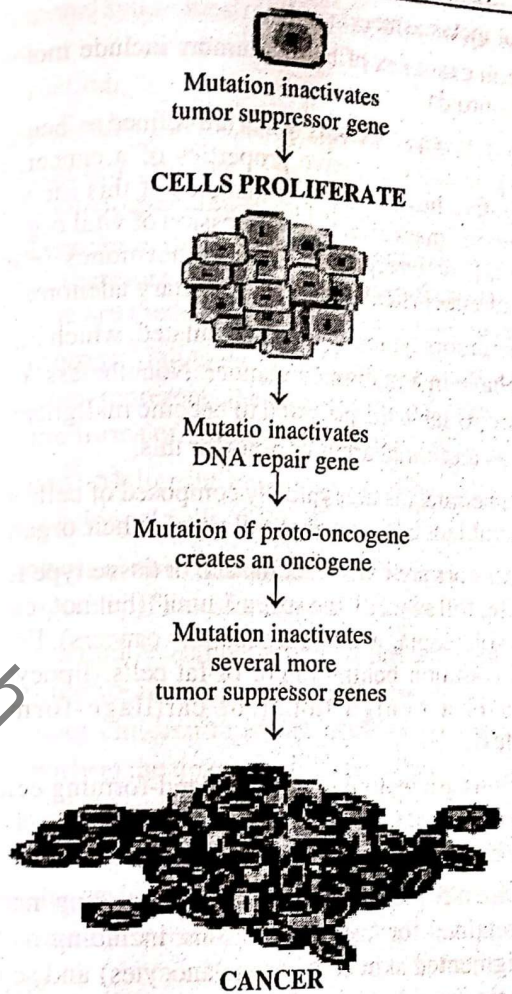


Classification of Neoplasia

1. Benign Tumor

The term benign implies a mild and nonprogressive disease, and indeed, many kinds of benign tumors are harmless to the health. It is a tumor that lacks all three of the malignant properties of a cancer. Thus, by definition

- Benign tumor does not grow in an unlimited, Aggressive manne
- Does not invade surrounding tissues,

- Does not metastasize.

Common examples of benign tumors include moles, lipom and uterine fibroids.

However, some neoplasms which are defined as 'benign tumors' because they lack the invasive properties of a cancer, may still produce negative health effects. Examples of this include tumors which produce a "mass effect" (compression of vital organs such as blood vessels), or overproduce certain hormones (e.g; thyroid adenomas, adrenocortical adenomas, pituitary adenomas).

Benign tumors typically are encapsulated, which inhibits their ability to behave in a malignant manner. Nonetheless, many types of benign tumors have the potential to become malignant and some types, such as teratoma, are notorious for this.

Benign neoplasms are typically composed of cells which bear a strong resemblance to a normal cell type in their organ of origin.

These tumors are named for the cell or tissue type from which they originate, followed by the suffix "-oma" (but not -carcinoma, -sarcoma, or -blastoma, which are generally cancers). For example, lipoma is a common benign tumor of fat cells (lipocytes), and chondroma is a benign tumor of cartilage-forming cells (chondrocytes).

Adenomas are benign tumors of gland-forming cells, and are usually specified further by their cell or organ of origin, as in hepatic adenoma (a benign tumor of hepatocytes, or liver cells).

There are a few cancers with 'benign-sounding' names which have been retained for historical reasons, including melanoma (a cancer of pigmented skin cells, or melanocytes) and seminoma (a cancer of male reproductive cells).

Signs and Symptoms of Benign Tumor

- Benign tumors,may be asymptomatic or may cause specific symptoms depending on their anatomic location and tissue type. Symptoms or pathological effects of some benign tumors may include:
- Bleeding or occult blood loss causing anemia
- Pressure causing pain or dysfunction
- Cosmetic changes, Itching

- 'Hormonal syndromes' resulting from hormones secreted by the tumor.
- Obstruction,
- Compression of blood vessels or vital organs

2. **Malignant tumors** (cancers) are usually named using-carcinoma, -sarcoma or -blastoma as a suffix,

Cancers are classified by the type of cell that resembles the tumor and, therefore, the tissue presumed to be the origin of the tumor. These are the histology and the location, respectively.

- **Carcinoma:** Malignant tumors derived from epithelial cells. This group represents the most common cancers, including the common forms of breast, prostate, lung and colon cancer.

Sarcoma: Malignant tumors derived from connective tissue, or mesenchymal cells.

- **Lymphoma and leukemia:** Malignancies derived from hematopoietic (blood-forming) cells
- Germ cell tumor: Tumors derived from totipotent cells. In adults most often found in the testicle and ovary in fetuses, babies, and young children most often found on the body midline, particularly at the tip of the tailbone; in horses most often found at the poll (base of the skull).
- Blastic tumor or blastoma: A tumor (usually malignant) which resembles an immature or embryonic tissue. Many of these tumors are most common in children.

Metastasis

It is displacement, is the spread of a disease from one organ or part to another non-adjacent organ or part. It had been previously thought that only malignant tumor cells and infections have the capacity to metastasize.

- Cancer cells can break away, leak, or spill from a primary tumor, enter lymphatic and blood vessels, circulate through the bloodstream, and be deposited within normal tissue elsewhere in the body. Metastasis is hallmark of malignancy. Most tumors and

other neoplasms can metastasize, although in varying degrees (e.g., glioma and basal cell carcinoma rarely metastasize)

- When tumor cells metastasize, the new tumor is called a secondary or metastatic tumor, and its cells are like those in the original tumor. For example, that, if breast cancer metastasizes to the lungs, the secondary tumor is made up of abnormal breast cells, not of abnormal lung cells. The tumor in the lung is then called metastatic breast cancer, not lung cancer.

Mode of Spread

- Blood stream
- Lymphatic drainage
- Both
- Direct spread

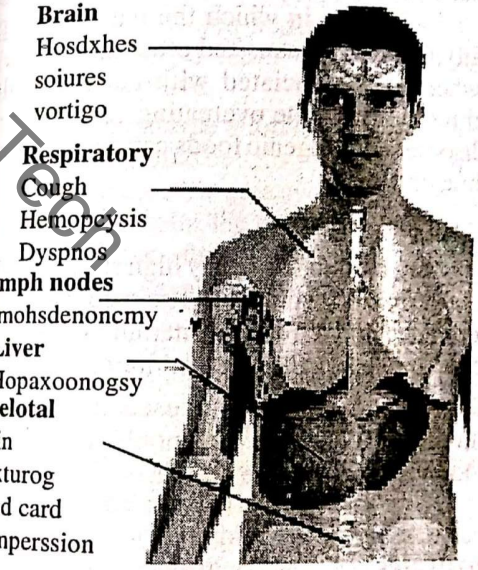
Cancer cells may spread to lymph nodes (regional lymph nodes) near the primary tumor. This is called nodal involvement, positive nodes, or regional disease. ("Positive nodes" is a term that would be used by medical specialists to describe a patient's condition, meaning that the patient's lymph nodes near the primary tumor tested positive for malignancy.

- Localized spread to regional lymph nodes near the primary tumor is not normally counted as metastasis, although this is a sign of worse prognosis. In addition to the above routes, metastasis may occur by direct seeding, called transcoelomic spread. This is generally only seen in the peritoneal or pleural cavities by ovarian tumours and mesotheliomas respectively.
- Metastatic tumors are very common in the late stages of cancer. The spread of metastases may occur via the blood or the lymphatics or through both routes. The most common places for the metastases to occur are the lungs, liver, brain, bones There is also a propensity for certain tumors to seed in particular organs. This was first discussed as the "seed and soil" theory by. For example, prostate cancer usually metastasizes to bones. In a similar manner, colon cancer has tendency to metastasize to the liver. Stomach cancer often metastasizes to the ovary in women.

Signs and Symptoms: They Depend on the Location of the Tumor

- Local symptoms: unusual lumps or swelling, hemorrhage, pain and/or ulceration. Compression of surrounding tissues may cause symptoms such as jaundice.
- Symptoms of metastasis (spreading): enlarged lymph nodes, cough, hemoptysis, hepatomegaly, bone pain, fracture of affected bones, neurological symptoms. Sever pain.
- Systemic symptoms: wt loss, poor appetite, fatigue cachexia, night sweats, anemia and specific paraneoplastic phenomena, i.e. specific conditions that are due to an active cancer, such as thrombosis or hormonal changes.

Common sites and symptoms of Cancer metastasis



Diagnosis of tumor

- Clinical observation,
- Histopathological study or biopsy,
- Fine needle aspiration cytology,
- Radiological investigation through X-ray, CT scan,
- Tumor markers.

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7. Introduction to Nutritional disorders- disorders of macro nutrients

A nutritional disorder is a disease that results from excessive or inadequate intake of food and nutrients which leads to conditions such as obesity, kwashiorkor and rickets. Nutritional disorders usually result from long-standing states and habits such as malnutrition, compulsive disorders and abnormal intake of specific nutrients and minerals.

Overnutrition

Metabolic

Obesiy is caused by consuming too many calories compared to the amount of exercise the body is performing, causing a distorted energy balance. It can lead to diseases such as cardiovascular disease and diabetes. Obesity is a condition in which the natural energy reserve, stored in the fatty tissue of humans and other mammals, is increased to a point where it is associated with certain health conditions or increased mortality. Acute overeating can also be a symptom of an eating disorder. Goitrogenic foods can cause goitres by interfering with iodine uptake.

Vitamins and Micronutrients

Vitamin poisoning is the condition of overly high storage levels of vitamins, which can lead to toxic symptoms. The medical names of the different conditions are derived from the vitamin involved: an excess of vitamin A, for example, is called."hypervitaminosis A".

Iron overload disorders are diseases caused by the over accumulation of iron in the body. Organs commonly affected are the liver, heart and endocrine glands in the mouth.

Deficiencies

Proteins/fats/carbohydrates

- Protein-energy malnutrition

Kwashiorkor : Kwashiorkor is a severe form of malnutrition, caused by a deficiency in dietary protein. The extreme lack of protein causes an osmotic imbalance in the gastro-intestinal system causing swelling of the gut diagnosed as an edema or retention of water.

Extreme fluid retention observed in individuals suffering from kwashiorkor is a direct result of irregularities of the lymphatic system

and capillary exchange. The lymphatic system serves three major purposes: fluid recovery, immunity, and lipid absorption. Victims of kwashiorkor commonly exhibit a reduced ability to recover fluids, immune system failure, and low lipid absorption, all of which result from severe undernourishment. Fluid recovery in the lymphatic system is accomplished by re-absorption of water and proteins which are returned to the blood. However, due to the lack of proteins, no substantial pressure gradient can be established to draw fluids from the tissue back into the blood stream. This results in the pooling of fluids, causing the swelling and distention of the abdomen.

The low protein intake leads to some specific signs:

- Edema of the hands and feet,
- Irritability, anorexia,
- Desquamative rash, hair discolouration,
- Large fatty liver.
- The typical swollen abdomen is due to two causes: ascites because of hypoalbuminemia (low oncotic pressure), and enlarged fatty liver.

Protein should be supplied only for anabolic purposes. The catabolic needs should be satisfied with carbohydrate and fat. Protein catabolism involves the urea cycle, which is located in the liver and can easily overwhelm the capacity of an already damaged organ. The resulting liver failure can be fatal. This means in patients suffering from kwashiorkor, protein must be introduced back into the diet gradually. Clinical solutions include weaning the affected with milk products and increasing the intake of proteinaceous material to daily recommended amounts.

Marasmus

Marasmus is caused by a severe deficiency of nearly all nutrients, especially protein and carbohydrates. It can be distinguished from kwashiorkor in that kwashiorkor is protein deficiency with adequate energy intake whereas marasmus is inadequate energy intake in all forms, including protein. Protein wasting in kwashiorkor may lead to edema. The malnutrition associated with marasmus leads to extensive tissue and muscle wasting, as well as variable edema. Other common characteristics include.

- Dry skin, loose skin folds hanging over the buttocks (glutei) and armpit (axillae), etc.
- There is also drastic loss of adipose tissue (body fat) from normal areas of fat deposits like buttocks and thighs.

• The afflicted are often fretful, irritable, and voraciously hungry

Intellectual disability

The signs and symptoms of intellectual disability are a behavioral. Most people with intellectual disability do not look lik they are afflicted with such, especially if the disability is caused b environmental factors such as malnutrition or lead poisoning. Th so-called typical appearance ascribed to people with intellectu disability is only present in a minority of cases, all of which ar syndromic.

Children with intellectual disability may learn to sit up, crawl, or to walk later than other children, or they may learn to tal later. Both adults and children with intellectual disability may als exhibit some or all of the following characteristics:

- Delays in oral language development
- Deficits in memory skills
- Difficulty learning social rules
- Difficulty with problem solving skills
- Delays in the development of adaptive behaviors such as self help or self-care skills
- Lack of social inhibitors

Dietary Minerals

Calcium

Osteoporosis : Osteoporosis itself has no symptoms; its mai consequence is the increased risk of bone fractures. Osteoporoti fractures occur in situations where healthy people would no normally break a bone; they are therefore regarded as fragilit fractures. Typical fragility fractures occur in the vertebral column rib, hip and wrist.

Rickets: Rickets is defective mineralization of bones befor epiphyseal closure in immature mammals due to deficiency o impaired metabolism of vitamin D, phosphorus or calcium, potentiall leading to fractures and deformity. The predominant cause is a vitami D deficiency, but lack of adequate calcium in the diet OR cases o severe diarrhea and vomiting may be the cause of the deficiency Although it can occur in adults, the majority of cases occur in childre suffering from severe malnutrition, usually resulting from famine starvation during the early stages of childhood.

Signs and symptoms of rickets include:

- Bone tenderness
- dental problems
- muscle weakness (rickety myopathy) increased tendency for fractures (easily broken bones), especially greenstick fractures
- Skeletal deformity
- Toddlers: Bowed legs (genu varum)
- Older children: Knock-knees (genu valgum) or "windswept knees"
- Cranial deformity (such as skull bossing or delayed fontanelle closure)
- Pelvic deformity
- Spinal deformity (such as kyphoscoliosis or lumbar lordosis)
- Growth disturbance
- Hypocalcemia (low level of calcium in the blood)
- Tetany (uncontrolled muscle spasms all over the body)
- Craniotabes (soft skull)
- Costochondral swelling (aka "rickety rosary" or "rachitic rosary")
- Harrison's groove
- Double malleoli sign due to metaphyseal hyperplasia
- Widening of wrist
- Tetany: Tetany or tetany seizure is a medical sign consisting of the involuntary contraction of muscles, which may be caused by disease or other conditions that increase the action potential frequency of muscle cells or the nerves that innervate them. Muscle cramps that are caused by the disease tetanus are not classified as tetany; rather, they are due to a blocking of the inhibition to the neurons that supply muscles.

Iodine deficiency

Goiter : Goitre is associated with hypothyroidism or hyperthyroidism may be present with symptoms of the underlying disorder. For hyperthyroidism, the most common symptoms are associated with adrenergic stimulation:

- Tachycardia,
- Palpitations,
- Nervousness,
- Tremor, and increased blood pressure.

Clinical manifestations are often related to hypermetabolism, including increased metabolism, excessive thyroid hormone, an increase in oxygen consumption, metabolic changes in protein metabolism, immunologic stimulation of diffuse goiter, and ocular changes (exophthalmos). Hypothyroid individuals have

- Weight gain despite poor appetite,
- Cold intolerance,
- Constipation and lethargy.

Selenium Deficiency

Keshan disease : Keshan disease is a congestive cardiomyopathy caused by a combination of dietary deficiency of selenium and the presence of a mutated strain of Coxsackievirus. Often fatal, the disease afflicts children and women of child bearing age, characterized by heart failure and pulmonary edema. Over decades, supplementation with selenium reduced this affliction

Iron Deficiency

Iron deficiency anemia: Iron-deficiency anemia is characterized by the sign of pallor (reduced oxyhemoglobin in skin or mucous membranes), and the symptoms of fatigue, lightheadedness, and weakness. None of the symptoms (or any of the others below) are sensitive or specific. Pallor of mucous membranes (primarily the conjunctiva) in children indicates anemia with best correlation to the actual disease,

Because iron deficiency tends to develop slowly, adaptation occurs and the disease often goes unrecognized for some time, even years; patients often adapt to the systemic effects that anaemia causes. In severe cases, dyspnea (trouble breathing) can occur. Unusual obsessive food cravings, known as pica, may develop. Other features are

- Anxiety, Irritability or a low feeling
- Angina
- Constipation
- Sleepiness/Hypersomnia
- Tinnitus
- Mouth ulcers
- Palpitations
- Hair loss
- Fainting or feeling faint
- Depression
- Breathlessness
- Twitching muscles
- Pale yellow skin
- Tingling, numbness, or burning sensations

- Missed menstrual cycle
- Koilonychia (spoon-shaped nails) or nails that are weak or brittle

Zinc

May exhibit with physical and mental Growth retardation

"VITAMINS"

Thiamine (Vitamin B1)

Beriberi : Symptoms of beriberi include weight loss, emotional disturbances, impaired sensory perception, weakness and pain in the limbs, and periods of irregular heart rate. Edema(swelling of bodily tissues) is common. It may increase the amount of lactic acid and pyruvic acid within the blood. In advanced cases, the disease may cause high output cardiac failure and death. Symptoms may occur concurrently with those of Wernicke's encephalopathy, a primarily neurological thiamine-deficiency related condition.

Beriberi is divided into three historical classifications:

1. Dry beriberi specially affects peripheral nervous system: Difficulty in walking
   - Tingling or loss of sensation (numbness) in hands and feet
   - Loss of tendon reflexes
   - Loss of muscle function or paralysis of the lower legs
   - Mental confusion/speech difficulties
   - Pain
   - Involuntary eye movements (nystagmus)
   - Vomiting.
2. Wet beriberi specially affects the cardiovascular system and other bodily systems :

   Increased heart rate
   - Vasodilation leading to decreased systemic vascular resistance, and high output cardiac failure, Elevated jugular venous pressure, Dyspnea (shortness of breath) on exertion.
   - Paroxysmal nocturnal dyspnea
   - Peripheral oedema (swelling of lower legs)
3. Infantile beriberi affects also the children of malnourished mothers.
   - Hoarseness, where the child makes moves to mourn but emits no sound or just faint moans, caused by nerve paralysis.
   - Weight loss, becoming thinner and then marasmic as the disease progresses.

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- Vomiting, Diarrhea
- Occasionally convulsions were observed in the terminal stages
- Pale skin
- Edema, Ill temper
- Alterations of the cardiovascular system, especially tachycardia (rapid heart rate).

Niacin (Vitamin B3)

Diarrhea, dermatitis, dementia and death. A more comprehensive list of symptoms includes:

- High sensitivity to sunlight
- Aggression
- Dermatitis, alopecia (hair loss), edema (swelling)
- Smooth, beefy red glossitis (tongue inflammation)
- Red skin lesions
- Insomnia
- Weakness
- Mental confusion
- Ataxia (lack of coordination), paralysis of extremities, peripheral neuritis (nerve damage)
- Diarrhea
- Dilated cardiomyopathy (enlarged, weakened heart)
- Eventually dementia

Vitamin C

Scurvy: Early symptoms are malaise and lethargy. After 1-3 months, patients develop shortness of breath and bone pain. Myalgias may occur because of reduced carnitine production. Other symptoms include skin changes with roughness, easy bruising and petechiae, gum disease, loosening of teeth, poor wound healing, and emotional changes. Dry mouth and dry eyes similar to SjĪgren's syndrome may occur. In the late stages, jaundice, generalized edema, oliguria, neuropathy, fever, convulsions, and eventual death are frequently seen.

Vitamin D

- Osteoporosis
- Rickets

8. Introduction to Infections

An infectious disease or communicable disease is caused by biological agent such as by virus, bacteria, fungus or parasites. Infectious disease are invasion of a host organism by a foreign replicator, generally often called as microbes that are invisible to naked eye. An organism that a microbe infects is known as host for that microbe. In the humans host a microbe cause disease by either disrespecting a vital body process or stimulating the immune system to mount a defensive reaction. An immune response against pathogen can include increased fever, inflammatory reaction and other damaging symptoms. An infection is the detrimental colonization in a host organism by a foreign species. The infectious agents are Virus, Bacteria, Fungus.

Virus

Virusus are strict parasites of other living cells, not only of mammalian and plant cells, but also of simple unicellular organism, including bacteria. Viruses are simple forms of replicating, biologically active particles that carry genetic information in either DNA or RNA molecules, but never in both. Most mature viruses have a protein coat over their nuclic acid and sometimes a lipid surface membranes derived from the cell they infect. Because viruses lack the protein synthesizing enzymes and structural apparatus necessary for their own replication, they bear essentially no resemblance to a true eukaryotic or prokaryotic cell. Virus replicate by using their own genes to direct the metabolic activities of the cell they infect to bring about synthesis and reassembly of their component parts. Viruses are approximately 100-1000fold smaller than cell they infect. They are approximately 20nm - 300nmin diameter. They contain protein shell called capsid with lipid membrane or envelop which is usually acquired from cytoplasmic membrane of infected cell. Protein or glycoprotein structure called spikes protrude from surface o9f virus particles. Te protein shell forming capsid assumes cylindrical or helical shape. They protect nuclic acid genome from damage, help in process of entry into the cell, and also package enzymes essential for infection process. Pox virus, hepatitis virus, erpes virus, retro virus, arbo virus are examples for virus.

Ayurtech

Bacteria

They are smallest living cells of 0.1-10 micrometer. They have cytoplsmic membrane surrounded by a cell wall, a unique interwoven polymer called peptidoglycan which makes the cell wall rigid. The simple prokaryotic cell plan includes no mitocondria, lysosomes, endoplasmic reticulum, or other organells. Teir cytoplasm contains only ribosomes and a single, double- stranded DNA chromosome. Bacteria have no nucleus, but all chemical elements of nucleic acids and protein synthesis are present. Their nutritional requirement vary greatly, most of them are free living. Tiny metabolic factories divide by binary fission.

Vibrio, coccus, bacilli, spiral are varieties of bacteria. Tubercular bacilli, lepromatus bacilli, streptococcus are few examples of bacteria.

Fungi

They exist either in yeast or mold forms. The smallest yeast are similar to the size of bacteria but most are larger. Sizes vary from 2-20 micrometer. They multiply by budding. Molds form tubular extensions called hyphae which when linked together in a branched network form a fuzzy structure as seen on neglected bread. Fungi are eukaryotic and both yeasts and molds have a rigid external cell wall composed of their own polymers called glucan, mannan and chitin. Their genome may exist in a haploid or diploid state and replicate by meiosis or simple mitosis. Most fungi are free living and well distributed in nature. Generally fungi grow more slowly than bacteria.

Mycoses are diseases caused by fungi. Because of the similarity between human cells and fungal cells, it has been difficult for scientists to design antibiotics that are effective against fungi and do not harm humans. Some of the diseases caused by fungi are: Tineas, vaginal infection (candidiasis), and histoplasmosis.

9. Introduction and Classification of Microorganisms such as Virus-Bacteria-Fungus

Microbiology is the branch of science that deals with micro organisms or those which are not visible to naked eye. Microbiology

is the science defined by smallness. It was made possible by the invention of microscopes, which allowed the visualization of structures too small. One can know the microscopic living forms life cycle, morphology, chemical characters and other relevant information. The science of medical microbiology dates back to the pioneering studies of pasture and Koch, who has isolated specific agents and proven that they could ease disease by introducing the experimental method. The scientists studied the structure, physiology and genetics of microbes in detail and began to answer questions relating to the links between specific microbial properties and disease . These gradually extended from bacterial disease to Fungal, Parasitic and finally Viral infections.

Some characteristic features of microbes

- Some micro organisms synthesize nitrogen containing compounds that contribute to the nutrition of living things that lack this ability.
- Some like oceanic algae contribute to the atmosphere by producing oxygen through photosynthesis.
- Micro organisms have astounding range of metabolic and energy yielding abilities.
- Some can exist under conditions that are lethal to other forms for example, some bacteria can oxidize inorganic compounds such as sulfur and ammonium ions to generate energy and some can survive and multiply in hot springs at temperature higher than 75 degree centigrade.
- Some microbial species have adapted to symbiotic relationship with higher forms of life.

The major classes of micro organisms in terms of ascending size and complexity are viruses, bacteria, fungi and parasites. Parasites exists as single or multi cellular structures with the same eukaryotic cell plan of our own cell. Fungi are also eukaryotic, but has rigid external walls that make them seem more like plants than animals. Bacteria also has cell wall but their cell plan is prokaryotic and lacks the organelles of eukaryotic cells. Virus have a genome and some structural elements, but must take over the machinery of another living cell (prokaryotic or eukaryotic cell) to replicate.

Viruses:

Viruses are strict intracellular parasites of other living cells, not only of mammalian and plant cells, but also of single unicellular

organisms including bacteria. Viruses are simple forms of replicating, biologically active particals that carry genetic information in either DNA or RNA molecules, but never in both. Most mature viruses have a protein coat over this nucleic acid and sometimes a lipid surface membrane derived from the cell they infect. A single cell with infected viral partical may yield many thousands of viral particles. With many viruses, cell death and infections of other cells by the newly formed viruses results.

Bacteria

They are microbes of size 0.1 to 10 micro meters living cells. They have cytoplasmic membrane surrounded by cell wall as a unique interwoven polymer called peptidoglycan makes the wall rigid. The simple prokaryotic cell plan includes no mitochondria, lysosomes, endoplasmic reticulum or other organelles. The cytoplasm contains only ribosomes and single and double stranded DNA chromosomes. Bacteria have no nucleus, but all chemical elements of nucleic acid and protein synthesis are present. They are divided by binary fission and can be grown in artificial culture.

Fungi

Fungi exist in either yeast or mold forms. The smallest of yeasts are similar in size to bacteria, but most are larger 2-12 micro meter. They multiply by budding. Molds form tubular extension called hyphae. When linked together in a branched network, they form fuzzy structure. They are eukaryotic, both yeast and molds have external rigid cell wall composed of their own unique polymers called as glucan, mannan and chitin. Their genome may exist in a diploid or haploid state and replicate by meiosis or simple mitosis. Most fungi are free living and widely distributed in nature. Generally, fungi grow more slowly than bacteria, although their growth rates sometimes overlap.

Parasites

Parasites are the most diverse of all micro organisms. They range from unicellular amoebas of 10 to 12 micrometer to multi cellular tape worms of 1 meter long. The individual cell plan is eukaryotic, but organisms such as worms are highly different and have their own organ system. Most worms have microscopic egg or larval stage, and part of their life cycle may involve multiple vertebrae and invertebrate host. Most parasites are free living, but some dependent on combination of animal, arthropod or crustacean host for their survival.

PAPER - I
Part - B

Chapter-4

NIDANA PANCHAKA VIGYANA

1. Difference between Roga and Rogi Pariksha

परीक्ष– प्रमाणैःअर्थावधारणंपरीक्षा। (वात्सायनभाष्य)

The thoroughknowledge gained from pramaanas through examination and investigation of disease and the patient is called as pareeksha

• ज्ञानपूर्वकं हि कर्मणां समारम्भंप्रशंसन्ति कुशलाः (च.वि. ८)

A physician must have knowledge, good skill about examination of patient and analyzing the disease for proper diagnosis. Then only he can treat the disease properly.

• रोगमादौपरीक्षेततोअनन्तरंऔषधं (च.सू. २०)

The first and foremost step is to examine the patient and study the disease form in the patient, diagnose the disease and then start the treatment on the basis of pareeksha.

• व्याधेस्तुएषुपरिज्ञानंवेदनयाश्चनिग्रहः (भै.र.)

Vyadhi is identified by its clinical features expressed in the patient. A physician having complete knowledge must examine the patient before treatment.

• हेतौलिङ्गेप्रशमनेरोगाणाम् अपुनर्भवे ज्ञानंचतुर्विधंयस्यसराजार्होभिषक्तमः। (च.सू. १९)

A physician is called as a royal physician he who knows the knowledge of etiology, symptomatology of a disease and its respective treatment.

परीक्ष्यास्तु प्रयोजनं प्रतिपत्तिज्ञानम्।
प्रतिपत्तिर्नाम यो विकारो यथा प्रतिपत्तव्यस्तस्य तथानुक्तम् ।। (च.वि. ८/१३२)

Pareeksha helps us to gain pratipatti jnaana. In Ayurveda for particular disease they have mentioned particular utpatti (Nidana), lakshana or presenting features. Thus gaining knowledge about that and planning for treatment according to it is called as

About the Author

The author named Dr. Nisha Kumari belongs to a small village in Karkala of Udupi district, Karnataka. She was though born and brought up until primary education and pre university in Kundapura. Her parents were Dr. Prabhakar Athikary and Mrs. Saraswathi P. Athikary. She did her under graduation B.A.M.S. in Alva's Ayurveda Medical College, Moodbidri in the year 2005 and completed her M.D. in Ayurveda from S.D.M. Ayurveda College, Udupi on the specialization Roga Nidana during the year 2007. She has rendered her service in Alva's Ayurveda Medical College, Moodbidri, Muniyal Institute of Ayurvedic Medical Science and currently she is working as Associate Professor in the Department of Roga Nidana in S.D.M. Ayurveda College and Hospital, Hassan.

About the Book

The current text book named "A Text book of Roga Nidana and VikruthiVijnana" will be available in Volume 1 and Volume 2. The Volume 1 comprises of the basic concepts of the disease and general as well as systematic methods of examination of patient. The Volume 2 comprises of the systemic pathology and the description of all of diseases. The book is written as per the new CCIM syllabus which will be beneficiary for third year undergraduate students and also others. This book is brought with the team efforts of teachers and post graduate students of Roga Nidana and therefore the book is a package of fresh and experienced thoughts.

The book encompasses all the topics told in the new syllabus with classical references and relevant information from allied science. It consists of Basic concepts, disease description, critical analysis and bed side case taking methods with physical examination, basic laboratory methods and radio imaging. The author wishes all the students of Ayurveda to utilize the book along with other classical texts of Ayurveda to understand and implement the Science both in Theory as well as Practice. The intension of this book is not only to ease the understanding of the subject but also it must be a good reason to read and refer Classical Texts of Ayurveda.

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A Text Book For Roga Nidana And Vikruthi Vijnana

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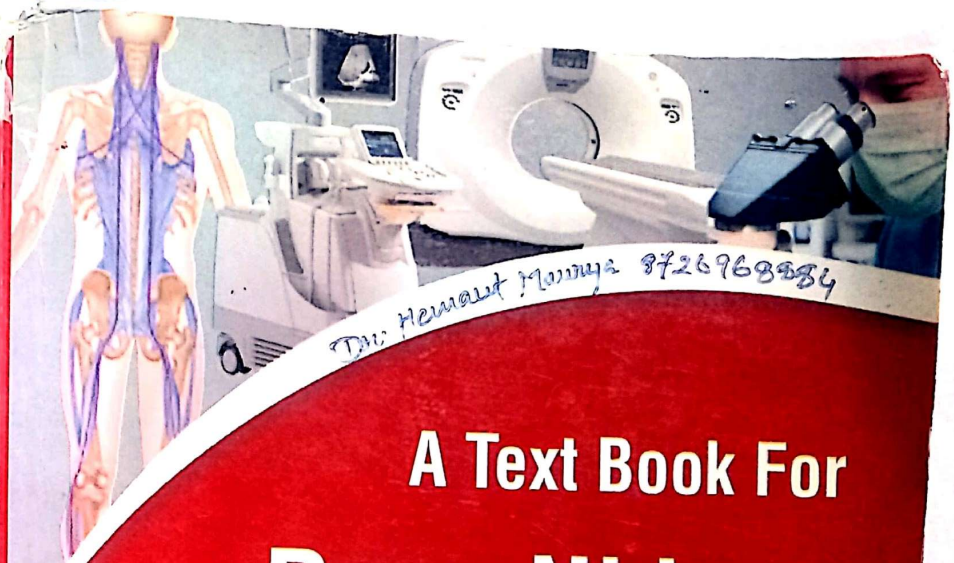

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A Text Book For Roga Nidana And Vikruthi Vijnana

Dr. Nisha Kumari

CHAUKHAMBHA ORIENTALIA
VARANASI

organisms including bacteria. Viruses are simple forms of replicating, biologically active particals that carry genetic information in either DNA or RNA molecules, but never in both. Most mature viruses have a protein coat over this nucleic acid and sometimes a lipid surface membrane derived from the cell they infect. A single cell with infected viral partical may yield many thousands of viral particles. With many viruses, cell death and infections of other cells by the newly formed viruses results.

Bacteria

They are microbes of size 0.1 to 10 micro meters living cells. They have cytoplasmic membrane surrounded by cell wall as a unique interwoven polymer called peptidoglycan makes the wall rigid. The simple prokaryotic cell plan includes no mitochondria, lysosomes, endoplasmic reticulum or other organelles. The cytoplasm contains only ribosomes and single and double stranded DNA chromosomes. Bacteria have no nucleus, but all chemical elements of nucleic acid and protein synthesis are present. They are divided by binary fission and can be grown in artificial culture.

Fungi

Fungi exist in either yeast or mold forms. The smallest of yeasts are similar in size to bacteria, but most are larger 2-12 micro meter. They multiply by budding. Molds form tubular extension called hyphae. When linked together in a branched network, they form fuzzy structure. They are eukaryotic, both yeast and molds have external rigid cell wall composed of their own unique polymers called as glucan, mannan and chitin. Their genome may exist in a diploid or haploid state and replicate by meiosis or simple mitosis. Most fungi are free living and widely distributed in nature. Generally, fungi grow more slowly than bacteria, although their growth rates sometimes overlap.

Parasites

Parasites are the most diverse of all micro organisms. They range from unicellular amoebas of 10 to 12 micrometer to multi cellular tape worms of 1 meter long. The individual cell plan is eukaryotic, but organisms such as worms are highly different and have their own organ system. Most worms have microscopic egg or larval stage, and part of their life cycle may involve multiple vertebrae and invertebrate host. Most parasites are free living, but some dependent on combination of animal, arthropod or crustacean host for their survival.

PAPER - I
Part - B

Chapter-4

NIDANA PANCHAKA VIGYANA

1. Difference between Roga and Rogi Pariksha

परीक्ष– प्रमाणैःअर्थावधारणंपरीक्षा। (वात्सायनभाष्य)

The thoroughknowledge gained from pramaanas through examination and investigation of disease and the patient is called as pareeksha

- **ज्ञानपूर्वकं हि कर्मणां समारम्भंप्रशंसन्ति कुशलाः** (च.वि. ८)

A physician must have knowledge, good skill about examination of patient and analyzing the disease for proper diagnosis. Then only he can treat the disease properly.

- **रोगमादौपरीक्षेततोअनन्तरंऔषधं** (च.सू. २०)

The first and foremost step is to examine the patient and study the disease form in the patient, diagnose the disease and then start the treatment on the basis of pareeksha.

- **व्याधेस्तुएषुपरिज्ञानंवेदनयाश्चनिग्रहः** (भै.र.)

Vyadhi is identified by its clinical features expressed in the patient. A physician having complete knowledge must examine the patient before treatment.

- **हेतौलिङ्गेप्रशमनेरोगाणाम् अपुनर्भवे ज्ञानंचतुर्विधंयस्यसराजार्होभिषक्तमः।** (च.सू. १९)

A physician is called as a royal physician he who knows the knowledge of etiology, symptomatology of a disease and its respective treatment.

परीक्ष्यास्तु प्रयोजनं प्रतिपत्तिज्ञानम्।
प्रतिपत्तिर्नाम यो विकारो यथा प्रतिपत्तव्यस्तस्य तथानुक्तम् ।। (च.वि. ८/१३२)

Pareeksha helps us to gain pratipatti jnaana. In Ayurveda for particular disease they have mentioned particular utpatti (Nidana), lakshana or presenting features. Thus gaining knowledge about that and planning for treatment according to it is called as

pratipattijnaana. A physician will not get success in treatment until and unless he understands roga properly.

Difference Between Roga Pareeksha and Rogi Pareeksha

Roga pareeksha is the analysis of disease. It is the study of vyadhi and its charectors. What is the cause of the disease, how the causative factor entered the body, what are its consequences, what are the features .....all these come under roga pareeksha. This can be achieved through Nidana panchaka and Shat kriyakala.

Rogi pareeksha is examination of the patient who is suffering from disease or vyadhi. Observing the clinical features, investigating body, part of body, fluid or elements of body comes under rogi pareeksha. Trividha, chaturvidha, shadvidha, Astasthana, Dashavidha pareekshas are used for Rogi pareeksha. Inspection , palpation, percussion, interrogation are different means to test or examine the patient. After having complete knowledge in Roga physician should carry on Rogi pareeksha.

The Roga pareeksha may need textual knowledge. But for Rogi pareeksha a physician needs good Skill, intelligence, long practice, training and sharp perception ability. Thus Roga Pareeksha is examination and understanding the disease, Rogi Pareeksha is examination of patient and his condition and condition of disease process for proper diagnosis of Disease.

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2. Importance of Nidan Panchaka

There is a cause behind every effect. Similarly there is a cause behind every disease. It is called as nidana. Why, where and how of disease are explained by using nidanapanchaka which paves the way for perfect diagnosis and proper treatment. There are different dimensions of nidana which gives various pathogenesis. Multiplicity in symptoms makes disease innumerable.

निदानंत्वादिकारणम् (अमरकोश)

The root cause for the new beginning is called as nidana.

निदानंपूर्वरुपाणिरूपण्युपशयस्तथा। सम्प्रतिर्चेतिविज्ञानरोगाणांपन्चधास्मृतं।।

Nidana (why, what, where) the cause, **Samprapthi** (how) pathogenesis or mode of onset, **Poorvarupa-** the primonitary

symptoms, **Rupa-** the actual fully manifested symptoms in accordance of the disease and severity, **Upashaya-** trial and error method to elicit the cause and components of disease. All these are five basic elements called as nidanapanchaka required for rogapareeksha. A physician should analyze the disease in above order to reach unbiased diagnosis which facilitates treatment of the diagnosed disease.

निदानंकारणमिहोच्यतेतच्येहव्याधिजनकम् व्याधिबोधकं च सामान्येनोच्यते/तत्रव्याधिजनकं निदानहेतुःव्याधिबोधकं च कारण-निदान-पूर्वरूपरूपोपशयसम्प्राप्तिरूपम्। तच्चहेतुरुपम्रिदानजनकम्

Nidana is the cause of a disease. Due to nidana vyadhi utpatti occurs. Nidana proceeds further producing particular samprapti leading to symptom formation that is poorvarupa and rupa. Vyadhi is completely formed with expression of symptoms or rupa. Thus it is from nidana where other elements of nidanapanchaka are progressed.

व्याध्युत्पत्तिहेतुर्निदानम्।

3. Hetu- Definition, Synonyms, Samanya and Vishishta Purvarupa

The one which is responsible for origin of disease is called as nidana.

सेतिकर्तव्यतकोरोगोत्पादकहेतुनिदानम्।

A particular factor can be called as nidana only when it develops a complete disease process in the body either immediately or often a certain period. Thus Nidana is the etiological factor or any causative factor that leads to disease.

Synonyms of Nidana

निमित्तहेत्वायतनप्रत्ययोत्थानकारणैःनिदानमाहुपर्यायैः

Nimitta, (the responsible factor), Hetu (etiological factors), Ayatana (a place of entry of disease), Pratyaya (reason), Uttana (the factor that has caused the beginning or origin), Karana (cause of a disease), Moola (the root cause), Prerana (inspiration to start), Yoni (origin), Udgama (cause for the onset or upcoming).

Classification of Nidana

स च हेतुरेकधाःअत्रप्रथमंचतुर्विधः। यदाह्युपकल्पनीयाध्यायेहरिश्चन्द्र ।। सन्निकृष्टविप्रकृष्टव्यभिचारिप्राधानिक भेदाचतुर्धाइति। (मधुकोष)

Based on the time taken for the onset of the disease nidana are classified into four types. Sannikrushta, Viprakrushta, Vyabhichari, Pradhanikahetu.

१. सन्निकृष्ट

सन्निकृष्टोयथानक्तंदिनऋतुभुक्तांशादोषप्रकोपस्यहेतवः, न तेचयादिकंअपेक्षन्ते।
सन्निकृष्टोज्वरस्यरूक्षादिसेवावा।

The time taken for the nidana to enter the body and manifestation of the disease is very less. The nidana causes doshadushti to lead prakopa of doshas without undergoing cayavastha. This is independent of seasonal accumulation of doshas. The changes brought about by digestive process, diurnal changes over the doshas make sannikrushta karana. For example consumption of rukshadi nidanas at night by the patient will develop jwara by next day.

२.विप्रकृष्ट

२. विप्रकृष्टम्– हेमन्तेनिचितःश्लेष्मावसन्तेकफप्रकोपकृत् विप्रकृष्टोरुद्रकोपः)

It is an distant cause that is dependent on temporal state of doshasexhibites through caya. For example caya of kapha occurs in hemanta ritu will cause disease in vasantha ritu at its prakopavastha. Here accumulation of kapha in hemantaritu is considered as viprakrushtakarana of disease that will be manifested in vasanta ritu.

३. व्यभिचारी

Vyabhicharihetu is inferior or the subordinate cause that is not strong enough to produce disease independently. But it can precipitate disease under favorable condition. For example consumption of viruddahara is unable to alone initiate morbidity in person doing regular exercise and are naturally strong.

व्यभिचारी–योदुर्बलत्वाद्व्याधिकारणासमर्थः। अबलीयंसो/अथवाअनुबन्यन्ति, न यदाविकाराभिनिवृत्तिः

४. प्राधानिक

प्राधानिको– यथा– विषादि

It is the prime and strong cause that shall bring sudden and intense morbidity. For example consequences of vishasevana.

त्रिविधोवाअसात्मेन्द्रियार्थसंयोगःप्रज्ञापराधपरिणामभेदात्।

The hetu has another three fold classification as Asatmendriyarthasamyoga, Prajnaparadha, Parinaama.

तत्रअसात्मेन्द्रियार्थसंयोगोअयोगातियोगामिथ्यायोगयोक्तारूपरसादयःप्रज्ञापराधोमिथ्याज्ञानादिपरिणामोअयो गादियुक्ताऋतुस्वभावजाःशीतादयः।।

It is further classified as heena yoga, mithyayoga, atiyoga

1. **Asatmendriyarthasamyoga :** incorrect contact of indriyas (senseorgans) with indriyarthas (objects).
   a. (chakshurendriya) heena yoga- reading articals of small letters in dim light.
   b. Chakshurendriyamithyayoga- visualizing horrible sights or sights that create fright and fear like rakshasa, vidhyut, kshakirana.
   c. Chakshrindriy aatiyoga- continuous reading overnight without rest to eyes.
   d. Ghranendriya hina yoga-Less utilization of olfactory sensation.
   e. Ghranendriya mithyayoga- smeeling foul and unpleasing odour, dust, bad fumes.
   f. Ghranendriy aatiyoga- working or staying in the place which possess heavy fragrance, inhaling continuous fumes.

Hinayoga is in adequate utilization. All sense organs are ment for its work and function of perception. If unused then that particular sense organ looses its sharpness and its functional quality. Mithyayoga is abnormal utilization which can cause indriyaupatapa and upagatha. This can cause permanent functional damage to sense organs. Atiyoga is excessive utilization of sense organs. All system in our body works at congenial environment under particular threshold. But if excess work is given then that particular sense organ or system gets stressed and undergo fatigue. This phenomenon can cause faster degeneration or destruction of sense organs.

2. **Prajnaparadha**

धीधृतिस्मृतिविभ्रमंकर्मम्यत्कुरुतेअशुभं। प्रज्ञापराधम्तंविध्यात्सर्वदोषप्रकोपणं।।

Willful blaspamy or Knowingly doing mistakes is called as prajnaparadha. When any person loses his moral, ethics, patience by destruction of dhee, druthi and smruthi he or she does prajnaparadha. A person knows that hurting any innocent is wrong. Yet continues to break the moral. Thus bad and immoral use of kaya (physical abuse), vaak (verbal abuse) and manas (mental abuse) is prajnaparadha. It is again classifie into heena, mithya, atiyoga of kaya, vaak and manas.

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I. a. Hinayoga of kaya- Sedentary life style, no physical activity. All the time sitting idle and sleeping.

b. Mithyayoga of kaya- malla yudda (wrestling), Vega dharana (suppression of natural urges).

c. Atiyoga of kaya- Ativyayama, (excessive physical exertion), ativyavaya(over indulgence in sex).

II a. Hinayoga of Manas- achinta, nidra, (idle mind).

b. Mithyayoga of Manas- thinking bad about some one, creating and assuming false stories that create nonsense.

c. Atiyoga of Manas- excessive thinking, psychological strain with less sleep.

III.a. Hina yoga of Vaak- very less speaking or communication, poor social association.

Mithyayoga of Vaak- scolding, verbally abusing the innocent, speaking harsh or rude.

Atiyoga of Vaak- excessive talking, talking in loud voice.

3. Parinaama

It is he bad consequences of abnormal seasonal variation, natural calamities. Though it is beyond the accessibility of human, in one or the other way man is the responsible factor for such natural disaster. Population explosion, deforestation, urbanization, industrialization, have destroyed the natural resourse by pollution and has spoilt the whole ecosystem. As a result of such Adharma there is janapadodwamsa. The cause of those factors that lead to such disease and destruction is called as parinaama.

शीतोष्णवर्षलक्षणापुनर्हेमन्तग्रीष्मवर्षाः। संवत्सर स कालःतत्रातिमात्रस्वलक्षणःकालः।। कालातियोगःहीनस्वलक्षणकालःकालयोगः। यथास्वलक्षणविपरीतलक्षणस्तुकालःकालमिथ्यायोगः कालःपुनःपरिणामउच्यते (च.सु. ११/४२)

Kaala or season is decided by cold, rainfall, movement and intensity of sun, wind and so on. Cold and dry climate during shishira, hemanta, hot and humid climate during vasanta and grishma, rainy during varsha are the seasonal bifurcation which are made naturally. But this discipline can be shattered leading to manifestation of features of abnormal and eneven seasonal variations. Such consequences are called as parinaama which is cause of many diseases. Parinaama is again classified as-

(a) **Hinayoga-** absence of rainfall during rainy season.

(b) **Mithyayoga-** extreme sun during winter season, rainfall during summer season.

(c) **Atiyoga-** excessive cold or snow fall during winter which is unusual to that geographic area. Excessive rainfall during rainy season than usual (this can cause flood).

१. दोषहेतुः

दोषहेतवायथाचयप्रकोपप्रशमनिमित्तायथार्तूत्पन्नामधुरादयः।

The cause that can initiate a dosha to undergo vaishamya that can lead to disease in future is called as dosha hetu. Dosha can undergo vikruta based on seasonal variation for example kapha sanchaya in shishira and prakopa in vasanta ritu. Dosha can undergo vaishamya based on aahara for example - madhura rasa can cause vriddi of kapha, katu rasa can cause vriddi of pitta dosha. Dosha can under go to dushti based on vihara for example ativyayama can cause Vata prakopa, atapa sevana can cause pitta prakopa, diva swapna can cause kapha prakopa. The causes that initiate dosha dushti is called as dosha hetu.

२. व्याधिहेतुः

व्याधिहेतवोयथामृद्भक्षणंपाण्डुरोगस्यकारणम् ।

The specific etiological factors that cause specific vyadhi is called as vyadhi hetu. For example mrut bhakshana is a specific nidana that can cause marubhakshanajanya paandu. Madatyaya is a disease specifically produced due atimadya sevana.

३. उभयहेतुः

उभयहेतुःयथावातरक्तेहस्त्यश्वोष्ट्रैर्गच्छतश्चाश्वतश्चइत्यादि।

This implies the factor responsible for dushti of a particular dosha and at the same time they act s specific etiological factor for particular disease. For example travelling in gaja, ashwa, ustra can specifically cause vataprakopa. At the same time if person indulges in amala, dadhi, abhishyandi aahara then it specifically causes raktadushti. Due to vata and rakta dushti patient can suffer from a specific disease called vatarakta.

१. उत्पादकहेतुः

तत्रोत्पादकोयथाहेमन्तजोमधुरंरसःकफोत्थः।

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Dosha dushti is required before manifestation of any disease. Specefic nidanas that can cause dosha dushti in the form of vriddi or prakopa will be an initiating state of any disease production. This initiating factor is called as utpaadaka hetu. Yet the disease is not fully formed and still in ongoing pathology. Excessive intake of guru, madhura ati snigdhahara produces kapha sanchaya in hemanta ritu.

२. व्यन्जकहेतुः

व्यन्जकोयथा– तस्यैवकफस्यव्यन्जकोवसन्तंसूर्यसंतापः इति...

This is the triggering or aggravating cause to already existing base pathology. For example the kapha which has undergone caya in hemanta ritu (due to atisnigdha, guru, madhurahara) due to sharp sunlight in vasanta ritu will undergo prakopavastha. Here guru madhura snigdha ahara in hemanta ritu is utpadaka hetu. To this addition of exposeure to sunrays in Vasanta ritu becomes vyanjaka hetu for kapha prakopa.

१. बाह्यहेतुः

तत्रबाह्याआहारविहारकालादय।। (मा.नि.)

The cause from external sourse is called as bahya hetu. Various types of food habits, lifestyle, environmental and seasonal factors, toxins are bahya hetu. For example excessive intake of alcohol can cause liver disease. Here alcohol is the bahya hetu that has entered inside the body to produce disease.

२. आभ्यन्तर

आभ्यन्तरायथादोषदोष्टोत्थः।। (मा.नि. १/५)

The inert or internal cause that produce a disease is called as abhyantara. Dosha dushti is intrinsic factor that becomes abyantara hetu for vyadhi utpatti.

Merits of knowledge of nidana

- **Nidaana Soukarya:** for the purpose of vyadhi vinischaya knowing hetu is important e.g. mrit bhakshana causing mrit bhakshana janya pandu.
- **Saapeksha Nidana:** In case of two diseases having similar presentation and features to differentiate between the two nidana is needful. Kati shula caused due to abhigata is different from Katisula caused due to degeneration.

- **Saadya Asaadyatha:** The disease of single cause and alpa bala is easily curable.
- **Swasthya Raksha:** after knowing causes for diseases if one prevents those cause then one will not suffer from any diseases. Kaarana is given importance throughout the disease process. Concept of vyaadhikshamatwa is told keeping hetu in mind

.....व्याधि उत्पादक प्रतिबन्धत्वात्.....

Body should have strength or resistance to avoid the causative factors entering the body. As per the motto of ayurveda swasthya rakshana comes first rasaayana therapies take active part here.

- **Chikitsa:** nidana parivarjana is the first line of treatment for which knowledge of nidana is essential. Vipareeta karma is another method of treatment where oushadha is based on opposite quality of nidana. Pathya apathya is decided on the basis of nidana that pacifies dosha that had undergone dushti due to nidana.
- **Upashaya Anupashaya:** This partly depends upon hetu especially while doing hetu vipareeta, hetu vyadhi Vipareetha. The knowledge of hetu is essential.
- Due to hetu only other elements of nidana panchakas like samprapthi rupa etc exists.

Thus the knowledge of nidana is essential for

- Avoidance of reoccurrence
- Planning the Management
  - **Preventive**
    - Awareness
  - **Non-preventive**
    - Preventive measures

Limitation of Nidana

- Only by knowing nidana one cannot get complete knowledge about all diseases because one cause may give rise to many diseases.

एकोहेतुरनेकस्य तथैकस्थैक एव हि व्याधेरेकस्यवहवः बहूनि बहवस्तथा। (च.नि. ८/२४)

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- Different treatment is told in different stages of disease I,e in poorva rupa stage of jwara langhana and apatarpana is given.
- Vyadhi swarupa is explained basically by rupa in other words a disease is explained looking at its lakshana.
- Some times patient may not be able to tell the cause or causative factor may be unpredictable still one cannot stop treating the patient.
- **नास्तिरोगो विर्न दौषैर्यस्माद्विचक्षणः अनुक्तमपि दोषाणं लिंगैर्व्याधिमुपाचरेत्।**

In a disease which has more than one cause or many cause it is impossible to explain which is the exact cause of that particular disease among many causes.

- If only cause is seen and treated then the treatment becomes very superficial. Any hidden disease may be unseen and left untreated.
- It is not always a rule that nidana conveys name of disease just as in mrit bhakshana janya pandu. Even symptoms may convey the cause just as vomiting after head injury conveys skull fracture.
- In most of the foreign sick examination cause is predicted by looking at features.

Conclusion

Thus for proper diagnosis of disease nidana is one of the tool but not the only tool. Nidana panchakas combine together and help physician for proper and perfect diagnosis.

Asta sthaana, trividha, dasa vidha rogi pareeksha is also a supportive tool. Using any one among these does not give complete picture of disease or sometimes may give wrong diagnosis. Hence an ideal physician should use all the tools including yukthi so that there should not be any confusion about disease identification and treatment set up. Because proper diagnosis is line for proper treatment.

4. Purva Rupa- Definition, Synonyms Samanya and Vishishta Purvarupa

Before the manifestation of disease proper there are few features seen in the patient which are manifested prodromal to disease. Such symptoms are called as poorva roopa. The knowledge of kriya kala is very essential to understand the utpatti of poorvarupa. In the sthana samsravastha of vyadhikriyakala utpatti of poorvarupa takes place. Poorva rupa are those premonitory symptoms which indicate the occurance of on coming disease.

स्थानसंश्रयिणः कृधा भावि व्याधि प्रबोधकम्।
दोषाः कुर्वन्ति यत् लिंग पूर्वरुपं तद् उच्यते।। (मा.नि. १/३)

Based on dosha dushya sammorchana the sthanasamsraya takes place in the body during fourth phase of kriyakala. As a result of this symptoms of dosha dushti will manifest which indicate the actual disease manifestation very shortly. Such symptoms are called as poorva rupa which are the indicators of future upcoming disease.

पूर्वरुपं प्रागुत्पत्ति लक्षणं व्याधेः (च.चि. १/८)

The symptoms which are produced before the actual manifestation of the disease is called as poorvarupa.

अव्यक्त लक्षणं तेषां पूर्वरूपम् इति स्मृतम्। (च.चि. २८)

The alpa (less) or asampoorna (incomplete) lakshanas which are seen before the actual disease manifestation.

प्राप्तिं येन लक्ष्यते.....उत्पत्तिस्तुरामयो दोषविशेषेणाधिष्टितः।
लिंगं अव्यक्तमल्पत्वात् व्याधीनां यथायथम्।। (अ.हृ.नि. १/४)

The prodromal symptoms of a forth coming disease which doesn't clarify the particularity of the doshas taking part in the samprapti of the disease are called as poorvarupa. Here the symptoms are few and not clear.

भावि व्याधि प्रबोधकमेवलिंगं पूर्वरूपमिति। (म.नि. १/१६)

The symptoms that manifest before the actual disease manifestation, the symptoms that indicate the manifestation of disease in nearest is called as poorvarupa.

Classification of Poorvarupa

द्विविधा हि पूर्वरुपं भवति– सामान्यं विशिष्टं च।

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तत्र सामान्यं येन दोषदूष्यसम्मूर्च्छनावस्था जनितेन भावि ज्वरादि व्याधि मात्रम् प्रदीयते, न तु वातादि जनितद्वाद् विशेषः।। (सुश्रुत)

Poorvarupa can be Classified into Two Types

1. Samanya poorvarupa- the general symptoms that indicate the forthcoming disease, but it will not give the information about the involved dosha in disease manifestation. For example shrama, arati, vivarnata are all poorvarupa that indicate the manifestation of Jwara soon. They suggest that there will be fever after sometime but they will not indicate the dosha because of which fever is produced.
2. Vishishta poorvarupa. This variety of poorvarupa implies the on coming disease along with indication of the dosha involved in the disease. For example if patient shows jrumbha before jwara then it is vataja jwara, if patient shows nayana daha before jwara then it is pittaja jwara, if patient shows aruchi before jwara then it is kaphaja jwara.

तत्र प्राग्रूपं त्रिधा दृश्यते– किन्चित् शरीरं किन्चित् मानसं किन्चित् शरीरमानसं च।। (म.नि. १/५,६)

According to madhava it is of three types. Premonitory symptoms indicating the on coming somatic disease, prodromal symptoms indicating the on coming psychological disease and poorvarupa indicating both psychosomatic disease.

Importance of Poorvarupa

- Poorvarupa helps in identification of the probable disease before it is fully manifested.
- If chikitsa is started in poorvarupa avastha then disease gets cured easily.
- Poorvarupa helps in disease diagnosis.

5. Rupa- Definition, Synonyms, Samanya and Vishishta Purvarupa

The clinical features that represent the symptoms of disease which the patient is been effected are called as rupa. When the

disease is fully manifested it exhibits particular symptoms particular to disease. By looking at those signs and symptoms physician will diagnose the disease and also plan for the treatment accordingly.

Roopavastha is the succeeding stage of poorvarupa. The symptoms which are vague or unclear in poorvarupa becomes completely and clearly manifested in rupa avastha.

तदेव व्यक्ततां यातं रूपमित्यभिधीयते।

सस्थानं व्यन्जनं लिंगं लक्षणं चिह्नमाकृतिः।। (म.नि. १/७)

The symptoms that indicate the manifested disease is called as rupa. The synonyms are samsthana, vyanjana, linga, lakshana and chinna.

व्याधेः स्वरुपम् यत् व्यक्तं तद्रूपं इति।

The disease affected in the body is expressed in the form of symptoms. The features of disease are called as rupa.

उत्पन्नव्याधिबोधमेव लिंगम् रूपं।

Features that represent the disease running in the body are called as rupa.

तथाविधदोषदूष्यसंमूर्च्छनाविशेषो ज्वरादिरूपो व्याधिः। तत् कार्यश्च अरुच्यादयः।

Based on nidana the dosha dushti occurs. Respective dhatupradoshana with dushta dosha causes dosha dushya sammurchana. After this stage clinical features start to manifest. This feature is called as rupa.

Classification of Rupa

1. Pratiniyata lakshana: The cardinal features that directly helps the physician in drawing the diagnosis. The prime symptoms. Pratyatma linga, avyabhichari lakshana are its synonym. For example the cardinal symptom of jwara is tapa or raised body temperature, body ache, tiredness. Drava mala sarana is pratyatma lakshana of atisaara.
2. Doshaja lakshana: the lakshanas of a disease that indicate the involved dosha in the disease is called as doshaja lakshna. For example daha, paka, puya srava, jwara in vrina is indication of pittaja vrina.
3. Avasthanusaara lakshana : The symptoms manifest according to the stage or state of the disease. For example. Association

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of ama in atisara is named as amatisaara. Stage of vatarakta which involves rasa rakta maamsa dhatu is called as uttana vatarakta.

4. Atura samvedhya lakshanas : The symptoms that are only seen, felt or experienced by patient only. It cannot be perceived from outside by others . for example pain, burning sensation are felt and expressed by patient only. Physician cannot find symptoms but patient has to express it. Where as Physician can elicit signs by examining the patient.
5. Vaidya samvedhya lakshanas : The signs which a physician can elicit and examine for disease diagnosis are called as vaidhya samvedhya lakshanas. For example measuring blood pressure, sparsha pareeksha, akotana pareeksha in jalodara.

Rupa avastha is a stage occurring in vyaktavastha of kriyakala. There will be manifestation of clinical features which explains the diagnosis of vyadhi. Different features are seen in different disease. The disease are identified based on its features or rupa. Some times chikitsa is based on lakshanas (lakshanika chikitsa).

6. Upashaya/Anupashaya-Definition, Types and its importance in diagnosis

Introduction

There are vast array of references for clinical examination of the patient and also objective testing. Yet there are occasions to the physician where he still cannot land in diagnosis. This may be due to complex presentation of disease symptom, failure of patient to express, patient with atypical presentation and inadequate information available to physician. In such instances there is the final tool for diagnosis that is Upashaya - Anupashaya. It is the specializes tool which includes darshanadi, aptopadeshadi trivida pareeksha and also Shadvidha, Astasthana, Dashavidha pareekshas.

गूढलिङ्गं व्याधिमुपशयानुपशयाभ्यां परीक्षेत। (च.वि. ४/८)

This is the fifth and final method of diagnosis of disease. Large number of disease can be accurately diagnosed through knowledge of Nidana, poorvarupa, rupa and samprapthi, but when the signs and symptoms of any disease are goodha (not clear) or when more

than one disease have common symptoms due to which diagnosis is doubtful in that condition ayurveda advocates the adoption of the fifth method i.e, upasaya and anupasaya to arrive at correct diagnosis.

हेतुव्याधि विपर्यस्त विपर्यस्तार्थकारिणाम्। ओषधान्नविहाराणामुपयोगं सुखावहम्।।
विद्यादुपशयं व्याधेः स हि सात्म्यमिति स्मृतः। विपरीतोऽनुपशयो व्याध्यसात्म्यमिति स्मृतः।।
(A.H.Ni.1/6-7)

This is a practical oriented trial and error method. The physician is advised to administer to the patient certain aushadha, (medicaments) ahara (food/Dietics) and vihara (healthy practices) and observe its effects. If the patient gets comfort by such methods and physician finds the condition improving, then it's known as Upashaya. It's also called as satmya. On the other hand if the patient complains of discomfort and physician finds the condition worsening, then its known as anupashaya, also called asatmya. Both of these will help in arriving at the correct diagnosis of the disease.

To arrive at a diagnosis of any disease a specific group of symptoms is essential. But when group of symptoms is not marked or the symptoms appear to be ambiguous or do not appear at all, trial and error method of treatment becomes helpful to arrive at a correct diagnosis.

Definition of Upasaya

उपशयः पुनर्हेतुव्याधिविपरीतानां विपरीतार्थकारिणां चौषधाहारविहाराणामुपयोगः सुखानुबन्धः।
(Ch.Ni 1/10)

औषधादिजनितः सुखानुबन्ध उपशयः। (Madhukosha on M.N.1/8-9)

Such of the medicines diet and regimen which brings about comfort ness either by acting directly against the cause of the disease or the disease itself or by producing such effects indirectly are called upasaya.Upasaya implies such factors which soothes the mind and body.

वैधर्म्यं च हेतुसमानधर्मकत्वेऽपि रोगप्रशमकत्वमिति। (Madhukosha on M.N.1/8-9)

Some symptoms are common to two diseases, if a disease exhibits such type of symptoms and the symptoms which are helpful for differential diagnosis are lacking a treatment is given on the assumption that it's a particular disease out of the two possible ones.

Examples

- A physician comes across a patient who has Shula in his janu sandhi, which is a symptom common to two important diseases:

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Sandhivata and Amavata-Painful points are seen Both disease :

Sandhivata is produced due to profound increase of vata. The disease known as Amavata caused by profound increase of Ama, kapha accumulating in the Sandhi. If by the other methods of examination the physician is unable to arrive at a conclusion about disease then he has to adopt Upashaya Anupashaya method of examination.

The physician has to administer application of oil massage to the thighs and knee joint or the affected joint. And watch for the changes.The next day if the patient says that he has found relief and comfort by that treatment then physician can determine the disease as Sandhivata because both oil and massage are best to mitigate the increased vata and so the patient got relief and comfort, this procedure acted as upasaya and helped in diagnosis.

On the contrary if the oil massage worsenes the pain next day in the patient, then the disease is considered as Amavata. Due to the presence of Ama the pain is increased after sneha or taila abyanga.

''स्नेहोष्णमर्दनाभ्यांचप्रणश्येत्सचवातिकः''

- A physician comes across a patient of Kati shula. Katu shula can be produced by Sheeta guna of vata and also by rooksha guna of vata. When the physician administers power application with shunti choorna on Kati pradesha and the symptom pacifies, then it is inferred that Kati shoola has caused due to sthabdata and shaitya. Powder of Shunti increases Ushnata, clears Sthabdata and Shaitya (sheeta). On the other hand if katishula decreases due to application of tila taila it is inferred as shula is causes due to rooksha guna of vata. As snigdha guna of taila pacifies rooksha guna of vata, thus upashaya is seen.

Difference between Upasaya and Chikitsa

- The use of औषध, अन्न or विहार though common to both upasaya and Chikitsa yet. Upasaya should not be mistaken for Chikitsa. In upasaya the selection of the औषध, अन्न or विहार is only at random and not the ideal one. In Chikitsa the physician will have thoughtfully selected the ideal one.
- Sometimes the औषध, अन्न or विहार prescribed may become anupasaya causing greater discomfort during upashaya anupashaya prayoga.

- In Upasaya any one of these i.e औषध, आहारा or विहार will have to be adopted and not all the three, where as in Chikitsa the use of all three is very necessary.
- Complete procedure will not have to be adopted during the upasaya where as it's very essential to strictly adopt the proper procedure of each therapy in Chikitsa.
- Hence upasaya is defined as that which is nearer to or resembles or imitates Chikitsa but it's not considered as complete treatment.
- In the due course of trial and error method if patient finds relief (upashaya) then the same may be continue as chikitsa in defined methodology. If the patient finds discomfort (anupashaya) then immediately the administered Aushadha or ahara or vihara has to be stopped. Thus it cannot be chikitsa.
- Chikitsa has to give comfort to the body, cure the ailment without any discomfort or worsening.

Types of Upasaya

The procedure of selecting the Aushada, Anna, Vihara is broadly of two kinds.

Viparita: Hetu, Vyadhi and Ubhaya

Viparitarthakari: Hetu, Vyadhi and Ubhaya

Thus there will be Eighteen Subdivisions in this method;

1. **Hetuvipareeta:** Qualities opposite to cause of the Disease.

Aushadha

हेतुविपरीतमौषधंयथा– शीतकफजेज्वरेशुण्ट्याध्युष्णंभेषजं

Sunti in sheeta jvara

Anna

हेतुविपरीतमन्नंयथा– श्रमानिलजेज्वरेरसौदनः

Mamsa rasa in vatajajvara

Vihara

रात्रीजागरण

Waking up at night in case there is an increase in kapha produced by diwaswapna.

2. **Vyadhivipareeta :** Qualities opposite to disease

Aushada

व्याधिविपरीतमौषधंयथा–अतिसारेस्तम्भनंपाटादि

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Use of Kutaja for stambana in Atisara., Khadira in Kusta and Haridra in Prameha as explained as agroushadhi dravyas in specific disease.

Anna

व्याधिविपरीतमन्नंयथा– अतिसारेस्तम्भनंमसूरादि

Consumption of Masura for stambana in Atisara.

Vihara

व्याधिविपरीतोविहरोयथा– उदावर्तेप्रवाहणं

Pravahana in Udavarta. (The vata that has gone pratiloma tuens anuloma after pravahana or straining.

3. Ubhay Vipareeta: Qulities opposite to both cause of the disease and the disease proper.

Aushadha

हेतुव्याधिविपरीतमौषधंयथा– वातशोथेवातहरंशोथहरंचदशमूलं

Using Dashamoola kwatha in Vataja shotha useful for both Vata and Shotha. As Dashamoola is Vathahara dravya.

Anna

हेतुव्याधिविपरीतमन्नंयथा– शीतोत्थज्वरेउष्णाज्वरघ्नीचयवगू

In sheeta jwara use of ushna and jwaragna yavagu. Yavagu is tarpaka gives strength to diseased patient.

Vihara

हेतुव्याधिविपरीतोविहरोयथा– स्निग्धदिवास्वप्रजायांतन्द्रायांरूक्षंतन्द्राविपरीतंचरात्रिजागरणं

Night awakening advised for tandra caused by day sleep along with oily content in food.

4. Hetuvipareetharthakari : Qualities that supports the cause of disease.

- **हेतुविपरीतार्थकार्यौषधंयथा– पित्तप्रधानेपच्यमानेशोथेपित्तकरउष्णउपनाहः**

Aushadha- Upnaha chikitsa with pittakara Usna dravya in Pittaja vrana shotha. In pittaja vrina pittavardaka dravyes are given for sheegra pachana.

Anna

हेतुविपरीतार्थकार्यन्नंयथा– पच्यमानेपित्तप्रधानेशोथेविदाह्यन्नं

Ahara which producing vidaha in Pittaja vrana shotha for sheegra pachana of sotha.

Vihara

हेतुविपरीतार्थकारीविहारोयथा– वातोन्मादेसन्त्रासनं

Trasana in Vatika unmada. to produce trasana.

5. Vyadhi Vipareetharthkari : Qualities similar and supportive to disease.

Aushadha

व्याधिविपरीतार्थकार्यौषधंयथा– छर्ध्यांवमनकारकंमदनफलादिः

Use of madanaphala in chardi. Madanaphala induces chardi and remove ama.

Anna

व्याधिविपरीतार्थकार्यन्नंयथा– अतिसारेविरेककारकंक्षीरं

Use of milk as a purgative in Atisara. Milk inercases bowel movement and removes dosha.

Vihara

व्याधिविपरीतार्थकारीविहारोयथा– छर्ध्यांवमनसाध्यायांवमनार्थंप्रवाहणं

Stimulating the root of tongue to create vomiting sensation in disease Chardi. Induces vomiting that clears doshas in Amashaya.

6. Ubhayavipareetharthkari : Qualities similar and supportive to cause and Disease.

Aushadha

अग्निनाप्लुष्टेअगुर्वादिनालेपः, उष्णंहिहेतावग्नौव्यथौचदाहेअनुगुणंप्रतिभाति

Use of agaru lepa in burnt wounds. In case of first degree burns use of sheeta deavyas will retain the ऊष्म inside the skin producing vrina in later stage. Instead treat the plushta Dhagda area with ushna upanaha. Due to this the heat that has entered inside the skin will come outside and manifestation of vrina can be avoided.

Anna

हेतुव्याधिविपरीतार्थकार्यन्नंयथा– मध्यपानोत्थेमदात्ययेमदकारकंमध्यं

Use of Madhya for Madatyaya produced by Madhya.

After excessive madhyapana क्षार is produced in GIT that produces toxic effect expressed in Madatyaya. In such condition medicated madhya prepared of amla dravyas are given. Because when क्षार and अम्ल gets mixed together मधुर विपाक is produced that clears the sympton of madatyaya.

Ayuteb

Vihara

हेतुव्याधिविपरीतार्थकारीविहारोयथा– व्यायामजनितसंमूढवाते
जलप्रतरणादिरुपोव्यायामः, अयंहेतौव्यायामेव्याधौचसंमूढवातेअनुगुणःप्रतिभाति।

Swimming exercise for Urustamba which is produced by exertion. कफ, मेदस् and आम travells from kosta to thigh region and occludes the channel or siras of Uru. Swimming in opposite direction of the current is an strainuous exercise due to which vata inereases to produce Heat or Ushma. This Ushma generated during strainuous exercise will clear the occlusion produced by Kapha, Meda and Ama in Uru pradesha.

Anupashaya

विपरीतोऽनुपशयो व्याध्यसास्त्माभिसंज्ञितः।। (A.H.Ni.1/7)
विपरीतोऽनुपशयो इत औषधादीनां दुःखकर उपयोगोऽनुपशय इत्यर्थः।।
(Madhukosha on M.ni.1/9)

Aushadha aahara, vihara that increases pain, misery and disease is called as anupashaya. This is opposite to upashaya.

7. Samprapit- Definition, Synonyms and Type and Samprapti Ghataka

Introduction

Samprapti means pathogenesis which deals with the evolution of disease. How these causative factors bring about changes in structural and functional units of the body i.e. vata, pitta and kapha molecules, how these molecular changes brings about the structural derangement in various tissues and organs, how these structural changes derange the functions of organs and how the deranged function of one organ leads to derangement of function of other organs and whole body.

This term is defined as the process of development of disease, which starts from the disturbance of the equilibrium of the doshas and after going through different stages that cause disease.

Samprapti Laxana

यथा दुष्टेन दोषेण यथा चानुविसर्पथा। निवृतिरामयस्यासौ संप्राप्तिर्जातिरागति।। (अ.ह.नि.१)

The genesis (evolution, process of manifestation) of the disease by the Dushti of doshas which are constantly circulating is known

as Samprapti. It can also be quoted as systemic production of disease is samprapti.

Nidana Sevana
↓
Dosha Dushti
↓
Dhatu Vigunata
↓
Circulation of dusta dosa and dushya in srotas
↓
Sroto Dushti (Poorvaroopa)
↓ Sthana samrraya in any ashaya
Roopa (Main disease manifestation)
↓ Progression to multiple system
Upadrava

Samprapti Bheda

- Sankhaya
- Vikalpa
- Pradhanya
- Bala & Kala
- Vidhi

Sankhya (Numerical)

तद्यथा अष्टौ ज्वराः, पञ्च गुल्माः, सप्त कुष्ठान्येवमदिः।

It denotes the number of subtypes of disease. For example 5 types of kasa, 8 types of udara, 3 types of raktapitta.

Vikalpa (Proportional)

समवेतानां पुनर्दोषाणामंशांशाबलविकल्पो विकल्पोऽस्मिन्नर्थे।।

During alteration of dosha which is caused by nidana sevana, its property gets exaggerated. This exaggeration may be of its single property, more than one property or all the properties. The alteration of dosa according to alteration of property in proportional way is called vikalpa samprapti. If vata is involed then one has to identify which form of dosha dusti has taken place (vriddi, prakopa, leena, sanga, avarana and so on), which guna of vata is responsible (chala, laghu, ruksha, sookshma so on), which is the dhatu affected, what is the severity of dhatu pradosha, relation between involved dosha and pradushita dhatu, in which srotas the doshas are circulating, what are the consequences of mutual association of all above are described in vikalpa samprapti. It is also called as amshamsha vikalpa samprapti.

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Pradhaniya (Main)

प्राधान्यं पुनर्दोषाणां तरतमाभ्यामुपलभ्यते। तत्र द्वयोस्तर त्रिषु तम इति।।

If two out of three doshas get dushtavastha, the comparative term i.e. "Tara" is used to indicate predominant one. If however, all the three dosas get dushti then the superlative term "tama" is used to indicate the most predominant one. This refers to the situation where more then one dosha is involved in the development of disease. The predominant dosha is identified which is the chief component in making a disease.

Bala Samprapti (Severity)

बलकाल विशेषः पुनर्व्याधीनामृत्वहोरात्राहारकाल विधिविनिश्चयतो भवति।।

It refers to the situation where it is important to know which dosha is main and which is subsidiary. Indicating the strength/ weakness on the basis of the cause, area of involvement and the organ effected.

Kala Samprapti (Time)

This refers to the determination of the altered dosha by the exaggeration of the property of particular dosha at particular period i.e. exaggeration of kapha dosha in the morning diet Kaphaj Vyadhi (disease caused by kapha).

Vidhi Samprapti

द्विविधो व्याधयो निजागन्तु भेदेन, त्रिविधास्त्रिदोषभेदेन, चतुर्विधा साध्यासाध्य-मृदुदारुण भेदेन।

Vidhi or variety of disease can be illustrated as below

I. Disease can be of two types

Nija Agantu

II. Disease on the basis of dushti of doshas

Vataja Pittaja Kaphaja

III. Disease is of four types

Sadhya Asadhya Mrudu Daruna

Samprapti Ghataka

The components involved in Samprapti or pathogenesis of a disease are called as samprapti ghataka.

- **व्याधिजनकव्यापार विशेषयुक्त व्याधि जन्मेहसंप्राप्ति शब्देन वाच्यम्।** (च.नि.१/११ चक्रपाणि)
- **घटयति परस्पर सम्बन्धादिकमिति।** (Shabda kalpadrumam)

The mutual involvement or association of dosha with dhatu in amavastha in a particular ashaya, spreading through srotas, produces disease. Understanding these components and their status helps samprapthi vighatana and paves the way for chikitsa.

यदा च रोग उत्पादक हेतुः व्याधिम् उत्पादयति तदा सम्प्राप्ति घटका एते भावविशेषा भवन्ति।

- दोष
- दूष्य
- अग्नि
- आम
- स्रोतस्
- स्रोतो दुष्टि
- रोगाधिष्ठान
- उद्भवस्थान

Recent Scholars Added the 5 more Samprapthi Ghatakas

- रोग मार्ग
- अरिष्ठ
- व्यक्त स्थान
- साध्यासाध्यता
- उपद्रव

1. Dosha

Sanchaya	Prakopa	Prasara
वात-स्तब्ध पूर्ण कोष्ठता	कोष्ठतोद सञ्चरण	वायो र्विमार्गगमनं आटोपौ
पित्त-पीतावभासता मन्दोष्मता	अम्लिका पिपासा परिदाह	ओष चोष परिदाह धूमायनानि पित्तस्य
कफ-अङ्गानां गौरवमालस्य	अन्नद्वेष हृदयोत्क्लेदश्च	अरोचक अविपाक अङ्गसादः च्छर्दिश्चेति

2. Dooshya

This is the second component usually found in association with Doshas. Sapta dhathus and malas together form the dushyas. Also other elements in the body like Lasika,Udaka , Vasa are included as part of dushyas itdelf.

Different kind of dushita avastha of dosha and dushya with different permutation and combination initiate further pathological process. This state of association of dushta dosha with dooshita dushyas together is called as dosha dushya sammorchana- the primary stage in any vyadhi.

3. Agni

मन्दतीक्ष्णोऽथ विषमः समश्चेति चतुर्विधः। कफपित्तानिलाधिक्यात्तत्साम्याज्जाठरोऽनलः।।१।।

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Agni is the principal component of the body for every physiology. The metabolism, catabolism, transformation, digestion, destruction of toxins all are brought about by agni. In short agni is life, when agni is lost there will be an end of life. Its functions at various levels and intensities bring normal continuity of life. Dosha vaishamya causes disease and the same causes agni vaishamya. Longstanding disease will also deteriorate the quality of agni.

There are 4 varieties of dushta agni

1. Mandagni– Dominated by kapha dosha causes amajeerna
2. Tikshnagni– Dominated by Pitta dosha causes vidagdhajeerna
3. Vishamagni– Dominated by Vata dosha causes Vishtambhajeerna
4. Samagni– A normal agni doing proper pachana with the involvement of all the three doshas in samavastha

विषम- **यः कदाचित् सम्यक् पचति, कदाचिदाध्मान शूल।**
उदावर्त अतिसार जठर गौरव आन्त्रकूजन प्रवाहणानि कृत्वा स विषमः।

Vishamagni can causes Shula (pain) adhmana (abdominal destsension), udavarta (upward movement of Vata, Atisaara, jatara garava (heaviness in intestine), aantrakoojana (gurgling in abdomen) and pravahika.

मन्द- **यस्त्वल्पमप्युपयुक्तमुदर शिरोगौरव कास श्वास प्रसेक**
च्छर्दि गात्रसदनानि कृत्वा महता कालेन पचति स मन्दः। (सु.सू. ३५/२४)

Stasis of food, heaviness of head, respiratory symptoms like kasa and shwasa, excessive salivation, vomiting, pain all over the body, delay in digestion.

तीक्ष्ण- यः प्रभूतमप्युपयुक्तमन्नमाशु पचति स तीक्ष्ण स एवाभिवर्धमानो अत्यग्निरित्याख्यते, स मुहुर्मुहुः प्रभूतमप्युपयुक्तमन्नमाशुतरं पचति, पाकान्ते च गलतालोष्ठशोष दाह संतापाञ्जनयति। (सु.सू. ३५/२४)

Tikshnagni can produce pittaja vikara especially atyagni condition where patient consumes large amount of food frequently and ingested food gets digested very soon. Other features like dryness in oral cavity and throat, burning sensation and increased temperature are also sun.

4. Ama

●आमेन तेन सम्पृक्ता दोषा दूष्याश्च दूषिताः। सामा इत्युपदिश्यन्ते ये च रोगास्तदुद्भवाः।।

Saama is the condition which manifests due to dosha , dushya combination with Ama resulting into formation of various kinds of disorders.

साम दोष	लक्षण
वात	विबन्धा, अग्निसाद, तन्द्र, अन्त्रकूजना, वेदना, शोथ, स्नेहाद्यैः वृद्धिमाप्नोति
पित्त	दुर्गन्धि,हरित श्याव वर्ण,अम्ल रस,गुरु,घन अम्लिका,कण्ठ हृत्दाह
कफ	आविल, तन्तुल, स्त्यान, दुर्गन्ध, क्षुत् उद्गार विघात,

सामधातु	लक्षण
रस	अरुचि, अश्रद्धा, आस्यवैरस्य, अरसंयता, गौरव, तन्द्र, अन्गमर्द, क्लम, ज्वर, पाण्डु, क्लैब्य, साद, क्रशांगत, अग्निनाश, अकालवलिपलिथ
रक्त	कुष्ठ, विसर्प, अस्रुग्धर, प्लीह, विद्रधि, नीलिक, व्यंग, तिलकालक, दद्रु, चर्मदल, श्वित्र, गुदमेढ्रपाक
मांस	अर्बुद, अधिमांस, गलशालूक, पूतिमांस, अलजि, गण्ड, गण्डमाल, उपजिह्विक, अर्शस्
मेद	अतिसथोल्य, प्रमेहपूर्वरूप, ग्रन्थि, गलगण्ड, ओष्टप्रद्दि, अतिस्वेद
अस्थि	अधिअस्थि, अधिदन्त, अस्थि भेद, शूल, विवर्णता,
मज्ज	रुक् पर्वणाम्, भ्रम, मूर्छदरशनं, etc.
शुक्र	क्लैब्य, अहर्षण, अल्पायु, etc.

5. Srotas

They are the channels through which the dushta dosha and dushya circulate or been transported. Physician should understand Sroto Dushti Karana of Srotas, Sroto Dushti Lakshana and Sroto Viddha Lakshana as told by Charaka and Susruta respectively.

स्रोतस्	दुष्टि लक्षण
प्राणवह	अतिसृष्ट, अतिबद्ध, कुपित, अल्पाल्प, अभीक्ष्ण, सशब्द शूल उच्छवास
उदकवह	जिह्वा तालु कण्ठ क्लोम शोष, तीव्र पिपासा
अन्नवह	अनन्नाभिलाष, अरोचक, अविपाक, छर्दि
रसवह	अश्रद्धा, अरुचि, आस्यवैरस्य, अरसज्ञता, हल्लास, गौरव, तन्द्रा, अङ्गमर्द, ज्वर, तम, पाण्डुत्व, स्रोतोरोध, क्लैब्य, अङ्गसाद, कृशाङ्गता, अग्निनाश; अकाल वली, पलित,

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रक्तवह	कुष्ठ, विसर्प, रक्तपित्त, असृग्दर, गुद मढ्र आस्य पाक, प्लीह, गुल्म, विद्रधि, नीलिका, कामला, व्यङ्ग, पिल्पव, तिलकालक, दद्रु, चर्मदल, श्वित्र, पामा, कोठ, अस्रमण्डल।
मांसवह	अधिमांस, अर्बुद, कील, गलशालूक, गलशुण्डिका, पूतिमांस, अलजी, गलगण्ड, गण्डमाला, उपजिह्विका।
मेदोवह	प्रमेह पूर्वरूप
अस्थिवह	अध्यस्थि, अधिदन्त, दन्तास्थि भेद शूल, केश लोम नख श्मश्रु दोष
मज्जावह	पूर्वरुक्, भ्रम, मूर्च्छा, तमो दर्शन, स्थूलमूल पर्व व्रण।
शुक्रवह	क्लैब्य, अहर्षण, क्लीब, अल्पायु विरूप प्रजनन।
आर्तववह	वन्ध्यत्व, मैथुन असहिष्णुत, आर्तवनाश।
स्वेदवह	अस्वेदन, अतिस्वेदन, पारुष्य, अतिश्लक्ष्णाङ्ग, परिदाह, लोमहर्ष।
मूत्रवह	अतिसृष्ट, अतिबद्ध, अल्पाल्प अभीक्ष्ण, मूत्र, बहल, सशूल मूत्र।
पुरीषवह	अल्पाल्प कृच्छ्र मलत्याग, सशब्द शूल अतिद्रव अतिग्रथित अतिबहु मलत्याग।

6. Srotodushti Prakara

- **दोषदुष्टारसैर्धातून् दूषयन्तिउभयेमलान् अधोद्वेसप्तशिरसिखानि स्वेदवहानि मलामलायनानिस्युः यथास्वंतेष्वथोगदाः।** [Ca.Ch.5/7]
- At first dushti of dosha, dhatu and mala occurs.These dushta dosha, dhatu,mala sancharana takes place in srotas This causes Srotho dushti which are Structural and functional damage of srotas.
- There are 4 types of sroto dushti. They are.

अतिप्रवृत्तिःसंगोवासिराणांग्रन्थयोपिवा विमार्गगमनंचापिस्त्रोतसांदुष्टिलक्षणम्। [Ca.Vim.5/24]

1. Athipravruthi– excessive flow as in Atisaara.
2. Sanga– Obstruction to flow as in vibhanda.
3. Vimargagamana– Flowing in other channel where usually it doesn't flow (as in chardi).
4. Siragranthi– Formation of cyst or tortion of channels or vessels as in Arshas.

7. Adhistana

The definite place of doshas which becomes chief site for disease. It can be Shareera (body) or Manas (mind).

- **द्वे रागानीके अधिष्ठान भेदेन मनोअधिष्ठानं, शरीराधिष्ठानम् च,**(च.वि.६/३)
- **दोष दुष्यावं आभ्यन्तरकारणे रोगस्य। तत्र दूष्यं स्त्रोतश्च अधिष्ठाने रोगस्य। आशया अपि धातु निर्मिता एव, अतः आशया अपि दूष्ये स्त्रोतसि च अन्तर्भवति। अधिष्ठानज्ञानम् च, चिकित्सायाम् अति उपयोगकारि भवति। सम्प्राप्ति लक्षणयोः सम्बन्ध**

8. Udbhava sthana

The place from where the disease starts is called as udbhava sthana

द्वे रोगानीके आशय भेदेन– आमाशय समुत्थम्, पक्वाशय समुत्थम् चेति,... (च.वि. ६/३)

2 Types of Vyadhi

1. Amashaya samutha- Kapha pittaja vyadhis.
2. Pakwashaya samutha- Vataja vyadhis.

9. Rogamarga

Movements of doshas are called as dosha gati. But the channels which they select for their movement and finally settle in new abode is called as Marga. The pathway in which dushta doshas move and carry disease producing agents with them is called as Roga Marga. They are three in number. Generally srotas are the margas. But to understand te sthana of disease it can be catagorised under three divisions.

1. Shakha : external pathway. Also called as bahya rogamarga
2. Marmasthi sandhi : middle pathway also called as madhyama roga marga
3. Koshta : internal pathway also called as abhyantara roga marga

त्रयोरोगमार्गाइति– शाखामर्मास्थिसन्धयः, कोष्ठश्च।

Shaka Roga Marga– The superficial body components or uttana dhatus are part of bahya roga marga. It lies in the most pheripheral or external surface of the body. rasa and twak, rakta, mamsa dhatus are components of shaka marga. The diseases of shakhamarga are manifested mostly in twak.

तत्रशाखारक्तादयोथातवस्त्वक्च, सबाह्योरोगमर्गः।

Marma Asti, Sandhi– The middle compartment of body which consists of marma (specially shira, hrudaya, basti), asti, sandhi (musculoskeletal system - muscle, tendon, ligaments, bones, joints) is madhyama roga marga.

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मर्माणिपुनर्बस्तिहृदयमूर्धादीनि, अस्थिसन्धयोअस्थिसंयोगास्तत्रोपनिबद्धाश्चस्नायुकण्डराः, समध्यमरोगमार्गाः।

Koshta Marga– This is the inner most compartment of the body. This comprised of all the organs of thorasic, abdominal, pelvic region. Shareeramadhya, Mahanimna, antaraani are synonyms to koshta. Thus it forms abhyantara roga marga.

कोष्ठः पुनरुच्यतेमहास्रोतः शरीरमध्यंमहानिम्नमामपक्वाशयश्चेतिपर्यायशब्दस्तन्त्रे, सरोग-मार्गाआभ्यन्तरः।

Diseases Pertaining to Particular Roga Marga

Shakaanusari Roga

The diseases of bahya roga marga are :

Ganda (mumps) pidaka (popular rash) alaji (smaller than pidaka) apaci (oozing ulcer) adhimaamsa (mass formation) mashaka (macula popular rash) kushta (skin diseases), visarpa (erysepeles) shwayathu (local oedema), gulma (swelling) arsha (external pile), vidhradhi (abscess).

तत्रगण्डपिडकालज्यपचीचर्मकीलअधिमांसमषककुष्ठव्यङ्गदयोविकाराबहिर्मार्गजाश्चविसर्पश्व-यथुगुल्मअर्श विद्रध्यादयः शाखानुसारिणोभवन्तिरोगाः।

Madyamaroganusari Roga

The diseases pertaining to madhyama roga marga are :

Pakshagata (hemiplegia) paksha graham (hemiparesis), apatanaka (tetanus), ardita (facial palsy), sosha (degenerating diseases) rajayakshma (depleting disease) asti sandhi shoola (arthralgia) gudabramsha (prolopse rectum) diseases of shiras and basti.

पक्षवधग्रहअपतानकअर्दितशोषराजयक्ष्मअस्थिसन्धिशूलगुदभ्रंशादयः शिरोबस्तिरोगादयः।
(A.H.Su. 22/17)

Koshtanusari Roga

The disease pertaining to inner most compartment of the body is called as abhyantara roga marga. They are: jwara (fever) atisaara (diarrhea) chardi (vomiting), alasaka (stagnant compound of ama) vishuchika (cholera) kasa,(cough0 shwasa (dyspnoea) hicca (hiccups) anaha (abdominal distension) udara (ascitis) pleeha (spleenomegaly) visarpa (erysepeles) shwayathu (local oedema), gulma (swelling) arsha (external pile), vidhradhi (abscess).

ज्वरातिसारच्छर्दिअलसकविसूचिककासश्वासहिक्काआनाहउदरप्लीहादयोअन्तर्मार्गजाश्चविसर्पश्वयथुगुल्मअर्शोविद्रध्यादयः कोष्ठानुसारिणोभवन्तिरोगाः।

10. Vyaktasthana

It is the final destination dushta doshas which travelled in srotas and land in new place. It is that place where the symptoms of the diseases are finally seen in the stage of manifestation.

11. Upadrava

The disease associated with complications which gives additional suffering to the patient and also the treatment turns difficult is called as upadrava.

- उपद्रवस्तु खलु रोगोत्तर कालजो रोगाश्रयो रोग एव स्थूलो अणुर्वा, रोगात् पश्चात् जायत इति उपद्रव संज्ञः। (च.चि. २१/४०)

Some of the Examples are

- Upadrava of Pandu

  Aruchi, Pipasa, Chardi, Jwara, Agnisada, Shopha, Moorcha, Klama.

- Upadrava of Chardhi

  Kasa, Shwasa, Hikka, Trishna, Vaichitya, Hridroga.

12. Sadhya- Asaadhyata

- **Based on Dosha**

➢One dosha - Sadhya ➢ Two doshas - Yapya
➢Three doshas - Asadhya

- **Based on dhatu**

➢Uthana - Sadhya ➢ Gambhira - Krichrasadya or asadhya

- **Based on Roga Marga**

Bahya Rogamarga
Maha kushta - Asadhya
Kshudra kushta - Sadhya
Madyama Rogamarga
Marma roga - Asadhya
Sandhi vata - Yapya
Utthana vata raktha - Sadhya

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8. Shat Kriyakaala, Reationship between Nidana Panchaka and Shat Kriyakaala

Introduction

It is the series of events taking place before vyadhiutpatti. There are Different stages where body turns from equilibrium to morbid state leading to disease manifestation. Various levels of doshadushti, different intensities of dhatupradosha and its mutual interaction will trigger production of morbidity. It states at what stage disease becomes visible and what is the right time to start the treatment. Thus it is named as kriyakala.

The doshas undergo abnormalities due to indulgence in unsuitable ahara and vihara, inturn bring about abnormalities in dhatus resulting in disease. These abnormalities starting minutely develop in successive stages to produce disease. The series of vikrutakriya (abnormal activities) successively developing in different periods of kala is known as kriyakala of evolution of disease. It is the narration in sequential order of abnormal changes taking place in dosha, dushya, agni, srotas etc. This knowledge is very helpful for both diagnosis and treatment of diseases. The concept of kriyakala is introduced in the vranaprashnaadhyaya of Susruta Samhitain sutra sthana.

Classification

Charaka and Vagbhata gives a version of doshic disturbances envisaged in 3 consecutive stages namely chaya, prakopa and prashama.The last stage prashama is the return of disturbed doshas to normal which may either be natural or due to appropriate treatment measures. Susruta's version does not include the prashama stage.

2 types of kriyakalas are mentioned in our classics namely rutukriyakala and vyadhikriyakala.

1. Rutukriyakala

चयप्रकोपप्रशमा वायोग्रीष्मादिषु त्रिषु २४ वर्षादिषु तु पित्तस्य श्लेष्मणाः शिशिरादिषु।

(Ash.Hrd.12/24)

Dosha	Sisira	Vasanta	Greeshma	Varsha	Sarat	Hemanta
Vata			Chaya	Prakopa	Prashama	
Pitta				Chaya	Prakopa	Prashama
Kapha	Chaya	Prakopa	Prashama			

The equilibrium of doshas is very unstable and is undergoing change constantly every day. These daily changes happening in particular rutus has been described as the three stages of doshas as Chaya (mild increase), prakopa (profound in increase) and prashama (decrease to normal). As the cycle of changes in rutu goes on naturally, so the cycle of changes in doshas also are natural events.

2. Vyadhikriyakala

संचयं च प्रकोपं च प्रसरं स्थानसंश्रयम् व्यक्तिं भेदं च यो वेत्ति दोषाणां स भवेद्भिषक् ।।३६।।

(Su.Su.21/36)

It includes 6 stages in the process of manifestation of disease namely sanchaya, prakopa, prasara, sthanasamshraya, vyakti and bheda.

Stage 1- Sanchaya/Chaya

This stage represents the beginning phase of a disease characterised by vague and ill defined symptoms except some characteristic symptoms of dosha. This is the accumulation of doshas in their principal abode or intense augmentation of doshas in their prime seats.

चयोवृद्धिः स्वधाम्नेवप्रद्वेषोवृद्धिहेतुषुविपरीतगुणइच्छाच। (अ.हृ.सू. १२/२२)

It is a state of augmentation of doshas in their principal loci and is characterized by aversion towards augmenting factors and craving towards the factors having opposite qualities of the augmented doshas.

तत्रसंहतिरूपवृद्धिः चयः। (सु.चि. ३३/३)

Compactness is seen in this stage of accumulation.

संचितानां खलु दोषाणां स्तब्धपूर्णकोष्ठता पीतावभासता मन्दोष्मता चाङ्गानां गौरवमालस्यं चयकारणाविद्वेषश्चेति लिङ्गआनि भवन्ति तत्र प्रथमः क्रियाकालः१८ (Su.Su.21/18)

Clinical features seen in sanchayaavastha includes.

Vata- Stabdhakoshtata (stiffness of abdomen), poornakoshtata (fullness of abdomen).

Pitta- Pitavabhasata (yellowish discolouration), mandoshmata (mildness of heat).

Kapha- Angagouravam (heaviness in body), alasyam (lassitude).

Also aversion towards the cause of accumulation

Importance

प्रथमः क्रियाकालः आद्दकर्मावसरः।।

It is the foremost occasion for intervention as sanchaya is the first stage in kriyakala.

संचयेऽपहृता दोषा लभन्ते नोत्तरा गतीः ते तूत्तरास गतिषु भवन्ति बलवत्तराः।।३७।। (Su. Su. 21/37)

Dosas having been eliminated in the stage of accumulation do not attain successive stages. They become stronger as they proceed further.

वातवृद्धि- मधुराम्ल- लवणस्निग्धोष्णैउपक्रमै पित्तवृद्धि- मधुर-तिक्त-कषाय-शीतैरुपक्रमै कफवृद्धि- कटुतिक्तकषायतीक्ष्णोष्ण-रुक्षैरुपक्रमै ।

Stage 2- Prakopa

प्रकोप-कोपस्तून्मार्गगामिता। (अ.ह. १२/२३)

Dissemination of doshas from their principal seats

उदीरणंअधिकंदोषाणाम्। (सु.उ. १०/४)

High degree of aggravation of doshas

उन्मार्गगामिता– स्वस्थानंत्यक्त्वादोषस्ययत्पुनर्मार्गान्तरगमनम्। (च.सू. १७/११२)

Prakopa is defined as the movement of doshas away from their principal loci.

विलयनरूपावृद्धिः प्रकोपः। (सु.चि. ३३/३)

Increase of doshas in the form of dissolution.

Prakopa again of 2 types

a) AchayapoorvakaPrakopa- prakopa of doshas without accumulation in their principal loci

ex: vatakopa by balavadvigrahad

pittakopa by krodha

kaphakopa by diwaswapna

All these activities instantaneously produce doshaprakopa.

b) Chayapoorvaka Prakopa- prakopa of doshas after the accumulation of doshas in their principal loci.

Features seen in this stage includes.

तेषां प्रकोपात् कोष्ठतोदसंचरणाम्लीकापिपासापरिदाहान्नद्वेषहृदयोत्क्लेदाश्च जायन्ते तत्र द्वितीयः क्रियाकालः ।।२७।। (Su.Su. 21/27)

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Vata- Vayuvimargagamanamatopa (movement of vayu in abnormal channels and tympanitis).

Pitta- Oshachoshaparidahadhoomayana (localised heat, sucking pain, generalised burning sensation and feeling like emitting smoke).

Kapha- Arocakaavipakaangasadachardi (anorexia, indigestion, lassitude and vomiting).

Importance

Doshas spread to the site of other doshasthen treatment should be given to the doshaoriginally belonging to that site. For example, vayu located in sites of pitta, then treatment is given for pittadosha.

Stage 4- Sthanasamshraya

This is the stage of localisation.

देहएकदेशाश्रयणं स्थानसंश्रयणं विदुः। (Narasimhabhasya)

It is defined as the localisation of all pervasive dosas of prasara stage to a specific loci.

कुपितानां हि दोषाणां शरीरे परिधावतं। यत्र संगः खवैगुन्यात् व्याधिस्तत्रोपजायते।। (Su.Su24/19)

Aggravated doshas circulating all over body localises on the place of khavaigunya (derangement in channels) resulting in vyadhi

स्थानसंश्रय इति दोषदूष्यस्य संश्रयः। (Su.Su.21/33)

This results in unwholesome interaction between dosha and dushya at the area of khavaigunya.

तत्र तृतीयः क्रियाकालः ३२
अत ऊर्ध्वं स्थानसंश्रयं वक्ष्यामः एवं प्रकुपितातांस्ताञ्च शरीरप्रदेशानागम्य तांस्तान् व्याधीन् जनयन्ति ते यदोदरसन्निवेशं कुर्वन्ति तदा गुल्म विद्रध्युदराग्निसङ्गनाहविसूचिकातिसारप्रभृतीञ्जनयन्ति वस्तिगताः प्रमेहाश्मरीमूत्राघातमूत्रदोषप्रभृतीना मेढ्रगता निरुद्ध प्रकशोपदंशशूकदोष प्रभृतीन गुदगता भगन्दरार्शः प्रभृतीनां वृषणागता वृद् ध्ऊर्ध्वजत्रुगतास्तूर्ध्वजाना त्वङ्गांसशोणितस्थाः क्षुद्ररोगान् कुष्ठानि विसर्पांश्चा मेदोगताग्रन्थ्यपच्यर्बुदगलगण्डालजीप्रभृतीनां अस्थिगताविद्रध्यनुशयी प्रभृतीना पादगताः श्लीपदवातशोणितवातकण्टकप्रभृतीनां सर्वाङ्गगता ज्वरसर्वाङ्गरोगप्रभृतीन् तेषामेवमभिसंनिविष्टानां पूर्वरूपप्रादुर्भावाः तं प्रतिरोगं वक्ष्यामः तत्र पूर्वरूपगतेषु चतुर्थः क्रियाकालः ३३। (Su.Su. 21/33)

- When localised in abdomen they produce gulma,abscess, udara, dyspepsia, hardness of bowels, pricking pain, diarrhoea etc.

- Localised in vasti they produce prameha, calculi, suppression of urine and other urinary disorders
- Penis-phimosis, soft chancre, sookadoshaetc
- Rectum- fistula in ano, piles etc
- Scrotum- enlargements
- Supraclavicular region- diseases of that region
- Skin (rasa), muscle and rakta- minor skin diseases, leprosy, other skin disorders and erysipelas
- Medas-cyst, scrofula, tumour, goitre, alajietc
- Bone- abscess etc
- Feet-filaria, vatarakta, vatakantakaetc
- Generalised all over body- fever and other generalised disorder

Importance

स्थानसंश्रयेण क्रुद्धा भाविव्याधि प्रबोधकं। (Madhukosha)
दोषाकुर्वन्ति यत् लिंगं पूर्वरूपं तदुच्यते। (मा.नि. १/७)
पूर्वरूपगतेषु चतुर्थः क्रियाकालः। (Su.Su.21/33)

This stage gives a clue on future disease as Poorvaroopa (premonitory symptoms) appear in this stage.

प्रकोपितास्तुखलुतेप्रकोपणविशेषाद्दुष्यविशेषाच्च विकारविशेषानभिनिर्वर्तयन्त्यपरिसंख्येयान्।। (च.वि. ६/७)

There can be innumerable number of diseases due to variations in prakopaavastha and dooshya (sthana) involved.

In this stage, treatment principle is doshavyadhipratyaneekaie treatment for both dosha and vyadhi. If treatment not given in this stage it progresses to vyaktavastha.

Stage 5- Vyakti

व्याधे प्रव्यक्तं रूपं व्यक्तिः। (डल्हण)

Clear manifestation of disease is seen in this stage along with well manifestation of clinical features

अत ऊर्ध्वं व्याधेदेशेन वक्ष्यामः शोफार्बुदग्रन्थिविद्रधिविसर्प प्रभृतीनां प्रव्यक्तलक्षणाता ज्वरातीसारप्रभतीनां च तत्र पञ्चमः क्रियाकालः ।।३४।। (Su.Su.21/34)

Well manifested symptoms of inflammation, tumour, cyst, abscess, erysipelas, fever, diarrhoea etc seen.

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Importance

Disease syndrome is clearly defined as well manifested clinical features(roopa) seen in this stage. Here treatment is given for vyadhi.If treatment not done it progress to last stage of kriya-kalabheda.

Stage 6- Bheda

The distinctive change that occurs to a disease after the fully manifested stage can be called as bheda.The persistent lingering of a disease is also considered as bhedaavastha, which is an indication of bad prognosis. Ex: when avrunasopha become vrunasopha it is bhedaavastha.

अत ऊर्ध्वमेतेषामवदीर्णानां व्रणभावमापन्नानां षष्ठः क्रियाकालः ज्वरातिसारप्रभृतीनां च दीर्घकालानुबन्धः तत्राप्रतिक्रियमाणोऽसाध्यतामुपयान्ति ।।३५।। (Su.Su.21/35)

In this stage, sotha burst and become ulcers. Fever, diarrhoea etc attains chronicity.

Importance

If physician fails to intervene at this stage the disease will become incurable.

अप्राप्ते क्रियकाले प्राप्ते वा नर्ता क्रिया। क्रियाहीन अतिरिक्तावा साध्येषु अपि न सिद्ध्यति।।

If proper treatment told in kriyakala is not given or vyadhi crossed all the kriyakalas or incomplete treatment was given then a curable vyadhi turns to incurable.

The Samprapthi of nidana panchaka is explained in terms of Kriyakala. Poorvarapa manifests in Sthana samsraya. Roopa will manifest from vyalta stage on wards.

9. Upadrava and Udarka

The disease process consists of various stages. Preliminary stage where the disease just starts to exhibit. Manifesting stage where a disease is fully settled in with all its features. Tertiary or terminal stage where disease starts destroying organ, organ system or whole body. In this stage apart from the symptoms of disease proper some other features that suggest more morbidity or more fatality is seen. In that stage all the conventional treatment modalities fail or body no more responds to treatment. It is the stage where inspite of

medication sampraptivighatana doesn't take place but samprapti still continues. That state is called as Upadrava.

Upadrava is the complication produced in a disease. As a matter of fact this complication is also a disease with separate entity. But Upadrava develops after the formation of main disease. The etiology of doshadushti is similar for main disease and upadrava. For example in patient of kaphajapeenasa later there can be upadrava in the form of kaphajakasa.

Definition of upadrava

उपद्रवस्तुखलुरोगोत्तरकालजोरोगास्त्रयोरोगएव । स्थूललणुर्वारोगात्पश्चात्जायतेइतिउपद्रवसम्ज्ञां ।।
(च.चि. विसर्पचिकित्सा)

This is the stage where complications are seen in the patient or makes the disease worst and treatment difficult. Upadrava is a stage of disease produced after the formation of main disease. It indicates terminal stage of disease. Upadrava depends on the fate of primary disease and exhibited in sever (sthoola) or milder (anu) form.

उपद्रवोरोगारम्भकदोषप्रकोपजायन्तेअन्यविकारः । व्याधिरुपरियोव्याधिर्भवत्युत्तरकालजः ।। उपक्रमविरोधि च स उपद्रवउच्यते । (म.नि. १/२)

Upadrava is the stage of complication of any disease. It is produced by same dosha that had caused the main disease. The main or primary disease in the due course of time or kala proceeds further, and as result of failure of treatment or indulgence in further dosha prakopaka aahara and vihara leads to upadrava. In this state the disease turns more complex and deteriorates the condition of the patient.

एनदोषेणप्रकुपितेनरोगः स भवति। तेनैवअपथ्यबलालब्धेनसतः य अन्यःरोगःउत्पध्यते स उपद्रवः ।।

During the utpatti of roga dosha dushti takes place in a particular intensity giving particular symptoms. Based on the symptoms chikitsa has to be given to correct the dosha vaishamya. If the chikitsa administered is incorrect or if the patient does not respond to the treatment then the dosha dushti continues leading to worsening of the disease and patient. The morbidity and chances of mortality raises with the progression of disease. This condition is called as upadrava.

तत्रोपसर्गिकोनामयः पूर्वोत्पन्नंव्याधिजघन्यकालजातो । व्याधिरुपसृजते स तन्मूलएवोपद्रवसम्ज्ञ।
(सु.सू. ३५/१८)

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पूर्वेद् भवतिनिमित्तेनयोअपरोजायतेगदः । तमुपद्रवमित्याहुः अतिसारोयथाज्वरा ।।

Upadrava is the bad transformation of the primary disease. This is bhedavastha of shad kriyakala. This is complication of the actual disease which worsens the suffering in patient and treatment more difficult. The dosha responsible for the formation of main disease itself is causing upadrava.

व्याधिरुपरियोव्याधिः भवत्युत्तरकालजः। उपक्रमविरोधि च स उपद्रवः उच्यते ।। (मा.नि.१/२)

A sequel of new symptoms upon the main disease that manifest in the due course of time and doesn't respond to the treatment is called as upadrava.

द्विधा स्वतन्त्रपरतन्त्रत्वाअध्योअन्त्यः पुनर्द्विविधा। पूर्वजापूर्ववरुपाख्याजाताः पस्चादुपद्रवः ।। (अ.ह.सु. १२/६०)

It is of two types 1. Swatantra- independent

2. Paratantra- dependent

Later again it is classified as-

1. Poorvarupa- the one manifested before disease
2. Upadrava- the one manifested in the later part of disese.

पूर्वोद्भवनिमित्तेनयोअपरिजायतेगदः । तमुपद्रवमित्याहुः अतिसारोअथज्वरैः।। (क.सु.२७/५७)

Upadrava is a super added features upon the already existing primary disease. Just like manifestation of atisara in the patient suffering from jwara, peenasa is followed by kaasa.

Generally upadrava subsides when the main disease subsides. But if there are life threatening symptoms seen then upadravas are to be controlled first. When the life of the patient is stabilized the chikitsa for actual vyadhi has to be given.

Thus one can say upadrava has manifested if following conditions are applied:

1. It is produced after the formation of main disease.
2. The dosha responsibl for the utpatti of vyadhi and utpatti of upadrava are same.
3. The nidana explained for vyadhi utpati and manifestation of its upadrava are also same.
4. The main disease is swatantra (independent) and its upadrava is dependent on primary disease.

Ayuteca

5. Normally upadrava subsides when the primary disease is cured.
6. Generally the main disease persists during the course of upadrava.

Example :

UPADRAVAS OF PANDU ROGA

1. Aruchi
2. Jwara
3. Murdha Ruja
4. Agni Sada
5. Shopha
6. Kantha Gatho Abalatwam
7. Moorcha
8. Klama
9. Hridaya Peeda.

UPADRAVAS OF HRIDROGA

क्लमः सादो भ्रमः शोषो ज्ञेयास्तेषामुपद्रवाः। कृमिजे तु कृमीणां ये श्लेष्मिकाणां हि ते मताः।।

* Fatigue,
* Giddiness
* Tiredness and body ache
* Decrease of dhathus, emaciation

These are the complication of hrudroga.

UPADRAVA OF SOTHA:

कृशस्य रोगैर्बलस्य यो भवेदुपद्रवैर्वा वमिपूर्वकैर्युतः ।
स हन्ति मर्मानुगतोऽथ राजिमान् परिस्रवेद्धीनबलस्य सर्वगः ।।१५।। (ca.chi 12/15)

If patient is lean and disease which the patient is suffering is strong then shotha is an upadrava. Development of shwayathu in emaciated patient or who has become weak due to suffering from long standing disease.

Udarka:

उदर्क नाम उत्तरकालिन फलं । (म.नि.)

This usually appears as sequel to a disease that manifests after the disease is cured. Udarka means the after effects of a disease appearing in the body of the patient once the primary disease is cured.

Example : Manifestation of dry cough and weakness soon after Jwara is cured. Here the dry cough and weakness is udarka to jwara. But these are just light symptoms and they are not disease. Therefore treatment is not required for udarka as it is temporary and not distressfull to the patient. Thus a wise physician should not get confused udarka with upadrava.

10. Arishta Vigyan- Definition, Types and its Importance

Introduction

The signs and symptoms which herald the on coming death, the signs and symptoms indicating near fatality are called asArishtalakshana. Just as the flowers indicate the next coming fruit, the smoke indicate fire and cloud indicate rain similarly manifestation of Arista lakshanas indicate nearing death. There is no death without arishtalakshanas and there will be no life after their appearance. Hence physician should acquire a thorough knowledge of the arishtalakshana.

The description of Arishta is first told in detail by Shatapada-brahmana based on the information from vedas and also some Vaidyagranthas. Jnana ofarishta is important in chikitsa because one should have proper knowledge regarding the ayu of a vyakthi then only the treatment becomes fruitful. Vagbhata says that chikitsa depends on ayu, so if there is increased ayu then the prognosis will be good. If an individual does not have ayu, the will be vyakta (manifested) ofarishta. If a Physician attempts to treat the patient having Arishtalakshanathere will be nashta or loss to the Vaidya in terms of Dhana, Yashas and Vidya. Hence ayurveda sampoorna phala is obtained only by having jana of ayu.The maana of this ayu depends on prakruthi and vikruthi.

Synonyms of Arishta

Hemachandra	Medini Kosha	Some Others
Upadrava,	Ashubha	Saubhagya
Uplinga,	Rishta	Shubhasuchaka
Utpata,	Arishta	
Prathikula,		
Durbhagya,		
Asaguna,		
Arishta		

Definition:

कोशाकार

- **न रिष्टं इत्यरिष्टम्**

भावप्रकाश

- **आतुरस्यरिष्टमिति विद्यात्**

माधवनिदान (मधुकोश)

- **नियतमरणव्यापकंलिंगम् अरिष्टम**

Appeared symptoms which indicate definite death of the patient

सुश्रुत (डल्हण)

- **अरिष्टान् यत्रमरणलक्षणानि**
- **शरीरशीलयोर्यस्यप्रकृतेर्विकृतिर्भवेत्।**
- **तत्वरिष्ट समसेनव्यसतस्तुनिबोधमे।**

Abnormal changes happening in the body, temperament and constitution are in brief called as arishta.

- **रोगिणोमरणंयस्मात्अवश्यंभवतिलक्ष्यते**
- **तत् लक्षणं अरिष्टं स्यत् रिष्टं चापितदुच्यते**

Dangerous and ominous symptoms suggesting definite death of a patient.

Classification of Arishta

Purusha samshraya– The lakshanas which are found in body of the person who is nearing death.

1. Lakshana nimitta– Features that are since birth that are indicative of death and Ayu. This can be accessed from various particular attributes like hasta rekha, padarekha, angaavayava-lakshana, nyunaadhika sankhya.
2. Lakshya nimitta– The symptoms or the features affecting the course of various disease. The Patient may suffer from any Grave disease which shows fatal symptoms, This may depends on nidanaof vyadhi, lakshana and upadrava.
3. Nimittanurupa– This hethu is avyaktha. It gives ayupramanajnana. These are the fatal features which invariably appear in every person prior to his death without any other reason.

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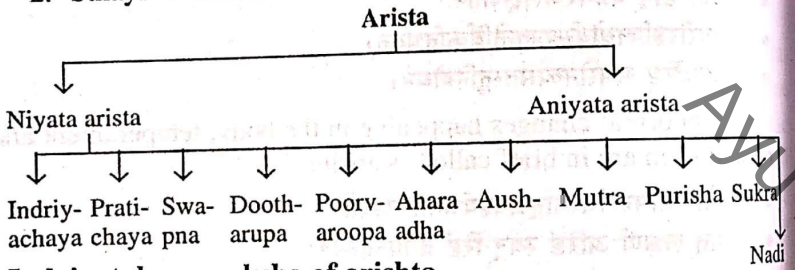
Purusha anashraya

The environmental variations, behavior of animals and birds, appearance of messenger or relatives of patient, changes in the surroundings of patient that give bad omen suggesting of nearing death in patient.

- **According to sushrutha**
  1. Aniyatha- Indefinite (dootha arishta)
  2. Niyatha- Definite (doshaja arishta)
- **According to ashtangahrudaya**
  1. Asthayi- Signs resemble fatal signs actually not fatal (rishtabhasa)
  2. Sthayi - Permanent fatal signs



Indriyatahapareeksha of arishta

Sparshanendriya

- Information through sparshana (touch/palpation/percussion) vaidya should palpate the whole body of the patient.
- Spandana - apandana (presena or absenes of pulsation).
- Mrudu- kathina, ruksha - sheeta, snigdha - ruksha, usna - sheeta of anga or angavayava.
- If there is sampoornasheetashareera but same time patient expierence Daha.
- Aakasmikaupaghatha, pakshaghata - ushnapradesha becomes sheetha, swedaadhikya.
- Hrudayasthambha, aakasmikaupaghatha - spandithapradesha becomes aspanditha.

Rasanendriya

- Rasanendriyataha pareeksha in arista vijnana is of two types- patient himself can percieve and others can percieve.

- This type of perception can be due to absence of swabhavika-jnana of rasanendriya or it can be due to viparyaya jnana.
- In certain mukhapaka due to vikruthi of rasanendriya there will be viparyayajnana.
- In sarpavisha if katuaahara cannot be percieve that is loss of swabhavikajnana.
- Shothayuktha, shuska, sakantaka, syavavarna, supthatha, malavrutha of jihwacannot perceive right taste.
- Malavrithajihwa is seen in gambheerarogaavastha of annavaha-srothas.
- Makshika and yuka goes away from the body.
- In lead poisoning there is syavavarna of jihwa.

Ghranendriya

- In gandha vishaya aristha also there are two types- person himself can perceive different unusual smell and others can perceive unusual smell from patients body. It can be sugandha or durgandha in nature.
- Smell of different flowers comes from patient's the body (push-peethakam).
- Even after snanadurgandha or without snanasugandha comes from the body.
- In deerghakaleenamadhumehamadhuragandhacan be perceived from patient's body.

Darshanendriya

- Person can see adrishyavasthu but unable to see drishya-vasthuor patient can have viparithajnana of chakshurindriya.
- Unusual sights or visual hallucinations like Stars and moon at day time, clouds and thunder in clear sky, agni, jala
- Visual appearance of supernaturalelements like pretha, rakshasa.
- Continuous movement of eye ball or absence (nishchala) of ocular movement.

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Srothrendriya

- Two types, they are : Absence of swabhavikajnana and presence of viparyayajnana.
- Hearing shabda in shabdaabhava and not hearing ofshabda in presence of shabda.
- Hearing nadipravaha (river flowing), samudragarjana (waves of ocean) in its absence.
- Hearing shatrushabda-harsha

Chaya and Prabha Arishta

- Chaya and prabhaare mutually opposite qualities that determines both saubhagya and daurbhagya, sukha and dukha. Chaya depends on colour of the skin and aabha in person. Chaya is based on panchamahabhootas and among them vayavya chaya (ruksha, syava, aruna, prabhaheena) is most vikrutha, ashubha, alakshana. Gaura, agaura, syama, ashyama, krishna akrishna are prakrutha. All the four chayas are seen in swastha persons but Neela, syava, tamra, haritha are viparitha. If chaya becomes viparitha in swastha then it is Arishtasoochaka that brings mrutyu.

  Prabha means lustre which can be viewed from distance and having agneyaguna.

Prabha is of seven types- rakta, peetha, pandu, kaala, syama, haritha

When they are snigdha and nirmala in prakrutha it is taken as shubhasoochaka. If it appears Ruksha and anirmala then it is vikrutha andashubha soochaka.

Swapna Darshana

It is another unique parameter to arishtalakshana. Swapna means dreams. Those dreams that appear in the patient or patient's near relative suggestive of bad omen is called arishtasoochaka-swapna. Swapna is of two types mainly-shubhaswapna and darunaswapna.

According to the yama in which one see the swapna the phala will vary. Swapna plays important role in telling the bhavior fortune of a person. Shubhaswapna includes dreaming objects like gaja, ashwa, cow, matsya, devatha, brahmana, purvikas, savishaprani,

swethavasthra, swethapushpa, nirmalajalashaya are suggestive of good prognosis or recovery.

Dreaming of bad objects like- ullukha, rakshasa, pretha, pishacha, valmeeka, shmashana, long hair or nail, sanyasi, red eye. Person indulges in- drinking chathurvidha sneha, doing vamana-virechana, getting swarna or any other metals, bandhana, consuming madya with pretha, sinking in shuddhajalanadi, colour of person changes while bathing, hugging pretha or sanyasi, by wearing red dress and moving to dakshinadisha by making loud noises, etc are indicative of arishta.

Dootha lakshanas Indicating Arishta

Messenger indicating death of patient is called as dootha-lakshana or dootha arista. The person who approaches the physician to seek help for a patient is called as dhoota. If dhoota is in Deena avastha, Bhayavastha, wearing Malinavasthra, Napumsaka, sthreedoota, Adhika sankhya, Crying with Untied hairs are considered as bad omen.

- Vaidyamarganimitta: Appearance of Sarpa, Dog, Cat, Bhasma fell over body, Sound of cry, sight of some oneFalling, Hearing abuse words, Seeing krurapashu , pakshi, Anishtasamacharaon the way to patients home is considered as Arishta.
- Athurakulabhava/residence of patient: On arrival of physician to patient's house if physician observes Brahmana coming out of house, Ratna, swarna lost, site of Broken vessels, observes vessels full of fire and Extinguishing of fire is considered as Arishta.

Arishtasoochaka poorvarupa

Disease	Arishta Poorvarupa
Gulma	Antrashotha, antrakoojana, atyadhikadurbalatha, koshtabadhatha
Kushta	Trushna, vrana, vrukkaroga, phupphusa roga
Rajayakshma	Kramashabalakshaya, increased prathishyaya, streeprasanga
Unmada	Dhyanaavasta, shramayukta, udvegi, moha
Apasmara	Andhakara seen without andhakara,nashabdha but shabdha is heard.
Bruhtaantra	Aantrapoornaavarodha
Arbuda	Shoola, daurbalya, vivarnatha of nakha

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Arishtasoochaka Rupa– Following are the examples of diseases and association of particular symptoms is indicative of Arista.

- Gambheera hikka with raktatisara
- Anaha along with atisara
- Person with balamamsakshaya having jwara associate with shushka kasa
- Shotha spreading from udara to extremites
- Rajayashma with balakshaya, prathishyaya vardhana

Ahara aushadha arishta

- **Ahara–** If vaidya himself advices about the diet for the rogi based on dosha and vyadhianusara - but no labha / no change in vyadhi avastha then it is Arishta.
- **Aushadha–** If one tried to prepare aushadha with great difficulty and it fails,
  - ➢ Dravyaasulabha (non availability of medecines), the vessel using for preparation of medicine if gets destroyed or not available,
  - ➢ If vaidya due to lack of time/forgets to prepare medicines, and not able to prepare the aushadha.
  - ➢ Once aushadha is prepared and if it gets spoil
  - ➢ If the medicine is prepared in uchitha rithi and already its phala is prooved in other rogis but when it is given to the particular rogi it becomes nishphala all these are considered as arishta.

Arishta in Mutra, Pureesha, Shukra

- On the basis of density- if mutra, pureesha, shukra sinks in water then it is indicated that the patient will die within one month.
- In Tailabindu Mutrapareeksha if taila bindu moves in utharapoova/eeshana and agneya direction then death is certain within 1 month, if bindu is Chidritha then mruthyu nishchaya, if tailabindu goes to Vayavya direction then the patient will not survive even if amrutha is given, Shiroheenamanavachaya

(drop of oil taking shape of headless human), shape of oil drop like that of tortoise, buffalo, honey bee, shastra all these are indicative of mruthyu.

- Mala pareeksha : athikrishna , athishubhra , athipeetha , aruna, ushna of mala indicates mrthyu.

Arishta in Nadishastra

1. Nadi which is highly vibrating and pulsating like that of lightening.
2. Nadi which is more rapid and sometimes very thin, runs extremly weak/fast/cold.
3. Nadi not felt in hand but in leg and mouth remains open.
4. Whose nadi creates dehashaithya along with swasa and daha- die within 15 days.
5. Nadi is teevra and manda sometimes with sweda- die within 7 days.

11. Sadhyasadhyatwa- Types, their parameters and importance

Introduction

तच्च दुःख संयोगो व्याधय उच्यते।। (सु.सू. १/२३)

Manifestation of pain or misery or any kind of discomfort to the body is called vyadhi.

तथाविध दोषदूष्य सम्मोर्च्छना विशेषो।
ज्वरादि रूपो व्याधिः त्वत्कार्याश्चारुच्याः।। (मा.नि: १/७)

Vyadhi manifests due to dosha-dushya sammurchana as a result jvaradi diseases are going to manifest inside the body by producing symptoms like anorexia, raise in temperature and so on.

There are multiple classifications of vyadhi based on many criterias. Out of them classification of vyadhi based on its curability and incurability is also an important part. This explains the prognosis of the disease.

साध्यासाध्य विभागज्यो ज्यानपूर्वं चिकित्सकः।
काले चारभते कर्म यत्तत् साधयति ध्रुवं।। (च.सु. १०/७)

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The physician who knows all the features of curable and incurable diseases perfectly and commences treatment at the appropriate time, with clear knowledge definitely succeeds in his medical practise.

Classification of prognosis of a disease साध्यासाध्य रोग

Based on prognosis disease are of two types

1. Saadhya vyadhi- curable disease
2. Asaadhya vyahi- incurable disease

सुखसाध्यं मतं साध्यं कृच्रसाध्यमथापि च। द्विविधं चाप्यसाध्यं स्याध्याप्यं यच्चानुपक्रमं।।
साध्यानं त्रिविधश्चाल्पमध्यमोत्कृष्टतां प्रति। विकल्पो न त्वसाध्यानां नियतानां विकल्पना।।
(च.सु. १०/९-१०)

Sadhya vyadhi or curable diseases are of two types - sukasadya (easily curable) and krichra sadya (curable with difficulty). Similarly asadya vyadis are of two types- yapya (pallible or manageable) and anupakrama (incurable by any means and they are fatal).

Based on upaya (treatment) sadya vyadi is of 3 types- alpa sadya, madyama sadya & utkrista sadya.

Alpa sadya– Curable with less treatment

Madyama sadya– Curable with moderate treatment

Utkrista sadya– curable with excellent and intensified treatment.

सुखसाध्य लक्षण

हेतवः पूर्वरूपाणि रूपण्यल्पानि यस्य च। न च तुल्यगुणो दूष्यो न दोषः प्रकृतिर्भवेत्।।
न् च् कालगुणस्तुल्यो न देशो दुरुपक्रमः। गतिरेका नवत्वं च रोगस्योपद्रवो न च।।
दोषश्चैकः समुत्पत्तौ देहः सर्वौषधक्षमः। चतुष्पादोपपत्तिश्च सुखसाध्यस्य लक्षणं।।(च.सु.१०/११-१३)

- If the bala is Alpa with respect to hetu, purvaroopa, roopa
- Qualities of doshas & dhatus are not similar
- Doshas aggravated in disease is not similar to constitution
- Disease not similar to season
- Habbitat & body parts are not favourable to disease
- Disease confined to one path
- Only one dosha and one system is involved.
- The body of patient is strong and well immuned

- Disease of recent onset associated with no complications.
- The patient responds well to the medicines and treatment.
- All the four padas of chikitsa are efficiently available at right time.

कृच्छ्रसाध्य लक्षण

निमित्त पूर्वरूपाणां रूपाणां मध्यमे बले। कालप्रकृतिदूष्याणां सामान्ये अन्यतमस्य च।।
गर्भिणी वृद्धबालानां नात्युपद्रवपीडितं। शस्त्रक्षाराग्निकृत्यानामनवं कृच्छ्रदेशजम्।।
विध्यादेकपथं रोगं नातिपूर्णचतुष्पदं। द्विपथं नातिकालं वा कृछ्रसाध्यं द्विदोषजं।।

- **Madyama bala-** * Nimitta * Purvaroopa * Roopa
- **Samanya-** * Kala * Prakriti * Dushya
- **Disease affecting-** * Garbini * Vridha * Bala
- Less complication
- Disease which can be treated by shastra , kshara , agni .
- Not newly manifested
- Disease occuring at vital points or joints
- Disease involving one path, but not fully responding to quadruple of treatment.
- Two paths are involved but not very chronic
- Two doshas are involved
- Eg. arshas, shakasridha kamala

याप्य लक्षण

शेषत्वादायुषो याप्यमसाध्यं पथ्यसेवयः। लब्ध्याल्पसुखमल्पेन हेतुना आशुप्रवर्तकं।।
गम्भीरं बहुतातुस्थ्ं मर्मसन्धि समाश्रितम्। नित्यानुशायिनं रोगं दीर्घकलमवस्थितं।।(च.सु.१७-१८)

- Ayusho sheshavat- patient is getting slight relief if wholesome regimen is followed.
- Sudden aggravation of disease due to slightest exposure to etiology.
- Deep seated dhatus like medas is involved
- Many dhatus are involved
- Vital organs & joints are affected
- Disease which is persisting
- Disease existing for a long time
- Two doshas are involved
- Eg. ksataja kasa, ksudra svasa

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प्रत्याख्येय रोग लक्षण

विध्याद्दिवदोषजं तद्वत् प्रत्याख्येयं त्रिदोषजं।। क्रियपथमतिक्रान्तं सर्वामार्गानुसारिणं।।
औत्सुक्यरतिसंमोहकरमिन्द्रियनाशनं। दुर्बलस्य सुसंवृद्धम् व्याधिं सारिष्टमेव च।।

(च.सु. १०/१९-२०)

- Disease are produced by all tridoshas together
- Gone beyond the scope of treatment
- Moving in all the pathways
- Restlessness
- Delusion
- Loss of sense perception
- Diseases present in weak person
- Disease which are greatly increased
- Loss of consciousness and orientation. Loss of all normal functions pertaining to organ syatem.
- Having fatal sign.

  Eg. Urdhva, maha, chinna svasa in weak patient is incurable.

12. General Diagnostic Principles of Anukta Vyadhi (Ch.Vi.4)

Certain diseases are explained by our acharyas by their name and they are named due to som reasons. But there are lots of diseases unnamed. As charaka said the disease may be innumerable and cannot name every disease. Based on dosha avastha in terms of vriddi kshaya prakopa, based on intensity of dhatu dushti, based on permutation and combination of two dosha or three, based on permutation and combination of dosha and dhatu, based on permutation and combination of dosha, dhatu, malas, based on srotas involved, based on dosha gati and roga marga and based on ashaya there may be innumerable diseases. Again based on the bala of rogi or involvement of vyadhikshamatwa, based on bala of roga and nidanas (ahara, vihara, karma) disease may be uncountable. Under such circumstances the amshamsha vikalpa has to be done and conclusion can be drawn. The parameters of pareeksha required for it is explained by charaka in vimana sthana 4th chapter.

- Use the three basic pramanas namely Apptopadesha pratyaksha and anumana. The three pramanas are the sources of knowledge for the determination of the specific characteristic features of disease.
- Yukthi is reasoning being included under reasoning (anumana)

Aptopadesha: It comes from authoritative instructions which are the teachings from aptas who are reliable par excellence. They know things in their entirety by determined expierence. Thus the knowledge they have is true and authentic.

- First of all one should examine the various aspects of disease by employing all the three pramanas. One cannot acquire authoritative knowledge of a thing in all its aspects simply by examining it through any one part of these three pramanas. Of all the pramanas one should acquire knowledge in the beginning through authoritative instructions and therefore proceed to examine the patient through pratyaksha (the direct observation) and anumana (inference). What has to be examined by direct observation, what by inference, when to be examined and when all the methods are to be used collectively will be known after gaining complete textual knowledge. The nidana panchakas, vyadhi swabhava, prabhava, vyadhi naama, upadrava, udarka, vedana, samsthana, adhishtana and finally various kinds of yoga, chikitsa prakara, pathyapathya with matra and anupana are explained by aptas.

Pratyaksha : It is done by direct observation by direct examination of the specific characteristics of a disease or patient using physician's own senses. The objects of senses of physician are used on the patient exept rasanendriya. Physician has to use chakshurindriya for observing color, shape, location, size of lesions in patient. Physician has to use ghranendriya for perceiving normal and abnormal odour of patient or body fluids of patient, physician can use shravanendriya to hear gurgling sounds, cracking sounds in joints, voice of patient. Physician can use sparshanendriya by touching the patient and assess mrudu, khara, ruksha, parusha, mardava, vishamata or samatwa of twacha or body parts. It also includes assessment of ushna sheeta and sparshajnana of patient. But physician cannot use his rasanendriya to examine the patient or disease. Here anumana

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pramana has to be uses. For example if pipeelika moves towards patient or towards mutra of patient then it means patient has increased madhuryata in body or mutra.

- Assessment of patient can be done through various kinds of observations, interrogation and implementation of trial and error method.
- Experimentation is another tool for assessment. Taila bindu pareeksha, jala nimajjana pareeksha, anna pareeksha (rakta mixed with anna and fed to dogs) with shwana, apsu majjana of mucous, semen and watching the avasadana, makshika or pipeelika moving towards mutra are certain examples for rogi pareeksha.

Anumana : it is the means of gaining knowledge through inference. Assessment of agni can be done by asking about appetite, bowel pattern. One can assess the strength or physical endurance by asking the capacity for exercise. Psychological assessment can be done by looking at various behavioral patterns, tolerance, response to various situations, thrives, desires, memoy, intelligence, malingering (acting or pretending to be sick where actually he/she is not). One can also assess the prognosis, arishta lakshana, improvement of the condition or worsening of the disease.

- Finally with collective utility of pratyaksha, anumana and aptopadesha with the help of yukthi the upashaya and anupashaya can be administered. Certain examples like taila prayoga to differentiate amavata and sandhi vata, shunti churna local udvarthana to assess katishula due to ruksha or sheeta property etc are told
- Today due to advent of technology one can utilize imaging techniques, laboratory aids, electronic readers, microscopes for assessment of patient. For example of a patient comes with chest burn it may be due to amlapitta or pittaja hridroga. Therefore one can use ECG reading to find the involvement of hridaya to cause heart burn. (if ECG shows abnormality then it can be pittaja hridroga, if ECG is normal then it might be amla pitta.

In this way if there is no direct reference about the disease or treatment in text then one can approach the patient and manage the condition in above said way.

* There are Aparisankeya vyadhi where all diseases are not named or given any specific names out still they exist.

- विकारोनाम कुशले न जिह्मीयात् कदाचन
- न हि सर्वं विकाराणां नामतोऽस्ति ध्रुवास्थिति:

All the existing vyadhies were not given names, but still they exists. Charaka in Chikitsa sthana after the Description of Bala Roga he has used the word uktaan Anuktaan that refers to those diseases which are not explained in the text with particular or specific names. That does not mean that more vyadhies are not known or only vyadhis with titles are only known. The vyadhies which are not explained in the text are called as Anuktan. But the basic explaination while talking about vyadhi one should consider to basic understanding or basic concept that diseases are produend due to dosha dushya Sannurehana. Under such cireunstanus-

dosha : Vata, Pitta, Kapha.
Avastha : Vriddi, Kshaya, Prakopa, Leena, Saana, Nirana
Dushya : Rasa, Rakta, Maansa, Meda, Asti, Majja, Sukra
Vriddi and Kshaya and pradosha avastna, upadhatu, Indriya, Mala vriddi leshaya pradosha avastha. Their mutual interaction, their mutal interaction with Tara and Tama.
Desha : Bhoutika Desa Atura desha
ashaya, sthana, Srotas, Roga marga, Dosagati
Bala : Vyadhi bala Vyadhikshamatwa bala of Rogi
Kala : Ritu, dina, vaya Prakruti : Vyadhi Prakruti, Atusa Prakruti

All these are examined with the help of Dwividha, Trivida, Chaturvida, Shadvida, Astasthana, Dasavida pareekshas. And now to begin the treatment is to be Analyzed.

Thus wise should properly understand a disease by scriptural testimony, direct observation and inference. As far as possible all factors should be discussed in their entirety. After examining the disease by aptopadesha, pratyaksha, anumana the vaidhya should gain knowledge regarding vyadhi swabhava and the chikitsa required for it. Therefore one who is perfect in theoretical knowledge and understands the disease nature properly and adapts apt therapeutic measures shall never fail in getting good result or achieves success. When a physician who even if well versed in the knowledge of disease but not implemented the knowledge in therapeutics or if approach towards patient is not correct then he won't be able to treat the patient.

Ayuteb

Chapter- 5

PARIKSHA VIGYANA

1. Importance and knowledge of Aptopadeshadi & Darshanadi Trividha, Chaturvidha, Chaturvidha, and Shadvidha Pariksha

Pareeksha

- परीक्षकारिणोहिकुशलाभवन्ति (च.सु. १०/५)
- ज्ञानपूर्वकंहिकर्मणांसमारम्भंप्रशंसन्तिकुशलाः (च.वि.)

Pareeksha means "Pareetha Ekshaie" the circumspect examination or study. Pareeksha are of 2 types, Roga Pareeksha and Rogi Pareeksha.

Different types of Rogi pareeksha are

Dwividha Pareeksha

1. Pratyaksha
2. Anumana

Trividha Pareeksha

1. Darshana
2. Sparshana
3. Prashna

Chaturvidha Pareeksha

1. Pratyaksha
2. Anumana
3. Aptopadesha
4. Yukthi

Panchavidha Pareeksha

1. Panchagjanendriya pareeksha

Shatvidha Pareeksha

1. Panchagjanendriya pareeksha
2. Prashna

Astavidha Pareeksha

1. Nadi
2. Mala
3. Mootra
4. Jihwa
5. Drik
6. Sparsha
7. Shabdha
8. Akrithi

Dashavidha Pareeksha

1. Prakriti
2. Vikriti
3. Sara
4. Samhanana
5. Spramana
6. Satmya
7. Satwa
8. Aharashakti
9. Vyayama Shakti
10. Vaya

Definition of Pareeksha

प्रमाणैः अर्थावधारणंपरीक्षा। (वात्स्यायनभाष्य)

Through the means of pramana one can acquire clear and undoubtful knowledge about vishaya (patient) is called as pareeksha. Only after clear knowledge about disease, one can plan the treatment. This is the key for successful treatment.

Prayojana

रोगमादौपरीक्षेततोऽनन्तरमऔषधम (च.सू. २०/२०)

- First physician should do pareeksha of patient and disease, then should think of oushadha for yedhavidhachikitsa (described treatment protocol in text).
- For getting knowledge about sign and symptoms
- For identifying the disease and predicting the prognosis
- To differentiate between laghu vyadita and guru vyaditha
- To get yetha vidha jnana by doing pareeksha according to the disease.

Types of Pareeksha

- Rogi pareeksha (examining patient through history taking).
- Roga pareeksha (examining disease and diagnosis of disease by nidana panchaka.

Rogi Pareeksha

Why to Study Rogi Pareeksha?

By using this rogi pareeksha we can get knowledge about

- Ayu– by using jyotirlakshana, shareera lakashana, aristalakshana etc.
- Bala– by using prakruti, sara, samhanana, pramana, satmya etc.
- Dosha– by using nidana, hetu vishesha, dushya vishesha etc.

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Rogi Pareeksha According to Different Scholars

- Acco to Susrutha Samhita– 1. Panchendria pareeksha 2. Prashna pareeksha.
- Charaka Samhita– 1. Pratyaksha 2. Anumana 3. Apthopadesha
- Astangakara– 1. Darshana 2. Sparshana 3. Prashna

How to do Rogi Pareeksha– The Vaidya should be clean, hygienic, should have calm or stressless mind, should wear white clothes, should focus only on examination.

1. Darshana Pareeksha

The knowledge obtained by using chakshurendria directly or indirectly comes under darshana pareeksha.

According to Astanga Sangraha, Sarvanga sundari commentary:-

दर्शनेनदृष्टयाकासमेहाध्यर्तेषुपीतशुक्लवर्णसंस्थानप्रमाणोपचयच्छायाविण्मूत्रच्छर्दितादिकम्।

(अ.ह.सु. १/२१)

By darshana pareeksha we can examine

- Varna, samstana, pramana, chaya of skin, eyes, tongue, body parts, urine, stools.
- Prakruta and vikara status of body.
- And even other things which is observed by eye- eg: signs of diseases, discoloration, shape, size, strueture and so on.

Pareeksha Bhavas in Darshana

वर्णसंस्थानप्रमाणच्छायाः शरीरप्रकृतिविकारौचक्षुर्वैषयिकाणियानिचान्यान्यनुक्तानितानिचक्षुषापरीक्षेत।

(च.वि. ४/७)

By using darshana pareeksha we can examine

- Varna of nakha, netra, jivha, twak, kesha, danta, mutra, pureesha, srava, chardi.
- Pramana of anga, pratyanga, sopha, arbuda,
- Akruti and prakruti (built, nourishment, decubetus, gait, physical deformity or disability).
- Chayaa of patient
- General appearance of patient.

It is told that first we have to do direct examination, and if any doubt arise we can go for indirect examination (eg: Radiological view, microscopic view).

Some of the eg- kamala, (varna) udara (samsthana for sotha)

2. Sparshana Pareeksha

Usually done by touching, palpating, percussing the affected site in the patient. Palms or fingers of hands of physician are used in accordance to the disease. The physician's hands should not be neither cold or hot, because it may lead to wrong assessment.

Types of Sparshana Pareeksha

- Parimarshana- palpation
- Prapeedana- compression
- Lunchana- traction
- Ayamana- extension
- Akotana- percussion

प्रकृतिविकृतियुक्तंस्पर्शचजिज्ञासुः प्रकृतिस्थेनपाणिनाशरीरमस्यकेवलंस्पर्शतविमर्शयेद्वाऽन्येन।

(च.वि. ४/७)

Gives information about normalcy and abnormality of the body

- One can assess texture, consistency and enlargement of organs by palpation.
- Most important pareeksha in sparshana pareeksha is nadi pareeksha. If the nadi is manda means we can infer that the patient is having Mandagni.
- One can assess temperature variations by sparshana pareeksha eg: -Usna sparsha in jwara.
- One can assess the tenderness on palpation eg: - Mridu sparsha in pittodara.
- Assessment of cutaneous sensation or Sparshajnana.
- Assessment of roukshya, parushya, slakshnata, snigdata, kharata, mrudutwa, in twak vikaras.
- Assessment of rigidity, spasticity, flaccidity, degree of movement in locomotor and neurological disorders.

स्पर्शनेनहस्तकायस्पर्शेनज्वरगुल्माविद्रध्याद्यार्त्ततथाशीतोष्णास्तब्धस्पन्दश्लक्ष्णखरस्पर्शदिकंच।

(अ.ह.सू. १/२२)

Use palns for performing sparsha pareeksha to assess jwara (ताप) texture in gulma, texture and tenderness in vidradhi, consistency of Srara in Vidradhi, sensary pereeption, pereeption of heat and cold on touching patient's body, assessment of rigidity, pulsation, sliminess, roughness.

3. Prashna Pareeksha

Prashna pareeksha is done by interrogation or talking to the patient or attendant of patient.

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By this method, we can even get the knowledge about

- Past history
- Family history
- Personal history
- Symptoms

How to do Prashna Pareeksha?

- Physician should speak politely, friendly, soothing manner in such a way that the patient feels comfortable and confidence in doctor, thus reveal all problems.
- Physician should not laugh or engage in other matters while patient is narrating the history, because the subject may feel that physician may be ignoring them or making fun on them.
- Physician should be brave enough.
- One should not use medical terminologies when talking to patient, because it may cause discomfort to the patient or patient may not understand what physician is asking.
- The question which the physician ask should be in such a way that the patient can understand and give all information about disease.
- If required physician should give maximum privacy to the patient.

प्रश्नेनपृच्छयाशूलारोचकच्छर्दिहृदद्र्वंसुच्छन्ददुश्चन्दत्वंमृदुक्रूरकोष्ट्तांस्वप्नदर्शनमभिप्रायंजन्मामयप्रवृत्तिनक्षत्रद्विष्टेष्टसुखदुखादिच।

- Physician should ask about the relieving and aggravating factors in shoola shwasa etc.
- Ask the mode of onset, time duration, cause as in arochaka,
- Ask the frequency, nature of food ingested previous to illness in chardi, atisaara etc.
- Prashna pareeksha will guide us to understand nature of kosta. Asking questions about appetite, quantity of food, nature of food, bowel pattern to the patient will help assessment of Koshta.
- Quantum of sleep, nature of sleep, cause of disturbance during sleep can be asked in prashna pareeksha.
- To disease physician should ask the general information of patient that is his name, place of birth and residence, age, occupation.

Chaturvidha Roga Pariksha

आप्तोपदेशं

- **आप्तोपदेशं– तत्रआप्तोपदेशंनामाप्तवचनम् । आप्तहिअवितर्कस्मृतिविभागविदोनिष्प्रीतिउपतापदर्शिनश्च।। तेषांमेवगुणयोगाद्वत् वचनंप्रमाणं।** (च.वि. ४/४)

Authoritative instructions are the teachings of aptas. Aptas are free from doubts and their memory is unimpaired, i.e they know things in their entirety by determinate experience.

- **तत्रएतत्उपदिशन्तिबुधिमन्तः**

रोगमेकैकमेवंप्रकोपणमेवंयोनिमेवउत्थानमेवआत्मानमेवअधिष्ठानमेवसंस्थानमेवंशब्दस्पर्शरूपरसगन्धमेवमुपद्रमेवंवृद्धिस्थानक्षयसमन्वितमेवमुदर्कमेवंनामानमेवंयोगंविद्यात्, तस्मिन्नियंप्रतिकारर्थाप्रवृत्तिरथवानिवृत्तिरपिउपदेशाज्ञायते।।

One can understand the below mentioned characteristic features of diseases from authoritative testimony. Learned physicians describe the following aspects

(Characteristic features of each and every disease) :

1. Provoking factors.
2. Dosas involved or source
3. Mode of manifestation
4. Nature like seriousness of rohini or acuteness of samnyasa (syncope)
5. Location
6. Pain
7. Symptoms
8. Association with specific sounds, touch, colors, tastes and smell
9. Complications
10. Association with symptoms of aggravation, maintenance and abatement
11. Prognosis
12. Names
13. Concomitants
14. Prescriptions and prohibitions in the treatment.

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प्रत्यक्षं

- प्रत्यक्षंतुखलुतद्यत्स्वयमिन्द्रियैःमनसाचउपलभ्यते।। (च.वि. ४/४)
- प्रत्यक्षंनाम्तत्आत्मनचइन्द्रियैःचस्वयमुपलभ्यते; तत्रआत्मप्रत्यक्षाःसुखदुखःइच्छाद्वेषादयः, शब्दादयस्तुइन्द्रियप्रत्यक्षाः।। (च.वि. ८/३९)

Things perceived by onself or with the help of sense organs come under the category of direct observation. Eg: Happiness, misery, etc.

- प्रत्यक्षंअपिचउपलभ्यते-मातपित्रोर्विसदृशान्निअपत्यानि, तुल्यसम्भवानांवर्णस्वरआकृतिसत्व-बुद्धिभाग्यविशेषाः, आयुषोवैषम्यम्, इहकृतस्यावाप्तिः, अशिक्ष्शितानांचरुदितस्तनपान-हासत्रासादीनांप्रवृत्तिः, लक्षणोत्पत्तिः, कर्मसादृश्येफलविशेषः, मेधाक्रचित्क्रचित्कर्मण्यमेधा, जातिस्मरणम् इहागमनमितश्च्युतानामिति, समदर्शनंप्रियाप्रियत्वम्।। (च.सु. ११/३०)

By perception also it is observed - progeny dissimilar to parents, difference in complexion, voice, physiognomy, mind, intellect, and fate in spite of the similar genetic source, birth in a superior and inferior clan, slavery and sovereignty, happy and unhappy life, inequality in life span, achievement of the result of the deed here, inclination of untrained ones weeping, breast - suckling, laughing, fear etc. Appearance of marks in body parts, difference in result in spite of similarity in action, intellectual interest or otherwise of previous birth showing the coming back of thepersons who had left the world, liking or otherwise in spite of similar face.

अनुमानं

- अनुमानंखलुतर्कोयुक्तिअपेक्षः।। (च.वि. ४/४)
- अनुमाननंनामतर्कोयुक्तिअपेक्षः; यथा– अग्निंजरणशक्त्या, बलंव्यायामशक्त्या, श्रोत्रादीनि-शब्दादिग्रहणेनअपिएवंआदि।। (च.वि. ८/४०)

Inference is based on argument accompanied with reasoning. Eg: One can infer agni from the power of digestion.

- तत्यथा– अग्निंजरणशक्त्यापरीक्षेत, बलंव्यायामशक्त्यां, श्रोत्रादिनिशब्दात्अर्थग्रहणेन, मनोअर्थव्यभिचरणेन, विज्ञानंव्यवसायेन, रजःसङ्गेन, मोहंअविज्ञानेन, क्रोधाभिद्रोहेण, शोकंदैन्येन, हर्षमामोदेन, अवस्थान्मविभ्रमेण, श्रद्धामभिप्रायेक, मेधांग्रहणेन, संज्ञानामग्रहणेन, स्मृतिंस्मरणेन, ह्रियमपत्रपणेनशीलमनुशीलनेन, द्वेषंप्रतिषेधेन, उपधिमनुबन्धेन, धृतिमलौल्येन, वरयतांविधेयतया, वायोभक्तिसात्म्यव्यधिसमुत्थानानिकालदेशउपशयवेदनविशेषेण, गूढलिङ्गं व्यधिंउपशयानुपशयाभ्यां, दोषप्रमाणविशेषस्तुएवंकल्याणअभिनिवेशन, अमलंसत्वमविकारेण, ग्रहण्यास्तुमृदुदारुणत्वंस्वप्नदर्षनमभिप्रायंद्विष्टइष्टसुखदुखानिचआतुरपरिप्रश्नेनैवविद्यात्दृति।। (च.वि. ४/४)

These are the factors to be observed by inference:

1. Agni from the power of digestion.
2. Strength from the capacity for exercise.
3. Conditions of the senses, auditory etc. from their capacity to perceive the respective objects sound etc.
4. Existence of mind from the perception of specific objects even in the presence of all other senses along their respective objects. When senses and their respective objects are present together, all the sense perceptions should have occurred. Absence of such perceptions indicates that there is a third factor which determines the perception and this is mind.
5. Knowledge of a thing in proper reaction to it, e.g. when one approaches drinking water, he feel like taking water (provided of course he is thirst) which indicates that he is in full knowledge of the thing along with its uses.
6. Rajoguna from attachment to woman etc. Such attachments are caused by rajoguna alone.
7. Moha (unconsciousness) from lack of understanding.
8. Anger from the revengeful disposition.
9. Grief from the sorrowful disposition.
10. Joy from happiness like indulgence in dancing, singing, playing musical instruments and remaining in festive mood.
11. Priti (pleasure) from satisfaction which is reflected by joyous appearances of face eyes etc.
12. Fear from apprehension.
13. Courage from strength of the mind even when one is in dangerous situation.
14. Energy of an individual from his initiative in such actions such as are normally difficult to perform.
15. Stability of the mind from avoidance of any mistake.
16. Desire from request.
17. Intelligence from the power of comprehension of scriptures, etc.
18. Recognition from the recollection of the name
19. Memory from the power of remembrance

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20. Modsty from bashfulness
21. Liking from the habitual intake of things
22. Dislike from disinclination for taking something
23. Deception from subsequent manifestation- An individual pretending to be a well-wisher but actually having evil intentions can be judged from his subsequent activities like the murder of the brother etc.
24. Courage from firmness
25. Obedience from compliance with orders
26. Age, liking, homologation and cause of the disease from the stage of the life, habitat, conduciveness and characteristic features of pain respectively. Age of the patient can be determined by the stage of lifelike childhood etc. habitat of an individual determines his liking eg: if an individual has a liking for wheat and maasha, then he should be inferred to be an inhabitant of Madhya desha (central region of the country). When something is conducive to the individual, it should be treated as wholesome. If somebody is suffering from hyperpyrexia, it can be safely inferred that the etiological factors of fever are responsible for this condition.
27. Diseases having latent symptoms from the administration of such therapies as would alleviate or aggravate the condition. Diseases having well manifested symptoms can however diagnosed by symptoms only and for their diagnosis exploratory therapies are not required.
28. Degree of vitiation of dosas from the measurement of provocative factors. When these provocative factors are in abundance, there is excessive vitiation of dosas on the other hand, if there are less of provocative factors then the vitiation of dosas is mild.
29. Approaching death from had prognostic signs.
30. Approaching prosperity from the initiation of useful work and
31. Promotion of sattvika qualities of the mind from the absence of its impairments, like attachment, envy, etc.

Similarly the costiveness or laxity of grahani, dreams, desires

for food etc. likes and dislikes, happiness and unhappiness etc. are to be known by interrogating the patient.

युक्ति

- **युक्तिश्चैषा– षड्धातुसमुदयाद्गर्भजन्म, कर्तृकरणसम्योगात्क्रियाः; कृतस्यकर्मणःफलंन-अकृतस्य, नअङ्कुरोत्पत्तिरबीजात्; कर्मसदृशंफलं, नान्यस्माद्बीजाद्अन्यस्यउत्पत्तिःइतियुक्तिः।।** (च.सू. ११/३२)

Yukti is perception of knowledge by Rationale thinking as told as - fetus formed from combination of six dhatus, action due to conjunction and disjunction of doer and instrument, result comes out of the action performed and not of unperformed. There is no growth of sprout without seed, etc. This is Rationale.

"Shadvidha Pareeksha"

षड् विधो हि रोगाणाम् विज्नानोपायः तध्था-पंचभिः श्रोत्रादिभिः प्रश्नेन चेति।। (च.सू.१०/३)

There are 6 ways to examine a diseased patient and understand the disease. They are as follows:

Shrotrendriyataha pareeksha– Examination of the patient by hearing.

Ghranendriyataha pareeksha– Examination of the patient by olfaction.

Rasanendriyataha pareeksha– Examination of the patient by taste perception.

Chakshrindriyataha pareeksha– Examination of the patient by observation.

Sparshanendriyataha pareeksha– Examination of the patient by palpation, percussion or by simple touch and tactile stimulation.

Prashna pareeksha– Examination of the patient by interrogation.

Shrotrendriya Pareeksha

तत्र श्रोत्रेन्द्रिय विज्नेय विशेषा रोगेषु वृणस्त्रावविज्नानीयादिषु वक्ष्यन्ते– तत्रसफेनं रक्तमीरयन्निलः स सशब्दो निर्गच्छति इत्यामादयः।। (सु.सू. ८)

- Phenayukta (frothy) rakta is due to vata. This rakta produces sound while discharging from vrina.

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- In gulma, Vatodara one can hear antrakujana
- In Atopa udara gudugudyana is heard.
- In vatarakta, astivikruti shabda of sandhi sputana is heard.
- Patient of kshataja kasa produces sound like paaravata iva koojan.
- Kasa produces binna kamsya swana tulya ghosha
- Patient suffering from apatantraka produces kapotavat kujana
- Swara bedha or bhinna swara in seen in vataja pratishyaya
- Sound like that of intoxicated bull is produced in Maha shwasa.

Ghranendriyataha Pareeksha

लोहगन्धिश्च: नि:श्वासो भवत्यस्मिन् भविष्यति।। (म.नि. ३)

घ्राणेन्द्रिय विज्नेय अरिष्टलिंगादिषु वृणानाम् च गन्थ विशेष:।। (सु.सू. १०/५)

- Metallic odour from expiration in raktapitta
- Bad odour from vruna is suggestive of arishta lakshana
- In raktameha patient emits smell of raw meat.
- Ammatisaara gives strong offensive smell.
- Kunapagandhi shukra gives blood smell and cadaveric smell
- Haridra meha emits pungent smell
- Offensive bad smell of sweat is seen in sthoulya

Rasanendriyataha Pareeksha

रसनेन्द्रियविज्ञेया: प्रमेहादिषु रसविशेष:।। (सु.सू. १०/८)

रसं तु खल्वातुरगतमिन्द्रियवैषयिकमण्यनुमानम्.....

न ह्यास्य प्रत्यक्षेण ग्रहणमुपपध्यते।

तस्मादातुरपरिप्रश्णेनैवातुरमुख रसं विध्यात्।। (च.वि. ४/७)

Susruta used this pareeksha mainly to examine mutra and differentiate prameha roga.

Usually panchendriyataha pareeksha should be done using indriyas of physician. But in rasanendriyataha pareeksha physician should not use his own tongue to taste body fluids of patient. Instead other alternative method of anumaana and prashna pareeksha is to be used.

- Ants approaching the urine samples of urine indicates madhurata in mutra.

- Flies approaching urine samples indicate puya meha or pus in sample.

Chakshurendriyataha Pareeksha

It is the Examination of the patient by using chakshurindriya by physician.

चक्षुरिन्द्रियविज्नेया: शरीरोपचयायुर्लक्षणबलवर्णविकारादय:।। (सु.सू. १०/८)

It is by observation of color, shape, size of body of patient.

- Peetavarna of netra, mutra, pureesha, twaca in kamala
- Akruti of pidaka in visarpa
- Gaatra of shareera in sthoulya
- Kampa in jwara
- Gait in pakshagata and grudrasi

Sparshanendriyataha Pareeksha

Examination of patient by sparshnendriya of physician.

स्पर्शेन्द्रियविज्नेया: शीतोष्णस्लक्ष्णकर्कशमृदुकटिणत्वादादयस्पर्शविशेषा: ज्वरशोफादिषु।। (सु.सू. १०/८)

- Assessment of sheetata and ushnata of patients body by touching the body of the patient.
- Assessment of softness or hardness of skin, swelling, mass in the body of patient by palpation.
- Assessment of fluid thrill in jalodara by anguli aakotana or percussion.
- Assessment of shotha, tactile sensation, pain threshold are all assessed by sparshana pareeksha.

Prashna Pareeksha– Interrogating the patient relavant to the disease. The entire component of history taking, some of the components of clinical examination make for prashna pareeksha.

प्रश्नेन च विज्नानीयाद् देश कालं जाति सात्म्यमातंकसमुत्पत्ति वेदनासमुन्नायां बलमन्तराग्निं। आतमूत्रपुरीषाणां प्रवृत्यप्रवृत्ती कालप्रकर्षादींश्च विशेषान्।। (सु.सू. १०/८)

Asking the patient few questions about his or her where abouts (name, occupation, age, religion, sex, education, socio economic status, area of residence, marital status), history of presenting

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complains, past history, medical history, social history, family history, personal history on appetite, food pattern, digestion, frequency of stools and urine, habbits and addictions. All these comprises samanya prashna pareeksha.

Vishesha prashna is asking question related to particular system. For example if patient gets symptoms pertaining to gastro intestinal system the few questions like.

- What was the food you had previous to the sickness
- When and where the pain started?
- What was the frequency of stools passed if any loose stools
- Is the pain related to food intake?

If the patient has symptom related to urinary system few of the questions like:

- Is there any pain or burning sensation during micturition?
- Is there increased or decreaed frequency of micturition?
- Ask for the quantity of fluid intake per day
- Ask for the nature of food intake
- Ask about the sexual exposure.

2. Importance and Knowledge of Ashtasthana Pariksha

1. Naadi Pareeksha

It is the special science used in ancient days to examine the patient. It is more than a pulse reading. A physician feels for the pulsating part of the body and diagnose the disease.

नाडी– शरीरान्तः नाडीकायाम्।।

Synonyms

धमनी, धरणी, तन्तुकि, स्फुरणि, जीवनज्ञाना, हिंस्रा, स्नायु, वासा, धरा, सिरा।

Naadi Spandana Kaarana

परिव्यप्याखिलकायंधमन्योहृदयाश्रया। बहन्त्याशोणितश्रोतः शरीरंपोषयन्तिताः।।
हृदयाकुञ्चानाद्रक्तंकीयाद्युत्क्लुधमनी। ततसञ्चितंतदुत्तंचप्राविश्यात्वपुरास्वपि।।
ब्रजीत्वानिखिलुदेहंततोविशदिफुफुसं। फुफुसाद्यदयंथातिक्रियैवस्ततपुनः पुनः।।
रुधिरोप्लववेगेनधमनीस्पन्दतेमुहुः। उत्प्लवप्रकृतैर्भेदादभेदः स्यातस्पन्दनस्यच।।
नतुप्रकारान्समासेनभूववत्संनिरामयः।। (नाडीदर्पणं १५)

The entire blood goes to hridaya and from hridaya it reaches pupphusa. There it attains prana vayu and again via hridaya it spreads to all part of the body. During this process certain areas undergoes pulsation that can be felt on palpation. This is called as naadi.

Naadi Pareeksha Yogya Vaidhya

स्थिरच्चित्तप्रसन्नात्मांमनसाचविशारदा। (नाडीदर्पणं २४)

A physician should have sthira (stable) mind, prasanna manas (pleasing mind, devoid of stress or worries) and shoul be expert in rightly assessing Nadi.

Vaidya Who is not Elegible to do Nadi Pareeksha

पीतमद्यश्चञ्चलात्मामलमूत्रादिवेगायुकु।
नाडीज्ञानेअसमर्थः स्याल्लोभाक्रान्तकामुकः।। (नाडीदर्पणं २५)

The physician who has drunk alcohol or narcotics, unstable and fluctuating mind, who does mala and mutra vega dharana. Who doent know about Nadi pareeksha, greedy, too much desirous on worly elements.

योग्यरोगी

त्यक्तमूत्रपुरीषस्यसुखासीननस्यरोगिणः। (नाडीदर्पणं २८)

Who has voided urine and faeces, who has sat in comfortable position and trust the science.

अयोग्यरोगी

दुर्तमार्गस्थविश्वासरहितअज्ञातगोत्रिणांविनाभिशंसनंवैध्योनाडीद्रष्टाचकिलविषी।। (नाडीदर्पणं २९)

One who is wicked, non trust worthy, whose gotra is not known, who do not trust science and the attending physician.

There are about 3.5 crores of Naadi of which 24 are palpable among that 8 are used for examination. (kanada)

१. अंगुष्टमूलनाडी (जीवनाडी/जीवसाक्षिणीनाडी)
२. गुल्फमूलनाडी
३. कण्ठमूलनाडी
४. नासामूलनाडी
५. नेत्रमूलनाडी
६. जिह्वामूलनाडी
७. कर्णमूलनाडी
८. मेढ्रमूलनाडी

Method of Naadi Pareeksha According to Raavana

- Physician and rogi should sit in a peaceful place.

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- Patient after a long journey or any exertion, take rest for sometime before examining.
- Middle of asthi prakoshta is vishishta nadi- jeevasakshini nadi.
- After leaving 1angula using three fingers nadi should be pressed 3 times to the correct flow.
- Either in sitting position or in lying position nadi examined
- If angushta nadi is not perceivable then look for other nadi.
- Nadi of both hands should be examined.
- For females left hand and males right.
- If patient is in fear, console the patient by talking and then examine the nadi.
- Children are kept on the lap of physician, divert their mind make them calm and then examine.

Any bands, watch or any other interruptions should be removed

According to Yogaratnakara

- Physician should gain mental stability and peace of mind before examining the patient.
- Early hours of the day nadi should be studied.
- Physician should examine the patients right hand nadi below the right thumb.
- Females left hand nadi and males right hand nadi.
- Elbow of the patient is slightly flexed to the left and wrist slightly bend to the left with the fingers distended and dispersed.
- Examine the nadi repeatedly for three times by applying and releasing the pressure alternately over the nadi till the flow of nadi becomes clear so as to asses the condition of dosha rightly.
- The three fingers placed in position over the nadi indicate the condition of tridosha and their gathi.

Index finger - vata, middle- pitta, ring finger- kapha

According to Others

- **Kanaada–** Morning time after evacuvation of malas by both physician and patient before nadi pareeksha.

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- According to condition nadi can be looked at anytime.
- **Basavarajeeyam–** Nadi palpated over the kurpara sandhi madhya of right hand with three anguli.
- Angushtamoolas pashchima bhaga madhya nadi gathi is noted.
- **Bhavaprakash–** Males right hand and females left hand is examined.
- Angushtamoola nadi is touched with the three fingers.
- Bhishak will know the sukha and dukha by examining the nadi of a person.

Experts Openion

- Special skill and intelligence is required for grasping minutest change or variation in pulsating nadi.
- The tactile perception with reference to nature, rate, rhythm, volume, consistency, texture and its resemblence to an animal.
- For identifying all these requires constant practise and high experience.
- Concentration of mind is the most important thing in nadi pareeksha.
- Physician should understand even the minute tactile perception even in the middle of distractions (proper sparshanendriya jnana).
- Practice of manthras daily in early morning hours. Example : chanting of gayathri mantra and look for the beats of his own nadi.
- The practice of mantras and pranayama daily to get peaceful mind.
- Should understand first which part of the finger gets the beat and the flow of the beat, path of its movement.
- Note the normal flow of nadi of ones own just after waking up, after bath, after having breakfast etc.....

Pre Requisites Before Nadi Pareeksha

- The place of examining the nadi has to be free of injury and any infection.
- While examining use three fingers of vayu, agni and jala.

- Nadi should not be checked on the cephalic vein or radiocarpal joint. Nadi has to be checked only on radial artery.
- While placing the fingers leave a slight gap between the fingers to avoid any confusion as to how the nadi is being felt
- Do not allow the patient to strain his/her arm.
- Always support one hand with the other. If checking the right hand, then support the right hand with your right hand.
- Energy flows in a circuitous manner.
- Patients right should be checked with your left hand and left hand must be checked with your right hand.
- First right hand should be checked in males and then the left hand. The reverse holds true for females.
- Nadi pareeksha is not performed for children under 2 years as their forearm is too small for us to place our fingers.
- Nadi pareeksha should not be done by standing, talking, watching television, reading or while performing any activity.
- Before nadi pareeksha, the vaidhya should be in a state of calm peace and harmony.
- The patient should not have had anything to eat or drink, should not bath, exercise, perform yoga, pranayama, or indulge in any kind of prayer, chanting, reading, writing or any activity whatsoever.
- If patient had travelled long distance, give sufficient time to relax.
- The patient should not do activities that cause excitation of their senses like use of perfumes or deodrants.
- Person who have indulged in an intercourse early morning, nadi should not be examined.
- A patients nadi has to be observed early in the morning from day break until 9.30am before sun shifts to pitta kala.
- It is important to visualise the movement of energies, the direction (moving from heart towards the arm), also look for other kinds of movements like circular movement, missing beats, faster beats etc.

Ayutech

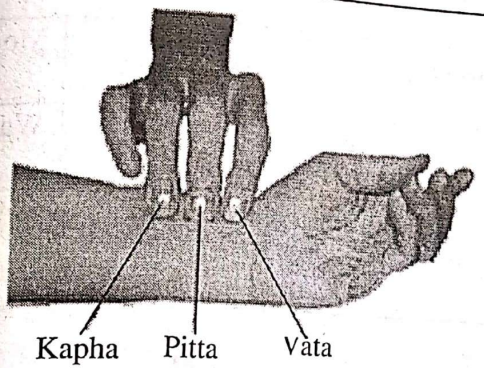


Fig.1 Traditional Method

Asthasthana of Nadi

पाणिपात् कण्ठ नासा अक्षि कर्ण जिह्वा च मेढ्रगा। वामदक्षिणतो लक्ष्याः षोडश प्राणबोधकाः।।

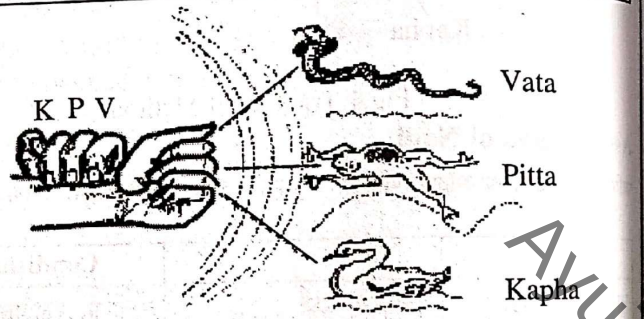
(रावण)

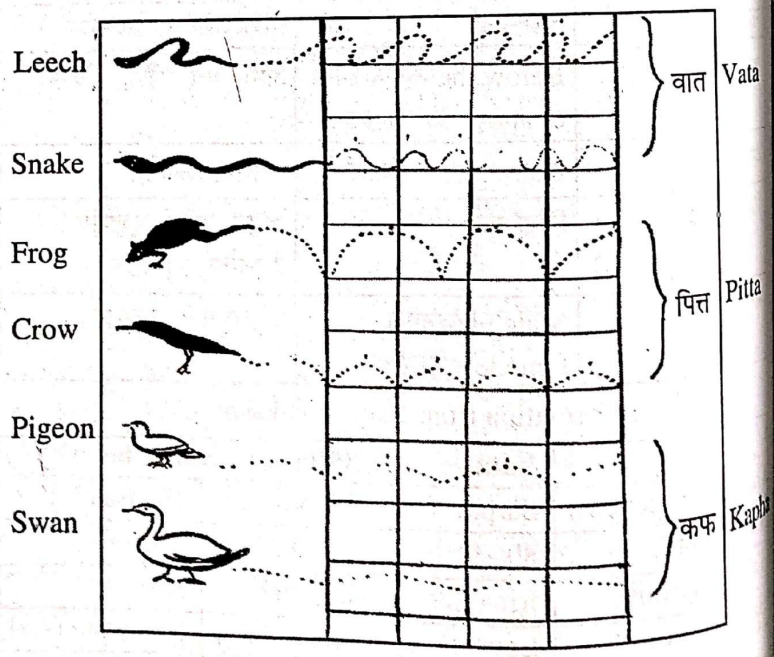
Nadi	Site	Condition
पाद/गुल्फ नाडी	गुल्फस्य अधः	अजीर्णा, रक्तपित्त
कण्ठ नाडी	उभय पार्श्वा of कण्ठ	तृष्णा, क्रोध, भय, शोक, मैथुन
नासा नाडी	नासामूल	मरण, जीवन, कण्ठरोग
अक्षि नाडी	Below the अपांग सन्धि & above कपालास्थि	उद्वेग, भय, शोक, वैकल्य
कर्ण नाडी	Below the कर्णपालि	चक्षुरोग, कर्णरोग
जिह्वा नाडी	जिह्वा मूल	जीवन, मरण, मुखरोग, कण्ठरोग, नासारोग
मेढ्र नाडी	Male –शिश्नमूल, Female– भगपार्श्वा	अधराङ्गघात, गुह्यरोग

Various information from Nadi pareeksha:

	Vata	Pitta	Kapha
Gathi (Movement)	Sarpa	Manduka	Hamsa
Vega (Rate)	80 - 95	70 - 80	50 - 60
Tala (Rhythm)	Irregular	Regular	Regular
Bala (Force)	Low (+)	High (+++)	Moderate (++)

Akruthi (Tension and volume)	Low	High	Moderate
Tapamana (Temperature)	Cold	Hot	Warm to cold
Kathinya (consistency of vessel wall)	Rough, hard	Elastic, flexible	Soft, thick





Effects of Dosha Prakopa in Nadi

वातोद्रेके गतिं कुर्यात् जलौकासर्पयोरिव। पित्तोद्रेके तु सा नाडी काकमण्डूकयोर्गतिम्। हंसस्येव कफोद्रेके गतिं पारावतस्य च।। (अभिनव नाडीतंत्र)

- In vata prakopa gati will be like जलौक, सर्प
- In pitta prakopa gati will be like मण्डूक कुलिङ्ग काक
- In kapha prakopa gati will be हंस, पारावत

The Angusta Mula Nadi

अङ्गुष्टमूलसंस्था तु विषेशेण परीक्ष्यते। (नाड़ी परीक्षा)

अस्ति प्रकोष्टगा नाडी मध्ये कादपि समाश्रिता। जीवनाडीति सा प्रोक्ता नन्दिना तत्ववेदिना।। (रावन)

The naadi which is situated at the angusta moola is of utmost importance.This naadi is also called as jeevanaadi. The pulsation of radial artery can be noticed at the base of the thumb.

In general the term naadi pariksha implies the examination of the naadi at the wrist for the following reasons:

- It is very easy to examine
- This is a very apt region where a physician can keep his 3 fingers to check the 3 doshas of a patient.
- Angusta moola nadi is Superficial
- In conditions like sleeping also nadi can be examined.

Three Basic Gathis of Nadi

	Vata Pulse	Pitta Pulse	Kapha Pulse
Character Istic	Fast, feeble, cold, light, thin, disappears on pressure	Prominent, strong, high amplitude, hot, forceful, lifts up the palpating finger.	Deep, slow, broad, thick, cool, regular
Location	Best felt under the index finger	Best felt under the middle finger	Best felt under the ring finger
Gati	Moves like a cobra	Moves like a frog	Moves like a swimming swan

Vega (Rhythm)

- Rate- number of beats per minute
- To get an accurate resting pulse- take in early morning in a restful condition.

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- Physiologically- vega is high (80-90 beats/min) in vata, moderate (70 - 80 beats/min) in pitta and low (50 - 60 beats/min) in kapha.
- Relation with height- tall people have slower heart rates and short people have faster heart rates (pulse rate inversely proportional to height).
- Relation with age- children have higher heart rates and older people rate is slow.
- Relation with metabolism- slower the pulse rate slower the metabolism.
- Relation with agni- when agni is strong pulse is fast, light and hot and agni is slow pulse is slow, heavy and cool.

Tala (Rhythm)

- Rhythm– Defined as the time interval between two consecutive or successive uplifts.
- In a healthy person– The time interval is regular, uninterrupted and rhythmic.
- Balanced tala reflects– Synchronization function of prana vayu, vyana vayu, avalambaka kapha, and sadhaka pitta.
- If regularly irregular- both kapha and vata are in imbalanced state.
- If irregularly irregular - both vata and pitta are in imbalanced state.

Bala (Force)

- Force is pressure of the pulse.
- Bala- the amount of force pressing on the blood vessel is being exerted back onto the fingers.
- Force/pulse pressure (PP) = difference between systolic and diastolic pressure.
- If systolic blood pressure is 120 and diastolic blood pressure is 70 then PP is 50 which is normal..
- If PP is 170 which is high - heart is working under great stress and if PP is 10 - person doesn't receive oxygen to brain.

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- If bala is high (+++) then force is full and bounding is high, deep pressure of finger necessary in order to stop the pulsation
- If bala is moderate (++) there is moderate pressure.
- If bala low (+)- superficial pressure causes the pulse to disappear.

Akruthi (Volume and Tension).

- Volume- uplift to the palpating finger, amplitude.
- It is not necessary to depress the radial artery, just feel the uplift while the fingers rest lightly on the artery.
- In order to feel the volume try to press the artery gently and feel the throb pushing against the fingers.
- If throbbing is very prominent in middle finger , the volume is good (+++) it is, pitta. If throbbing is felt under ring finger, it is moderate volume (++) it is kapha. If throbbing is barely felt under index finger, volume is low (+) it is, vata.
- Don't press too hard.
- Amplitude is high volume is high.
- The volume corresponds to systolic blood pressure.
- High volume is pitta type of pulse, if good amount of water intake, high systolic blood pressure.
- Low volume indicates dehydration, congestive heart failure, anemia.
- Tension is felt by pressing the ring finger to stop the pulsation of the radial artery and then feeling the tension under the middle and index fingers.
- Tension is the pressure between the two uplifts, diastolic pressure. It is the constant pressure of blood in the artery.

Tapamana (Temperature)

There is relation between gati of the pulse, the wave of the pulse, the temperature of the pulse and the agni or metabolic fire of the person.

If pulse is cold, fast and light then it is inferred that vata is high, agni is low leading to vishama agni.

If pulse is hot, sharp and light to touch then it is understood that pitta is high, agni is high leading to tikshna agni

Kathinya (Consistency of the Vessel Wall)

- The consistency of vessel wall, felt by rolling the artery between the palpating finger and the radial bone.
- Palpating reveals– vessel wall is thick or thin, elastic or inelastic, rigid, hard or rough.
- If vata- rough and hard vessel and vessels becomes narrow.
- If pitta- elastic and fragile, bruise easily.
- If kapha- broad and thick.

Nadi in Various Diseases

Jwara	Ushna, vegavathi gathi
Ajeerna	Katina, manda gathi
Athisara	Pruthula, jada gathi
Grahani	Balaheena, sookshma gathi
Prameha	Granthi rupa gathi
Gulma	Vakra rupa, vishtambha gathi
Raktapitta	Manda, kathina gathi
Rajayakshma	Gaja gathi
Arsha	Sthira, manda gathi
Muthraghata	Sphurana, samplutha
Pandu	Chanchala, teevra gathi
Amaja vikara	Jada, pruthula gathi
Malajeerna	Athyatika spandana
Vrana	Theja, vegavathi
Visha	Sarpa gathi

Pulse Conditions with Unfavorable Prognosis

The following pulse conditions are indicative of bad prognosis

- Rapidity of the pulse.
- Hardness (this indicates that the pulse is felt between the beats)
- Extreme slowness of the pulse.

- High tension pulse.
- Extreme smallness.
- Extreme arrhythmia.
- Displacement of the pulse from its normal site.
- Imperceptibility of the pulse.
- Irregularly irregular pulse.
- A pulse which is only felt under the index finger at vata spike, is very feeble and moves like an ant.

Effect of Various Rasa on Nadi

Madhura Rasa– **मधुरे बहिर्गानाडी।** (कणाद)
मधुरे हंसगामिनी। (नाडी ज्नान तरंगिणी)

Madhura rasa increases kapha. It is Manda, the pulse is predominant in the region of kapha.

Amla Rasa– **अम्ले कोष्णा प्लवगतिः।** (कणाद)
अम्ले भेकगतिः कोष्ण। (नाडी ज्नान तरंगिणी)

Amla rasa increases pitta, the prolonged intake of amla rasa results in plavagathi (leaping of pulse), soshna, the movement resembles the frog.

Effect of Food on Nadi

In Hunger– **चपला क्षुदितस्य स्यात्।** (नाडी परीक्षा)

In hungerthe beats of the pulse is fast.

After Meals– **स्थिरा तृप्तस्य सा भवेत्।** (नाडी परीक्षा)

After meals the pulse is slow, inc. of kapha..the pulse is full.

Nadi Pareeksha in Arishta

- **हनि च स्थानविच्युता।** (नाडी परीक्षा)

A naadi which is displaced from its position it indicates an immediate death

- **स्थान च्युतिस्च नाडीनां सद्यो मरणहेतवः।** (हारीत)

Acc. To haaritha if the pulse displaced from its original position then the patient will die immediately.

- Vibrating and pulsating like that of lightening.

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- More rapid and sometimes very thin runs extremely weak/ fast/cold.
- Nadi Not felt in hand but in leg and mouth remains open.
- Creates Dehashaithya along with Swasa and Daha- die within 15 days.
- *Teevra* and *Manda* sometimes with *Sweda* - die within 7 days.
- *Mukha Nadi* sensation disappears, *Shaithya* and *Klama* in body- die within 3 days.
- Not felt at proximal end, cold in middle, appears tired at terminal- die within 3 days.
- Feeble and felt like cloth wave and cold- die within one yama.

Contra Indications for Nadi Pareeksha

१. सद्योस्नात	२. सद्योभुक्त	३. क्षुधित
४. तृष्णित	५. आतप, धूम, धूपसेवित	६. व्यवायश्रान्तदेह
७. भुक्त	८. निद्रित	९. उपवासिन
१०. व्यायामश्रान्तदेह	११. भूतावेश	१२. रोदन
१३. मद्यपान	१४. मतिभ्रम	१५. पवनाभ्याससाधक
१६. स्नेहअवगाहिन	१७. कुकुट, शश, मण्डूक, सर्पमांसादिभक्षक	१८. अपस्मार
१९. श्रान्तदेह	२०. तैलाभ्यङ्ग	

After Nadi Pareeksha

नाडीस्पृष्ठत्वातयोवैः हस्तप्रक्षालनंचरेत्। रोगहानिर्भवेद्शीघ्रंगंगास्नानफलंलभेत्।।
योरोगिणः करस्पृष्ट्वास्वकरक्षालयेत्। रोगस्तस्यविनश्यन्तिपङ्कप्रक्षालनाद्यथा।।

(नाड़ीदर्पणं १०१/१०२)

One has to wash off hands properly after nadi pareksha.

Conclusion

- Nadi vijyana is a specialised science and a chief examination parameter with the supreme standard authenticated diagnosis.
- It is not simply a pulse reading but an examination of patient as a whole.
- Unlike modern science it not only covers cardiovascular system but each and every organ pathology can be identified.

- Very sharp sense, extreme skill authenticated knowledge and intelligence for interpretation is required for nadi pareeksha.
- It is a combination of prathyaksha, anumana, apthopadesha and yukthi.
- Nadi pareeksha has never allowed any requirment of advanced materialistic investigations or imaging techniques as today.
- With the advent of present day imaging techniques and materialistic investigations people started ignoring this science.
- Today lab technicians and biotech engineers have become people to diagnose the disease than a physician.
- Therefore we lost the good old skill and art of nadi pareeksha.
- Based on various sampradayas different scholars started different way of nadi pareeksha. Even today Chinese, Arabic, Greek medicine, Siddha and some spiritual scholars continue there own way of art of nadi pareeksha.
- Atempts have made to materialise nadi pareeksha in present days. Lots of ongoing researches works on revoking nadi pareeksha through instrumentation.
- Yet there are a lot of oppositions for this attempts, as nadi pareeksha pertains to subjective and objective approach to a patient and instrumentation just becomes an objective approach.

2. Mootra Pareeksha

अथातः संप्रविक्ष्यामिमूत्रस्यचपरीक्षणम् । येनविज्ञातमात्रेणरोगचिह्नंप्रकाश्यते।।

Mutra is the metabolic end product of all metabolism. It represents both healthy and sick state of the body. Therefore examination of mutra reveals many varieties of disorder of multiple system.

Method of Collection of Urine Sample

निशान्त्ययामे घटिकाचतुष्टये उत्थाप्य वैद्यः किल रोगिणं च।
मूत्रं धृतं काचमये च पात्रे सूर्योदये तत् सततं परीक्षेत्।। (यो.र.)

The wise physician should wake up patient inthe morning around 4 '0' clock, should collect the urine sample in a clean glass

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vessel, and the same should be closely and carefully examined during sunrise time.

Examination of Dosha Dominance in Urine

वातेचपाण्डुरंमूत्रंसफेनंकफरोगिणः। रक्तवर्णंभवेत्पित्तेद्वन्द्वजेमिश्रितंभवेत्।।
सन्निपातेचकृष्णंस्यादेत्तन्मूत्रस्यलक्षणम्।।

दोष	मूत्र
वातप्रकोप	नील, रूक्ष
पित्तप्रकोप	पीत, अरुण, तैलसम
कफप्रकोप	स्निग्ध, वारितुल्य, पल्वल
रक्तप्रकोप	स्निग्ध, उष्ण, रक्त

भौतिक परीक्षा (Physical Examination)

- मात्रा- Quantity
- गन्ध- odour
- वर्ण- Color
- पारदर्शकता- turbidity/ transperency
- गुरुत्वा- specific gravity

Swaroopa of Mutra in Various Diseases

अजीर्णप्रभवेरोगेमूत्रंतण्डुलतोयवत् । नवज्वरेधूम्रवर्णबहुमूत्रंप्रजायते।।
पित्तानिलेधूम्रजलाभमुष्णंश्वेतंमरुच्छलेष्मणिबुद्बुदाभम्।।
तच्छलेष्मपित्तेकलुषंसरक्तंजीर्णज्वरेअसृक्सदृशंचपीतम्।
स्यात्सन्निपातादपिमिश्रवर्णंतूर्णंविधिज्ञेनविचारणीयम्।।

रोग	मूत्र
अजीर्ण	तण्डुलोदक
नवीनज्वर	धूम्रवर्ण, बहुमूत्रं
वात-पित्तज्वर	धूम्रजलाभं, उष्णं
वात-श्लेष्मज्वर	श्वेत, बुद्बुद्
श्लेष्म-पित्तज्वर	कलुषं, सरक्तं
जीर्णज्वर	असृक्सदृशं, पीतं
सान्निपातज्वर	मिश्रवर्ण

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Tailabindu Pareeksha

परीक्षाविधिवत्कार्यारोगिमूत्रस्यतत्त्वतः। तृणेनदापयेत्तैलबिन्दुंतत्रातिलाघवात्।।
विकासितंतैमथाआशुमूत्रेसाध्यःसरोगीनविकसितंचेत्।
स्यात्कष्टसाध्यस्तलगेत्वसाध्योनागर्जुनेनैवकृतापरीक्षा।।

A special modality of examination of urine developed by ayurvedic scholars of medieval period. Well explained in the texts like Basavarajeeyam, Yogaratnakara and Vangasena.

Here, a drop of tila taila is instilled into the vessel, where the patients urine is collected. Prognosis of disease is predicted by observing the pattern of taila over the surface of the urine.

Parameters for Assessment

- Direction of movement of taila
- Speed of movement of the oil drop
- Distribution of taila in the surface of mutra
- Shape taken up by taila on dropping over mutra
- Sinking of oil drop
- Floating of oil drop

Some of the observations are:

- If oil spreads quickly over the surface of the urine - साध्य
- If the oil does not spread - कष्टसाध्य
- If the oil directly goes inside and touches the bottom of the vessel - असाध्य

Good Prognosis of Taila Bindu Pareeksha

पूर्वाशांवर्धतेबिन्दुर्यदाशीघ्रंसुखीभवेत्। दक्षिणाशांज्वरोज्ञेयस्तथाआरोग्यंक्रमाद्भवेत्।।
उत्तरस्यांयदाबिन्दोः प्रसरः सम्प्रजायते। अरोगितातदानूनंपुरुषस्यनसंशयः।।

If the oil drop moves towards east then patient turns healthy very soon. In patient suffering from jwara if oil drop moves to south then gradually patient will become healthy. If moves towards north direction then disease definitely cures and patient turns healthy.

Bad Prognosis of Taila Bindu Pareeksha

वारुण्यांप्रसरेद्बिन्दुःसुखारोग्यंतदाआदिशेत् । एशान्यांवर्धतेबिन्दुर्ध्रुवंमासेननश्यति।।
आग्नेय्यांतुतथाज्ञेयंनैरुत्यांप्रसरेध्यदि । छिद्रितश्चभवेत्पश्चाद्ध्रुवंमरणमेवच।।
वायव्यांप्रसरेद्बिन्दुःसुधयापिविनश्यति । विकाशितंहलंकूर्मसैरिभाकरसंयुतम्।।

करण्डमण्डलंवापिशिरोहीननंरतथा । गात्रखण्डंचशस्त्रंवखड्गंमुशलपट्टिशम्।।
शरंचलगुडंचैवतथैवत्रिचतुष्पथम् । बिन्दुरूपंनरोद्वृष्ट्वानकुर्वीतक्रियांक्वचित्।।

- If oil spreads towards Esanya- patient is bound to die in a month's time.
- If spreads towards Agneya or Nairutya- patient is bound to die.
- If spreads towards Vayavya- going to die anyway.
- If it creates the following structures indicates the asadhya lakshana- tortoise, buffalow, honeybee, headless humanbody, shastra like knief etc.

Direction of spread of oil drop	Conclusion
East	Patient quickly recovers.
South	Has fever and will recover slowly.
North	Will definitely recover
West	Will recover with ease
North-east	Will die within a month
South-east	Will die within a month
South-west with sieve like appearance	Patient will definitely die
North-west	Death is certain

Based on the Shape of Oil Drop

- Vata dosha– Like a sarpa
- Pitta dosha– Like a chatra
- Kapha dosha– Like a Mukta
- Bhuta dosha– Narakara, Mastaka Dvayam
- Preta dosha, Kula dosha– Like the shape of chalani
- Definite recovery– Like the shape of hamsa, karanda, taadaka, kamala, gaja chatra, torana.
- Will not recover– Like the shape of a hala, kurma, shiroheena nara, gaatra khanda, shara, mushala.

यस्यपर्युषितंमूत्रंसान्द्रिभवतिभाजने। पुरुषंकफकोपनेतमाहुसान्द्रमेहिनं। (च.नि. ४/१५)

The Urine turns turbid in saandra meha. Saandrata in mutra is minly due to kapha dosha.

यस्यसंहन्यतेमूत्रंकिन्चित्किन्चित्प्रसीदति। सान्द्रप्रसादमेहितितमाहुश्लेष्मकोपतः।
षट्पदपिपीलिकाभिश्चशरीरमूत्राभिसरणं। (Ch.Ni.4/47)

In poorvarupa of prameha ants crawl towards the urine sample.

Urine examination according to modern science:

The examination of urine provides a wide variety of useful medical information regarding the diseases. It is done to find out metabolic or endocrine disturbances of the body and to detect intrisic condition that may adversely affect the urinary tract or the kidneys

It is composed of 4 parts

- Specimen evaluation
- Chemical screening
- Gross\physical examination
- Sediment examination

Physical Examination

Volume– An adult normal average daily volume of urine is about 1200 - 1500ml

- Polyuria– Quantity of urine more than 2500ml per day
- Oliguria– Less than 500ml per day
- Anuria– Complete suppression of urine

Colour– Normal urine may vary from pale yellow to dark amber.

Appearance– Normal urine is clear

Cloudy– Because of phosphate

Turbid– Presence of protein or red blood cells

Sediment Formation– If urine contains amorphous phosphates, large number of leucocytes, epithelial cell etc on standing it for sometime, sediment formation take place at the bottom of container.

Odour

Presence of ketone bodies emit sweet or fruity smell. If Contaminated urine with Bacteria then urine emits pungent smell.

Reactin & Ph

Freshly voided normal urine is usually slightly acidic &Ph is 4.6–7.0.

A high protien intake and ingestion of acidic fruits produce acidic urine.

Intake of high vegetables and citrus fruits cause an alkaline urine.

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Specific Gravity

The specific gravity determination is used to measure the concentrating and diluting power of Kidneys.

- Specific. Gravity of urine - 1.003 to 1.030.

  Specific Gravity rises when the fluid intake is low.

  Specific Gravity decreases when the fluid intake is more.
- In Diabetis insipidus the specefi Gravity is low.
- Specific Gravity is high in Diabetis mellitus, dehydration, protienuria, lipoid nephrosis etc.

Chemical Examination of Urine

Protien will be present in urine condition like.

- Pre renal conditions
- Dehydration
- Heart disease
- Severe diarrhoea

Ketone Bodies will be present in urine conditions like.

- Severe Diabetes mellitus
- Fever
- After prolonged diarrhoea & vomiting.

Glucose will be present in urine in conditions like.

- Diabetes mellitus.
- Hyper activity of endocrine gland like thyroid, pituitary, adrenal gland.
- After brain injury and coronary thrombosis.

  Bile Pigments & Bile Salts are seen in urine due to Hepatic and post hepatic conditions.

  Urobilinogen is seen in urine due to hepatic & post hepatic condition the level is increased. In Prehepatic condition the levels are very High.

Blood is seen in urine due to following conditions.

- acute nephritis
- Calculi
- Renal carcinoma
- Tuberculosis of kidneys

Microscopic Examination of Urine

Pus Cells– If pus cells are more than 5 pus cells per H.P.F then it indicates.

- Urinary tract infections
- Acute glomerulonephrits
- Renal tubular acidosis
- Non infectious irritation to the uterine bladder or urethra

Epithelial Cells– If there are more than 5 epithilial cells per H.P.F it indicates

Conditions Like

- Pyelo nephritis
- Acute tubular necrosis
- Salicyclate intoxication

Crystals– When present in high concentration indicate presence of Renal calculi

3. Mala Pareeksha

Dosha Dominance in Mala

वातान्मलेतुदृढताशुष्कताचापिजायते । पीतताजायतेपित्ताच्छुक्लताश्लेष्मतोभवेत्।।
सन्निपातेचसर्वाणिलक्षणानिभवन्तिहि । त्रुटितंफ़ेनिलेरूक्षंधूमलंवातकोपतः।।
वातश्लेष्मविकारेचजायतेकपिशंमलं । बद्दृंसुत्रुटितंपीतश्यामंपित्तानिलद्भवेत्।।
पीतश्वेतंश्लेष्मपित्तादीषत्सान्द्रचपिच्छिलं । श्यामंत्रुटितपीताभंबहश्वेतंत्रिदोषतः।।

Lakshana of Mala in Different Diseases

जलोदर	सित, पूतिगन्ध, महत्
क्षय	श्याम
आमयुक्त व्याधि	पीत
वातजग्रहणि	शुष्कं, तनु, फेनवत्
पित्तज्ग्रहणि	नील, पीत, द्रवं
कफजग्रहणि	भिन्न, आम, गुरु, वर्च
संग्रहग्रहणि	द्रवं, शीतं, घनं, स्निग्धं
वातिक अतिसार	अरुणं, फेनिलं, रूक्षं, अल्पमल्पं
पित्तज अतिसार	पीत, नीलं, लोहितवर्णं
कफज अतिसार	शुक्लं, सान्द्रं, विस्रं, शीतं

Jala Nimajjana Pareeksha– A small sample of mala is taken and dropped in container containing water.

- सामतल– sinks in the water to the bottom of the container

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- अप्सुअवसीदति, भृशदुर्गन्धि, विछिन्नं,
- जलेप्लवन, दुर्गन्धरहित, अपिच्छिल,
- निराममल– floats in water

Praksheena Mala Lakshana

कपिलंगुटियुक्तंचयदिवचोंअवलोक्यते । प्रक्षीणमलदोषेणदूषितःपरिकथ्यते।।

Jeerna Mala Lakshana

दुर्गन्धंशीतलश्चैवविष्ठोत्सर्गोयदाभवेत् । तदाजीर्णमलंवैध्यैर्दोषज्ञैःपरिभण्यते।।

Malarupa Arishta Lakshana

अतिकृष्णंचातिशुभ्रंपीतंतथाअरुणं । मरणामयलंकिन्तुभृशोष्णंमृत्यवेधृवम्।।

Asadhya Mala Lakshana

अत्यग्रौपिण्डितंशुष्कंमन्दाग्नौतुद्रवीकृतम् । दुर्गन्धंचन्द्रिकायुक्तमसाध्यंमललक्षणं।।

Dosha Varna in Mala

वातस्यचमलंकृष्णंततःपित्तस्यपीतविट् । रक्तवर्णंमलंकिंचिन्मलंश्वेतंकफोद्भवम्।।

Examination of Faeces

- **Collection of Stool**

In the Morning specimen is collected in 50mlquantity in clean and dry container. It should be examined within 1 hour of collection.

Physical Examination

- Consistency : hard, semisolid or loose
- Colour : yellow, brown, red, green
- Mucous
- Blood

Consistency

Abnormal Consistency	Reasons
1. Pale, Bulky, Frothy	Steatorrhoea
2. Hard	Constipation
3. Flattened & ribbon like	Obstruction in the lumen of bowel
4. Semisolid	Mild diarrhea
5. Rice water stool	Cholera
6. Watery	Bacterial infection

Color of Stools

Abnormal	Reasons
Black	Bleeding in the upper GIT or iron administration
Bright red	Bleeding piles, contamination with menstrual blood
Clay coloured	Post hepatic jaundice
White	After barium meal

Chemical Examination

- Reaction if acidic or alkaline.
- Occult blood.

Normal stool specimen are slightly acidic, neutral or slightly alkaline.

Ph range from 5.8 to 7.5

- Strongly acidic stool due to Fermentation seen in lactose intolerence.
- Strongly alkaline seen due to Excess of protien in diet.

Microscopic examination of stools shows food particals, meat fibers, mucus, parasites like larva, ova, cyst, live worms, segments of worms, RBC, pus cells.

4. Jivha Pareeksha

Examination of tongue is called as jivha pareeksha. It comes under pratyaksha and darshana pareeksha. Jivha pareeksha reflects the status of mukha, khanta, amashaya. In normal individual jivha is swaccha, snigdha, no coating, pinkish red in color.

One can assess the status of nutrition, oxygenation, circulation, hydration by jivha pareeksha. There can be both anatomical defect (since birth or acquired) or functional deficit in the tongue. The shape, size, color, contour, fissures, visible ulcers or wounds, coating, mass formation, deviation, motility, ability to speak etc are the elements to be seen in examination of tongue. There can be variation in the tongue due to doshic predominance or on the basis of impact of disease on the tongue.

Doshanusaara Jivha Lakshana

Vata dosha– Nila varna, ruksha in texture

Pitta dosha– Rakta varna, thick in texture

Kapha dosha– Snigdha and mrudu in nature.

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Vyadhi Anusaara Jivha Lakshana

Jivha lakshana	Roga
Sweta varna or peeta varna, Malavruta	Koshta bhadh, sotha, jeerna jwara
Neela varna, rukshata	Trushna, vataja jwara, hrudroga, shwasa, sahasa
Peetavarna,	Kamala, pittaja pandu
Rakta varna	Vruna in tongue, glositis, fissure, madatyaya
Mala alepa	Ajeerna, agnimandhya
Shweta	Pandu, shock, mal nutrition
Aruna varna	Shwasa, visha
Utsanna (sotha), guru	Arbuda, endocrinal disorders, visha, obesity
Tanu	Teevra apatarpana
Excessive lala srava	Krimi, visha, amajeerna, chardi, kaphaja unmaada, ardita
Durgandha	Mukha roga, (dantaroga, dantamoolagata roga, jivha roga) Vruna, ajeerna, ashuchi (not performing dantha dhavana, jivha nirlekhana and mukha prakshalana) pratishyaya
Loss of rasajnana	Jwara, pratishyaya, amavata, all amavastha in amashaya, paralysis of 9th nerve
Vaak dourbalyata	Tongue tie, udanavata dushti, muka, minmina, pakshagata, ardita, dementia, madatyaya
Kampa	Kampavata, hyperthyroidism, chorea
Deviation to one side	hemiplegia
Large tongue	acromegaly
Hairy leucoplakia	HIV infection

5. Shabdha Pareeksha

This is the examination of various types of sound produced by patient. It is again prakyaksha pareeksha and shravanendriya taha pareeksha. The sound can be heard directly or by using instruments.

Various method of shabda pareeksha:

- Voice of the patient- Deena swara, Snigdha swara, Karkasha dwani, Swarabedha, sound like that of howling of any animal.
- Sound produced in abdomen on direct hearing. Presence or absence of intestinal gurgling sound.
- Sound produced by chest during breathing- type of respiration, added respitatory sounds like wheeze, crackles, stridor.
- Sound produced on percussion- hyper resonant percussion note, dull percussion note.
- Tics or Crackling sound produced by joints on movement.

तत्रश्रोत्रेन्द्रियविज्ञेयविशेषारोगेषुवृणस्रावविज्ञानीयादिषुवक्ष्यन्तेतत्रसफेनंरक्तमीरयन्निलःससशब्दोनिर्गच्छतिइत्यामादयः।। (सु.सू. ८)

- In vatarakta, astivikruti shabda of sandhi sputana is heard.
- Patient of kshataja kasa produces sound like paaravata iva koojan.
- Kasa produces binna kamsya swana tulya ghosha.
- Patient suffering from apatantraka produces kapotavat kujana
- Swara bedha or bhinna swara in seen in vataja pratishyaya
- Sound like that of intoxicated bull is produced in Maha shwasa.
- The patient is made to talk and observed for conscious, orientation and speech ability.

6. Sparsha Pareeksha

Usually done by touching, palpating, percussing the affected site in the patient. Palms or fingers of hands of physician are used in accordance to the disease. The physician's hands should not be neither cold nor hot, because it may lead to wrong assessment.

Types of Sparshana Pareeksha

- Parimarshana– palpation
- Ayamana– extension
- Prapeedana– compression
- Akotana– percussion
- Lunchana– traction

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Palpation of chest, axilla, cervical region, inguinal region for lymphnode enlargement. Plaplation for placement of trachea, chest symmetricity and chest expansion. Test for vocal fremetus are all sparsha pareeksha for respiratory system.

Assessment of apex beat, pulsations, thrill, impulse are used for cardiovascular system.

प्रकृतिविकृतियुक्तंस्पर्शचजिज्ञासुःप्रकृतिस्थेनपाणिनाशरीरमस्यकेवलंस्पर्शतविमर्शयेद्वाऽन्येन। (च.वि.४/७)

Gives information about normalcy and abnormality of the body.

- One can assess texture, consistency and enlargement of organs by palpation.
- Most important pareeksha in sparshana pareeksha is nadi pareeksha. Eg if the nadi is manda means we can infer that the patient is having mandagni.
- One can assess temperature variations by sparshana pareeksha eg: -Usna sparsha in jwara.
- One can assess the tenderness on palpation eg: - Mridu sparsha in pittodara.
- Assessment of cutaneous sensation or Sparshajnana.
- Assessment of roukshya, parushya, slakshnata, snigdata, kharata, mrudutwa, in twak vikaras.
- Assessment of rigidity, spasticity, flaccidity, degree of movement in locomotor and neurological disorders.

स्पर्शनेनहस्तकायस्पर्शेनज्वरगुल्माविद्रध्याद्यार्त्ततथाशीतोष्णास्तब्धस्पन्दश्लक्ष्णखरस्पर्शादिकंच।
(अ.ह.सू. १/२२)

- Assessment of sheetata and ushnata of patients body by touching the body of the patient.
- Assessment of softness or hardness of skin, swelling, mass in the body of patient by palpation.
- Assessment of fluid thrill in jalodara by anguli aakotana or percussion.
- Assessment of shotha, tactile sensation, pain threshold are all assessed by sparshana pareeksha.

7. Druk Pareeksha

Examination of eye in the patient is called as druk pareeksha. Eye reflects over all health status of the body. Therefore druk pareeksha must be an important part of routine physical examination.

In vata prakopavastha eye turns dhumra varna and chanchala.

In pitta prakopa color of sclera is peeta varna or tamra varna

In kapha prakopa there will be snigshata in eye and sravayukata and sthira drushti.

Druk in Various Disease

Roga	Changes in eye
Jeerna jwara	Nirbala, nisteja, shuna akshi
Kaamala	Peeta varna of sclera
Vishuchika	Deep sunken eyes
Vrikka sotha, Pandu	Akshi koota shotha
Pandu	Pallor in sclera
Murcha	Stabdhakshata
Manyasthambha	Vikruta, urdwa gati
Unmaada	Urdwa drishti, chanchala
Krishna vartula (dark circles below eye)	Insomnia, nutritional defeciency

An eye examination is a series of tests performed by an ophthalmologist (medical doctor), optometrist, or orthoptist assessing vision and ability to focus on and discern objects, as well as other tests and examinations pertaining to the eyes. Health care professionals often recommend that all people should have periodic and thorough eye examinations as part of routine primary care, especially since many eye diseases are asymptomatic.

Eye examinations may detect potentially treatable blinding eye diseases, ocular manifestations of systemic disease, or signs of tumours or other anomalies of the brain.

Visual acuity is the eye's ability to detect fine details and is the quantitative measure of the eye's ability to see an in-focus image at a certain distance. The standard definition of normal visual acuity (20/20 or 6/6 vision) is the ability to resolve a spatial pattern separated by a visual angle of one minute of arc. The terms 20/20

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and 6/6 are derived from standardized sized objects that can be seen by a "person of normal vision" at the specified distance. For example, if one can see at a distance of 20ft an object that normally can be seen at 20ft, then one has 20/20 vision. If one can see at 20ft what a normal person can see at 40ft, then one has 20/40 vision. The 6/6 terminology is more commonly used in Europe and Australia, and represents the distance in metres.This is often measured with a Snellen chart.

Refraction

Refractive error is an optical abnormality of the eye in which a corrective lens is needed for proper focusing. Refraction is the procedure by which any refractice error is characterized and qualified. Refraction is a process your eye care professional uses to measure your refractive error, or vision problem. A refractive error is an optical defect that does not allow light to be brought into sharp focus on your retina, resulting in blurred or distorted vision. Examples of refractive error are myopia, hyperopia, and astigmatism.

Objective Refraction: An objective refraction is a refraction obtained without receiving any feedback from the patient. An objective refraction is obtained by using different instruments. Your doctor will use a retinoscope or auto-refractor to measure your refraction without asking for subjective responses from you.

Retinoscopy: One of the most common instruments used for objective refraction is the retinoscope. Using a retinoscope, your doctor will project a streak of light into your pupil. A series of lenses are flashed in front of your eye. By looking through the retinoscope, your doctor can study the light reflex of the pupil. Based on the movement and orientation of this retinal reflection, the refractive state of your eye is measured.

Auto-refraction: Another instrument used for objective refraction is an auto-refractor. An auto-refractor is a computerized instrument that shines light into your eye. The light travels through the front part of your eye to the back part of your eye, then back again. The information bounces back to the instrument, giving an objective measurement of your refractive error. Auto-refractors are quick and easy to use, and require no feedback from you.

Pupil Function

An examination of pupilary function includes inspecting the pupils for equal size (1 mm or less of difference may be normal), regular shape, reactivity to light, and direct and consensual accommodation. Pupils Equal and Round; Reactive to Light and Accommodation (Direct and Consensual).

The swinging-flashlight test is the most useful clinical test available to a general physician for the assessment of optic nerve anomalies. This test detects the afferent pupil defect, also referred to as the Marcus Gunn pupil. It is conducted in a semidarkened room. In a normal reaction to the swinging-flashlight test, both pupils constrict when one is exposed to light. As the light is being moved from one eye to another, both eyes begin to dilate, but constrict again when light has reached the other eye.

If there is an efferent defect in the left eye, the left pupil will remain dilated regardless of where the light is shining, while the right pupil will respond normally. If there is an afferent defect in the left eye, both pupils will dilate when the light is shining on the left eye, but both will constrict when it is shining on the right eye. This is because the left eye will not respond to external stimulus (afferent pathway) but can still receive neural signals from the brain (efferent pathway) to constrict.

If there is a unilateral small pupil with normal reactivity to light, it is unlikely that a neuropathy is present. However, if accompanied by ptosis of the upper eyelid, this may indicate Horner's syndrome.

Ocular Motility

Ocular motility should always be tested, especially when patients complain of double vision or physicians suspect neurologic disease. First, the doctor should visually assess the eyes for deviations that could result from strabismus, extraocular muscle dysfunction, or palsy of the cranial nerves innervating the extraocular muscles. Saccades are assessed by having the patient move his or her eye quickly to a target at the far right, left, top and bottom. This tests for saccadic dysfunction whereupon poor ability of the eyes to "jump" from one place to another may impinge on reading ability

and other skills, whereby the eyes are required to fixate and follow a desired object.

The patient is asked to follow a target with both eyes as it is moved in each of the nine cardinal directions of gaze. The examiner notes the speed, smoothness, range and symmetry of movements and observes for unsteadiness of fixation. These nine fields of gaze test the extraocular muscles: inferior, superior, lateral and medial rectus muscles, as well as the superiorand inferior oblique muscles.

Visual Field

Testing the visual fields consists of confrontation field testing in which each eye is tested separately to assess the extent of the peripheral field.

To perform the test, the individual occludes one eye while fixated on the examiner's eye with the non-occluded eye. The patient is then asked to count the number of fingers that are briefly flashed in each of the four quadrants. Common problems of the visual field include scotoma (area of reduced vision), hemianopia (half of visual field lost), homonymous hemianopsia and bitemporal hemianopia.

Some Other Conditions

- Blepheritis– Redness and scaling of lid margines
- Entropion– Inversion of Lid margine
- Ectropin– Eversion of lid margine
- Ptosis– Drooping of eye lid
- Lacrimation– Discharge from eye due to irritation or infection
- Trachoma– Follicals in upper eye lid
- Keretitis, iritis– Redness
- Xerophthalmia– Dryness of eye
- Ptregyum– A muscular Flap

8. Aakruti Pareeksha

This is the last variety of pareeksha of this group. It is the judgment of one's disease status by examination of body features like physical structure, aging features, gait, decubetus, nutritional status, body mass index.

Utility of Akruti Pareeksha in Ayu Pareeksha

तत्र महापाणिपादपार्श्वपृष्ठस्तनाग्रदशनवदनस्कन्धललाटं। दीर्घाङ्गुलिपर्वोच्छ्वासप्रेक्षणबाहुं, विस्तीर्णभ्रूस्तनान्तरोरस्क, ह्रस्वजङ्घामेढ्रग्रीवं, गंभीरसत्व-स्वरनाभिम्, अनुच्चैर्बद्धस्तना, उपचितमहारोमशकर्णं, पश्चान्मस्तिष्कं, स्नातानुलिप्तं मूर्धानुपूर्व्या विशुष्यमाणशरीरं पश्चाच्च विशुष्यमाणहृदयं पुरुषं जानीयाद्दीर्घायुः स्वल्वयमिति। तमेकान्तेनोपक्रमेत्। एभिर्लक्षणैर्विपरीतैरल्पायुः मिश्रैर्मध्यमायुरिति। (सु.सू. ३५/४)

- Paani paadadi should be little more biggerthan that of swa anguli pramaana.
- Inspiration, eyes, arms should be Dheergha (denotes only length).
- Eyebrows, interval between breasts (stanaantaram), interval between hrudaya & kanta (uraskam) should be broader.
- Shorter legs, penis & neck.
- Should have gambhira swara, gambhira satwa, gambhira naabhi.
- Slightly compact breasts.
- Who is having fleashy, broaderas well as hairy ears.
- Hair streaks behind the neck.
- After bath drying from head to heart at the end

Characters opposite to this indicate short life span while mixed ones indicate medium life span.

Utility of Akruti pareeksha in pramana pareeksha

Anguli pramana : It is the unit of measurement of length, height, width of body parts. It is fixed as स्वाङ्गुलि.

तत्र, स्वैरङ्गुलैः पादाङ्गुष्ठ प्रदेशियौ द्वयङ्गुलायते प्रदेशिन्यास्तु मध्यमानामिकाकनिष्ठिका यथोत्तरं पञ्चमभागहीनाः।

चतुरङ्गुलायते पञ्चाङ्गुलविस्तते प्रपदपादलते। षट्चतुरङ्गुलायविस्तता पाष्णि। चतुर्दशाङ्गुलायतः पादः।

चतुरङ्गुलायते पञ्चाङ्गुलविस्तते प्रपदपादतले। षट्चतुरङ्गुलायविस्तता पाष्णि। चतुर्दशाङ्गुलायतः पादः।

चतुर्दशाङ्गुलपरिणाहानिपादगुल्फ जङ्घाजानुमध्यानिः। अष्टादशाङ्गुला जङ्घा, जानुपरिष्टाच्च,

एते पञ्चाशतः जङ्घायमसमवुरु, द्वयङ्गुलानि व्रषणचिबुकदश्ननासापुटभाग

कर्णमुलभ्रुनयनान्ताराणी, चतुरङ्गुलानि मेहनवदनान्तर नासाकर्णललाटग्रीवाच्छ्रायद्रष्टयन्तरणी।

द्वादशाङ्गुलानि भगविस्तारमेहननाभिहृदयग्रीवास्तनान्तरमुखायाममणिबन्ध प्रकोष्टास्थौल्यानि।

इन्द्रबस्तिपरिणा हंसपीठकूर्परान्तरायामः षोडशाङ्गुलः। चतुर्विंशत्यङ्गुलो हस्तः। द्वात्रिंश-दङ्गुल्परिमाणौ भुजौ। {Su.Su.35/12}

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- Third, fourth & little toe successively one-fifth lessthan the second toe.
- Prapada & Padatala-4 angula length and 5 angula breadth.
- Heel -6 angula length.
- The great toe &second toe of the feet-2 angula and 4 angula breadth.
- The foot is 14 angula length.
- Leg is18 angula length.
- Scrotum, chin, teeth, anterior flaps of the nose, root of the ear, space between brows & interior of eyes are 2 angula in length.
- Penis, mouth cavity, nose ear, for head, neck, interval of the pupils are 4 angula in length.
- Vaginal canal, space between penis & umbilicus, umbilicus & heart, heart & neck are 12 angula in length.
- Interval between thumb root & index finger, between ears & eye corner & length of the middle finger is 5 angula.
- Index & ring fingers are 4 & a half fingers long.
- Thumb & little finger half & 3 angula.
- Area of iris is 1/3 of eye1/9 part iris is pupil.
- From middle of the skull to the end of hair root in neck is 10 angula.
- Space between the two ears through back is 14 angula.
- Total height of the person -120 angula.

General Apperance

- Does the Appearance consistent with chronological age?
- Is the patient Tall, short, fat, thin, muscular, asthenic?
- Is there any Deformities, is the body proportionate?
- Any history of weight gain/loss?
- Presence of oedema and mass

Physical Attitude

- Posture- patient with a heart failure will sit upright because they may become dyspnoeic if they lie flat (orthopnoea).
- Patient with abdominal pain lies still.
- Patient with colic are restless or may even roll about to get relief.
- Patient with joint disease have an attitude of helplessness.

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Gait

- Positions adopted by patients while walking.
- Types & Related Conditions.
- Spastic- walks on narrow base, difficulty in bending knees, drags feet along, circumduction of leg.
- Spinal cord disease.
- Hemiplegic- spastic gait with only 1 leg affected.
- Stamping- raises foot abnormally high & jerks forward.

> Sensory ataxia.

- High stepping- toes catch ground.

> Common peroneal nerve palsy.

- Drunken/reeling- walk on broad base, widely planted feet & placed irregularly.

> Cerebellar ataxia.

- Festinant- flexion dystonia, rapid, short, shuffling steps.

> Parkinsons disease.

- Waddling- widely planted feet, body tilted backwards, increased lumbar lordosis.

> Muscle weakness of pelvis girdle, muscular dystrophy.

Decubitus

Posture adopted by patient when lying in bed this gives a Diagnostic clue.

Conditions

- Severely ill patients- slip down in bed/chair & unable to correct.
- Cardio respiratory- sits up.
- Abdominal pain (pertonitis)- lie still.
- Colic (renal, biliary, intestinal)- restless/roll.
- Painfull joint disease- attitude of helplesness.
- Severe meningitis- neck retraction & stiffness.
- Tetanus- opisthotonos.
- Pneumonia & Pleurisy- lying on affected side.
- Hemiplegia-one side immobile, affected arm flexed, affected leg externally rotated & extended.

3. Importance and Knowledge of Karanadi Dashavidha Parikshya Bhava

दशविधं तु परीक्ष्यं कारणादि यदुक्तमग्रे तदिह भिषगादिषु संसार्य संदर्शयिष्यामः इह कार्यप्राप्तौ कारणं भिषक् करणं पुनर्भेषजं कार्ययोनिर्धातुवैषम्यं कार्यं धातुसाम्यं कार्यफलं सुखावाप्तिः अनुबन्धः खल्वायुः देशो भूमिरातुरश्च कालः पुनः संवत्सरश्चा-तुरावस्था च प्रवृत्तिः प्रतिकर्मसमारम्भः उपायस्तु भिषगादीनां सौष्ठवमभिविधानं च सम्यक् इहाप्यस्योपायस्य विषयः पूर्वेणैवोपायविशेषेण व्याख्यातः इति कारणादीनि दश दशसु भिषगादिषु संसार्य संदर्शितानि तथैवानुपूर्व्यैतद्दशविधं परीक्ष्यमुक्तं च। ।।८४।। (Cha.Vi.8/84)

Ten important factors of examination- The prilininary requisiti are-

1. Kaarana:-The physician serves as the causative factor for the achievement of karyaprapti (dhathusamyata). Physician does Harya by giving chikitsa.
2. Karana:-Includes the medicaments needed for the accomplishment of the treatment. Karana is responsible factor for effects in chikitsa.
3. Kaaryayoni:-It is the disturbance of equilibrium of dhatus. Due to which chikitsa is planned.
4. Karya:-Maintenance of equilibrium of doshas. After chikitsa disturbed doshas are brought beck to normal.
5. Karyaphala:-Attainment of sukha.
6. Anubandha:-Longevity datu to continvity of dosha sanyata.
7. Desha:-Both the land as well as the patient are included under desha. (desa ss well as aatura deha desha).
8. Kala:- The year consisting of seasons and the state of disease constitute kala or time. It include age, duriasion, deurnal variation.
9. Pravruthi (Intiation) of Therapeutic action in accordanes to disease.
10. Upaya:- Excellence of the physician and the correctness of the therapy.

१. कारणंभिषगित्युक्तमग्रे, तस्यपरीक्षा– भिषक्रामयोभिषज्यति, यः सूत्रार्थप्रयोगकुशलः यस्य च आयुः सर्वथाविदितंयथावत् । स च सर्वधातुसाम्यंचिकीर्षन्नात्मानमेवादितः परीक्षेत-गुणिषुगुणतः कार्याभिनिवृत्तिंपश्यन्, कश्चिदहमस्यकार्यस्याभिनिर्वर्तेनसमर्थो न वेतिः,

तत्रेभेभिषग्गुणायैरुपपन्नोभिषग्धातुसाम्याभिनिर्वर्तेनसमर्थोभवतिः, तद्यथा– पर्यवदातश्रुतता, परिदृष्टकर्मता, दाक्ष्यं, शौचं, जितहस्तता, उपकरणवक्ता, सर्वेन्द्रियोपपन्नता, प्रकृतिज्ञता, प्रतिपत्तिज्ञताचेति।। (Cha.Vi.8/86)

कारणं– Kaarana is bhishak or the one who treats the disease. Bhishak is the one who can understand the सूत्रार्थ-s that are told in the classics and is skilled in its prayoga. He is the one who knows everything on Ayu (Sukhaayu, dukhaayu, hitaayu. ahitaayu). A physician possessing the following qualities is capable of bringing about the Dhatusamyata.

a) पर्यवदातश्रुतता:– Knowledge about the Shastras related to disease or dravya and other.

b) परिदृष्टकर्मता:– Witnessesd the chikitsa karmas or who has achieved practical knowledge.

c) दाक्ष्यं:– Skilled and efficient.

d) शौचं:– Pure inside and in the work.

e) जितहस्तता:– Completes what has been intiated, special efficiency or charm to cure disease.

f) उपकरणवक्ता:– Equipped with requisites, and needful elements.

g) सर्वेन्द्रियोपपन्नता:– Posession of normal sense organs with efficient funetioning.

h) प्रकृतिज्ञता:– Who knows the prakrithi of patient.

i) प्रतिपत्तिज्ञता:– One who has upakramajnana.

२. करणंपुनर्भेषजं।

भेषजंनामतद्यदुपकरणायोपकल्पतेभिषजोधातुसाम्याभिनिर्वृत्तौप्रयतनमानस्यविशेषतश्चोपायांतेभ्यः। तद्द्विधंव्यपाश्रयभेदात्– दैवव्यपाश्रयं, युक्तिव्यपाश्रयंचेति। तत्रदैवव्यपाश्रयंमन्त्रौषधिमणिमंगल-बल्युपहारहोमनियमप्रायश्चित्तोपवासस्वस्त्ययनप्रणिपादगमनादि, युक्तिव्यपाश्रयंसंशोधनोपशमने-चेष्टाश्चदृष्टफलाः। एतश्चैवभेषजमंगभेदादपिद्विविधं द्रव्यभूतं, अद्रव्यभूतं च।

तत्रयद्द्रव्यभूतंतदुपायाभिप्लुतम्।

उपायोनामभयदर्शनविस्मापनविस्मारणक्षोभणहर्षणभर्त्सनवधबन्धस्वप्नसम्वानातिरमूर्तोभाव-विशेषोयथोक्ताः सिद् ध्युपायाश्चोपायाभिप्लुताइति। यत्तुद्रव्यभूतंतद्वमनादिषुयोगमुपैति। तस्यापीयं-परीक्षाइदमेवंप्रकृत्यैवंगुणमेवंप्रभवमस्मिन्देशेजातमस्मिन्नृतावेवंगृहीतमेवंनिहितमेवमुपस्कृतमनया च मात्रयायुक्तमस्मिन्व्यधावेवंविधस्यपुरुषस्यैवतावन्तंदोषमपकर्षत्यपशमयतिवा, यदन्यदपिचैवं-विधंभेषजंभवेत्तच्चानेनविशेषेणयुक्तमिति।। (Cha.Vi.8/87)

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करणं:– They are medicaments required and utilised for the purpose of attaining Dhatusamyata.

They are of two types, Daiva Vyapaashraya and Yukti Vyapaashraya.

Daiva Vyapaashraya:– This includes chanting of Mantra, or saered Hymes, Oushadadharana, use of jewels, auspicious rites, religious sacrifices, oblations, religiouscharity, rites, vows, paying obeisance, pilgrimages prayers and so on.

Yukti Vyapaasraya:– Includes Samshodhana and Samshamana, Based on its constituents, they are of two types- Dravya-bhuta and Adravya-bhuta. eg:- is adravya bootha.

Adravya Bhuta is based on Upaya. It includes terrorizing, surprising, dememorising, shocking, exciting, shocking, scolding threatening for murder, binding, inducingsleep, massageetc. Dravya Bhuta includes yogas used for Vamanaadichikitsa. They should be examined for the following things. Dravya bhoota materials from sthavara, jangama, kritrima courser are used.

Prakruthi

Guna

Prabhava

Desha (place of growth)

Rtu

Griheeta (mode of collection)

Nihitam (preservation)

Maatra (dosage)

३. **कार्ययोनिर्धातुवैषम्यं, तस्यलक्षणंविकारागमः। परीक्षात्वस्यविकारप्रकृतेश्चैवोनातिरिक्त-लिंगविशेषावेक्षणंविकारस्यचसाध्यासाध्यमृदुदारुणलिंगविशेषावेक्षणंइति।**(Cha.Vi.8/88)

The Karya-yoni is the disturbance of equilibrium of the dhatus. This is indicated by the onset of diseases. This is understood by the appearance of specific symptoms in smaller or greater degrees and also from the specific characteristics of diseases such as curability, incurability, seriousness, mildness etc.

४. **कार्यं धातुसाम्यंतस्यलक्षणंविकारोपशमः परीक्षात्वस्यरुगुपशनंस्वरवर्णयोगः शरीरोपचयम्बल-वृद्धिः, अभ्यवहार्याभिलाषः, रुचिराहारकाले, अभ्यवहृतस्यचाहारस्यकालेसम्यग्जरणं, निद्रालाभोयथाकालं, वैकारिणां च स्वप्नानामदर्शनं, सुखेन च प्रतिबोधनं, वातमूत्रपुरीषरेत-सांमुक्तिः, सर्वाकारैर्मनोबुद्धीन्द्रियाणांचाव्यापत्तिरिति।।** (Cha.Vi.8/89)

The Equilibrium of doshas and dhatus represents the action which is indicated by the alleviation of the disease. This can be understood from the following:-

a. Alleviation of the pain or suffering
b. Appearance of normal voice and complexion
c. Nourishment of the Body
d. Increase in the strength
e. Desire to take food
f. Appetite during meal-time
g. Proper digestion of the food taken.
h. Getting sleep at appropriate time
i. Absence of dreams
j. Happy awakening
k. Proper elimination of flatus, urine, faeces and semen
l. Unimpairement of mind, intellect and senses.

५. **कार्यफलं सुखावाप्तिः, तस्यलक्षणं– मनोबुद्धीन्द्रियशरीरतुष्टि।** (Cha.Vi.8/90)

Attainment of spiritual-happiness is the result of therapeutic action. It is characterized by the satisfaction of mind, intellect, senses, and the body.

६. **अनुबन्धस्तु खल्वायु, तस्यलक्षणप्राणैः सहसंयोग।।** (Cha.Vi.8/91)

It is the maintenance of longevity. It is characterized by its union with pranavata.

७. **देशस्तु भूमिरतुरश्च।।**

तत्रभूमिपरीक्षाआतुरपरिज्ञानहेतोर्वास्यादौष्ठ्यपरिज्ञानहेतोर्वा।। तत्रतावदियमातुरपरिज्ञानहेतोः।। तद्यथाअयंकस्मिन्भूमिदेशेजातः संवृद्धोव्याधितोवातस्मिंश्चभूमिदेशेमनुष्याणामिदमाहारजातम्, इदंविहारजातम्, इदमाचरजातम्, एतावश्चबलम्, एवंविधंसत्वम् एवंविधंसात्म्यम्, एवंविधोदोषः, भक्तिरियम्, इमेव्यधयः, हितमितम्, अहितमिदमितिप्रयोग्रहणेन। औषधपरिज्ञानहेतोस्तुकल्पेषु-भूमिपरीक्षावक्ष्यते।। (Cha.Vi. 8/92-93)

AyuTech

Desha includes both land as well as the patient.

It includes the place of birth, growth of patient and affliction with the disease. Specific features concerning food, exercise, customs, strength, mental condition, dominance of one or other doshas and liking.

आतुरस्तुखलुकार्यदेशः। तस्यपरीक्षाआयुषः प्रमाणज्ञानहेतोर्वास्याद्, बलदोषप्रमाणज्ञानहेतोः, दोषप्रमाणानुरूपोहिभेषजप्रमाणविकल्पोबलप्रमाणविशेषापेक्षोभवति। सहसाह्यतिबलमौषधमपरीक्षक-प्रयुक्तमल्पबलमातुरमतिपातयेत्; न ह्यतिबलान्याग्नेयवायवीयान्यग्निक्षारशस्त्रकर्माणिवाशक्यन्तेऽल्पबलैः सोदुम्; असह्यातितीक्ष्णवेगत्वाद्धितानिसद्यः प्राणहराणिस्युः। एतच्चैवकारणमपेक्षमाणा हीनबल-मातुरमविषादकरैर्मृदुसुकुमारप्रायैरुत्तरोत्तरगुरुभिरविभ्रमैरनात्ययिकैश्चोपचरन्त्यौषधैः, विशेषतश्चनारि, ताह्यनवस्थितमृदुविवृतविक्लवहृदयाः प्रायः सुकुमार्योऽबलाः परसंस्तभ्याश्च।

तथाबलवतिबलवत्व्याधिपरिगतेस्वल्पबलमौषधमपरीक्षकप्रयुक्तमसाधकमेवभवति।

तस्मादातुरंपरीक्षेतप्रकृतितश्च, विकृतितश्च, सारतश्च, संहननतश्च, प्रमाणतश्च, सात्म्यतश्च, सत्वतश्च, आहारशक्तितश्च, व्यायामशक्तितश्च, वयस्तश्चेति, बलप्रमाणविशेषग्रहणहेतोः।। (Cha.Vi.8/94)

The patient should be examined for to obtain knowledge regarding the span of life, strength, intensity of dosha. The dosage of the medicament/therapy is decided by the strength of the individual and the intensity of the doshas. Weak patients are incapable of resisting strong therapies like medicaments dominating agni and vayuamhabhuta, application of alkalies and heat, and surgical operations. Thus a weak patient should be given milder therapies, especially for ladies, as they are by nature unsteady, light, tender, and is sensitive and of weak temperament. Similarly if weak therapies are administered to a strong individual having a serious disease without proper examination, the disease does not get cured. Therefore the papatient should be examined for his **Prakruthi, Vikruthi, Sara, Samhanana, Pramana, Satmya, Satva, Aharashakti, Vyayama Shakti, and Vayas.**

८. कालः पुनःसंवत्सरश्चातुरावस्थाचतत्रसंवत्सरोद्विधात्रिधाषोढाद्वादशधाभूयश्चाप्यतःप्रविभज्यते-तत्तत्कार्यमभिसमीक्ष्य। अत्रखलुतावत्षोढाप्रविभज्यकार्यमुपदेक्ष्यतेहेमन्तोग्रीष्मोवर्षाश्चेति-शीतोष्णवर्षलक्षणास्त्रयऋतवोभवन्ति, तेषामन्तरेष्वितरेसाधारणलक्षणास्त्रयऋतवः-प्रावृट्शरद्वसन्ताइति। प्रावृडितिप्रथमःप्रवृष्टःकालः तस्यानुबन्धोहिवर्षाः। एवमेतेसंशोधन-मधिकृत्यषट्विभज्यन्तेऽऋतवः।। (Cha.Vi.8/125)

The year consisting of seasons as well as the state of disease constitute kala or time. Depending upon the necessity, year is divided

into two, three, six, twelve and even more. Hemantha, greeshma and varsha are the three seasons characterized by cold weather, hot weather and rainy seasons. Pravrut, sharat and vasantha are of moderate nature. Pravrut is characteristed by beginning of rains and then follows the rainy season. Seasons are thus divided into six based on the administration of elimination therapies.

तत्रसाधारणलक्षणेष्वृतुषुवमनादीनांप्रवृत्तिर्विधीयते, निवृत्तिरितरेषु। साधारणलक्षणाहिमन्दशी-तोष्णवर्षत्वात् सुखतमाश्चभवन्त्यविकल्पकाश्चशरीरौषधानाम्, इतरे पुनरत्यर्थशीतोष्णवर्षत्वाद्-दुःखतमाश्चभवन्तिविकल्पकाश्च शरीरौषधानाम्। (Cha.Vi.8/126)

Importance of Sadharanartu– Suitable for performing Vamanaadi Karmas. Sadharanartus will be moderate in cold,heat and rain. They do not adversely affect the conditions of body and drugs.

तत्रहेमन्तेह्यतिमात्रशीतोपहतत्वाच्छरीरमसुखोपपन्नंभवत्यतिशीतवाताध्मातमतिदारुणीभूतमवबद्धदोषंच, भेषजं पुनःसंशोधनार्थमुष्णस्वभावमतिशीतोपहतत्वान्मन्दवीर्यत्वमापद्यते, तस्मात्तयोःसंयोगे-संशोधनमयोगायोपपद्यतेशरीरमपिचवातोपद्रवाय।

ग्रीष्मेपुनर्भृशोष्णोपहतत्वाच्छरीरमसुखोपपन्नंभवत्युष्णवातातपाध्मातमतिशिथिलमत्यर्थप्रविलीनदोषं, भेषजंपुनः संशोधनार्थमुष्णस्वभावमुष्णानुगमनात्तीक्ष्णतरत्वमापद्यते, तस्मात्तयोः संयोगेसंशोधनमति-योगायोपपद्यतेशरीरम पिपिपासोपद्रवाय।

वर्षासुतुमेघजलावततेगूढार्कचन्द्रतारेधाराकुलेवियतिभूमौपङ्कजलपटलसंवृतायामत्यर्थोपक्लिन्न-शरीरेषुभूतेषुविहतस्वभावेषुचकेवलेष्वौषधग्रामेषुतोयतोयदानुगतमारुतसंसर्गाद् गुरुप्रवृत्तीनिवम-नादीनिभवन्ति, गुरुसमुत्थानानिच शरीराणि।

तस्माद्वमनादीनांनिवृत्तिर्विधीयतेवर्षान्तेष्वतुषुनचेदात्ययिकंकर्म । आत्ययिकेपुनःकर्मणिकाममृतुं-विकल्प्यकृत्रिमगुणो पधानेनयथर्तुगुणविपरीतेनभेषजंसंयोगसंस्कारप्रमाणविकल्पेनोपपाद्यप्रमाण-वीर्यसमंकृत्वाततःप्रयोजयेदुत्तमेनयत्नेनावहितः। (Cha.Vi.8/127)

Hemantha– Body is exposed to excessive cold,hencedoshas do not get detached and remain adhered to the srothas. The medicaments which are of ushnaveerya, due to affliction with the cold weather becomes mandaveerya (less potent).

Greeshma– Affliction of the body with excessive heat, hence dosha remains excessively detached Medicaments used in samshodana are by nature hot and because of affliction with excessive heat, becomes more teekshna. When these drugs are administered to an individual with already detached doshas, it results in excessive elimination of the doshas and results in Pipaasa.

Author

Varsha:– Shareera becomes kledamaya during varshartu, because of the exposure to rain water. There is impairement of the medicaments because of the contact with water and moist wind.

आतुरावस्थास्वपितुकार्याकार्यप्रतिकालाकालसञ्ज्ञा; तद्यथाअस्यामवस्थायामस्यभेषजस्याकालःकालः पुनरन्यस्येति; एतदपिहिभवत्यवस्थाविशेषेण; तस्मादातुरावस्थास्वपिहिकालाकालसञ्ज्ञा। तस्यपरीक्षामुहुर्मुहुरातुरस्य सर्वावस्थाविशेषावेक्षणंयथावद्भेषजप्रयोगार्थम् । नह्यतिपतितकालमप्राप्तकालंवाभेषजमुपयुज्यमानंयौगिकंभवति; कालोहि भैषज्यप्रयोगपर्यापिमभिनिर्वर्तयति।। (Cha.Vi.8/128)

Another understanding of kala is the state of the patient which determines the initiation of timely actions and prohibition on untimely ones. Determinetion of utility of a particular medicine depends upon the state of the patient.

९. प्रवृत्तिस्तु। प्रतिकर्मसमारम्भः। तस्यलक्षणंभिषगौषधातुरपरिचारकाणांक्रियासमसयोगः।। (Cha.Vi.8/129)

Indicates the initiation of the therapeutic action. It represents the combined action of the physician, medicaments,patient and attendant.

१०. उपायःपुनर्भिषगादीनांसौष्ठवमभिविधानंचसम्यक्।

तस्यलक्षणंभिषगादीनांयथोक्तगुणसम्पत् देशकालप्रमाणसात्म्यक्रियादिभिश्च सिद्धिकारणैःसम्यगुपपादितस्यौषधस्यावचारणमिति।। (Cha.Vi.8/130)

This comprises the excellence of the physicin and the administration of the correct therapy. This is characterized by the existence of desired qualities in the physician and the administration of correctly processed drugs depending on desha, kala, satmya and pramana.

4. Importance and Knowledge of Dashavidha Pariksha

1. Prakriti
2. Vikriti
3. Sara
4. Samhanana
5. Spramana
6. Satmya
7. Satwa
8. Aharashakti
9. Vyayama Shakti
10. Vaya

1. Prakriti

प्रकृतिमितिस्वभावं।

शुक्रशोणितसंयोगेयोभवेत्दोषउत्कटः प्रकृतिर्जायतेतेनतस्यमेलक्षणंश्रुणु। (सु.श. ४/६३)

तत्रप्रकृत्यादीन्भावाननुव्याख्यास्यामः तध्यथाशुक्रशोणितप्रकृति, कालगर्भाशयप्रकृति, आतुराहारविहारप्रकृति, महाभूतविकारप्रकृतिचगर्भशरीरंअपेक्षते। एतानिहिएनएनदोषाणाधिकेनएकैनेनेनानेकेनवासमानुबध्यन्ते, तेनतेनदोषेणगर्भानुबध्यते; ततः।

सासादोषप्रकृतिर्रुच्यतेमनुष्याणांगर्भातिप्रवृत्तातस्मात्श्लेष्मलाप्रकृत्याकेचित्पित्तलाः केचित्, वातलाः केचित्, संसृष्टाः केचित्समधातवः केचित्भवन्ति-तेषांहिलक्षणानिव्याख्यास्यामः। (च.वि.८/९५)

It is the inherent characteristic property of an individual refers to genetically determined physical and mental makeup. It is determined by (a) Sperms and ovum (b) Season and condition of uterus (c) Food and regimen of mother (d) Nature of mahabhutas comprising the foetus. Foetus may gets afflicted with one or more of the doshas which are dominantly associated with the above said factors. Doshas dominatingly the sperms and the ovum during the time of conception and also those inhabiting the uterus at that time determine the prakriti of the individual. Food and regimens of the mother, which aggravates Doshas at that time also determines the physical constitution. The Doshas that ultimately emerge as dominant factors actually determine the prakriti. Seasonal factors also indirectly serve as important factors for the determination of prakriti.

2. Vataprakruthi

अल्पकेशः कृशोरूक्षोवाचाल्श्चलमनसाआकाशचारिस्वप्नेषुवातप्रकृतिकोनरः।

Person having features like : Less hair, lean body, dry skin, talkative, active or hyperactive, fluctuant mentality, dreaming of flying in air in sky are all features of vata prakruthi.

Pitta Prakruthi

अकालपलितैर्व्याप्तोधीमान्स्वेदी च रोषणः स्वप्नेषुज्योतिषांदृष्ट्वापित्तप्रकृतिकोनरः।

Person who is aggressive, intelligent, high metabolic rate due to which there is premature aging features like graying of hair. Person of pitta prakruthi sweats a lot and there is increased heat radiation. In dreams person expierences fire, light and so on.

Kapha Prakruthi

गंम्भीरबुद्धिः स्थूलाङ्गः स्निग्धकेशोमहाबलः स्वप्नेजलाशयालोकीश्लेष्मप्रकृतिकोनरः। (श.सं.)

Stable and stable body, compact physique, oily and fair skin

and hair. Good physical stamina. In dream expierences water body like lake or river. Such individual is kapha prakruthi.

The combination of two or three of above makes dwandwaja and sannipatika (sama) prakruthi.

Vikriti

विकृतिश्चेतिविकृतिरुच्यतेविकारं । तत्राविकारंहेतु-दोष-दूष्य-प्रकृति-देश-काल-बलविशेषैर्लिङ्गतश्चपरीक्षेत्, नह्यन्तरेनहेत्वादीनांबलविशेषंव्याधिबलविशेषोपलब्धिः। यस्यहिव्याधेर्दोष-दूष्य-प्रकृति-देश-काल-बलसाम्यंभवति, महश्चहेतुलिङ्गबलं, सव्याधिर्बलवान्भवति; तत्विपर्ययाश्चअल्पबलः; मध्यबलस्तुदोषदूष्यादीनाम् अन्यतम-सामान्यात्हेतुलिङ्गमध्य-बलत्वाच्चोपलभ्यते। (च.वि. ८/१०१)

हेतु, दोष, दूष्य, प्रकृति, देश, काल, बलविशेषैः, लिङ्गः

The ideal features of prakruthi are lost here showing abnormal qualities in confined systems. Now person is no more healthy individual and thus recognised as sick. Such patients are to be examined in respect to vikriti as well. The morbid manisfestations are to be examined with referance to specific causative factors. Doshas, Dhathus involved in the pathogenisis of prakriti or constitution of an individual has influence from Desa, kala, Bala and produce symptoms without determining the strength of the causative factors. It is not possible to obtain the knowledge regarding the intensity of the disease without using above tools.

If the afflicted Doshas and Dhathus, physical constitution of the patient, Desa, Kala, Bala of the individual resemble that of the disease in quality and causative factors and symptoms then the disease is too strong and associated with numerous symptoms. The disease so manifested will be acute and severe, otherwise it is mild. If either one among the Doshas, Dhathus etc resemble that of the disease then the disease are of moderate nature, so the manifested disease is also moderate. In brief Vikriti Pareeksha refers to morbidity of the susceptible individual and also helps to ascertain the strength of the pathogenetic factors responsible for the manifestation of the disease and also helps to predict the prognosis of the disease. The symptoms are based on vikreeta rupa of doshas & dhatus.

3. Saara

सारचेतिसाराण्यष्टौपुरुषाणांबलमानविशेषज्ञानार्थंउपदिश्यन्ते; तध्यथात्वक्रक्तमांसमेदोअस्थि-मज्जशुक्रसत्वानिति। (च.वि. ८/१०२)

The purest forms of Dhathus which are of best quality is Saara. It is the best essence of dhatus. It is defined as the Dhathus based on Deha Prakriti depending upon the predominance of particular Dhathu in respect of good quantity as well as of good quality. The physical and psysio- psychological characteristics of different sara, described in the text are reflection of the states of dhathusara, in the form of structure and functions. It is defined as tissue vitality, tissue quality as tone of system, constitutional essence, an essence or excellence or purity of dhathus as stamina.

There are 8 Types of Saara

सारतश्चेत्यादौसारशब्देनविशुद्धतरोधातुरुच्यते।

It explains the nature and biological activity of the tissues at its normal & best form.

त्वक्-रक्त-मांस-मेद-अस्थि-मज्जा-शुक्र-सत्व

The Sara is been mentioned to access the bala of a person. Bala means physical strength or resistance to a disease. The number of sara will directly proportional to the strength of an individual. Sarvasara individual with having high resistance against disease. A physician should not take decision by seeing the body of a patient as strong, weak because of leaness. Some person may have small body and leaness but they are strong. Acharya similied such patients with ants. Ants have small body but they can carry too heavy load heavier than their body. The saara signifier the richness of health and healing capacity.

Sarvasaaralakshanas

Sarva saarce person have all the dhathus in abundance and of good quality. They are endowed with great strength, happiness, self control, and has firm, well balanced gait, resonant voice, they enjoy supremacy, wealth, enjoyment, honour, numerous offsprings, minimum disease, great respect, hope of success in all activities, capacity of withstanding troubles, wisdom and steadiness.

Ayutech

Madhyamasaaralakshanas

Moderate amount of sara possess qualities of respective saras in moderate degree and shows characteristics of sarvasara moderately.

Avarasaaralakshanas

Those people who have least amount of different saara, possess qualities of respective sara in lowest degree and show none or least characterisitcs of sarvasaara. Such individuals are physically weak, has poor immunity, low health status and short life span.

Twaksarapurusha

स्निग्धश्लक्ष्णमृदुप्रसन्नसूक्ष्माल्पगम्भीरसुकुमारलोमासप्रभेवचत्वक्त्वक्साराणाम्।
सुख-सौभाग्य-ऐश्वर्य-उपभोग-बुद्धि-विद्या-आरोग्य-प्रहर्षणानि-आयुष्यत्वंच।। (च.वि. ८/१०३)

The persons of twak saara have unctousness, smooth, soft skin and hair, clear, fine, less numberous, deep rooted and tender hair along with lustrous skin.

Such people will have happiness, good fortunes, power, enjoyment, intellect, knowledge, health, excitement and longevity.

Rakthasaarapurusha

कर्णाक्षिमुखजिह्वानासौष्ठपाणिपादतलनखललाटमेहनंस्निग्धरक्तवर्णंश्रीमद्भ्राजिष्णु।(च.वि.८/१०४)

The person with rakthasara will have ears, eyes, face, tongue, nose, lips, sole of hands and feet, nails, forehead and genital organs that are red in color, they have beautiful dazzling appearance along with unctuousness. They have Unctuous and coppery red colored nails, eyes, palate, tongue, lips, palms and soles.

Maamsasarapurusha

शङ्खललाटकृकाटिकाक्षिगण्डहनुग्रीवास्कन्धोदरकक्षवक्षःपाणिपादसन्धयःस्थिरगुरुशुभमांसोपचिता।
क्षमां, धृतिमलौल्यंवित्तंविद्यां, सुखमार्जवमारोग्यं, बलमायुश्चदीर्घमाचष्टे। (च.वि. ८/१०५)

Mamsa sara purusha are masculine in structure who have stable, heavy, compact, beautiful, handsome appearence and plumpness in temples, forehead, nape, eyes, cheeks, jaws, neck, shoulder, abdomen, axillae, chest and joints of upper and lower limbs being covered with flesh. Such people will have well grown body, bones and bony joints, well developed muscles observed all over the body.

Medosaarapurusha

वर्णस्वरनेत्रकेशलोमनखदन्तौष्ठमूत्रपुरीषेषुविशेषतः स्नेहोमेदः साराणाम् सारतावित्तैश्वर्यसुखोपभोग-प्रदानान्यार्जवंसुकुमारोपचारतांचाचष्टे। (च.वि.८/१०६)

Persons with medo sara are characterized by unctousness in complexion, voice, eyes, hair and other parts of body, nail, teeth, lips, urine and feaces.

Those person possess wealth, power, happiness, enjoyment, charity, simplicity and delicite habits. Urine and sweat are unctous, they have pleasant voice but they are unable to tolerate exertion.

Asthisaarapurusha

पार्ष्णिगुल्फजान्वरत्निजत्रुचिबुकशिरः पर्वस्थूलाः, स्थूलास्थिनखदन्ताः अस्थिसाराः।
महोत्साहाः, क्रियावन्तः क्लेशसहाः, सारस्थिरशरीराआयुष्मन्तः। (च.वि. ८/१०७)

Asthi saara purusha are characterized by robust heels, ankles, knees, forearms, aollar bones, chin, head, joints, bones, nails and teeth.

Those people will be enthusiastic and active are endowed with strong and firm bodies with longevity.

Majjasaarapurusha

मृद्वङ्गाबलवन्तः स्निग्धवर्णस्वराः स्थूलदीर्घवृत्तसन्धयश्चमज्जसाराः।
दीर्घायुषोबलवन्तः श्रुतवित्तविज्ञानापत्यसम्मानभाजः। (च.वि. ८/१०८)

Majja saara purusha possess softness of organs, strength, unctous, complexion and voice. those people will have pleasant and sweet voice, lustrous, longevity, strength, learning, wealth, knowledge, progeny and honour.

Sukrasaarapurusha

सौम्याः सौम्यप्रेक्षिणःक्षीरपूर्णलोचनाइव, प्रहर्षबहुलाः स्निग्धवृत्तसारसमसंहतशिखरदशनाः प्रसन्नस्निग्धवर्णस्वरा, भ्राजिष्णवो, महास्फिचश्च, शुक्रसाराः स्त्रीप्रियोपभोगाबलवन्तः सुखैश्वर्यरोग्यवित्तसम्मानापत्यभाजश्च।। (च.वि. ८/१०९)

Sukra saara purusha possess gentle face and look, as like milk is poring down from eyes, unctous, elevated, round, strong, uniform, firm with elevated margins, good look, unctous nails with white color, bones will be unctous and firm, large buttocks, lustrous, dazzling, smart and handsome, color will be clear. those person possess marked penile erection, great power of coitus, excessive

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sexual desire, clear and unctous voice, strong mental and physical health, supremacy and prosperity, honour, good progeny, good volume of semen, intelligent and wont suffer from any sukradusti vikaraas.

4. Samhanana

संहननश्चेतिसंहननं, संहतिः, संयोजनमित्येकोर्थः । तत्रसमसुविभक्तास्थि, सुबद्धसन्धि, सुनिविष्टमांसशोणितं, सुसंहतंशरीरमुइत्युच्यते। तत्रसुसंहतशरीराः पुरूषाबलवन्तः, विपर्ययेणाल्पबलाः, मध्यत्वात्संहननस्यमध्यबलाभवन्ति। (च.वि. ८/११६)

Patient must be examined for the compactness of the body and degree of nourishment Clinically patient may be assessed as pravara, madhyama and avarasamhanana. The Nurtrition status can be assused by buit, distribution, strature, maseulaine features, sturdy bones, compact joints, adequate blood cirulation, physical stamina, endurance . It is classified into three varieties.

(a) Pravarasamhanana : The Neutritional satus at its best

- Symmetrical and well demarcatede bones
- Well developed joints
- Well bound muscles and blood
- Strong built
- Good strength

(b) Madhyamasamhanana

- Moderate symmetry and moderate demarcated joints
- Moderateyl developed joints
- Moderate bound muscles and blood
- Moderately built
- Moderate strength

(c) Pravarasamhanana

- Weakly demarcated bones
- Weakly developed joints
- Weakly bound muscles and blood
- Weak built
- Weak strength.

5. Pramana

प्रमाणतश्चेतिशरीरप्रमाणंपुनर्यथास्वेनाङ्गुलिप्रमाणेनोपदेक्ष्यतेउत्सेधाविस्तारायामैर्यथाक्रमंतत्र-पादौचत्वारिषट्चतुर्दशाङ्गुलानिजंघेत्वष्टेदशाङ्गुलेषोडशाङ्गुलपरीक्षेपेच, जानुनीचतुरङ्गुलेषोडशाङ्गुल-परीक्षेपे, त्रिंशदङ्गुलपरीक्षेपावष्टदशाङ्गुलवूरू, षडङ्गुलदीर्घपञ्चाङ्गुलपरिणाहं, द्वादशाङ्गुलिपरिनाहोभगः।
(च.वि. ८/११७)

Pramana is the measurement of body & body part. Increase of pramana as in Organomegely or as in Astanindita purusha or decrease in pramana are considered as pathological.

Patients should be examined by measuring the organs of the body to understand the healthy physical status. A person endowed with proper measurement of organs will have longevity, strength, ojas, happiness, power, wealth and virtues following are the list of anga, pratyanda with normal angulipramana.

Organs	Height In anguli	Length In anguli	Breadth In anguli	Circum-ference In anguli	Other
Feet	4	14	6	-	-
Jangha	-	18	-	16	
Knee		4		16	
Thighs		18		30	
Testicles		6		8	
Phallus		6		5	
Vagina				12	
Waist			16		
Shiras					10
Abdomen		12	10		
Parshwa		12	10		
Distance b/n nipples					12
Nipples				2	
Chest	12		24		2
Hridaya					18
Shoulders					

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Shoulder blades				6	
Arms					16
Forearm					15
Hands					20
Axillae					8
Trika	12				
Back	18				
Neck	4			22	
Face	12			24	
Mouth		5			
Chin					4
Lips					4
Ears					4
Distance between eyes					4
Nose					4
Forehead					4
Head	16			32	
Entire body	84		84		

It is catagorised into three groups.

1. Pravara– Person who has apt pamana as said in classics
2. Madhyama– Person who has moderate built
3. Avara– Pramana as per classics is poor

The overall antrpometric examination can be done in this examination and assess the patient's general built.

6. Satmya

सात्म्यतश्चेतिसात्म्यंनामतध्यत्सातत्येनोपसेव्यमानउपशेतेतत्रयेघृतक्षीरतैलमांसरससत्म्याः सर्वरस-सत्म्याश्चतेबलवन्तः केशसहाश्चिरजीविनश्चभवन्ति, रूक्षसात्म्या; पुनरेकरससात्म्याश्चयेतेप्रायीणाल्प-बलाअल्पक्लेशसहाअल्पायुषोअल्पसाधनाश्चभवान्ति, व्यामिश्रसात्म्यास्तुयेतेमध्यबलाः सात्म्यनिमित्ततोभवन्ति। (च.वि.८/११८)

Satmya pareeksha explains the capacity of adaption of the person. Tolerance and wholesomeness of patient with reference to

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rasa, ahara krama, guna, matra of aahara is assessd here. Person conduming all rasa, all pathya ahara (snigdha, balya like ksheera, gruta) daily will have good tolerance, they are physically and mentally strong thus they live long. Person who takes only one rasa daily and intakes ruksha ahara (poor nutrition quality) will have less bala and less tolerance to external and internal stress, thus such indivisual have poor health and they live short. People who consume mixed items of above two groups have madyama bala, and ayusha

SN.	Aspects	Yes	No
1.	Ghritha		
2.	Ksheera		
3.	Taila		
4.	Mamsa rasa		
5.	Madhura		
6.	Amla		
7.	Lavana		
8.	Katu		
9.	Tikta		
10.	Kashaya		
11.	Ushna		
12.	Sheeta		
13.	Shushka		
14.	Drava		
15.	Snighda		
16.	Rooksha		
17.	Others		

Out of 17 points if person fulfills

Greater than 13 criteria approximately = pravarasatmya

Greater than 7 criteria approximately = madhyamasatmya

Greater than 3 criteria approximately= avarasatmya

7. Satwa

सत्वाश्चेतिसत्वमुच्यतेमनः तत्शरीरस्यतन्त्रकमात्मसंयोगात्। त्रिविधंबलभेदेनप्रवरंमध्यमं, अवरंचेति; अतश्चप्रवरमध्यावरसत्वाः पुरुषाभवन्ति। (च.वि. ८/११९)

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Satwa is the mental status of an individual which represents sensory and motor alertness along with understanding of mind, will power, intellect & judgement.

प्रवरसत्त्वाःपुरुषलक्षण=सत्त्वसार

स्वल्पशरीरानिजागन्तुनिमित्तासुमहतीष्वपिपीडास्वव्यथादृश्यन्तेसत्त्वगुणवैशेष्यात्; मध्यसत्वस्त्वपरानात्मन्युपनिथायसंस्तम्भयन्त्यात्मनाऽऽत्मानंपरैर्वाऽपिसंस्तभ्यन्ते; हीनसत्त्वास्तुनात्मनानापिपरैः-सत्त्वबलंप्रतिशक्यन्तेउपस्तम्भयितुं।

Pravarasatwa– Those individuals possess superior mental faculties, able to bear strong therapies with out any harmfulness, tolearate serious exogenous and endogenous diseases without many difficulties, tolerates pain, adopts some sort of happiness and sorrow, control himself, predominance of satwa guna.

Madhyamasatwa– Individual with moderate mental faculties, able to bear strong therapies with out any harmfulness, prominant rajo guna,tolerates when controlled by others or agrees after strong commant or requires moral support to withstand stress.

Avarasatwa– An individual of inferor mental faculties, neither themselves or others can sustain their mental strength, they will not take command, advice. They are susceptible to fear, grief, greed, delusion and ego, persons are contraindicated to samshodhana karma and they have prominant tamo guna.

8. Ahara Shakthi

- **आहारशक्तिः– अभ्यवहरणशक्त्याजरणशक्तयाच**
- **बलायुषीह्याहारायते**

जरणक्त्या– योबहुभुङ्क्तेपरिणमयतिच, असौअसावाहारशक्तिमान्। (च.वि. ८/१२०)

This is test for physical aleility & physical strength.

Ones capacity for food should be examined from abyavaharanashakthi and jaranashakthi. Strength and life span of the individual are determinied by the ones own diet capacity. It all depends on the condition of the agni residing in the body. That's why acharyas defined the role of agni in the manifestation or aggravation of the disease. If individual possess a good digestive power then he will be able to sustain the stronger therapies as a consequence he will recover quickly from the afflictions. Protection of agni is necessary to maintain excellent digestion and power of

ingestion, this leads to stronger immunity to resist against dreadful diseases.

Abyavaharana shakthi is the overall quantum of food intake (a person eats r roties in morning, 1 bowl rice noon 3 roti with 1 bowl rice at night - this represents the quantity of food ptient takes daily or per meal)

Jarana shakthi is the ability of digestion of ingested food. It is assessed by clear belching, good enthusiasm, timely manifestation of natural urges, lightness of body manifestation of next urge of hunger and thirst indicate th food of previous meal is digeated well. Assessment of koshta as krura, mrudu, Madhya helps to assess jarana shakthi. On the basis of quantum, quality and speed of digestion aharashakthi is classified as pravara, avara and madhyama.

9. Vyayama Shakthi

व्यायामशक्तिरपि–कर्मशक्त्यापरीक्ष्याकमेशक्त्याह्यनुमीयतेबलत्रैविध्यम्। (च.वि. ८/१२१)

The patients should be examined with reference to his capacity for exercise; which determines ones own ability to perform work. The stamina, endurance, tolerance of physical stress are all assessed here. Based on the ability and disability to do mild (routiene work), moderate (inclusive of occupational work and excersise), heavy work (heavy exercise, weight lifting) the vyayama shakthi is classified as avara, madhyama, pravara shakthi respectively.

10. Vaya

It is the examination of age and age related changes of the patient to see the age related disease or deformity which is prevalant in particular age groups.

वयः– कालप्रमाणविशेषापेक्षिणीशरीरावस्था।। (च.वि. ८/१२२)

त्रिविधं–

बालं, मध्यं, जीर्णम्

बालमपरिपक्वधातुम्– अजातव्यञ्जनं– सुकुमाम्–अक्लेशसहम्– सम्पूर्णबलं श्लेष्मधातुप्रायम्– आषोडशवर्षं,

Up to 16 years a person can be considered as bala

विवर्धमानधातुगुणंपुनः -आत्रिंशद्वर्षम् -30 years

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अनवस्थितसत्त्वम्– Phere is incompleteness in development. till that age one is considered as bala.

मध्यं–

समत्वागतबलवीर्यपौरुषपराक्रमग्रहणधारणस्मरणवचनविज्ञानसर्वधातुगुणंबलस्थिरव-वस्थितसत्त्वमविशीर्यमाणधातुगुणंपित्तधातुप्रायमाषष्टिवर्षमुपदिष्टम्।

An individual after the age of 30 years is considered as adult or Madhya. Here all types of growth and development is complete and this is a stsble phase of no growth or no degeneration.

वृद्धः - हीयमानधात्विन्द्रियबलवीर्यपौरुषपराक्रमग्रहणधारणस्मरणवचनविज्ञानं, प्रक्ष्यमानधातुगुणं-वायुधातुप्रायंक्रमेणजीर्णमुच्यतेआवर्षशतम्।

After madhyama vasha the process of degeneration begins. therefore the stage is called as jeernavastha or vriddapya.

One should examine in respect of age. age is defined as the state of body corresponding to the length of time. age is broadly classsified into 3 stages- childhood, middle age and old age.

Middle age is characterized by strength, energy, virility, prowness, acquisition, retention, recollection, speech, understanding and qualities of all dhathus having reached the normal limit with predominance of pitta and is from 30 years upto 60 years.

The old age is from 60 years and above. During this period, dhathus, sense organs, strength, energy, virility, prowness, acquisition, retention, recollection, speech, understanding, gradually degenerate, qualities of dhathus go down and predominance of vayu.

Importance of Dashavidha Pareeksha

Prakriti gives idea about strength and immune status of the patient. Exert an additive influence on the causative factors of a disease. Helps in the knowledge of the prognosis of a disease condition. For ex; atulya dushya desha ritu prakriti- indicates good prognosis. Eg; sadyaasadyata of prameha.In treatment, both in curative and preventive aspect.Vikriti helps to trace the samprapti, Hints about the prognosis of a disease. The correct line of treatment can be adopted Eg. In alpadosha- langhana, Madhya dosha-langhana-paachana, prabootadosha-sodhana. The right time for treatment can be determined only if the different stages of pathogenesis (shadkriya-

kaalas) are known which is possible only after vikritipareeksha.It helps in differential diagnosis. Samhanana helps to determine the site of a disease or disorder as in mamsa sosha etc, the dhatu affected in a particular condition- as in sthoulya, medas, sareerabala, ayu. Saatmya pareeksha helps to assess the strength of the person (sareerabala and satvabala) and longetivity of the person can be assessed from this type of saatmya accordingly as Sarvarasasaatmya and snigdhasaatmya- Balavan, klesasaha, ciranjeevi. Ekarasa-saatmya and rrookshasaatmya - Alpebala, Alpaklesasaha, Alpasatva. Vyaamisrarasasaatmya- Madhyabala, Madyaaayu.Satvabala helps to decide upon the correct mode of treatment for a patient. For ex; in case of sastrakarma and for sodhana like vamana karma, the ptmmust necessarily be satvavan. Lack of satvabala increases the chance for certain diseases like unmada. So to some extent it gives clue about nidana of such diseases.

Dashavida pareeksha also helps in-

1. Desiciding if agni, Shastra, Kshara karna ca be done.
2. Desiciding matra of sneha, duration of snehapana and possibility for aceha pana or vicharana sneha (by kostapareeksha and satmya pareeksha).
3. Quantum of Vyayama to be indicated in sthoulya. Medovikaras (Uyayamashakthi).
4. Dose and duration of treatment (prakruti, vikruti, vaya).

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History Taking

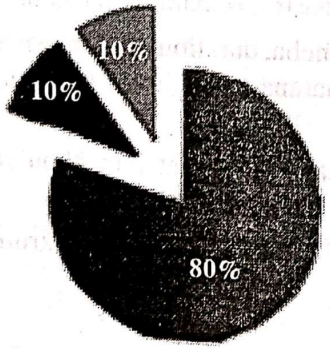
The medical history of a patient is information gained by a physician by asking specific questions, either to the patient or to other people who know the patient and can give suitable, with the aim of obtaining information useful in formulating a diagnosis and providing medical care to the patient.

Objectives for History Taking

- The questions are asked about patient's current and previous health problems.
- Current and previous medical treatment.
- The patient's health in general.
- Prevention of factors which might affect the patient's health in future.

Contribution to Diagnosis

•HISTORY TAKING •PHYSICAL EXAMINATION •INVSTIGATIONS



Care to be Taken During Interrogation

- Confirm patient
- Avoid prejudgement
- Elasticity in interrogation
- Order of priority to patient
- Interrogate Patient with witness
- Let the examination be spontaneous, physician should be actively listening.
- There should be no interruption, no leading question.

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Case Sheet

Preliminary Data

- **Registration number:**
  Record maintenance, billing purpose, medico legal aspects
- **Date (Dina):**
  For reference, record maintenance
- **Name (Nama):**
  Identification, communication, forming a rapport with patient, record maintenance, psychological benefit, other information such as religion.
- Age (Vaya): knowing age of the patient is essential for documentation and recordind. It is also essential for.

a. Diagnosis of disease as some diseases are common in specific age group as some birth defects found at the time of birth. Diseases like polio, mumps, worm infestation are prevalent in childhood. Hypertension, sexually transmitted diseases myocardial infarction, acid peptic diseases are common only in adulthood. Osteoarthritis, cataract and degenerating diseases are seen only in Old age.

b. Treatment planning: Shastra, agni karma is avoided in baala and vruddavastha, teekshna kshara prayoga, raktamokshana and prabhala sodana is also avoided in bala and vruddavasta. Variation in dosage is essential for all these one has to know the age of an individual.

o **Sex (Linga):** Apart from documentation purpose knowing sex of individual is essential because there are diseases which are particular to sex. For example.

In Male: Oral CA, liver cirrhosis, cryptorchidism, prostate CA, hodgkins disease are more common.

In Female: Sjogrens syndrome, iron deficiency anaemia, pica disorder, endometriosis, thyroid problems, esthetics, sexual abuse are usually seen.

Marital Status; Marital status of an individual helps a physician to know social, personal life of patient. Some of the

diseases like stress and depression due to marital dis congruency and unmarried status, domestic violence, infertility can be understood.

- **Education (Vidya)**

By knowing education status of a patient, physician can understand the Socio-economic status, IQ for effective communica-tion, attitude towards general health and self care, ability to read and understand medicine with administration, awareness about medical science, health and hygiene.

- **Address (Nivasa Sthana)**

Address of patient should be known for future correspondence. Also it gives a view of socio-economic status of a patient, prevalence of disease in that locality, quality of hygiene and sanitation in the patient's residence, availability of health service and other human resources for emergency referrals.

- **Occupation (Vritti)**

Assessing Socio-Economic Status, Predilection Of Diseases In Different Occupations. For example traffic police may suffer from varicose veins, heavy vehicle drivers may suffer from piles, software engineer may suffer from computer eye syndrome, people who work in textile industry may suffer from asthama.

- **Religion (Kulam)**

Identifying the festive periods if religious, predilection of diseases in specific religion.

Chief Complaint with Duration (Pradhana Vedana evam Avadhi)

These are those Complaint for which Patient approaches Doctoralong with Duration of the suffering of chief complaints (since days, weeks or months). Physician should understand what patient feels more important to him. For eg : The patient came to hospital for the complaint difficulty in breathing,then consider that as chief complaint not fever, even if fever started 2 days prior to that. Record the chief complaints in patient's own words.

Associated Complaints with Duration (Anubandha Vedana evam Avadhi).

Symptoms that accompany the main symptoms. For

Example- Severe pain since 3 days, associated with fainting since 2 days, nausea since 2 days and sweating since 1day. They also signify the symptoms suggesting particular underlying cause for Ex- Visual disturbance in Migraine, Palpitation in Angina.

The associated complaints are less severe than main complaints. Ask the patient to explain the symptoms in Sequence based on severity and Duration of each associated complaints.

History of Presenting Complaint

History is the patients interpretation of that symptom in chronological order since the-

- Mode of onset (sudden/gradual)
- Site and position of onset
- Mode of progression of disease and symptom manifestation
- Severity and functional status
- Precipitating, exacerbating and alleviating factors
- Previous similar episodes
- Associated symptom from that system
- Type of pathology
- If any TREATMENT received &its outcome (see reports of investigation & prescription of medications) are collected.

Collect information about Negative history

- Absence of expected symptom
- To exclude & make diagnosis easy
- Narrow down the range of diseases

Ex: Weight gain in middle aged lady

Absence of missed periods, facial hairs etc exclude pcod

Absence of reduced appetite, cold intolerance,pain etc exclude hypothyroidism.

History of Past Illness (Purva Vyadhi Vrittanta)

These are the description of the symptoms that occurred in the past or previous to present complaints. It helps in giving

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clue to nature of the present disease and also diseases occurred several years earlier may be relevant. Non recognition of such facts leads to pitfalls in diagnosis.

There are 3 Types of Past Illness-Clue to Present Illness

Chief Complaint- late complication of past illness after a variable symptom free period (ex: RF in childhood in the past can lead to valvular heart disease in adulthood.

Chief Complaint-complication of past illness without a symptom free period (ex: ulcerations, peripheral neuropathy due to DM. Diabetes mellitus might have started at the age of 40 years in the patient in the due course of time he may develop diabetic ulcer and neuropathy at the age of 60 years. The patient may start with symptoms of hypertension at the age of 40 years. Later hypertension continues with new complication of stroke manifestation at the age of 60 years).

Chief Complaint-past illness subsided but indirect complication (ex: Patient can suffer from Osteo Arthritis developing in a limb, united by a malunited fracture. Fracture might have happened in past which lead to malunion due to improper orthopaedic care, later patient can develop osrteoarthritis from same mal united limb).

Other information about drug, allergy or hypersensitivity, surgery, trauma, major illness for which patient has previously hospitalised. History of hypertension, diabetes mellitus.

Drug and Treatment History (Chikitsa Vruttanta)

Ask for the details of previous and ongoing medications. Drug may give hint about previous diagnosis, sensitivity and drug interaction.

Significance

- In India, unrestricted prescription & drug available freely from several sources makes room for unscientific medication.
- Same patient follow different system of medicine for same or different ailments.
- Drugs alter pattern of disease.

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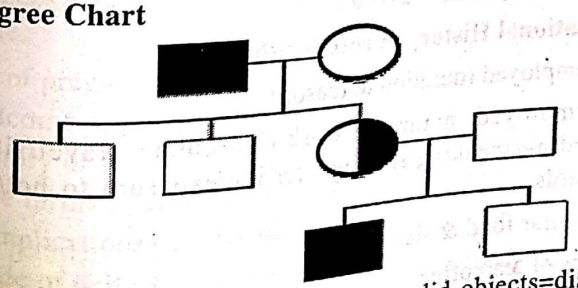
- Masks signs & symptoms.
- Present illness may be the untoward effects of any drug.

Information of medication like Drug name, content, dose, duration, time, MOA & for what complaint, Present medications, Medications taken OTC (analgesics etc), Medicine taken a little while ago but stopped recently etc are all has to be collected. Thus past history also includes Drug allergy, Surgical procedure, Psy-chiatricailments, Other Medical emergencies, previous Blood transfusions and timely Vaccinations.

Family History (Kautumbika Vruttanta)

- There are two types of family history that are to be collected by the patient. One family history about parents and siblings, another family history about spouse and patient's children. Family history generally pertains to familial or hereditary disease than runs within the family. This runs from parents to offspring. Details of Members in the family along with their Relation, description about Dead or alive, Reason for death, condition of Alive if suffering with same or any other illness, consanguinity, adopted, sexual & contraceptive history are all included in family history.
- Note the Genetically transmitted diseases, Contagious diseases & mental disorders.

Padigree Chart



Circles=females; squares=males; solid objects=diseased individuals; half-solid objects=carriers; unfilled objects= genetically healthy individuals.

Socio-Economic History (Samajika-Dhana Vruttantha)

The interaction and relation of the patient in society or among people with whom the patient comes across. Patient's behaviour, attitude, financial status, life expenses and expenditures are all collected from this part of history taking. It helps a physician in understanding.

- Social behaviour
- Family relationship & support
- Financial problem (debt)
- Abstain from house responsibility
- Endaemics, Pets

High Socio Economic Status May Contribute

Over eating, reduction in physical activity or sedentary life style, more indulgence in tobacco smoking alcohol, increased mental stress increases the Chance of obeisity, diabetes mellitus, hypertension, ischaemic heart disease.

Low Socio Economic Status May Contribute

Poverty, illiteracy, less space, increased incidence of infection, consanguent, helminths, active & passive smoking, improper immunisation and health care. This increases the chance of worm infestations, contagious diseases (infective diarrhoea, respiratory infections), child abuse, polio myelitis, malnutrition (kwashiorkor, marasmus) etc.

Occupational History (Vrutti Vrithantha)

- Unemployed (duration & reason)
- If employed, nature of work:Continuous travel/sitting/ standing/speaking/singing/exertion/exposure to hot/cold/ hazards.
- Irregular food & sleep habits
- Cups of tea/coffee
- Mental stress
- Lack of job security

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- Unhealthy/unsatisfied working atmosphere
- Frequent changing of job
- Not satisfied with boss, co-workers, salary
- If student: Active, regular, behaviour in school/college, studies, any problem with teachers/students.

Significance: Impact of work on physical health and mental health, Occupational diseases. Failure of social well- being and support networks can contribute to illness.

- Upbringing
- Home life
- Occupation
- Finance
- Relationships and Domestic Circumstances
- House
- Community Support
- Sexual History
- Leisure Activities - Hobbies and past times
- Pets
- Exercise

Obstretic & Gynaecological History Taking

This is done in female patients. Obs and gyn history influences a lot on general health of the patient. Obstetric history include.

- No of pregnancies
- Outcome of pregnancy
- History of Abortions
- Live births (males/females) and age of children
- Complications of pregnancy
- Mode of delivery
- Last child birth

Gynecological History Includes

- Age of Menarche

- Duration of menstruation.
- Quantity of blood loss.
- Dysmenorrhoea, amenorrhoa or other menstrual irregularities.
- Date of last menstrual period (LMP).
- Menopause, post menopausal bleeding.
- Breast examination.

Personal History (Vayaktigata Vruttantha)

- Diet (bojanam)– Quantity of food, Day's menu
- Appetite (ksuth)
- Bowel (vitt pravrutti)– Frequency of stools, consistency of stools, altered color, untoward symptoms during defecation.
- Micturition (mutra pravrutti)– Frequency of urine in day and night, quantity, color of urine, untoward symptoms during urination.
- Sleep (nidra)– Duration of sleep, nature of sleep, causes of disturbance in sleep.
- Habits during Premorbid State–Vvyayama, vyavaya, vishramadi.
- Addictions (madaka padartha upayoga)– Smoking, alcohol, snuffing, narcotics, coffee, tea all come under addictions. One has to ask duration of addiction, quantity of intake per day.

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Equipments for Physical Examination

Physical examination after detailed history taking is essential for disease diagnosis is an essential element. It requires few equipments that may be a form of instrument, apparatus, implant, in vitro reagent, or similar or related article that is used to diagnose, prevent, or treat disease or other conditions. This does not achieve its purposes through chemical action within or on the body (which would make it a drug). Some of the very essential equipment required for bedside patient examinations are as follows.

Stethescope– It isan important equipment for cardio

vascular, respiratory, GIT system examination. It is also vital sign examiner. It tells the presence or absence of life.

The stethoscope was invented in France in 1816 by RenÈ Laennec at the Necker-Enfants Malades Hospital in Paris. The stethoscope is an acoustic medical device for auscultation, or listening to the internal sounds of an animal or human body. It is often used to listen to lung and heart sounds. It is also used to listen to intestines, foetal heart sounds inside uterus and blood flow in arteries and veins. In combination with a sphygmomanometer, it is commonly used for measurements of blood pressure.

Parts of Stethescope

- Ear piece–They should be blunt and are fitted properly to ear.
- Ear tube– The direction of ear tube should be downwards and forwards in analogs to anatomy of external auditory canal of ear. They attach the ear pieces to the ear tube. Typically it is constructed of metal and consist of hollow tube.
- Acoustic tube–connects to the ear tube to the chest piece. Flexible, rubberised materials can be filled with different materials to best transmit sound from the patient to the physician.
- Chest piece– Consists of flat diaphragm and hollow bell. It is constructed of metals, typically double sided to work for differentially sized person and different sites of the body.

Types of Stethoscopes

➢ **Acoustic:** Acoustic stethoscope, with the bell upwards.

Acoustic stethoscopes are familiar to most people, and operate on the transmission of sound from the chest piece, via air-filled hollow tubes, to the listener's ears. The chest piece usually consists of two sides that can be placed against the patient for sensing sound; a diaphragm (plastic disc) or bell (hollow cup). If the diaphragm is placed on the patient, body sounds vibrate the diaphragm, creating acoustic pressure waves which travel up the tubing to the listener's ears. If the bell is placed on

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the patient, the vibrations of the skin directly produce acoustic pressure waves traveling up to the listener's ears. The bell transmits low frequency sounds, while the diaphragm transmits higher frequency sounds. This two-sided stethoscope was invented by Rappaport and Sprague in the early part of the 20th century. Acoustic stethoscopes are the most commonly used

➢ **Electronic**

An electronic stethoscope (or stethophone) overcomes the low sound levels by electronically amplifying body sounds. Electronic stethoscopes require conversion of acoustic sound waves to electrical signals which can then be amplified and processed for optimal listening. An electronic stethoscope can be a wireless device, can be a recording device, and can provide noise reduction, signal enhancement, and both visual and audio output. Electronic stethoscopes are also used with Computer-aided Auscultation programs to analyze the recorded heart sounds pathological or innocent heart murmurs.

➢ **Fetal Stethoscope**

A fetal stethoscope or fetoscope is an acoustic stethoscope shaped like a listening trumpet. It is placed against the abdomen of a pregnant woman to listen to the heart sounds of the fetus. The fetal stethoscope is also known as a Pinard's stethoscope or a pinard, after French obstetricianAdolphe Pinard (1844-1934).

➢ **Doppler Stethoscope**

A Doppler stethoscope is an electronic device which measures the Doppler effect of ultrasound waves reflected from organs within the body. Motion is detected by the change in frequency, due to the the Doppler effect, of the reflected waves. Hence the Doppler stethoscope is particularly suited to deal with moving objects such as a beating heart.

Wear and Maintenance

Stethoscope components are commonly made of plastic or rubber and may be damaged by solvents and other compounds used for cleaning, including alcohol and soap. The solvents may dissolve plasticizers that keep the components flexible. Lipids

in the human skin will deteriorate and harden the tubing so it is good practice to use a cloth cover or make sure it is over the shirt collar. Stethoscopes with two-sided chest pieces are often lubricated where the chest piece rotates around the stem, and must be re-lubricated periodically. If the lubrication is lost, the moving parts may grind against each other and destroy the fine mechanical tolerances required for the proper acoustic performance of the stethoscope.

Knee Hammer (Reflex Hammer)

A reflex hammer is a medical instrument used by physicians to test deep tendonreflexes. Testing for reflexes is an important part of the neurological physical examination in order to detect abnormalities in the central or peripheral nervous system. Reflex hammers can also be used for chest percussion

Parts :

- Rubber hammer head.
- Needle like middle part- for measuring skin and nervous system sensitivity.
- Brush like lower part.

Method of Use

The strength of a reflex is used to gauge central and peripheral nervous system disorders, with the former resulting in hyper reflexia, or exaggerated reflexes, and the latter resulting in hypor reflexia or diminished reflexes. However, the strength of the stimulus used to extract the reflex also affects the magnitude of the reflex. Attempts have been made to determine the force required to elicit a reflex, but vary depending on the hammer used, and are difficult to quantify.

The Taylor hammer is usually held at the end by the physician, and the entire device is swung in an arc-like motion onto the tendon in question. The Queen Square and Babinski hammers are usually held perpendicular to the tendon in question, and are passively swung with gravity assistance onto the tendon.

The Jendrassik maneuver, which entails interlocking of

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flexed fingers to distract a patient, can also be used to accentuate reflexes. In cases of hyper reflexia, the physician may place his finger on top of the tendon, and tap the finger with the hammer. Sometimes a reflex hammer may not be necessary to elicit hyper reflexia, with finger tapping over the tendon being sufficient as a stimulus.

Thermometer– A clinical thermometer is highly essential in every clinic and ward to examine the temperature of patient's body. It is Developed during 16th and 17th century.

Principle– The expansion of mercury on exposure to heat and contraction on exposure to cold is used as a principle on the working of a thermometer.

Parts:

1) It consist of a glass tube of 11 cm
2) Constricted terminal part of that contains mercury called bulb and linear end that is scale.
3) Has a small lumen inside the tube with constriction at the neck. The cross section of the body of the glass tube is triangular.
4) Has grading from 350c to 420c.
5) In farenheat scale, grading from 94 0 F to 106 0F.

Procedure– The thermometer should be washed properly with soap water or antiseptic solution before use and should be cleaned with tap water before use, it should always shaken properly before use, so that mercury comes below the arrow mark. Before taking the oral temperature the patient should not consume any hot or cold substances. The thermometer is kept in the oral cavity of the patient under the tongue and the patient is asked to hold the thermometer by sealing the lips. Care should not be taken to see that the mercury bulb is placed sublingually. The thermometer should be kept at the pace for 2 min before reading the temperature. After recording the temperature the thermometer should again be thoroughly cleaned and shaken back to its position. The temperature can be also be recorded to the similar fashion in axilla or rectum or groin.

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The normal body temperature of a person varies depending on gender, recent activity, food and fluid consumption, time of day, and in women the stage of the menstrual cycle.

Rectal temperature are higher then oral temperature by an average of 0.4 to 0.5 C(0.7 to 0.9 F)

Axillary temperatures are lower then oral temperatures by approximately 1degree. It takes 3 to 10 minutes to register.

Oral temperature can be taken by keeping under the tongue using classic glass mercury-filled or digital thermometers.

By ear a special thermometer can quickly measure the temperature of the ear drum, which reflects the body's core temperature.

Fever or pyrexia refers to elevated body temperature. Hyperpyrexia is extreme elevation in temperature above 41.1C (106F).

Causes may be infection, trauma such as surgery or injuries, malignancy, blood disorders such as acute hemolytic anemia, drug reactions, and immune disorders such as collagen vascular disease.

Hypothermia is defined as a drop in body temperature below 95°F. Causemay be exposure to cold, Reduced movements in paralysis, interference with vasoconstriction as from sepsis or excess alcohol, starvation, hypothyroidism, hypoglycemia.

Laryngeoscope

It is a device help for both diagnosis and treatment of larynx.

Parts

- Handle– contains a battery pack that supplies power to a light source inside the blade which can be straight or curved;riged or flexile.
- Smooth lighted tube/blade– Two basic styles of laryngoscope blade are currently commercially available: the curved blade and the straight blade. These specialty blades are primarily designed for use by anesthetists, most commonly in the operating room.

Laryngoscopy (larynx + scopy) is a medical procedure that is used to obtain a view of the vocal folds and the glottis. Laryngoscopy may be performed to facilitate tracheal intubation during general anesthesia or cardiopulmonary resuscitation or for procedures on the larynx or other parts of the upper tracheobronchial tree.

It is of 2 types

- Direct
- Indirect

Direct Laryngoscopy

Direct laryngoscopy is carried out (usually) with the patient lying on his or her back; the laryngoscope is inserted into the mouth on the right side and flipped to the left to trap and move the tongue out of the line of sight, and, depending on the type of blade used, inserted either anterior or posterior to the epiglottis and then lifted with an upwards and forward motion ("away from you and towards the roof"). This move makes a view of the glottis possible. There are at least ten different types of laryngoscope used for this procedure, each of which has a specialized use for the otolaryn-gologist and medical speechpathologist. This procedure is most often employed in direct diagnostic laryngoscopy with biopsy. It is extremely uncomfortable and is not typically performed on conscious-patients, or on patients with an intact gag reflex.

Indications

A. Diagnostic

(a) When the structure of the larynx can not visible properly on in- direct laryngoscopy, In a patient with hoarseness.

(b) For the examination of laryngeopharynx.

(c) Biopsy of larynx.

(d) In case of vocal cord paralysis.

B. Therapeutic

(a) For removal of forign bodies, small polyps, cysts, and other benign lesions.

(b) Injection of teflon paste in the vocal cord for vocal cord paralysis.

(c) For endotracheal intubation

Indirect laryngoscopy

Indirect laryngoscopy is performed whenever the provider visualizes the patient's vocal cords by a means other than obtaining a direct line of sight. For the purpose of intubation, this is facilitated by fiberoptic bronchoscopes, video laryngoscopes, fiberoptic stylets and mirror or prism optically-enhanced laryngoscopes.

Sphygmomanometer

A sphygmomanometer or blood pressure meter (also referred to as a sphygmometer) is a device used to measure blood pressure, composed of an inflatable cuff to restrict blood flow, and a mercury or mechanical manometer to measure the pressure. It is always used in conjunction with a means to determine at what pressure blood flow is just starting, and at what pressure it is unimpeded. Manual sphygmomanometers are used in conjunction with a stethoscope.

The word comes from the GreeksphygmÛs (pulse), plus the scientific term manometer (pressure meter). The device was invented by Samuel Siegfried Karl Ritter von Basch in 1881.[1] Scipione Riva-Rocci introduced a more easily used version in 1896. In 1901, Harvey Cushing modernized the device and popularized it within the medical community.

A sphygmomanometer consists of an inflatable cuff, a measuring unit (the mercury manometer, or aneroid gauge), and a mechanism for inflation which may be a manually operated bulb and valve or a pump operated electrically.

The usual unit of measurement of blood pressure is millimeters of mercury (mmHg) as measured directly by a manual sphyg-momanometer.

Types

There are two types of sphygmomanometers:

Manual sphygmomanometers require a stethoscope for auscultation (see below). They are used by trained practitioners,

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and cannot be used in environments too noisy to permit hearing the characteristic sounds. It is possible to obtain a basic reading through palpation, but this only yields the systolic pressure.

- Mercury sphygmomanometers are considered to be the gold standard. They measure blood pressure directly by observing the height of a column of mercury; errors of calibration cannot occur (unless the markings on the scale of millimeters are wrong). Due to their accuracy, they are often required in clinical trials of pharmaceuticals and for clinical evaluations of determining blood pressure for high-risk patients including pregnant women.
- Aneroid sphygmomanometers (mechanical types with a dial) are in common use; they require regular calibration checks, unlike mercury manometers. Aneroid sphygmomanometers are considered safer than mercury based, although less accurate.
- Digital, using oscillometric measurements and electronic calculation rather than auscultation. They may use manual or automatic inflation. These are electronic, easy to operate without training by anybody, and can be used in noisy environments. They measure systolic and diastolic pressures by oscillometric detection, using a piezoelectric pressure sensor and electronic components including a microprocessor. They do not measure systolic and diastolic pressures directly, but calculate them from the mean pressure and empirical oscillometric parameters.

Operation

In humans, the cuff is normally placed smoothly and snugly around an upper arm, at roughly the same vertical height as the heart while the subject is seated with the arm supported. Other sites of placement depend on species, it may include the flipper or tail. It is essential that the correct size of cuff is selected for the patient. Too small a cuff results in too high a pressure, while too large a cuff results in too low a pressure. For clinical measurements it is usual to measure and record both arms in the

initial consultation to determine if the pressure is significantly higher in one arm than the other. A difference of 10 mm Hg may be a sign of coarctation of the aorta. If the arms read differently, the higher reading arm would be used for later readings. The cuff is inflated until the artery is completely occluded.

With a manual instrument, listening with a stethoscope to the brachial artery at the elbow, the examiner slowly releases the pressure in the cuff. As the pressure in the cuffs falls, a "whooshing" or pounding sound is heard (see Korotkoff sounds) when blood flow first starts again in the artery. The pressure at which this sound began is noted and recorded as the systolic blood pressure. The cuff pressure is further released until the sound can no longer be heard. This is recorded as the diastolic blood pressure. In noisy environments where auscultation is impossible (such as the scenes often encountered in emergency medicine), systolic blood pressure alone may be read by releasing the pressure until a radial pulse is palpated (felt). In veterinary medicine, auscultation is rarely of use, and palpation or visualization of pulse distal to the sphygmomanometer is used to detect systolic pressure.

Digital instruments use a cuff which may be placed, according to the instrument, around the upper arm, wrist, or a finger, in all cases elevated to the same height as the heart. They inflate the cuff and gradually reduce the pressure in the same way as a manual meter, and measure blood pressures by the oscillometric method.

Pen Torch

It is a small illuminating torch required for physical examination of body parts under brighter atmosphere. Pupillary reaction, examination of throat, oral cavity and hollow structures torch is essential. Never examine jaundice, pallor, cyanosis using artificial lights or torch

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Clinical Examination

"Process of evaluating objective anatomic findings through the use of observation, palpation, percussion, and auscultation." The information obtained must be thoughtfully integrated with the patient's history and pathophysiology. Physical examination yield 20% of the data necessary for patient diagnosis and management.

Equipment Required

- Stethoscope
- Measuring tape
- Sphygmomanometer
- Tuning fork
- Magnifying glass
- Pen-torch
- Ophthalmoscope
- Tendon hammer
- Wooden spatula
- Disposable gloves, lubricant jelly and a proctoscope may also be required.
- Facilities for obtaining blood samples, urinalysis and faecal occult blood testing should be available.
- Accurate weighing scales and a height-measuring device.

General Approach

The patient must be Cooperative, the room where examination is carried out should bequiet, warm, well lit with chair, couch and steps to climb the couch. The room should posses both Natural light and artificial light based on the necessity. A good physician should know. How much to undress the patient. There must be Presence of female attendant when female patient is examined. (esp. PR & PV)

Summary of Plan

- Mental & emotional state
- Physical attitude
- Gait
- Physique
- Face and expression
- Skin and lymphnodes
- Hands and joints
- Feet
- Head and Neck
- Breasts
- Axillae
- Temperature
- Pulse
- Respiration
- Odours

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Mental & Emotional State

Assess the Intelligence, Mental & emotional state of the patient first and prepare for further evaluation. Note if the patient is Anxious/over anxious, suffers from Depression/retardation/ apathy etc.

Physical Attitude and Decubitus

Examine the Posture of patient. For example a patient with heart failure sit up because supine position may turndyspnoeic if they lie flat (orthopnoea). Similarly Patient with abdominal pain lies still, Patient with colic are restless or may even roll about to get relief. Patient with joint disease may show an attitude of helplessness. Observe for gait of patient right from entry of patient towards the physician.

General Appearance

Appearance consistent with chronological age of patient, physical attributes like tall, short, obese, lean, muscular and asthenic. Observe for any Deformities, or is the patient proportionate. Ask for history of weight gain or loss recently. Check for oedema, color change, lesion, discharge.

Facial Appearance and Expression

Many diseases produces characteristic facial appearances as inparkinsons disease (masked face), thyrotoxicosis (anxious face), acromegaly (moon face).

Observe for Parotid swellings in cheeks and below ears.

Cheeks appearpale in anemia & hypopitutarism, pale and puffy in nephrotic syndrome.

Bright circumscribed flush over malar bones in mitral stenosis, highly coloured in CHD.

Capillary tortuositiesnaevi in liver disease.

Skin

Observe skin under natural light. One can use magnified lense for skin examinations. Color, texture, sensation, striae, eruptions, thickness of skin and its appendages are to be observed. Most relevant points are pallor, yellowness, pigmentation & cyanosis. Dry and inelastic can be seen in dehydration.Dry,

wrinkled and Atrophiedtexture of skin seen by age or after glucocorticoid treatment. Thickened, loose & greasy skinseen in acromegaly.

1. Pallor– Occurs in thick or opaque skin. It is seen who are always pale, hypopitutarism, some conditions like anaemia, syncope, shock, local arterial occlusions, arterial spasm due to cold, raynauds disease.
2. Yellowness– Pale lemon yellow tint- haemolytic jaundice, Dark yellow or orange tint- obstructive jaundice (scratch marks due to bile salts Rarely due to carotenaemia).
3. Pigmentation– There are different patterns according to various skin diseases eg- in Neurofibromatosis type 1 there is milky coffee patches.
4. Cyanosis– Purple discoloration of skin and mucus membrane due to ooroxyen concentration in blood. It can be seen in cardiac insufficiency, respiratory arrest, rarely drugs phenacetin can cause cyanosis leading to methaemoglobinaemia, or sulphaemoglobinaemia.
5. Oedema : It is the swelling due to accumulation of free fluid in interstitial tissue space. It can be Dependent oedema which is seen in congestive heart failure,low plasma protein level (first ankles-dorsum of foot gradually leg, thighs and trunk) or Local oedema seen in local injury or infection and local venous obstruction. Oedema of whole upper body can be seen in intra thoracic tumors. Oedema is also classified as Pitting or non pittingoedema.
6. Examination of hands– Examin for Evidence of arthritis, neurological disease, liver disease, anaemia, acromegaly. Note for Finger clubbing, nail bed splinter haemorrhages, koilonychia (iron deficiency ananemia). Observe finger tips for Tremors. Fine tremor can be seen in thyrotoxicosis, coarse jerky tremors can be seen in metabolic encephalopathy.
7. Examination of feet– Look for Pitting oedema. (seen in renal disease, venous obstruction, pregnancy, cardiac failure). In Peripheral vascular disease the skin of foot turns shiny.In

Ischemic legs there will be no hair growth, skin looks blanched, reduced dorsalispedis artery pulsation, marked pallor on passive elevation will be seen. Painless trophic lesions and deep ulcerations on soles are seen in diabetic peripheral neuropathy.

8. Odour– Alchoholodour in alcoholic patient. Diebatic ketosis gives sweet and sickly odour. Uraemia gives ammoniacal or fishyodour. In Hepatic failure patient emits mousy odour. Halitosis or bad odour from mouth signifies poor dental hygiene or chronic gingivitis.

Examination of Neck

Physician should carry a proper Inspection of skin, shape, scars, form of neck, Palpation of neck best from behind. Look for Lymph nodes and examine Thyroid area examine Arteries & veins with pulsations.

Examination of Breast

It is always better to carry breast examination in every Women over 30 yrs of age. Ask the patient to place her Hands behind head and lye supine position in examination table. Palpate the 4 quadrants of breast and examine for mass or lump, note tenderness. Inspect for Asymmetry, visible mass, distortion, dimpling of skin, nipple discharge, ulceration, fixation, erthema (peaud orange discharge from nipple is suggestiveof breast cancer). Palpate axillary and cervical draining nodes. Examin if any Oedema in the arm. Breast examination is done on both sides in similar pattern.

Eye

Pallor is seen in lower palpabral conjunctiva, icterus has to be seen in upper bulbar conjunctiva. Look for pupillary reaction using pen torch. Carefully note the ocular movements and test for visual aquity. Ask patient if any altered vision or diplopia and photophobia are felt.

Vital Signs

Vital signs are the important signs that suggests influence

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on life of patient. Collection of vital signs and monitoring them is a must in every disease diagnosis and treatment. As far as vital signs are normal, life of the patient remains stable. Vital signs are as follows.

1. Body Temperature– Normal body temperature ranges from 98.6-100.4 degree Celsius (ORAL)100.4-100.8 degree Celsius (RECTAL)95.8-99.4 degree Celsius (AXILLARY).
2. Pulse Rate– Carotid pulse, radial pulse, dorsalispedis pulse, posterior tibial pulse are examined based on need. Radial pulse is most common area for pulse reading. Note for rate of pulse (number of pulse per minute), rhythm (regular, irregular), volume of pulse and condition of vessel wall.
3. Respiratory Rate– Normal respiratory rate in men=14-18/min and in woman=16-20/min. Assess the chest wall rising equal bilaterally. Observe if the movement is labored or if the client is using accessory muscles to breath.
4. Blood Pressure– Normal blood pressure is 120 systolic and 80 diastolic mm of mercury. Blood pressure 140/100 mm of hg is considered as hypertension, and if blood pressure falls to 110/60 mm of hg is considered as hypotension.
5. Heart Rate– Normal heart rate is 72-80 beats/min. Heart rate persistently raising above 100 beats/minute is considered as tachycardia and persistently below 60 beats per minute is considered as bradycardia. As in pulse recording examine heart beat for rhythm and note if any irregularity is heard.

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Systemic Examination

Cardiovascular System

This includes three components that has to be examined individually. Cardiovascular System also called as Circulatory System.

Heart– Pumps blood in body

Blood– Carries important oxygen, food, & waste through body.

Blood Vessels– routes blood travels- arteries, arterioles, capillaries, venules, veins.

Inspection in Cardiovascular System

- Anatomical Deformities in spine, rib cage or chest. (Pectusexcavatum, Visible pulsations- ventricular or aortic obstruction, Venous collaterance-sup venacaval obstruction, Venous collaterance in shoulder- axillary/subclavian vein obstruction).
- Presence or absence Anaemiaexamined through skin, nails, conjunctiva, tongue.
- Presence of central or peripheral Cyanosis.
- Examine finger tips for Clubbing. If finger tips are bulbous, nails are convex then clubbin is positive.
- Edema of feet (pitting), face, hands has to be seen.
- Abdominal features like distension or ascitis.
- Pulsations in the epigastrium.

Palpation in Cardio Vascular System

- Cold extremities suggestive of circulatory shock due to cardiac insufficiency.
- Raised body temperature indicated bacterial endocarditis or rheumatic heart disease.
- Apex beat : Patient should be in sitting position than supine. Physician should place Palm over pericardium feel forapex beat in intercoastal space (second rib).
- Thrills- palpable murmers

Percussion in Cardio Vascular System

- Percussion is of least importance in cardiovascular system. Yet one can percuss Cardiac border near right sternal border, physician can hear dull sound.

Auscultation in Cardiovascular System

- It is the very important form of examination. Auscultate for heart sounds in all the four auscultation areas. Note the heart rate, intensity of heart sound, cardiac murmers, irregularity in rhythm.

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Respiratoty System

Lung Capacity

- Inspiratory Capacity (IC)– Volume of maximal inspiration: IRV+TV=3600 ml.
- Functional Residual Capacity(FRC)–Volume of gas remaining in lung after normal expiration, ERV+RV=2400 ml.
- Vital Capacity (VC)– Volume of maximal inspiration and expiration: IRV + TV + ERV = IC + ERV = 4800 ml.
- Total Lung Capacity (TLC)– The volume of the lung after maximal inspiration.The sum of all four lung volumes,: IRV+ TV + ERV + RV = IC + FRC = 6000 ml.

Common Symptoms of Respiratory System

- Cough– It is sudden reflex by forceful expiration and expulsion of irritant material & secretions from the LRT through the glottis. A patient of cough must be asked for onset of cough and duration of suffering. Ask if is of dry cough or productive cough. Note for paroxysms of cough or number of bouts of cough. Know the aggravating and alleviating factors of cough. Dust, fume, climate, cold or freezed food may worsenbouts of cough. Examine for fever and other associated symptoms. Sudden cough may be seen in following conditions:
- Acute pulmonaryoedema,
- Pneumothorax
- Pulmonary infarction
- Aspiration into lungs

Cough of gradual onset of 2-3 weeks can be seen in:

- URTI
- Pneumonia
- Pulmonary embolism
- Acute bronchitis
- Pneumothorax
- Pulmonaryoedema

Gradual Onset of Weeks-months

- Pulmonary tuberculosis
- Interstitial lung disease
- Bronchogenic carsinoma

Chronic Cough for Months-years

- COPD
- Bronchial asthma
- Bronchiectasis
- **Nature of cough–** Sound of cough is brassy or metallic sound or can be Occasionally harsh & barking type in conditions

like tracheo bronchitis, mediastinal mass, tumor or aortic aneurysm compressing trachea.

Bovine– Cough is Non explosive, low pitch associated with hoarseness of voice, Less effective in clearing secretions. It can be seen in vocal cord paralysis.

Whooping– Cough is Severe attack of prolonged cough with 'whoop'sound due to inspired air entering through narrow glottis it is generally seen in pertussis.

Dry– Cough is seen in Viral infection of respiratory tract, Interstitial lung disease, Radiation injury to lungs, Tumors in lungs, Irritant gas inhalation.

Expectoration– Cough with sputum is called as expectoration. It is the matter ejected from the trachea, bronchi, and lungs through the mouth. Measure the quantity of sputum with help of sputon. Dry or Minimum sputum is seen inviral infection of RT and Bronchial asthma. Sputum may be Maximum (>100ml/day) in conditions like Bronchiectasis, Lung abscess, Broncho pleural communication, bronchorrhoea (massive), Broncho alveolar carcinoma, chronic bronchitis.

Quality of Sputum

- **Mucoid–** Sticky, colourless or white as seen in chronic bronchitis, chronic bronchial asthma.
- **Sereous–** Colourless, watery, sometimesfrothyasseen in left heart failure, bronchoalveolarcarcinoma.
- **Purulent–** Yellow, thick, viscous, may have foul smell, that indicate pyogenic infection.

Color of Sputum

- **Yellow** Suggestive of infection by streptococcal, staphylococcal etc.
- **Green** (verdoperoxidase -disintegrating cells)– Suggestive of infection, and seen in bronchial asthma (excess eosinophils).
- **Rusty** (dispersion of blood evenly)– Seen in pneumococcal pneumonia.

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- **Red Currant Jelly** (bright red & viscid-blood & mucus)– Seen in klebsiellapneumoniae.
- Black (melanoptysis)– Causes due to coal dust inhalation.

Odour of sputum- Foul smell suggestive of anerobic infection as seen in bronchectasis and lung abscess.

2. Hemoptysis– It is the condition in which there is blood in sputum. It can be seen in conditions like Tuberculosis, Necrotising pneumonia/lung abscess, Bronchogenic CA, Acute bronchitis, Bronchiectasis.
3. Dyspnea– Experience of discomfort in breathing or an awareness of respiratory distress.

Exertional Dyspnoea– It is seen in COPD, Bronchial asthma, Interstitial lung disease.

Wheeze– It is a musical sound produced when Air pass through narrow airways. This is also seen in Bronchial asthma, eosinophilia, Bronchopulmonaryaspergillosis.

Orthopnoea– A variety of dyspnoea that relieve on sitting/standing. This is seen in Severe attack of asthma, Massive pulmonary effusion, Tension pneumothorax.

Platypnea– This type of dyspnoearelieve on lying. It is seen in Hepato pulmonary diseases, Pulmonary av fistula.

Stridor– It is a High pitch inspiratory sound often Associated with cough & dyspnoea. It can be caused Due to obstruction of airflow during inspirationpredominantly in upper airway.

Cause– Foreign body inhalation, toxic gas inhalation, Laryngeal oedema due to anaphylaxis.

Diphtheria, Croup (laryngotracheobronchitis) Oedema of larynx, laryngeal tumour, Tracheal compression by lymph node, Vocal cord paralysis, Tracheal malignancy.

Apnoea–

Sudden stoppage of breathing for about 10 sec

4. Chest pain (chest tightness): Pleuritic Pain– It is Severe catching pain Increase on cough & inspiration. It can be due

to Inflamma-tion of diaphragmatic pleura-referred to shoulder tip & hypochondrium, also seen in Pneumonia, TB, Malignancy, Pulmonary infarction, Costochondritis, Rib fracture, Tumour invasion of chest wall.

Respiratory rate : Normal 14-16 breath/min

- Tachypnoea is increased respiratory rate noticed by doctor.
- Dyspnoea is increased repiratory rate felt by patient.
- Cheyne stokes breathing- deeply and quickening of breathing followed by diminished respiratory rate and rhythm. It is Common in cardiac failure, narcotic drug poisoning, neurologic disorder.

Inspection

- Mouth:-any swelling at back of mouth that cause sleep apnoea syndrome.
- Swelling of lips, tongue & other tissues are seen in angiooedema (associated with difficulty in breathing & stridor).
- Check nasal patency ask patient to breath through one nostril closing other nostril.
- Examine nose for any increased mucus, enlarged turbinate.
- Examine Throat for congestion and tonsil swelling.

Examine Chestwall

- Bleeding spots over chest wall-bleeding disorder with haemoptysis.
- Cutaneous lesions ex:bruises, scars, sinuses, nodules (exsarcoid).
- Skin eruptions (Vesicles over chestwall-herpes zoster with root pain).
- Scar-previous surgery (beneath the thyroid cartilage-previous tracheotomy, tracheostomy, thoracocentes.
- Venous engorgement-prominent chestwall veins in SVC obs.
- Arterial lesions-collaterals around scapulae, in coarctation of aorta, spidernaevi in cirrhosis.
- Subcutaneous lesions eg: metastatictumournodules, lipomas, inflammatory swellings.

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- Bony prominences eg:sternum, ribs, scapula, costochondral junctions.
- Visible lymphadenopathy.
- Breast lesions.
- Trail's Sign (sternomastoid sign) : tracheal shift to one side results in sternomastoid on that side to bcome prominent.
- Apex Beat– Note position. Diff to visualize in p with thick chest wall, pleuraleffusion, emphysema, pericardial effusion, shift due to mediastinal shift.

Note

- Intercostal Retraction– Visible indentations between the ribs as the intercostal muscles aid in breathing.
- Nasal Flaring– Intermittent outward movements of the nostrils with each inspiration.
- Pursed Lip Breathing– Partial closure of the lips to allow air to be expired slowly.
- Airflow obstruction & poor ventillation.
- Kyphosis– Accentuate the dorsal curve of the thoracic spine, increasing the anterior-posterior diameter of the chest (Elderly).
- Scosiosis and Lordosis.

Chest Expansion and Symmetricity

- This can be Explored by palpation. For examining this a physician should Face the patient and Place finger tip of both hand on lower ribcage. Ask the patient to take deep breath, this causes expansion of chest felt in fingers of physician.
- Compare the equality in both the lung surface.
- Any indrawing of suprasternal & supraclavicular fossae, intercostals spaces & epigastrium with inspiration & during exhalation contraction of abdominal muscles & lattisimusdorsi (not needed normally as elastic recoil of lung is adequate for exhalation)- indicate respiratory distress.

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Litten's Sign

- Sign for observing movement of diaphragm.
- Ask patient to stay in supine position with lower part of chestwall exposed to light. Look for movement of diaphragm which is made out as a wave form (phrenic wave) moving up & down in lower part of chest with each respiration.
- Unilateral absence of movement indicates unilateral phrenic nerve paralysis.
- Bilateral absence of movement indicate bilateral diaphragm paralysis associated with thoracoabdominaldiscordination of respiratory movement.

Hoover's Sign

- Indrawing of intercostals during inspiration as in advanced COPD.

Spine Exmination

- Ask patient to stand. Look for Spine convexity that determines side of scoliosis.
- kyphoscopliosis cause change in position of mediastenum.

Mode of Breathing

- Normal female breathing is thoracic where there is more use of intercostals muscles in passive breathing. In Males mode of breathing is Abdominothorasic.
- In respiratory distress patient use accessory muscles (sterno-cledomastoid, intercostals muscles) for breathing.

Palpation

- Trachea– Normally situated in Midline/slightly deviated to right 1-2mm & above supra sternal notch is 4-5cm length.

  Method of Examination– Keep middle finger on sternal notch; put index on one side, then ring on other side & Assess deviation.
- Chest Wall Expansion

  Measurement : Place measuring tape around chest at lower part of chest (xiphoid process)----record max inspiratory &

expiratory difference in chest circumference which indicate chest expansion.

- Tenderness Over Chestwall

Intercostals tenderness : Seen in acute pleurisy, empyema, Costochondritis (tietze).

Rib tenderness : Due to fracture rib, malignant deposit, osteomyelitis, chronic cough.

Others: chestbruise, skininflam, breastinflam, myalgia, herpes zoster.

- Vocal Fremitus (VF)– Or Tactile fremitus is tactile perception of vibrations produced in the larynx communicated to the chest wall through the lungs & tracheobronchial tree (low frequency vibrations) to examine this, Keep ulnar border of hand on identi-cal areas of both sides of chest ask patient to repeat 'one oneone'---compare 2 sides of chest for the intensity of vibrations felt by hand. Check top, midzone & lower zone anteriorly & posteriorly. It can be more intense in the right second intercostal space, as well as in the interscapular region, as these areas are closest to the bronchial bifurcation.
- Respiratory Movements– Palpate different areas of chest;

1. Infraclavicular Area Movement–

Ask the Patient to sit/ lie in supine position. Let patient breath steadily. Physician has to look tangentially at infraclavicular area at both sides of chest to see any difference in movement and also do keep 2 hands over infraclavicular area & make out movement.

2. Mammary & Lower Part of Chest

Sides of chest grasped with fingers to approximate tips of outstretched thumbs in regions of-

(1) Mammary area

(2) Xiphoid process (for lower part of chest)-------loose fold of skin in b/w 2 thumb is produced by adjustment of hands & with each chest expansion hands move apart. Look for degree of movement on 2 sides of chest estimated by relative movement of 2 thumbs with each respiration.

3. Posterior Movement

Chest grasped from behind in the region of the lower thoracic spine(10^{th})----degree of movement of 2 thumbs noted on either side.

Percussion

- Middle finger (pleximeter finger) of left hand of physician is placed firmly on part to be percussed, strike middle phalanx of the left middle finger with tip of middle finger of right (percussion finger) hand. Strike perpendicular but avoid repeated heavy striking, percuss directly over bones and also percuss from resonance to dull area.

Areas of Percussion

Anteriorly	Laterally	Posteriorly
supraclavicular	Apex of axilla upto 7th ICS	Chestwall-above spine of scapula
Clavicles		Interscapular
Infraclavicular-upto 5^{th} ICS		Infrascapularupto 10^{th} ICS (below angle of scplaupto 11th rib)

Percussion of Lung Apex

- Corresponds to supraclavicular area
- Keep middle finger of lt hand from behind &percuss with downward movement.
- Dullness over apex– Suggests of upper lobe pneumonia, TB, pancoast's tumour.
- Cardiac Dullness– Percuss cardiac borders.
- Obliteration or diminished note in this area is suggestive of-emphysema.

Clavicular Percussion

- Percuss medial one third of clavicle.
- Percussion of lateral part of clavicle-dull note due to lateral muscle mass.
- Abnormal percussion note over clavicle- suggestive of lesion of upperlobe.

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Normal Lung Percussion– Resonant that is moderately low pitch & heard easily. Anterior side is more resonant than back. Any lesion 5 cm deeper to chest wall or smaller than 2-3 cm diameter not alter percussion note.

Tympanitic Note

- Ex : drum like note heard over hollow visceras
- Hyper resonant & tympanic notes are due to vibrations produced by undampenedpercussion. If continues for significant time, then it is due to large acoustic mismatch of conducting media eg: tissues overlying air filled space.

Normal Dullness– 3rd to 5th ICS anteriorly (cardiac dullness) {loss of this-due to hyper inflation}.

- Dull–Shifted above suggests consolidation, pulmonary collapse, raised hemidiaphragm.
- Stony Dull.
- Hyperresonance– Severe hyperinflation like emphysema, pneumothorax.

Auscultation

Order of observation:

- Intensity of Bronchial Sounds
- o Type of breathing
- Comparison of inspirtory & expirtory components of breathing.
- Added sounds like rhonchi, crackles, pleural rub.
- Voice sounds vocal resonance, bronchophony, aegophony, whispering pectoriloquey.

	Bronchial	Character
Vesicular	Soft & quiet	Harsh & loud, high pitched (in consolidation), low pitch (occasionally in pulmonary fibrosis).
Expiration	1st third of expiration only heard	All of expiration heard (expiration time longer than Inspiration time)
Gap	No gap b/w inspiration and expiration	Clear pause b/w inspiration &expiration sounds

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Vesicular Breathing Sound

- Normal sound resembles Rustling of trees. It is Soft,low pitched.
- Inspiration is -3 times longer than Expiration.
- No gap b/w Inspiration & Expiration.
- Inspiration sound-due to gas turbulence in major airways.
- Expiration sound-due to elastic recoil of lung (& produced by central airways & at their bifurcations due to convergence of air flow).
- Maximum at the onset of expiration.
- Louder during Inspiration.
- Expiration has low frequency sounds.
- Only 1st one third of Expiration is audible.
- Heard all over chest (lung fields) except over larynx, trachea, upper part of sternum, lower cervical vertebra & 3rd & 4th dorsal vertebra.

Bronchial Breathing Sounds

- Harsher and blowing type. (greater intensity).
- Gap present.
- One can Hear whole of Expiration (louder than inspiration).
- Time of Inspiration & expiration are equal.
- Heard over tracheobronchial tree.
- Abnormal over lung.

Added Pulmonary Sounds

- Rhonchi/Wheeze–Produced as air travelling through narrowed airways. It is Continuous.

There are 2 types

- Monophonic Wheeze (from a single airway EX:large air way obstruction like bronchial Carcinoma).
- Polyphonic Wheeze (multiple airways ex: COPD, asthma)
- Crepitations/Crackles– They are Distinct clicking sounds Discontinuous in nature.

It is of 3 types

- Fine– Numerous individual clicks of low amplitude & high pitch.
- Medium– Less numerous individual clicks of lower amplitude & lower frequency (medium crackles caused by numerous secretions).
- Coarse– Infrequent individual clicks which are few enough to count during an inspiratory cycle that are individually much louder (higher amplitude) & of low frequency) Corse crackles are due to secretions moving around in airways ex:sputum in airways as patient breathes and sputum moves or bubbles. Large amount of fluid moves relatively slowly thus producing a low pitched sound of considerable volume (amplitude).

It is of 2 Types

1. Fixed Crackles– They do not change their pattern during an inspiratory cycle after a period of coughing.
2. Non Fixed– Crackles as a result of sputum.

- Pleural Sounds–This includes pleural rub which is charec-terised by a leathery or creaking sound produced by movement of visceral pleura over the parietal pleura when the surfaces are roughened usually by fibrinous material.
- **Vocal Resonance–** It is a Voice sound heard with chest piece of the stethoscope.

Types

(a) Bronchophony- voice heard near ear piece- which is of greater clarity but individual syllabelsare unclear.

Ex: Consolidation, Cavity communicating with bronchus, above level of pleural effusion.

(b) Aegophony- Voice has a nasal or bleathingquality (resembling goat) Ask the patient to whisper the number "22". it is high pitched breathing sound transmitted in consolidated lung tissue.

(c) Whispering pectoriloquy- Ask patient to whisper at the end of expiration, if sound is transmitted without distortion so that individual syllables recognized clearly then it is airless lung.

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Gastro Intestinal System

Examination of Oral Cavity

- Oral mucosa is normally coral pink, smooth and painless.
- Inspect inner and outer surfaces of lips, angles of mouth, gingiva, teeth, floor of the mouth, upper & lower surface of tongue, tonsils, palate and pharynx.
- Tongue should be protruded to bring its posterior third into view.
- Inspect the sides & undersurface of the tongue.
- Palpate the side of the tongue with gloved hand for any induration.
- Gentle pressure on anterior Aspect of relaxed tongue enable inspection of oropharynx, part of the naso-pharynx and epiglottis.

Observe for

Mouth ulcers– Aphthous ulcers, Malignancy, Collagen vascular disease, Herpes simplex stomatitis,

Oral thrush (Moniliasis)– Caused by candida albicans

- Thick whitish membrane on the tongue can be easily removed with swab, leaving a raw area, which do not bleed.
- Distinguish from pharyngeal diphtheria which usually does not extend to the tongue, adherent and not easily removed- if removed, the exposed mucous membrane bleeds.
- Conditions associated with oral thrush:
- Immunosuppressive and corticosteroids therapy
- Long term antibiotic
- DM, AIDS.

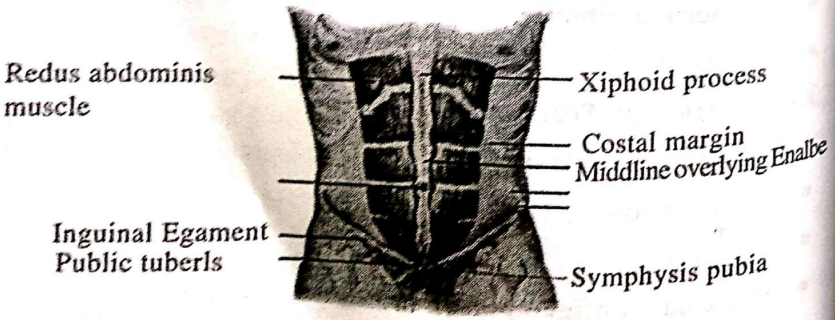
Examination of Teeth

- Number and condition of teeth
- Discoloration
- Decaying
- Abnormal configuration and artificial denture

Causes of Discoloration

- Staining due to tobacco
- Fluorosis causes pitted, mottled yellow teeth
- Tetracycline therapy in children- yellow teeth
- Examination of Gums-
- Vincent's angina- ulceration and sloughing of gingiva, caused by infection due to spirochetes & Fusiform bacilli.
- Lead poisoning-blue line at gum that can be due to deposition of lead sulfide in gum tissue.
- Scurvy- gums are soft, spongy, swollen and bleed easily
- Gingivitis- deep red congestion of gums, which bleed easily on touch.
- Hypertrophy of gum- in pregnancy, long term phenytoin treatment, scurvy
- Examination of Tongue- Examine for shape, size, color, deviation, tremors, ulcers, cracks and fissures.
- Atrophy of papillae
- Pale and bald tongue- iron deficiency
- Pink and bald- B-complex deficiency
- Magenta coloured- Riboflavin deficiency
- Beefy red- Niacin deficiency
- Tremors- thyrotoxicosis, parkinsonism, anxiety states
- Enlargement of tongue- acromegaly, Myxedema, amyloids, Down's syndrome.

The Abdomen



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	pancreas, splenic flexure and parts of transverse and descending colons.
Right Lower Quadrant (RLQ)	Appendix, cecum, ascending colon, bladder, right ovary, uterus if enlarged, right spermatic cord, and right ureter.
Left Lower Quadrant (LLQ)	Sigmoid colon, descending colon, bladder, left ovary, uterus, left spermatic cord, and left ureter.

Common Symptoms of GIT Disorders

- Dyspepsia- group of symptoms originate in the foregut.
- Characteristics- Symptoms of peptic ulcer disease, but endoscopy fails to detect an ulcer.
- Different types of dyspeptic disorders:
  - Reflux type symptoms: e.g. Retrosternal burning.
  - Peptic ulcer-like symptoms: Pain and vomiting. Food or antacids relieve pain.
  - Symptoms of disturbed motility: Early fullness (early satiety), recurrent belching.
  - Nausea- An unpleasant, queasy feeling in the throat or stomach that usually precedes vomiting.
  - Vomiting- Highly specific physical event that results in the rapid, forceful evacuation of gastric contents in retrograde fashion from the stomach up to and out of the mouth. It may be along with tachycardia, hyper salivation, and excessive perspiration.
  - Regurgitation- Contents of the stomach enter the oral cavity through reflux, not associated with forceful act of vomiting.
- Acute nausea and vomiting
  - Gastrointestinal infection
  - Head trauma
  - Pregnancy
  - Food poisoning
  - Abdominal visceral pain

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- Chronic nausea and vomiting
  - Motility disturbance
  - Intracranial pathology like space occupying lesion
  - Partial mechanical obst of gastrointestinal tract.
- Vomiting associated with pain abdomen
  - Peptic ulcer
  - Ureteric colic
  - Intestinal obstruction
- Vomiting without pain abdomen
  - Pyloric obstruction
  - Projectile vomiting- no nausea before vomiting
  - Due to raised intracranial tension
- Conditions associated with early morning vomiting
  - Chronic alcoholism
  - Psychogenic vomiting
  - Incipient uremia
  - Pregnancy
  - Relationship b/w the time of onset of vomiting and consumption of food.
  - Peptic ulcer and psychogenic vomiting- May vomit immediately after food.
  - Pyloric/duodenal obstruction, gastoparesis- Recurrent vomiting few hrs later. Vomitus may contain stale food.
- Non-gastrointestinal causes of vomiting
  - Metabolic: Hypercalcaemia, Hypoadrenalism, diabetic ketoacidosis and renal failure
  - Neurological: Increased intracranial tension, labyrinthine disease, migraine, severe pain, febrile states
  - Drug- induced: NSAIDS, digoxin, morphine, alcohol
  - Psychogenic: Bulimia and anorexia nervosa
  - Rumination-Habitual, involuntary, subconscious regurgitation of gastric contents which are then chewed and swallowed.
  - Ca stomach
  - Pancreatitis
  - Biliary obst and cholecystitis
  - Pregnancy
  - Renal failuse

Haematemesis- presence of blood in the vomitus

Causes

- Oesophagogastricvarices
- Erosive gastritis, oesophagitis, duodenitis
- Mallory-Weiss syndrome
- Gastric ulcer
- Peptic ulcer
- Profuse nose bleeds
- Stomach/oesophageal malignancy
- Vascular malformation

➢ **Approach to a Patient with Upper GI Bleed**

- Vomiting of bright red vomitus indicates bleeding at the pharyngeal or oesophageal level.
- Coffee-ground vomitus: Suggests bleeding into the stomach. Colour of the vomitus is characteristically brownish and may contain coffee-ground sediment. Colour is due to conversion of hemoglobin to acid hematin by gastric acid. Previous h/o chronic pain abdomen & dyspepsia with upper GI bleed is common with peptic ulcer disease.
- History of retching & violent vomiting especially after alcohol indicates Mallory-Weiss tear.
- Presence of chronic liver disease causing portal hypertension and bleeding oesophagealvarices.
- Elderly person with weight loss and hematemesis may be suggestive of upper gastrointestinal malignancy.

Lower Gastrointestinal Bleeding

- **Causes**
- Acute bacterial or amoebic dysentery
- Lower gastrointestinal malignancy (>40 yrs of age, recent change of bowel habit).
- Diverticulosis:

  Characteristics: Abdominal discomfort, constipation and altered bowel habit.

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- Ulcerative colitis & Crohn's disease & ischemic colitis:

  Characteristics– Lower abdominal pain, diarrhoea, rectal bleeding.
- Acute mesenteric infraction:

  Characteristics– Abdominal rigidity, altered bowel habit, lower GI bleed.
- **Malena:** It is the condition in which patient Pass black tarry stools.
- This Suggests upper GI bleed above the attachment of ligament of Treitz.
- Minimal of 60 ml of bleeding is required for the appearance of malena.
- Tarry colour due to the action of lower bowel secretions on the blood.
- Malena stool is usually sticky (intake of iron and bismuth salts will produce tarry stool but will not be sticky).
- Stool colour may remain black for several days even after the stoppage of bleed.

➢ **Hematochezia–** Indicates passing of frank blood per rectum

➢ **Common Causes Are**

- Colitis
- Fissure in ano
- Bleeding piles
- Malignancy rectal/colon
- Inflammatory bowel disease

➢ **Rare causes**

- Diverticulosis
- Ischemia of bowel
- Polyposis of colon
- Massive upper GI bleed with rapid intestinal transit.

➢ **Characteristics**

- Bleeding piles:

  Massive bleeding with splashing of blood.

  Bleeding continues even after passing the stool.
- **Anal canal bleed:**

  Can only soil the toilet paper. Usually bright red and separate from the faecal matter.

- **Anal fissure bleed:**
  Severe pain is associated with bleeding while passing the stool.
- Infection/inflammation of colon:
  Loose stools associated with blood and mucus and tenesmus.

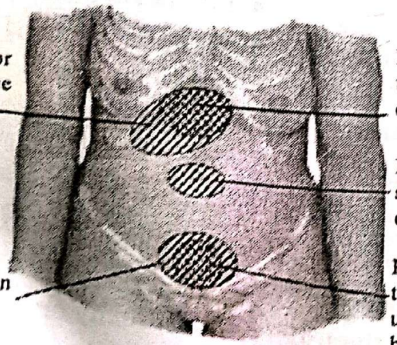
➢ **Abdominal distension**

- **Causes**

Factors	Consider
Fat	Excessive alcohol consumption
Flatus	Pseudo-obstruction, obstruction
Faeces	Subacute obstruction, constipation
Fluid	Overian or uterine mass, Bladder enlargement, Ascitis
Fetus	Date of the last menstrual period

- **Abdominal Pain** has several possible mechanisms and clinical patterns and warrants careful clinical assessment.
- Types
- Visceral pain occurs when hollow abdominal organs such as the intestine or biliary tree contract unusually forcefully or when they are distended or stretched.

  Solid organs such as the liver can also become painful when their capsules are stretched. Visceral pain may be difficult to localize. It is typically, though not necessarily, palpable near the midline, at levels that vary according to the structure involved.



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Visceral pain varies in quality and may be gnawing, burning, cramping, or aching. When it becomes severe, it may be associated with sweating, pallor, nausea, vomiting, and restlessness. The auto-nomic sensory fibers for visceral pain are the sympa-thetic fibers of T5 to L1 segments & parasympathetic from **vagus & S1 S2 S3** spinal segments. Nociceptors for visceral pain are **stretch** receptors and **chemoreceptors.**

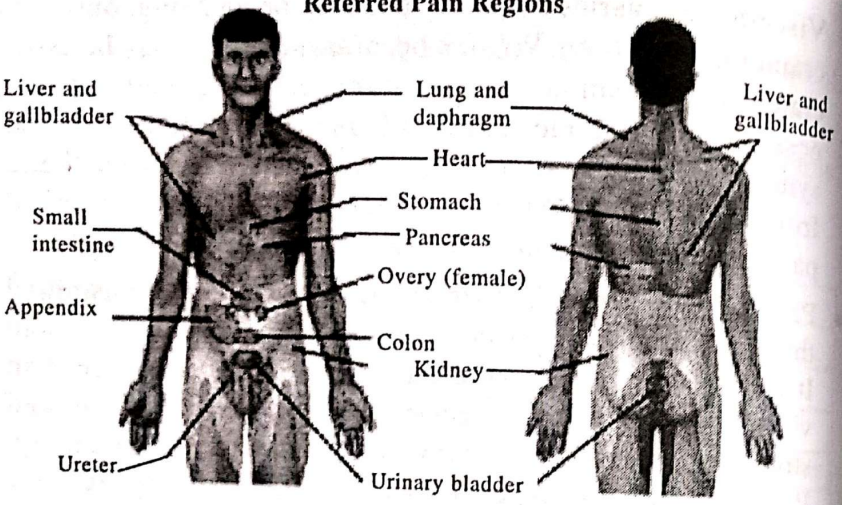
- Parietal pain originates in the parietal peritoneum transmitted through somatic sensory nerves and is caused by inflammation. It is a steady aching pain that is usually more severe than visceral pain and more precisely localized over the involved structure. It is typically aggravated by movement or coughing. Patients with this type of pain usually prefer to lie still. Palpation over the area is extremely painful, with overlying muscles contracting to protect the peritoneum. Abdominal pain may progress from a visceral sensation to a parietal pain.
- Check list in a patient of abdominal pain
  - Onset
  - Site
  - Type of pain
  - Aggravating factors
  - Relieving factors
  - Referred/radiation of pain
  - Other associated symptoms
- **Referred pain** is felt in more distant sites, which are innervated at approximately the same spinal levels as the disordered structure. Referred pain often develops as the initial pain becomes more intense and thus seems to radiate or travel from the initial site. It may be felt superficially or deeply but is usually well localized. Pain may also be referred to the abdomen from the chest, spine, or pelvis, thus complicating the assessment of abdominal pain.

Alteration in Bowel Habits

➢ **Constipation–** The term used if the stool frequency is less then 3times/week (Term is highly individualized and depends on the bowel habit of each individual).

- A disorder of bowel habit characterized by straining and infrequent passage of small, hard stools.

Referred Pain Regions



➢ **Dyschezia–** Difficulty in emptying rectum with requirement of excess straining at stool.

- A form of rectal constipation due to lose of tone of rectal musculature- requiring greater amount of stool collection to initiate the act.

➢ **Questions to Ask**

- What is the normal stool frequency?
- Do you strain at stool?
- How long have been constipated?
- Associated with abdominal pain, distention, nausea or vomiting?
- Stools are large or small and pellet shaped?
- Are any constipating drugs?

➢ Diarrhoea- Frequent passage of unformed stools with stool quantity more than 200gm/day.

➢ Questions to ask

- Normal stool frequency?
- How many stools daily?
- How long had diarrhoea?
- Are you awoken from sleep to open the bowels?
- What is the colour and consistency of stools?

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- Are blood and mucus present?
- Associated with nausea, vomiting, weight loss or pain?
- Any purgative abuse or antibiotics?

General Examination for GI System

➢ **Build and Nourishment**

- Diseases which lead to vomiting, diarrhoea, or dysphagia lead to starvation & severe malnutrition.
- Bleeding from benign and malignant ulcers lead to iron deficiency anemia.
- Loss of muscle bulk and subcutaneous fat occurs with chronic liver disease and chronic GI disorders.
- Kwashiorker and pellagra lead to diarrhoea.

➢ **Pallor–** Significant anemia seen in

- Bleeding due to oeophageal varies
- Malabsorption syndrome
- Portal hypertension with splenomegaly
- Bleeding tendencies due to defective prothrombin synthesis
- Any of the GI bleeding

➢ **Icterus:** Appears when serum bilirubin level reaches above 3mg/dl

➢ **Clubbing–** GI and hepatic causes

- Cirrhosis especially in biliary cirrhosis
- Hepatocellular carcinoma
- Ulcerative colitis and Crohn's disease
- Malabsorption syndrome

➢ **Cyanosis:**

- Portal hypertension can cause pulmonary AV shunting, Oxygen desaturation & hypoxia.

➢ **Pedal oedema:**

- Cirrhosisof liver is associated with swelling of feet.
- Patients of hepatic outflow and inferior venacaval obstruction.

➢ **Lymphadenopathy:**

- Left supraclavicular nodes(Virchow's node) enlarges due to metastasis from GI and testicular malignancy spreding through the thoracic duct.
- Viral infections, lymphoma and leukemia associated with generalized lymphadenopathy can also involve GI tract and para-arotic nodes.

➢ **Examination of face and eyes in relation to GI tract**

- Exophthalmos- Thyrotoxicosis can be associated with diarrhoea&weightt loss.
- Jaundice (yellowish discolorisation of skin, conjunctiva, mucus membrane, nails, urine, feces- suggestive of hepatobiliary disease.
- Subconjunctival hemorrhage- Leptospirosis is associated with subconjunctival hemorrhage and liver involvement.
- Kayser-Fleischer ring- Brownish green ring appears due to deposition of copper on Descement's membrane of cornea- found in patients with Wilson's disease.
- Xenthelasma– Yellowish deposit near the eyelids, associated with chronic cholestasis

➢ **Nails–** Leuconychia in cirrhosis of liver.

➢ **Skin:**

- Needle tracks may be visible with IV drug abusers.
- Skin excoriations with severe itching due to primary biliary cirrhosis or chronic cholestasis.
- Vitiligo can be associated with autoimmune hepatitis/primary biliary cirrhosis.

Techniques of Examination

➢ **Steps for Enhancing Examination of the Abdomen**

- The patient should have an empty bladder.
- Make the patient comfortable in a supine position, with a pillow for the head and perhaps another under the knees.
- Have the patient keep arms at the sides or folded across the chest. Often patients raise their arms over their heads, but this stretches and tightens the abdominal wall, making palpation difficult.

- Before you begin palpation, ask the patient to point to any areas of pain and examine these areas last.
- Warm your hands and stethoscope, and avoid long fingernails. You may need to rub your hands together or warm them up with hot water.
- Approach slowly and avoid quick unexpected movements.
- Watch the patient's face closely for any signs of pain or discomfort.
- Distract the patient if necessary with conversation or questions.
- Visualize each organ in the region you are examining.
- Stand at the patient's right side and proceed in an orderly fashion with inspection, auscultation, percussion, and palpation. Assess the liver, spleen, kidneys, and aorta.

➢ **Inspection**

➢ **The contour of the abdomen–** Normal scaphoid in shape and moves vertical direction on respiration.

➢ **Umbilicus–** Punkered depressed scar, situated midway b/w the upper border of symphysis pubis and xiphisternum, may be inverted and retracted

- Bulging of umbilicus– In umbilical hernia confirmed by impulse on coughing.
- Umbilicus is transversely stretched (smiling umbilicus) in massive ascites.
- Serous & seropurulent discharge occurs due to infection of umbilicus & patent urachus.
- Displacement of umbilicus in upper & lower abdominal mass lesions.

➢ **Skin Striae–** White, colourless lines over the abdomen occur in patients with gross distention of the abdomen due to rupture of elastic fibers e.g:pregnancy, massive ascites, excessive wt. gain.

- Purple striae- in Cushing's syndrome
- Campbell de Morgan spots: Small angiomas occur in elderly patients.

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➢ **Scars–** previous surgery or laparoscopy scars need to be described or diagram their location.

➢ **Discoloration of Skin**

- Cullen's sign- bluish discoloration around the umbilicus suggests bleeding into peritoneal cavity. E.g. Rupture of ectopic pregnancy, acute pancreatitis.
- Turner's sign- bluish discoloration of flanks due to hemoglobin undergoing tissue catabolism in acute pancreatitis

➢ **Visible pulsation–** Aortic aneurysm produces expansile pulsation. Mass overlying the aorta can have transmitted pulsation through the mass.

- Pulsatile liver causes predominantly right hypochondrial pulsation.

➢ **Visible Veins**

➢ **Demonstration of direction of flow in collateral vein-**

- Select a part of collateral vein of about 3-4 cm which is free of braches
- Press the 2 fingers over the middle part of this vein and empty the vein by drawing apart the 2 fingers without releasing the finger pressure
- Lift one of the fingers at a time and note the direction of filling up of the emptied vein.

Caput Medusa

- Veins radiating and flow of blood is away from umbilicus
- It suggests intrahepatic portal hypertension.
- Portal venous blood is returned to systemic veins through collateral vessels along the veins in the falciform ligament.
- It develop tortuous veins radially from umbilicus compared to the locks of hair of mythological dragon Medusa.

Visible peristalsis- may be normal in very thin elderly person with lax abdominal muscles.

➢ **Pyloric obstruction–** Epigastric fullness.

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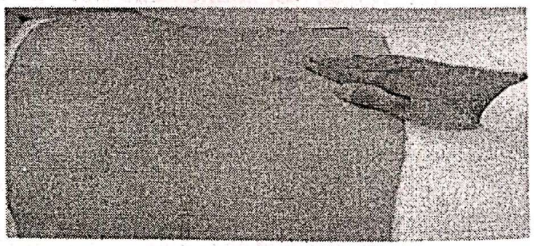
epigastrium while the patient is being rocked from side to side.

- Normally succussion splash may be present up to 2 hrs after a main meal.
- If heard 4hrs after the meal suggests delayed gastric emptying.
- E.g. pyloric obstruction, paralytic ileus, autonomic neuropathy.

Palpation

Warm up the palms before examination, use whole palm, tips of fingers, ulnar border of palm according to the need. Feel for swelling, its consistency,assesstendernessby palpation. A very good skill is needed for Moving the palm, sliding of fingers, careful observation of expression of face duringpalpation. Stay in right side of patient, to avoid cross respiration tilt the patient's head to the opposite side.

Light Palpation



Helpful in identifying abdominal tenderness, muscular resistance, and some superficial organs and masses. It also serves to reassure and relax the patient.Keeping your hand and forearm on a horizontal plane, with fingers together and flat on the abdominal surface, palpate the abdomen with a light, gentle, dipping motion. When moving your hand from place to place, raise it just off the skin. Moving smoothly, feel in all quadrants.

- Identify any superficial organs or masses and any area of tenderness or increased resistance to your hand. If resistance is present, try to distinguish voluntary guarding from involuntary muscular spasm.

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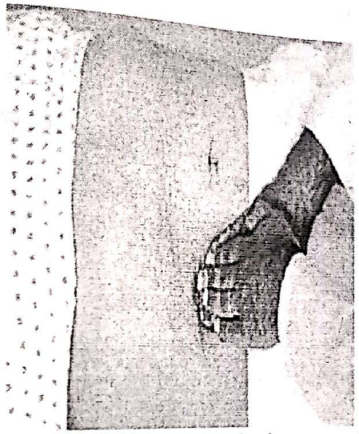
- Rigidity indicative of generalized peritonitis & abdominal wall does not move with respiration, will be hard & board like (board-like rigidity).

Deep Palpation

Two Handed Deep Palpation



This is usually required to delineate abdominal masses.Again using the palmar surfaces of your fingers, feel in all four quadrants.

- Identify any masses and note their location, size, shape, consistency, tenderness, pulsations, and any mobility with respiration or with the examining hand. Correlate your palpable findings with their percussion notes.

➢ **Points to be noted whenever the liver is palpable**

- Extent of enlargement from the costal margin in the mid-clavicular & mid-sternal line.
- Edge or border
- Consistency
- Movement with inspiration
- Surface
- Tenderness
- Pulsation

➢ **Features favouring a hepatic mass**

- Presence in the Right hypochondrium
- Movement with respiration
- Getting above the mass is not possible

Finger cannot be insinuated b/w the costal margin

Percussion

- The span of liver dullness is increasedwhen the liver is enlarged.

- The span of liver dullness is decreasedwhen the liver is small, or when free air is present below the diaphragm, as from a perforated hollow viscera. Serial observations may show a decreasing span of dullness with resolution of hepatitis or, less commonly, with progression of fulminant hepatitis.

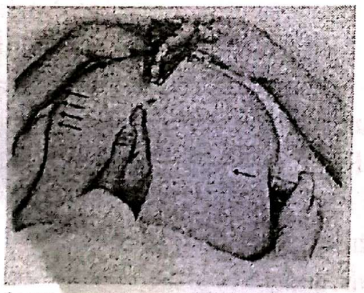
➢ **Detection of Ascites**

➢ **Puddle Sign–** Detects as little as 120ml of ascites fluid within the abdomen.

- **Elicitation–** Keep the patient in knee elbow position and maintain it for several mins.
- Percuss around umbilicus- presence of fluid will result in dull note.

➢ **Horseshoe–** shaped dullness- detecting moderate to massive ascites.

- **Method–** Percuss from umbilical region towards each flank on both side of the abdomen.
- Percuss the suprapubic region.
- In precence of ascites- both the flanks and suprapubic areas are dull to percuss due to collection of fluid.
- Fluid thrill- Place the palm on one side of abdomen of patient. Ask the attendant to place palm over middle of abdomen. Examiner should tap on the otherside of abdomen and feel the thrill on palm kept on side of abdomen. This usually signifies presence of massive ascites.



Urogenital System

General Symptoms

- Pain
- Pelvic pain

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- Hematuria
- Alteration in urine volume
- Frequency
- Nocturia
- Dysuria
- Urgency of Micturition
- Incontinency
- Enuresis
- Slow Stream
- Hesitancy
- Terminal Dribbling
- Urethral Discharge
- Hyper volemia & Hypovolemia

Common Reproductive System Features

- Impotence
- Loss of desire
- Erectile dysfunction
- Premature ejaculation
- Absence of orgasm
- Absence of emission
- Failure of detumescence
- Priapism
- Hirsutism
- Psuedohirsutism
- Virilization
- Defeminization
- Disturbances in menstruation

Symptoms of Renal and Urological Disease

PAIN– Pain arising from the urinary tract is a common symptom that is often due to obstruction, infection or tumor (usually felt in the flank or the loin).

- Ureteric obstruction (e.g. a stone) loin to groin pattern radiate to the iliac fossa, the testicle or the labia (the pattern depending to a certain extent on the level of the obstruction)
- Polycystic kidney disease- chronic flank pain
- Acute bladder outflow obstruction- severe supra pubic pain.
- Lower urinary tract infection- (cystitis or urethritis) accompanied by dysuria, frequency or strangury (painful micturition).

Urine stick testing (protein, blood and leukocytes).

- In men this pain may be associated with severe perineal or rectal discomfort-this suggests prostatitis.
- In young children with urinary tract infection and cystitis the symptoms may be much less obvious (cries on micturating).

- Pain from the kidneys, if it results from acute infection or abscess, may occasionally reflect tracking of pus upwards to the diaphragm, causing diaphragmatic pain, or in the retroperitoneal space to the psoas muscle, leading to pain when the muscle is stretched on passive hip extension.
- Glomerulonephritis is usually painless.
- Kidney tumours may cause a dull persistent flank pain.

Examine For

1. Site
2. Onset
3. Character
4. Severity
5. Radiation
6. Associated symptoms
7. Timing - duration, course, pattern
8. Aggravating & relieving factors

Haematuria (RBC in urine)

- With or without pain
- Continuous or intermittent
- Visible or not

➢ Macroscopic (pink, red, cola)

or

➢ Microscopic (4/un centrifuged, 2/centrifuged)

Essentials of Diagnosis of cause of hematuria

- Post infectious glomerulonephritis
- IgA nephropathy (berger's disease)
- Acute cystitis
- Urinary stone
- Analgesic nephropathy
- Sickle cell disease
- Poly cystic kidney disease
- Renal tuberculosis

Alteration in Urine Volume

- Normal urine output 700-2500 ml/day
- TYPES

1. Polyuria — more than 3 L/day
2. Oliguria — less than 500 ml/day
3. Anuria — less than 50 ml/day

- **CAUSES**

1. Systemic causes 2. Physiologic causes 3. Renal causes

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Polyuria: (Pathological)

- Diabetes Mellitus
- Central/cranial diabetes insipidus (due to deficient ACTH production).
- Post trauma
- Tumors & cysts of pitiutary
- Sheehans syndrome
- Gillianbarre syndrome
- Post hypophysectomy
- Granuloma
- Cmpty sella syndrome

Renal Causes of Polyuria

- Nephrogenic diabetes insipidus (due to tubular disfunction failure).

1. Acquired (multiple myeloma, hypercalcemia, pylenephritis, SC aneamia, analgesic & hypokalemic nephropathy).
2. Drugs or toxins (lithium, alcohol, phenytoin, propoxyphene, etc).
3. Congenital (polycystic disease, medullary cystic disease, heredietarynephrogenic diabetes insipidis).

- Solute diuresis (osmosis), glucosuria, chronic renal failure, high protein tube feeding, mannitolinfusion,contrast media infusion.
- Natriuretic syndrome, salt losing nephritis, diuretic phase of acute tubular necrosis
- Miscellaneous : treatmentg of all edematous conditions diuretic phase of acute glomerulonephritis & acute renal failure.

Oliguria - Pathological

Primary Renal Disease

- Acute glomerulo nephritis
- Acute tubular necrosis
- Renal cortical necrosis
- Vascular lesions - vein thrombosis, infarction, hemolytic urine syndrome, thrombotic, - thrombocytopenic purpura, disseminated intra vascular coagulation.

- Others- hepatorenal syndrome, rhabdomyolysis

Pre Renal Causes

- Congestive cardiac failure
- Cirrhosis of liver
- Hypoproteinemia
- Cardiogenic shock (sepsis/hemorrhage)
- Dehydration (vomiting diarrhea, burns)

Post Renal and Obstructive Cause:

- Calculi
- Tumors
- Retroperitoneal fibrosis

Ask for

- Fluid intake?
- Occupation? (hot atmosphere)
- Exercise, activities, status epilipticus (rabdomylosis?)
- Hisroty of diarrhea vomiting
- History of acute illness - renal disease
- Oliguria with hematuria and early morning puffiness, antecedent infection --- glomerulonephritis.

Causes of Anuria:

- Urinary tract obstructions
- Bilateral renal artery occlusion
- Bilateral renal venous occlusion
- Severe renal disease- cortical necrosis, rapidly progressive glomerulonephritis.
- Cardiogenic shock- sepsis, hemorrhage.
- Dehydration- diarrhea, vomiting, burns.

Clinical Evaluation:

- Examine all systems with special reference to-
- Loin tenderness
- Palpable hydronephrotic kidney
- Genitalia
- Rectum (prostatic & pelvic cause for obstruction)
- Vagina

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Dysuria

- Specific form of discomfort arising from the urinary tract in which there is pain immediately before, during or after micturition. It is felt as 'burning' or 'scalding'.
- Associated frequency of micturition and decreased functional bladder capacity.
- Infection and neoplasia in the bladder or urethra are the most important causes.
- An extreme form of dysuria, strangury, implies an unpleasant and painful desire to void when the bladder is empty or nearly so.
- Urgency is the loss of the normal ability to postpone micturition beyond the time when the desire to pass urine is initially perceived.
- Incontinence is the involuntary passage of urine. In extreme cases urgency may lead to urge incontinence, in which the desire to void cannot be voluntarily inhibited. Stress incontinence, on the other hand, is leakage of urine associated with straining or coughing, often due to weakened pelvic floor muscles. The term enuresis is usually used to describe noctural enuresis, or bed-wetting.

Triad of symptoms- frequently seen in elderly men with prostatic hypertrophy.

- Difficulty in initiating micturition (hesitancy)
- In completing micturition in a 'clean stop' fashion (terminal dribbling).
- Always associated with frequency of micturition and nocturia, the result of a low functional bladder capacity. In Advanced cases there is progressive bladder enlargement, with eventual overflow incontinence and continuous or intermittent dribbling of urine

Urethral Discharge :

- Usually only noticed by men. This Requires further investigatio. It may be Associated with symptoms of urethral irritation.

The Underlying pathology is likely to be urethritis. It is often infective and sexually transmitted.

Pelvic Pain

Examine for the vicera causing pain

- Pelvic origin?
- Extra pelvic origin? (referred pain- spine, appendicitis)

Menstrual Pain

- Somatic symptoms like edema, breast engorgement, abdominal discomfort/bloating prior to menses.
- Premenstrual syndrome- with irritability, lethargy, depression.
- Primary dysmenorrhea- with severe uterine cramps due to prostaglandin induced uterine ischemia.
- Secondary dysmenorrhea due to disease of pelvis, menstrual pain may b felt in sacral region- poorly localized cramp like & tend to radiate down the legs.

Adnexal Pain:

Most common cause is infection like acute salpingoophoritis. In this there will be low abdominal pain, fever with chills & begin in a few days after menses. Chronic pelvic inflammatory disease result from infection, present as infertility, associated with pain in intercourse & during menses.

Other causes are- ectopic pregnancy, torsion or rupture of ovarian cyst/neoplasm, endometriosis of fallopian tube/ovary, pain with menstruation & if posterior ligament is involved, then there is pain during intercourse.

Vulvar/Vaginal :

- Pain most common cause is infection. It is charecterised by Presence of vaginal discharge & pruritis. The causative organisms are monilla, trichomonas, herpes, cysts/abscess of bartholin's gland, condylomaaccuminatum, vaginismus. Symptoms like painful involuntary contraction of muscles surrounding vagina that can cause dyspareunia (it is a conditioned response to previous traumatic/frightening sexual exposure).

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Pregnancy Associated

- Threatened abortion/incomplete abortion with uterine cramps
- Bleeding/passage of tissue following a period of amenorrhea.
- Ectopic pregnancy has insidious presentation.

Characteristics of extra pelvic pain

- Chronic pain is deep seated dull aching, may occur as acute severe pain, made worse on pressure on abdomen. Pain is due to congestion of blood vessels and edema of pelvic organs.
- Causes are pelvic appendicitis, diverticulitis, referred from spine.

Appendicitis

- Initially pain is vague colicky in peri umbilicalor epigastric. Within 12 hrs pain shifts to right lower quadrant. Nature of pain is steady & worsened by coughing and walking.
- Vomiting with low grade fever is typical.
- Onset of vomiting before pain suggests alternate diagnosis.

Impotency:

- Impotence is the failure to achieve erection, ejaculation or both. Patient complains of sexual dysfunction. Various aspects of impotency are as:

1. Loss of libido (sex drive)
2. Inability to initiate or maintain erection
3. Ejaculatory failure
4. Premature ejaculation
5. Inability to achieve orgasm

Cause :

(A) **Organic : it can Primary or Secondary**

(1) Urogenitalcause

(2) Endocrine cause like acromegaly, hypo/hyper thyroidism, cushing's syndrome, addison's disease, all causes of primary and secondary hypogonadism.

(3) Due to systemic disease like chronic illness, neurological diseases involving lumbosacral segment of spinal cord, drugs like estrogens, sedatives, anticancer drugs etc.

(4) Alcohol& other drug addictions

(B) Psychogenic : due to Loss of desire

- androgen deficiency due to pituitary or testicular disease
- any chronic illness
- physiological- anxiety
- phobic avoidance
- habituating drug abuse.
- Erectile dysfunction-is defined as the constant inability to maintain an erect penis with sufficient rigidity to allow sexual intercourse. Causes are-
- Endocrine-testicular failure (primary or secondary), hyperprolactinemia.
- Penile diseases- previous priapism, trauma, peyronies's disease
- Neurologic diseases- ant temp lobe leison, spinal cord leison, tabesdorsalis, diabetic autonomic neuropathy, radical prostectamy & cystectomy & recto sygmoid operations.
- Vascular diseases- aortic occlusion damage from pelvic radiation, disease from sinusoidal space.
- Drugs like antihypertensives-clonidine,methyldopa, beta-blocker, thiazides,anti depressants- monoamine oxidase inhibitors, tricyclics; anticholinergics; antiandrogens-spironolactone, ketoconazole; antipsychotics, cns depressants-barbiturates, diazepam, narcotic drugs of habituation like heroin, tobacco, alcohol.

Premature Ejaculation– Is due to anxiety regarding sexual situation, performance, or emotional disorder (never due to organic disorder).

Absence of Orgasm– It is always due to psychiatric disorder especially when there is no loss of libido & erectile dysfunction.

Absence of Emission– Retrograde ejaculation (DM, surgery of neck of bladder) sympathetic denervation (following sympathectomy) androgen deficiency, drugs (phenoxy

benzamine, phenatolamine), anxiety, guilt, depression, mental problems, unresponsiveness of mate.

- **Failure of detumescence–** (restoration of flaccid state of penis after erection).
- **Priapism–** it is persistent & painful erection often unrelated to sexual activity. differentiated from normal by absence of tumescence of the glans penis.

(causes- idiopathic, sickle cell anemia, chronic myeloid leukemia, spinal cord injury).

Enquire for following

- If experienced normal potency before? (primary/secondary).
- Does it present always? (organic-persistent/psychological-situational and conditional).
- Onset (insidious and slowly progressive-organic, sudden-psychogenic).
- Does onset coincide with any serious illness or stressful event?
- If pt experience erection in sleep or in early morning?
- History of anxiety/depression?
- Any developmental abnormalities of UGT (primary and secondary sexual characters development).
- Small penis <2.5 cm & flaccid
- Normal adult testis - 5 +/- 0.8cm and vol 15-25ml
- (Testis small & firm in klinefelter's syndrome, small and soft in acquired testicular atrophy).
- Other features of hypogonadism- loss of libido, lethargy, less frequent shaving, soft and small testis.
- Enquire about psychological factors- disinterest in partner, marital disharmony, fear of sexual incompetence, guilty feeling, worry fatigue & ill health.

Disturbance in Menstrution

- If patient complains of disturbance in menstruation then suspect for-

1. Amenorrhea 2. Abnormal uterine bleeding

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If amenorrhea examine for

- Anatomic defects of outflow tract: Congenital defects of vagina, Imperforate hymen, Transverse vaginalis septa, Cervical stenosis, Intrauterine adhesions, Absence of vagina or uterus, Uterine mal development
- Ovarian failure :
  1. Deficient germ cells
  2. Germ cells resistant to FSH (plasma FSH>40 IU/L)
  3. Gonadal dysgenesiseg turner's syndrome
  4. Premature ovarian failure
  5. Secondary amenorrhea

  (hypothalamic dysfunction, pitiutary diseases, hypo & hyperthyroidism, cushing's syndrome, androgen secreting tumor, autoimmune ovary dysfunction, polycystic ovary, severe systemic illness- renal failure, endometrial TB etc).

* Chronic anovulation:

1. Deficient estrogen 2. Not secreted in cyclic fashion

Polycystic ovarian disease

Hormone secreting tumors

Hypogonadotrophichypogonadism

(</no estrogen so no withdrawal bleeding after progesterone administration due to- brain, pituitary- tumors, primary hypopituitarism, sheehan's syndrome).

Failure of menarche by the age of 15 years or absence of menstruation>6 months with previous periodic menses indicate.

Primary amenorrhea - no previous menses

Secondaryamenorrhoea- 3 consecutive months no menses

Abnormal uterine bleeding:

Normal bleeding

Cycle - 28+/- 3 days Flow - 4+/- 2 days

Loss - 40 - 100 ml blood

In Abnormalbleeding enquire for:

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Change in Frequency

Extended or decreased Duration

Amount of blood loss

Features and Causes of Ovulatory Cycles

- Spontaneous, regular in onset, predictable in duration & amount of flow, often associated with discomfort, due to progesterone withdrawal at the end of luteal phase.
- Sub mucous leiomyoma, adenomyosis, endometrial polyp (cycles- regular, prolonged & excessive).
- Outflow tract obstruction like uterine synechiae/scarring of cervix (cyclic, predictable menstruation with spotting).
- Intermittent bleeding bw cyclic ovulatory menses- cervical or endometrial bleeding.

Feature of Bleeding Due to Anovulatory Cycles

- Irregular
- Unpredictable- amount & duration
- Painless
- Due to failure in normal follicular maturation

  (Transient disruption- early menarchal years, perimenapausal period, stress, intercurrent illness.Persistent dysfunction- diseases affecting ovarian function like polycystic ovarian disease).

Acute Renal Failure

- Occurring over a period of hours or days.
- Reduction of the urinary flow rate- anuria or oliguria.
- Nitrogen retention and usually to sodium and water retention.
- Non-oliguric acute renal failure.
- Many are reversible spontaneously (repair of ischemic injury as in tubular necrosis) or as a result of therapy (removal of stone or other cause of obstruction).

Chronic Renal Failure

- Any form of renal parenchymal disease, chronic renal ischemia or unrelieved urinary obstruction may cause renal failure.
- Severe, there may be clinical manifestations of uremia GFR has fallen to one-third of normal or less.
- Lethargy, poor concentration, irritability, and failure of higher mental functions and ability to handle tasks are all commonly reported. In advanced cases there may be confusion, fits and stupor.
- uremic toxins to be removed by dialysis.
- Nausea, vomiting and diarrhea are also common in advanced uremia.

Nephroticsyndrome. ; common features are

- The presence of heavy proteinuria (usually >3g/day, compared with normal of <150mg/day), hypoalbuminaemia, hypercholesterolaemia and oedema.
- <2g/24h, and conversely some patients are able to maintain a normal or near-normal serum albumin concentration despite very heavy proteinuria in excess of 6g/24h.
- Proteinuria of this magnitude implies glomerular pathology and may coexist with a significant reduction in GFR.

Urinary Tract Infection

- Urinary tract is sterile except at its extreme distal end. Most frequent site of infection is the bladder, and the local symptoms reflect bladder irritation, with frequency of micturition, low functional bladder capacity and pain on passing urine - dysuria.
- There are more than 105 colony forming bacteriaunits/mL urine in a carefully collected midstream specimen (MSU).

Urinary Tract Obstruction

- Lower urinary tract obstruction is defined by residual urine in the bladder after micturition, or in more extreme forms by urinary retention with inability to empty the bladder at all.

- The most common causes- prostatic hypertrophy (benign hyperplasia or carcinoma) = featured as increased frequency, nocturia, poor stream, hesitancy, terminal dribbling.
- All of these are a consequence of a low functional bladder capacity, inability to empty the bladder completely, and impairment of the urinary flow rate.
- Upper urinary tract obstruction- demonstration of a dilated renal collecting system (renal pelvis and/or calyces), often seen to be proximal to a specific obstructing lesion.
- Upper and lower urinary tract obstruction may coexist, when the lower urinary tract obstruction is severe and/or of long standing, and leading to progressive dilatation of the upper urinary tract with consequent renal damage.
- Unilateral renal obstruction should not result in a rise in the serum creatinine. Therefore, if the creatinine is elevated there is also dysfunction of the contralateral kidney.

Renal Stones

- Symptoms and signs depend much on the location of the stone(s) and on size. Smaller stones may be asymptomatic.
- Larger stones in the kidneys frequently lead to renal pain, whereas stones in the ureter are particularly likely to cause acute obstruction and very severe ureteric and renal pain. Bladder stones are usually associated with symptoms suggestive of cystitis:
- Increased frequency, hematuria and pain are all common, and urinary tract infection is often associated.

Renal Hypertension:

- Most common cause of sustained BP elevation is essential hypertension. Minority of patients with raised BP renal disease will be found to be the cause.
- Hypertension may be one of the presenting features of virtually any disease of the renal parenchyma, including all forms of glomerulonephritis, many forms of tubulointerstitial disease, renal vascular disease, renal stone disease and obstruction.

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- Renal tumours and renal infections may occasionally present with hypertension, which in some cases can be the only presenting feature.
- Thus, in any patient with newly identified hypertension the possibility of underlying renal disease should be considered.

Renal Tubular Syndrome

- Only a few of tubular defects responsible for specific clinical manifestations.
- Proximal tubular abnormalities include renal phosphate wasting, aminoaciduria (of these, cystinuria with cystine stone formation is the most important), and renal tubular acidosis leading to chronic metabolic acidosis.
- Distal tubular defects are also associated with metabolic acidosis and with disturbances of potassium metabolism, sodium-losing nephropathy and nephrogenic diabetes insipidus, with resulting failure, respectively, of salt and water conservation.

Male-specific GU Related Symptoms

- Difficulty in starting or stopping urinary stream
- Voluntary bearing down (straining) to urinate
- Nature of stream (speed, strength, volume)
- Post-void dribbling or post-void fullness
- Discharge from penis, itching
- Lesions on the external genitalia
- Genital, groin, suprapubic or low-back pain
- Testicular pain or swelling
- Torsion of the testes
- Testicular self exam (frequency regularity)
- History of hydrocele, epididymitis, prostatism,varicocele, hernia, undescended testis, spermatocele, recent vasectomy, erectile dysfunction.

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Female-specific GU Related Symptoms

- Urinary symptoms, (pain, burning, malaise, abdominal pain, back pain, fever).
- Urethral discharge
- Menstrual History (menarche, interval, regularity, duration and amount of flow, dysmenorrhea)
- Date of most recent menstrual period (normal)
- Premenstrual symptoms (swelling, headache, mood swings, pain).
- Abnormal uterine bleeding
- Symptoms of menopause
- Age at menopause
- Postmenopausal bleeding
- Obstetric History: Gravida, Term, Para, Abortion, Live, (GTPAL) difficulties with pregnancies, deliveries.
- Infertility
- Post coital bleeding.
- Vaginal discharge (onset, colour, odour, consistency, quantity).
- Sense of pelvic relaxation (pelvic organs feel as though they are falling down or out).
- Lesions or persistent ulcerations to the external genitalia.

Medical History (Specific to Genitourinary System)

- Cystitis, pyelonephritis, Renal disease, Renal stones.
- Congenital structural abnormalities in the genitourinary tract.
- Recent onset of or increase in sexual activity.
- Recent GU tract instrumentation (e.g., catheter, urethral dilatation, cystoscopy).
- Recent gynaecological procedures.
- Menopause (with no hormone replacement therapy).
- Diabetes mellitus
- Immuno-compromise
- Sexually transmitted infections

- Pelvic inflammatory disease
- Human papilloma virus
- Sexual abuse
- Allergies
- Exposure to chemical irritants
- Medications currently used, prescription and over the counter (e.g., immuno-suppressants, oral contraceptives, anti-hypertensives, antipsychotics).
- Herbal preparations
- Risk behaviours (e.g., unprotected sex, alcohol or drug abuse, use of illicit injection drugs).

Family History (Specific to Genitourinary System)

- Urinary tract infections
- Renal disease (e.g., renal cancer, polycystic kidneys)
- Diabetes mellitus
- Kidney stones

Personal and Social History (Specific to Genitourinary System)

- Personal hygiene, toileting habits
- Sexual practices (risk behaviors, sexual orientation)
- Sexual or physical abuse
- Symptomatic sexual partner
- Use of contraceptive creams, foam, condoms, diaphragms etc.
- Use of bubble bath, douches
- Tight-fitting underwear or other clothing
- Multiple sexual partners
- Disruption in sex life (from GU symptoms)
- Smoking (associated risk of bladder cancer)
- Fear, embarrassment, anxiety
- Missing work, school or social functions because of GU symptoms (e.g., incontinence)

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Physical Examination

General signs

- Vital Signs
- Inspection
- Palpation
- Percussion
- Auscultation

Special Signs

- Cremasteric Reflex
- Trans Illumination Test
- Bulbocavernous Reflex

Physical assessment :

General

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale)
- Nutritional status (emaciated or obese)
- Match between appearance and stated age

Vital Signs

- Temperature
- Heart rate
- Respiratory rate
- Blood pressure

Inspection (Male)

- Abdominal or flank surgical scars
- Edema (facial, peripheral)
- Penis, scrotum and pubic area: inflammation, discharge, lesions, swelling, asymmetry, changes in hair distribution, nits, warts.
- Rectum: lesions, discharge, swelling, haemorrhoids
- Inguinal and femoral areas (for hernia)

Palpation and Percussion

- Suprapubic tenderness
- Bladder distension
- Abdominal tenderness or masses
- Costovertebral angle tenderness
- Enlargement of kidney (normal kidneys are usually not palpable unless client is thin)

- Inguinal and femoral nodes for swellings and hernia
- Superficial inguinal ring (for hernia)
- Penis: tenderness, induration, nodules, lesions
- Testes and scrotal contents: size, position, atrophy of testes, tenderness, swelling, warmth, masses, hydrocele
- Rectum: anal sphincter tone, rectal wall tumors, prostate gland
- Prostate: size, shape, contour, consistency, tenderness or nodules.

Inspection (Female)

- External genitalia: labia majora and labia minora: lesions, ulcerations, masses, induration, and areas of different color, hair distribution.
- Perineum: lesions, ulcerations, masses, induration, scars
- Clitoris: size, lesions, ulcerations
- Urethra: discharge, lesions, ulcerations
- Vagina: speculum exam- inflammation, atrophy, discharge, lesions, ulcerations, excoriation.
- Vagina: speculum exam-masses, induration or nodularity, relaxation of perineum (ask client to bear down and observe for any bulging of vaginal walls)
- Cervix: speculum exam- position, color, shape, size, consistency discharge, erosions, ulcerations
- Os: multipara or nullipara

Palpation and Percussion

- Lymph nodes: enlargement, tenderness, mobility and consistency (supraclavicular, infraclavicular, axilla, epitrochlear, inguinal).
- Skene's and Bartholin's glands: masses, discharge, tenderness
- Cervix: cervical tenderness, bleeding after contact, consistency of cervical tissue (normal cervix is pink and feels firm, like the tip of the nose; in pregnancy, the cervix is bluish and feels softer, like the lips of the mouth).

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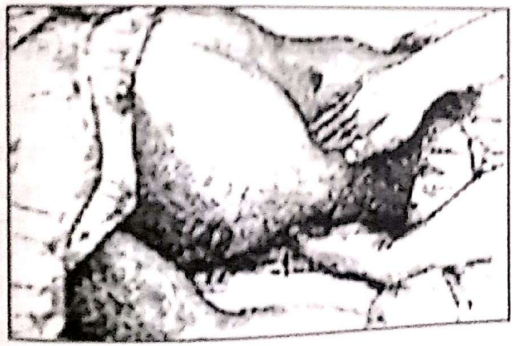
- Uterus: position, size, contour, consistency of uterine tissue, mobility on movement.
- Adnexa: ovaries for tenderness, masses, consistency, contour, mobility, pain on movement (Chandelier's sign)
- Anus: lesions, ulcerations, tenderness, fissures, hemorrhoids

Abdominal Palpation

(Bimanual Palpation)

- a palpable kidney can only be felt because it is enlarged, as in hydronephrosis, multiple cysts (polycystic kidney disease), or tumour (generally unilateral).



- A distended bladder is identified in the lower abdomen by a combination of palpation and percussion.
- Rectal examination- prostate gland.

Auscultation

- Pericardial friction rubs- Uraemic pericarditis
- Pleural friction rubs- Uraemic pleurisy
- Added heart sounds (S3 and S4)- volume expansion and incipient heart failure, and ventricular hypertrophy often as a consequence of hypertension.
- Vascular bruits and/or impairment of the major arterial pulses- possibility of renal vascular disease, which may underlie hypertension and/or renal failure if bilateral.

Locomotor System

Locomotory means pertaining to locomotion or movement. Also called as Musculoskeletal system mainly involves Bones, Muscles, joints. Spine, and 4 limbs come under this system.

Common Symptoms of Locomotor System

- Pain
- Stiffness
- Redness (Erythema) and warmth
- Swelling
- Weakness
- Locking and Triggering
- Deformity
- Extra-Articular manifestation

Pain

It may originate from a joint (arthralgia), muscle (mayalgia) or other soft tissue structure.

Assesment of the muskuloskeletal pain done by.

- Site
- Onset
- Character
- Radiation
- Associated factor
- Timing
- Exacerbating features
- Severity

Stiffness

Restricted range of movement

- Localized to particular joint-ankylosing spondylitis
- Generalized-Rheumatoid arthritis.

If the stiffness predominate over pain, suspect

- Spasticity (increasing muscle contraction in response to stretch) &
- Tetany (involuntary sustained contraction)

Swelling

Swelling may be due to diffuse soft tissue edema or caused by the collection of fluid in a joint, bursa or tendon sheath.

Eg: swelling in knee joint-haemarthrosis

Weakness

Suggests a joint disorder, peripheral nerve lesion or muscular disease.

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Eg: medial nerve compression in carpal tunnel syndrome

Location of weakness-

- Proximal weakness-primary muscle disease such as immune-mediated inflammatory muscle disease.

Eg: dermatomyositis

- Distal weakness-neurological

Eg: peripheral neuropathy of thiamine

Muscle Strength Scale

0. No detection of muscular contraction
1. A barely detectable flicker or trace of contraction with observation or palpation.
2. Active movement of body part with elimination of gravity.
3. Active movement against gravity only and not against resistance.
4. Active movement against gravity & some resistance
5. Active movement against full resistance without evident fatigue (Normal muscle strength)

Redness and Warmth

Seen in acute inflammatory arthritis

- Erythema or redness is common in infective,traumatic and crystal-induced condition.

Locking Andtriggering:

Locking: is the incomplete range of movement at a jt

True locking-block to usual range of movement by mechanical obstruction.

Eg: torn meniscus

Pseudo-locking-loss of range of movement due to pain rather than a mechanical block.

Eg :patellofemoral pain-holds knee in full extension & will not flex.

Triggering :When extending fingers from a flexed position there block to extension suddenly.It results from a nodular tendon thickening .

Deformity:

- Acute deformity- May occur when there is fracture,dislocation
- Chronic deformity-Mal alignment of bone forming joint or mal apposition of the surface of the joint which may be partial (sub luxation) or complete (dislocation).

Extra Articular Manifestation

- Inflammatory arthritis is commonly associated with skin, nails features.

  Eg: Septic arthritis-fever, malaise, Psoriatic arthritis

Nodules

- Sub cutaneous skin nodule-rheumatoid nodule
- Skin nodule-found in SLE & rheumatic fever
- Bony nodule-in OA
- Bouchard's nodes
- Heberden's node
- Gouty tophi- common site helix of ear
- Small dark red vasculitic spot due to small skin infarct in SLE.
- Raynaud's phenomenon
- Eye features-Conjunctivitis and Scleritis in RA

The Physical Examination:

- Appearance of the patient.
- Do not cause additional pain.
- When examining a limb compare it with the opposite side.
- Assess active before passive movement.

The commonly used terms are:

- Flexion
- Extension
- Hyperextension
- Adduction
- Abduction
- Varus
- Valgus

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Techniques of examination:

- Inspection
- Palpation
- Range of movement
- Direction of joint movement
- Maneuvers to test joint function

Above factors should helps to orient the distinguishing anatomical & functional features of each joint.

Gait

Gait is the cyclical pattern of musculoskeletal motion that carries the body forward.

Gait- stance & swing

Assessment of Gait

- Ask the patient to walk back and forth across the room.
- Observe for equality of arm swing, balanceand rapidity andease of turning.
- Next, ask the patient to walk on histiptoes, then onheels.
- Test patient's ability to stand with feet together with eyes open and then closed. (Romberg's test). Reassurepatient that you will support him, in case he becomes unsteady.
- Normal: Person can walk in balance with the arms swinging at sides and can turn smoothly. Person should be able to stand with feet together without falling with eyes open or closed.

Some of the Common Patterns of Gait Are

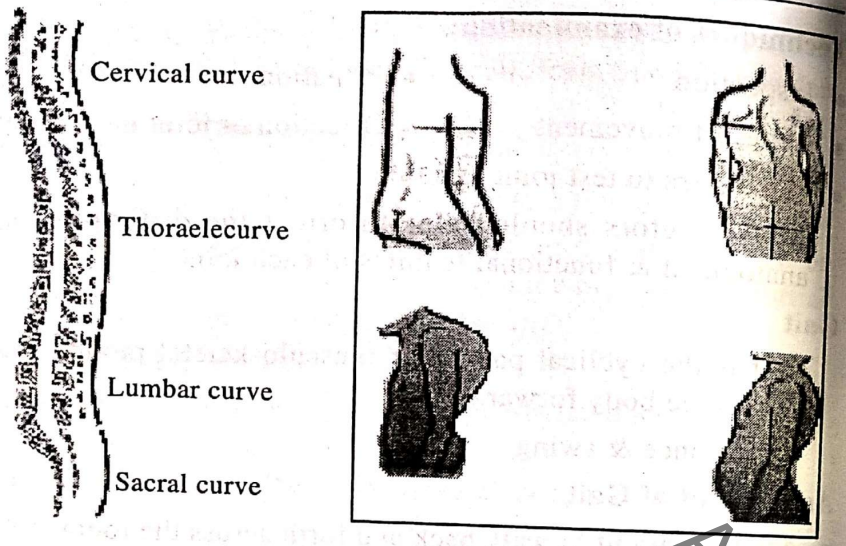
- Hemiplegic gait
- Spastic gait
- Scissors gait
- High steppage gait
- Parkinson's gait

Spine

- Concave curvature- Cervical & Lumbar
- Convex curvature- Thoracic &Sacrococygeal

In Examination of Spine Look For

- Scoliosis
- Kyphosis
- Lordosis
- Gibbus



- Spondylolysis
- Retrolisthesis
- Spondylolisthesis

Cervical Spine

- Posture of neck and any abnormality
- Palpate the bony contour
- Movement of neck
- Perform passive movements if there is impairment of the active range.
- Neurological examination for nervous system involvement

Thorasic Spine

- Inspect posture from front, back, side and note any deformity
- Examine bony contour and define areas of tenderness.
- Where local tenderness is not detected, perform gentle percussion with fist or tendon hammer.
- Whether spinal flexion does or does not corrected any scoliosis which is present.

Lumbar Spine: It include 3 components

1. Inspection for deformity

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2. Assess the movements of spine
3. Assess the effects of lumbar spinal pathology on the spinal cord or nerve roots.

General Examination of the Spine

The examination should begin as soon as you first see the patient and continues with careful observation during the whole consultation.

It is essential to observe the patient's gait and posture. Inconsistency between observed function and performance during specific tests may help to differentiate between physical and functional causes for the patient's symptoms.

Inspection

Examination of any localised spinal disorder requires inspection of the entire spine. The patient should therefore undress to their underwear.

Look for any obvious swellings or surgical scars.

Assess for deformity: scoliosis, kyphosis, loss of lumbar lordosis or hyperlordosis of the lumbar spine. Look for shoulder asymmetry and pelvic tilt.

Observe the patient walking to assess for any abnormalities of gait.

Palpation

Palpate for tenderness over bone and soft tissues.

Perform an abdominal examination to identify any masses, and consider a rectal examination (caudaequina syndrome may present with low back pain, pain in the legs and unilateral or bilateral lower limb motor and/or sensory abnormality, bowel and/or bladder dysfunction with saddle and perinealanaesthesia, urinary dysfunction and bowel disturbances, and rectal examination may reveal loss of anal tone and sensation).

Movement

The normal range of movements are outlined in the relevant sections below.

Examination of the spine must also include examination of the shoulders and examination of the hips to exclude these joints as a cause of the symptoms.

Neck Examination

Neck problems are common in general practice, either chronic discomfort, such as with cervical spondylosis, or following acute trauma, eg whiplash injuries following road traffic accidents. Evaluation of any neurological symptoms in the upper limbs must include an assessment of possible causes in the neck. Spinal cord compression in the neck may lead to lower limb problems and abnormal gait, as well as bladder and bowel disturbance.

Neck Inspection

Deformity: may be seen in cervical spondylosis or acute torticollis.

Instability of the cervical spine: check that the patient can easily support their head (obvious if mobile but instability may be missed in a supine patient).

Abnormal head posture may be due to neck problems but also other causes, eg weakness of the ocular muscles.

Asymmetry, eg of scapulae, or supraclavicular fossae, eg Pancoast's syndrome due to a malignant tumour at the apex of the lung.

Torticollis (affected side and chin often tilted to opposite side) or sternomastoid 'tumour' in infants. Causes of acquired torticollis include upper respiratory tract infection, vertebral malalignment or trauma.

Arms and hands: for wasting, fasciculation, motor abnormalities (tone, power), sensory deficits and any indication of thoracic outlet syndrome (see articles on Neurological Examination of the Upper Limbs and Cervical Disc Protrusion and Lesions).

Lower limb motor or sensory deficits may be caused by cervical spinal cord compression.

Neck Palpation

- Palpate for tenderness and masses:
- Posterior in the midline.
- Lateral.

- Supraclavicular-cervical rib (see article on Cervical Ribs and Thoracic Outlet Syndrome), lymph glands, tumours.
- Anterior- including thyroid examination.
- Midline tenderness in the cervical spine: may be due to supraspinous damage following whiplash injuries or may also indicate more major neck trauma.
- Midline tenderness localised to 1 space is common in cervical spondylosis.
- Palpate lateral aspects of vertebrae for masses and tenderness (the most prominent spinous process is T1).
- Paraspinal tenderness radiating into trapezius is common in cervical spondylosis.
- Crepitation: facet joint crepitus may be detectable with flexion and extension of the neck by either palpation or auscultation on either side of cervical spine; facet joint crepitus is common in cervical spondylosis.

Cervical Movement

Flexion– Normal range is 80^0 with chin able to touch region of sternoclavicular joint.

Extension– Normal range 50^0, so normal for full flexion to full extension is 130^0, primarily involves the atlanto-axial and atlanto-occipital joints.

Lateral Flexion– Normal range is 45^0 to both sides; restriction of lateral flexion is common in cervical spondylosis. Inability of lateral flexion without forward flexion at same time suggests atlanto-axial and atlanto-occipital joint abnormalities.

Lateral Rotation– Normal range is 80^0 to both sides; normally just short of plane of shoulders at full rotation. Rotation is restricted and painful in cervical spondylosis.

Thoraco-Lumbar Spine Examination

Low back pain is a very common presentation in general practice. Although the cause and severity of back problems are often fairly clear, it is often essential to make a thorough

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assessment and detailed examination of the back. A thorough examination of the lower limbs is essential.

Inspection

Observe for abnormal gait and posture, which may provide clues as to the nature and severity of the problem.

Superficial landmarks include:

T1 is the most prominent spinous process at the base of the neck.

T7/T8: lower border of scapulae.

L4: iliac crests.

S2: dimples at posterior superior iliac spines.

Assess curvature: kyphosis, scoliosis.

Ask the patient to bend forwards: postural scoliosis resolves; a structural scoliosis does not disappear and therefore needs further assessment. A lumber scoliosis may be associated with a prolapsed intervertebral disc. Disappearance of a scoliosis when sitting suggests that the scoliosis may be secondary to shortening of a leg. Idiopathic scoliosis leads to short stature with the trunk short in proportion to the limbs.

Ask the patient to extend their lower back. An increased kyphosis which is regular and mobile is found in postural kyphosis. Common causes of a fixed regular kyphosis are senile kyphosis (may be associated with osteoporosis, osteomalacia or pathological fracture), Scheuermann's disease and ankylosing spondylitis. Common causes of an angular kyphosis, with a gibbus or prominent vertebral spine include fracture, tuberculosis or a congenital vertebral abnormality.

Lumbar curvature: flattening or reversal of the normal lumbar lordosis as in a prolapsed intervertebral disc, osteoarthritis of the spine and ankylosing spondylitis. An increase in the lumbar curvature may be normal or due to spondylolisthesis, or secondary to an increased thoracic curvature or a flexion deformity of the hip.

Look for any other abnormalities, eg cafe-au-lait spots, which may suggest neurofibromatosis, a fat pad or hairy patch

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suggestive of spina bifida, or scarring suggestive of previous thoracotomy or spinal surgery.

Palpation

Check for bone tenderness of the spine: tenderness may indicate serious pathology such as infection, fracture or malignancy.

Ask the patient to lean forwards: tenderness between the spines of the lumbar vertebrae and at the lumbosacral junction and over the lumbar muscles may occur with prolapsed intervertebral disc and mechanical back pain.

Check for tenderness over the sacroiliac joints. This may also occur in cases of mechanical back pain and with inflammation of the sacroiliac joints.

A palpable step at the lumbosacral junction may indicate spondylolisthesis.

Percussion

Ask the patient to bend forward. Lightly percuss the spine from the root of the neck to the sacrum.

Significant pain is a feature of infections, fractures and neoplasms.

An exaggerated response may be a feature of a non-organic problem.

Movements

- **Flexion:**

  Observe carefully as hip flexion can account for apparent motion in a rigid spine.

  Flexion may be recorded by the distance between the fingers and the ground (most normal people can reach within 7cm of the floor) or the level that the person can reach (eg mid-tibia).

  The overall flexion is due to a combination of thoracic, lumbar and hip movements, and does not distinguish between them.

- **Schober's test:**

  When the spine flexes, the distance between each pair of vertebral spines increases. Schober's test can be used to provide a quantitative evaluation of flexion of the lumbar spine.

A tape with a 15 cm mark is placed vertically in the midline upwards from the level of the dimples at the level of the posterior superior iliac spines). Mark the skin at 0 and at 15 cm and then ask the patient to flex as far forward as they can.

Record where the 15 cm mark on the skin strikes the tape. The increased distance along the tape is due only to flexion of the lumbar spine and is normally about 6-7 cm (less than 5 cm should be considered as abnormal).

Flexion in the thoracic spine may be measured with the upper point 30 cm from the previous zero mark. Thoracic flexion is normally only about 3 cm.

- **Extension**

Ask the patient to arch their back; pain and restricted extension is particularly common in prolapsed intervertebral disc and spondylolysis.

Maximum range is thoracic 25^0 and lumbar 35^0.

- Lateral flexion:

Ask the patient to slide their hands down the side of each leg in turn, and record the point reached, either in centimetres from the floor or the position that the fingers reach on the legs.

The contributions of the thoracic and lumbar spine are usually equal.

- **Rotation**

The patient should be seated and asked to twist round to each side.

The normal range is 40^0 and is almost entirely thoracic; lumbar contribution is 5^0 or less.

Performing the test with the patient's arms folded across their chest gives a more accurate assessment.

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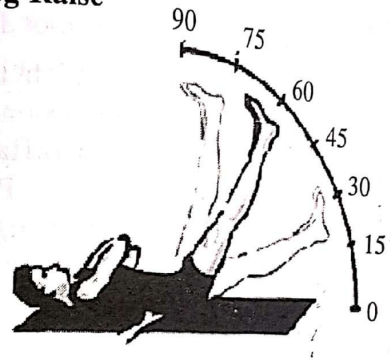
Test for Nerve Root Compression:

Straight Leg Raise



Technique

With the patient lying down on his or her back on an examination table or exam floor, the examiner lifts the patient's leg while the knee is straight.

A variation is to lift the leg while the patient is sitting. However, this reduces the sensitivity of the test.

Straight Leg test sometimes used to help diagnose a lumbar herniated disc.

Interpretation: If the patient experiences sciatic pain when the straight leg is at an angle of between 30 and 70 degrees, then the test is positive and a herniated disc is likely to be the cause of the pain.

- Sensitivity 91%
- Specificity 26%

If raising the opposite leg causes pain (cross or contralateral straight leg raising):

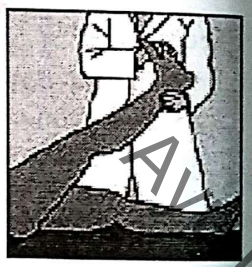
- Sensitivity 29%
- Specificity 88%

When performing the straight leg raise test the patient is positioned supine in the absence of pillows. The clinician lifts the patient's symptomatic leg by the posterior ankle while keeping the knee in a fully extended position. The clinican continues to lift the patient's leg by flexing at the hip until pain is illicited or end range is reached. Neurologic pain which is reproduced in the leg and low back between 30-70 degrees of hip flexion is a positive result of lumbar disc herniation at

the L4-S1 nerve roots. In order to make this test more specific, the ankle can be dorsiflexed and the cervical spine flexed. This increases the stretching of the nerve root and dura.

Pain at less than 30 degrees of hip flexion might indicate acute spondyloithesis, gluteal abscess, disc protrusion or extrusion, tumor of the buttock, an acute dural inflammation, a malingering patient, or the sign of the buttock. Pain at greater than 70 degrees of hip flexion might indicate tightness of the hamstrings, gluteus maximus, hip capsule or a pathology of the hip or sacroiliac joints.

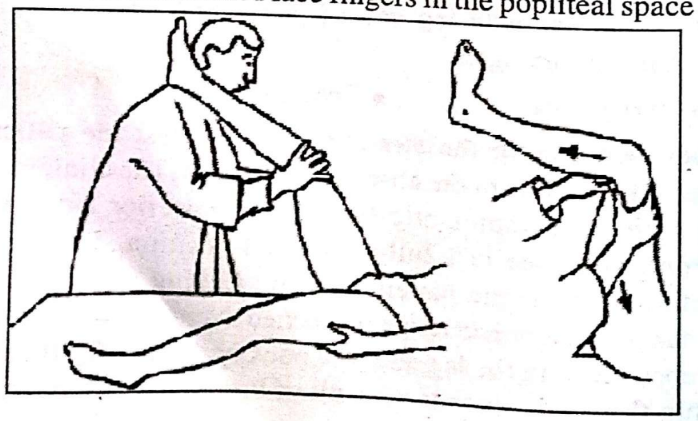
Bragard Sign



1. Procedure used to determine whether source of lower back pain is nervous or muscular. A straight leg raising procedure is done; if positive the leg is lowered just below the point of pain and then the ankle is dorsiflexed. If pain increases during dorsiflexion, pain is likely nervous in origin, whereas with no increase, the source is presumed muscular.
2. An orthopedic test of the knee joint to determine lesions of the meniscus.

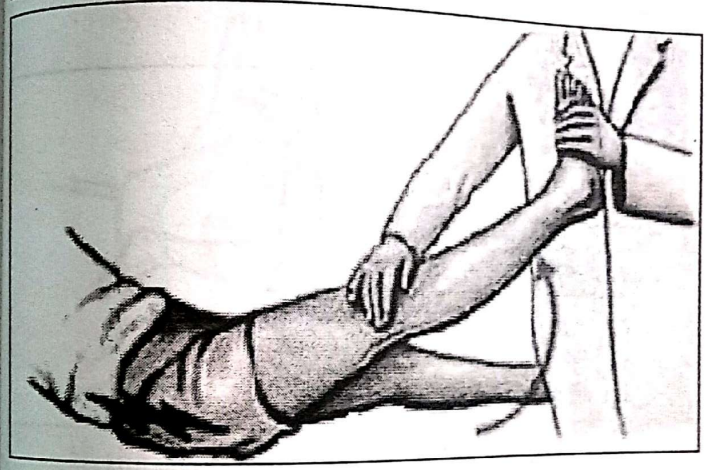
Bow String Test

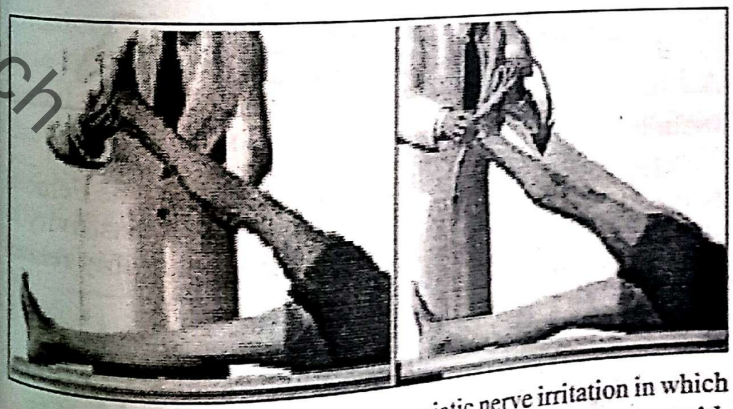
Patient is supine with knee flexed 90 and his leg placed on examiners shoulder. Place fingers in the popliteal space behind



the knee and apply pressure. If test is positive (patient has sciatica) there should be a tingling, burning sensation in the hip and buttocks.

Lesegue's Sign:





An indication of lumbar root or sciatic nerve irritation in which dorsiflexion of the ankle of an individual lyingsupine with the hip flexed causes pain or muscle spasm in the posterior thigh.

- Place the patient in the supine position.
- Ask the patient to raise his/her leg, without bending the knee, until pain occurs.
- To differentiate this pain from hamstring pain, slightly flex

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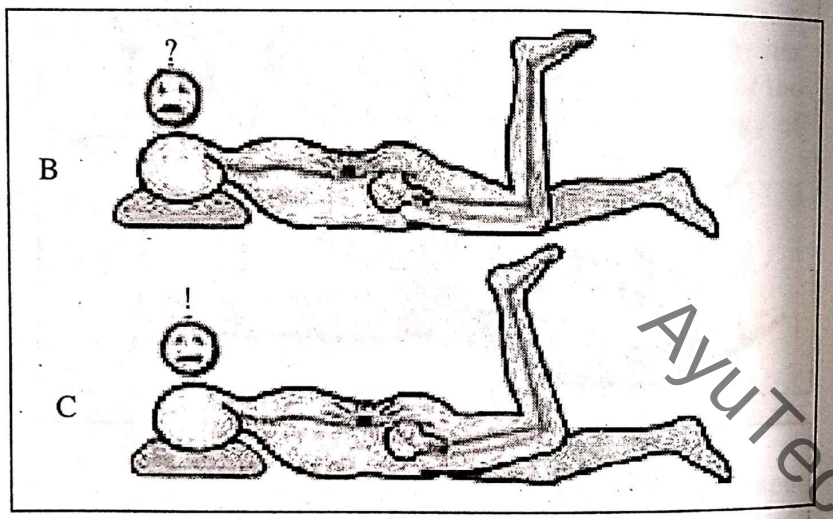
the knee and then dorsiflex the foot. If the pain is similar to the pain elicited by the straight leg raise, then patient is experiencing sciatic pain. Hip pain occurs throughout and does not radiate.

Femoral Nerve Compression Test



Definition

The Femoral Nerve Tension Test also known as the Femoral Nerve Stretch (Test) is a test used to screen for sensitivity to stretch soft tissue at the dorsal aspect of the leg, possibly related to nerve root impingements.

Description

The test is performed with the patient lying in prone. The examiner facilitates gentle knee flexion to its maximum. If no positive result appears (a positive result in this test means that it induces pain in the groin, anterior or posterior thigh, buttocks or lumbar region or while the knee is brought in flexion between 80 and 100 degrees), (s)he brings the hip to further extension.

Purpose

The femoral nerve tension test is used to screen for sensitivity to stretch soft tissue at the dorsal aspect of the leg, possibly related to root impingements.

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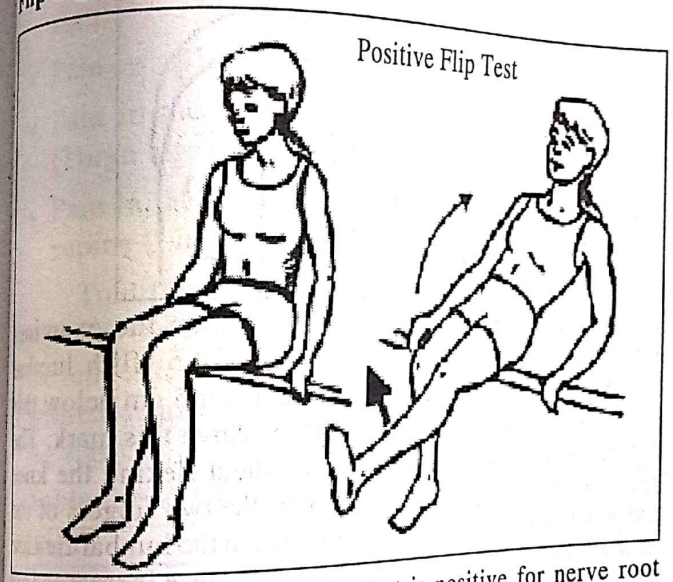
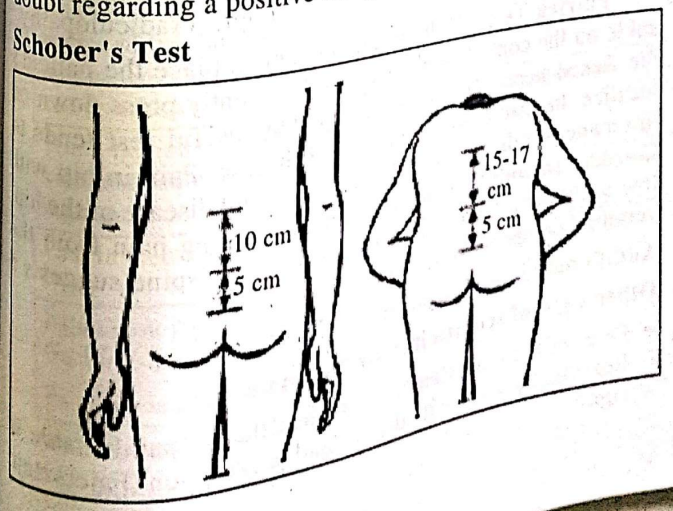
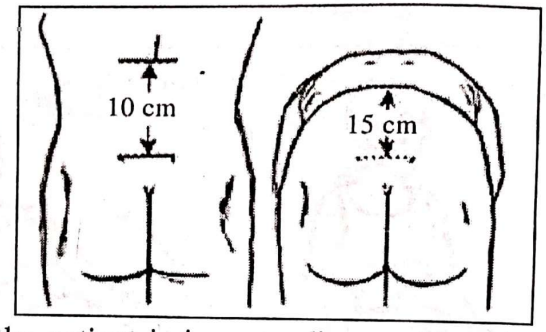
Flip Sign



If the straight leg raise test is positive for nerve root irritation, then check the flip sign. With the patient seated, gently raise the leg by extending the knee -- performing in essence, a seated straight leg raise. A positive flip test is the patient shifting the trunk backward to increase the angle at the hip. A negative flip sign (no trunk movement with full knee extension) raises doubt regarding a positive straight leg raise test.

Schober's Test





While the patient is in a standing position the examiner makes a mark approximately at the level of L5 (fifth lumbar vertebra). The examiner then places one finger 5 cm below this mark, and another, second, finger, 10 cm above this mark. The patient is asked to touch his/her toes without flexing the knee joints. By doing so, the distance between the two fingers of the examiner increases. However, a restriction in the lumbar flexion of the patient reduces this increase; if the distance increases less than 5 cm, then there is an indication that the flexion of the lower back is limited. For instance, this test is diagnostically useful as part of a clinical diagnosis of syndromes such as ankylosing spondylitis.

Other Provocative Testing

Louvel Sign– Have the patient cough or perform Valsalva maneuver. An increase in the back pain implies radiculopathy.

Patrick Test– With the patient supine, place the patient's ankle on the contralateral knee and then gently press down on the flexed knee, abducting the hip. This useful test tends to localize the discomfort to the site of disease. Pain in hip with this maneuver this suggests degenerative joint disease of the hip. Consider sacroiliitis if the test causes radiating pain from the low back down the leg. Pain felt in the lower spine suggests a vertebral compression fracture.

Additional Signs of Sciatica

Other signs of sciatica include the following:

- Pain on the contralateral side when the nonpainful side is flexed at the thigh with the leg held in extension (Fajersztajn sign);

- Loss of sensation on the lateral portion of the foot (Szabo sign);
- Pain on adduction of the thigh (Bonnet sign);
- Pain in the buttocks when the great toe is hyperextended (Turyn sign); and
- Pain in the lower back or down the leg when the patient is supine (Linder sign).

To differentiate sciatica from a hamstring injury, flex the hip with the leg straight until it feels painful and then dorsiflex the foot. A hamstring pull will not be painful with this maneuver, whereas in patients with sciatica, the pain will increase (Bragard leg sign).

Table for. A Chrestomathy of Additional Back Pain Pearls

Sign	Possible Cause
Back pain in a prone patient after pushing the foot to the buttocks and hyperextending the thigh (Ely sign)	Lumbosacral disease
Back pain in a supine patient after flexing the normal leg and thigh and hyperextending the painful leg and lowering it off the examination table (Gaenslen sign)	Lumbosacral disease
Pain along the sciatic or external cutaneous nerves of the thigh with the patient lying supine when the painful knee is passively flexed (Nachlas sign).	Lumbosacral disease
Trunk flexion while standing causes knee flexion and contralateral leg extension, (Neri leg sign)	Lumbosacral disease
Pain in the sacroiliac joint on sitting (Larrey sign)	Sacroiliac disease
Pain on moving or tilting the pelvis (Larrey fracture sign)	Pelvic fracture
Pain on compressing the pelvis (Erichsen sign)	Sacroiliac disease

Motor Testing of the Lower Extremity

Motor testing of the lower extremity usually provides

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objective information to identify the location of potential lumbosacral lesions. Joint movement requires 2 opposing movements involving 4 adjacent nerve roots:

- Hip movement involves L2-L3 for flexion and S1-L5 for extension.
- Knee movement involves L3-L4 for extension and L5-S1 for flexion.
- Ankle movement involves L4-L5 for flexion and S1 for extension.
- Some foot movements are mediated through a single nerve root:
- Foot inversion is primarily innervated by L4
- Great toe dorsiflexion is supplied by L5
- Foot eversion is predominately S1.

Table 1 offers examples of testing procedures for typical nerve root enervations associated with lower extremity movements.

Table for Lower Extremity Activity, Nerve Root Innervation, and Testing Procedure

Activity	Nerve Root Enervation	Testing Procedure
Hip flexion	L2-L3	Have the sitting patient raise the knee against resistance
Hip extension	S1-L5	Have the prone patient raise the leg off the examining table and then against resistance
Hip adduction	L2-L4	Try to push the sitting patient's knees apart while the patient resists
Hip abduction	L5-S1	Try to push the sitting patient's knees together while the patient resists
Knee flexion	L5-S1	Have the sitting patient flex the bent knee against resistance
Knee extension	L3-L4	Have the sitting patient straighten the bent leg against resistance
Plantar flexion	L5-S1	Have the patient rise up on the tiptoes
Foot dorsifle-	L4- L5	Have the patient rock back on the xion heels

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Low back pain sometimes involves the nerve roots forming the sciatic nerve. Table 2 summarizes some of the patterns.

Table for. Neurologic Findings in Lumbosacral Nerve Roots

Spinal Level	Pain	Numbness	Weakness	Reflexes
L4 root	L4 dermatome	Medial knee and calf	Knee extension, foot dorsiflexion	Reduced knee jerk
L5 root	L5 dermatome	Between great and first toe	Foot and big toe dorsiflexion	No change
S1 root	S1 dermatome	Lateral foot and sole	Foot eversion	Reduced ankle jerk
Midline disk her- niation	Bilateral legs	Perineum	Bowel, bladder dysfunction	Reduced anal wink

Have the patient perform the following flexion maneuvers for locating possible nerve damage or muscle weakness contributing to back pain:

- Check active plantar flexion with knee at 90 degrees (have the patient step on the gas). Weakness suggests S1 nerve root damage or tibial nerve dysfunction, tibiotalar ankle sprain, gastrocnemius muscle tear, Achilles tendon damage, or tendonitis;
- Check active dorsiflexion of the foot against resistance. Weakness suggests foot drop (L5), tibiotalar ankle sprain, and extensor tendonitis;
- Check ankle inversion against resistance. Weakness suggests foot drop (L5), subtalar ankle sprain, and anterior tibialis tendonitis;
- Check ankle eversion against resistance. Weakness suggests superficial peroneal nerve problem (S1), subtalar ankle sprain, and peroneal retinaculum sprain; and
- Check dorsiflexion of the great toe. Weakness suggests foot drop or L5 lesion, first metatarsal phalangeal joint problem, and extensor hallucislongus tendonitis.

The following tests are used for identifying the source of radiculopathy.

Testing for L4 Radiculopathy– Stretch the femoral nerve by having the patient lie on the side with the painful leg in the air. Hold the knee in extension and hyperextend the hip by 15 degrees. Passively flex the knee. Pain in the anterior thigh with this procedure suggests L4 radiculopathy.

Now check active knee extension. Weakness suggests L4 radiculopathy. If weakness is present, then check for a sensory defect over the medial malleolus.

Testing for L5 Radiculopathy– Next, check ankle dorsiflexion by having the patient walk on the heels. Weakness suggests foot drop or an L5 radiculopathy. Check for sensory loss over the great toe and dorsal foot to confirm.

Testing for S1 Radiculopathy– Finally check plantar flexion by having the patient rise up on the toes. Weakness or inability suggests a S1 radiculopathy. Check for sensory loss over the lateral malleolus and the plantar aspect of the foot. Confirm by checking for diminished ankle jerk. If the ankle jerk is increased, this suggests a contralateral upper motor neuron lesion.

Sensory Examination

Three types of sensation are tested in the lower extremity. Light touch, which is transmitted through the anterior spinothalamic tracts, is tested using an artist's paintbrush. Vibration and position sensation, which travel up the posterior columns, are tested using a tuning fork and by toe proprioception. Lumbosacral disease never affects these posterior columns. Pain and temperature travel up the lateral spinothalamic tracts, and these are tested by pinprick and temperature sensation (hot or cold).

Locating the Sensory Abnormality– The location of the sensation depends on the sensory dermatome or the area supplied by a spinal accessory nerve. Sensory loss implies interruption of the sensory fibers below the sensory level. The pattern of a combined motor and sensory loss can help to localize the site of

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the lesion. In radicular back pain, most of the sensory changes in low back pain represent involvement of a single nerve root. Testing the sensory distribution patterns can be helpful, although the lack of sensory loss does not rule out a specific nerve root process because dermatomes overlap. Moreover most sensory disturbances in the leg are caused by lesions involving the peripheral nerves rather than the nerve roots. Patterns of sensory loss are shown in Table 3.

Table for. Patterns of Sensory Loss With Peripheral Nerve Lesions

Location of Sensory Loss	Peripheral Nerve	Nerve Root Derivation	Associated Findings
Lateral thigh	Lateral femoral Cutaneous	L2-L3	
Posterior thigh	Posterior femoral cutaneous	S1-S2	
Medial leg	Saphenous	L2-L4	
Medial thigh	Obturator	L2-L4	Loss of thigh adduction
Anteromedial thigh and leg	Femoral	L2-L4	Loss of knee extension; diminished knee jerk
Foot	Sciatic	L4-S1	Loss of foot dorsi-flexion and inversion; reduced ankle jerk
Dorsal foot	Peroneal	L4-S1	Loss of foot dorsi-flexion and eversion

Screening Sensory Examination– The sensory examination requires significant patient cooperation. Perineal sensation has already been emphasized and should be tested in most (if not all) elderly patients with back pain.

Generally, distal sensation is tested first unless the patient has a specific sensory complaint. If the patient does have a specific complaint, have him or her draw it out or outline it and begin testing in the center of the area defined. Otherwise testing the foot provides the most useful information.

- Test pinprick and light touch sensation over the dorsal (L5), medial (L4), and lateral (S1) foot;
- Test vibration sense by placing the tuning fork on the great toe. (Sometimes it is useful to first touch the tuning fork on a bony prominence at the patient's elbow or wrist to give a sense of the vibration.) Let the patient's toes warm up if the weather is cold. Decreased vibration sense at the great toe suggests peripheral neuropathy. If the sensation is abnormal, then move up the leg to the ankles and then the patella. Vibration can only reliably be tested over bony prominence. When testing vibration, use a 128-Hz tuning fork. A 256-Hz tuning fork may be more sensitive for pernicious anemia; and
- Next, evaluate great toe proprioception by moving it. The patient should have the eyes closed or shielded from seeing the direction of movement. Hold the patient's toe by its sides. Move it toward the patient's head in a large upward movement and then move the toe downward away from the head. Have the patient say the direction of movement (up or down). Now perform the test by moving the toe about 2 millimeters and note the response. The small movements and holding the toe by the sides are worth stressing. If proprioception of the great toe is lost, the patient's problem is more complex than lumbosacral disease, which does not affect the posterior columns that communicate the proprioceptive information to the brain.

Examination of Upper Limb

It includes

- Shoulder joint
- Elbow joint
- Wrist joint
- Metacarpophalangial joint
- Proximal interphalangial joint
- Distal interphalangial joint

Examination

The glenohumeral joint is the most mobile joint in the body, but the large multi-directional range of motion is a trade-off for joint stability. The lack of stability makes the shoulder more

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susceptible to a large spectrum of injuries, especially with overhead activities involved in sports such as baseball, volleyball, swimming and weight lifting. The shoulder girdle is important because is serves as the connecting joint between the arm and the axial skeleton. It serves as the base of support for movements occurring at the elbow, wrist and hand.

During an examination, taking a thorough history is as important as the physical exam itself. The clinician should inquire about the patient's hand dominance, as well as their occupation and recreational activities. It is also important to establish their chief complaint, which may include pain, instability, weakness, or loss of range of motion. Complaints of numbness and tingling may be associated with neurovascular disorders, and stiffness may suggest adhesive capsulitis and/or arthritis. Furthermore, any crepitus may indicate bursa, osteoarthritis or rotator cuff pathology. It is also important to have patients try and establish an approximate timeline for when the injury occurred and what event or mechanism, if any, lead to the injury or onset of symptoms. For patients who report a dislocation, it should be asked what position the arm was in at the time of the dislocation, and what the frequency of dislocations or subluxations were. Finally it is important to establish what type of activities of daily living the patient can and cannot perform. Such activities include simple everyday tasks like getting dressed, lifting an object overhead, sleeping on the shoulder, brushing your teeth, combing your hair, putting on shoes, and carrying or lifting objects like groceries.

Paplation

There are several important bony and soft tissue structures that need to be palpated during the shoulder physical exam. Bony structures should include: the sternoclavicular joint, the clavicle, the acromioclaviular joint, the coracoid process, the borders of the scapula, and the greater and lesser tuberosities of the humerus. Soft tissue landmarks should include: the subacromialbursae, the supraclavicular fossa, the long head of the biceps tendon, the trapezius, and other associated muscles and tendons.

Range of Motion

Active range of motion performed by the patient is typically assessed first, and can be affected by both pain and motor function. The patient can be either seated or standing during the assessment, and movements to be tested should include forward flexion, extension, internal/external rotation, and abduction/ adduction.

- Active Range of Motion: Forward Flexion and External Rotation.
- Active Range of Motion: Internal Rotation
- Passive range of motion is performed by the clinician with the patient seated or supine in the same planes previously stated. This is used to isolate motion for an accurate evaluation of soft tissue.
- Passive Range of Motion: Horizontal Adduction

Normal motion for forward flexion is considered to be 0^0 to $170\text{-}180^0$, while normal extension is said to be 60^0. For internal and external rotation, the arm should be abducted to 90^0 for an accurate measurement. Normal internal rotation is said to be 90^0, while normal external rotation is around $60\text{-}70^0$. It is important to keep in mind that these values can vary greatly with patients who are overhead athletes, such as baseball or softball players. For adduction, the assessment is normally limited due to the trunk, but typically 30^0 is considered normal. Abduction motion can range from 0^0 to 180^0.

An example of limited passive range of motion can be seen in cases of frozen shoulder.

Frozen Shoulder: External Rotation

To improve range of motion, special exercises such as Codman's Pendulum can be performed to help relax the muscles around the shoulder, reduce pain, and increase motion.

Codman's Pendulum

Have the patient standing in a relaxed position, and tell them to swing their weak arm in a circular motion while keeping their

shoulder nice and relaxed. Be sure they swing their arm in both the clockwise and counterclockwise directions.

Rotator Cuff Strength Testing: Empty Can Test

Description: The empty can test is used to evaluate the strength and integrity of the supraspinatus muscle and tendon. The patient should stand with their shoulder abducted to 90ã and horizontally adducted forward 30^0 with the thumbs pointing down towards the floor, as if they are pouring out a can. Ask the patient to maintain this position. Proceed to apply downward resistance to the patient's forearm. A variation of this test can be done at 30^0 abduction instead of 90^0, where the supraspinatus should function in relative isolation.

Positive findings: Decreased strength or pain on resisted testing.

External Rotation

Description: The external rotation test examines the strength of the infraspinatus and teres minor.

With the patient's arms at their side, externally rotated 45^0 and elbow flexed to 90^0, the examiner applies an internal rotation moment to assess the strength of the external rotators.

Positive Findings: Decreased strength or pain on resisted testing. Significant weakness of the infraspinatus may be indicative of suprascapular nerve palsy, where the infraspinatus become denervated. This can be due to trauma, ganglion cyst or illness.

SubscapularisLift-Off Test

Description: The lift off test evaluates the muscular strength of the subscapularis. With the patient seated or standing, have them internally rotate their arm behind their back. Then ask the patient to lift the back of their hand off their lower back. If they are unable to complete this task, apply resistance to the palm to assess the strength of the subscapularis.

Positive findings: Inability to lift the dorsum of hand off the back.

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Impingement/Rotator Cuff Special Tests:

Neer's Impingement : The Neer impingement test assesses the presence of impingement of the rotator cuff, primarily the supraspinatus, as it passes under the subacromial arch during forward flexion.

Stabilize the scapula with one hand while applying passive forced flexion of the arm.

Positive findings : Pain in the anterior shoulder or reproduction of the patient's symptoms.

Hawkin's Kennedy Impingement Test : The Hawkin's test is used to evaluate impingement of rotator cuff and subacromial bursa.

The patient is seated or standing and with their arm forward flexed to 90⁰ and their elbow bent to 90⁰. Stabilize the top of the shoulder while internally rotating the arm at the forearm.

Stand at the side of the patient with one hand on top of the shoulder and keep the patient from elevating the shoulder. The other hand should be positioned close to the elbow with the thumb down, making it more comfortable for the examiner to internally rotate the arm. The test should not be done with the arm abducted.

Positive Findings : Pain in the anterior shoulder or reproduction of the patient?s symptoms with the test.

Instability Special Tests : Load and Shift Test The Load and Shift test examines integrity of shoulder stability in the anterior and posterior directions.

Have the patient seated or supine with their arm relaxed and resting at their side. Grasp the head of the humerus with thumb and fingers and apply an anterior and posterior glide from the resting position.

Positive Findings : Excessive gliding of the humeral head is considered to be a positive test. The degree of stability can be graded based on the following : Grade 0 is no gliding from the center of the glenoid, Grade 1 equals translation to the glenoid rim, Grade 2 translation of the head over the glenoid rim but no locking, and Grade 3 results in the head of the humerus locking over the glenoid rim.

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Apprehension Relocation The apprehension test, described by Row and Zarin, tests for anterior instability of the shoulder. The relocation test, described by Jobe, is used in conjunction with the apprehension test to distinguish between anterior instability and primary impingement of the shoulder.

To perform the apprehension test, have the patient supine, with their arm abducted and elbow flexed to 90ã. Gently externally rotate the arm. Once the patient becomes apprehensive or complains of pain, proceed with the relocation and surprise test by applying a posterior force to the humeral head.

Positive Findings: For the apprehension test, the patient may complain of pain or be apprehensive that their arm may dislocate as it is externally rotated. The relocation test is positive if the symptoms of apprehension reduce, or if the clinician is able to externally rotate the shoulder further without any increase in pain or apprehension. If the symptoms persist following the posterior directed force, the pain is associated with primary impingement and not anterior shoulder instability.

Sulcus Sign The sulcus sign tests for inferior instability caused by laxity of the inferior glenohumeral ligament complex.

Have the patient seated with their arm resting at their side. Grasp the patient's upper arm and apply a distal force to it.

Positive Findings: Increased inferior movement of the humeral head or the visible development of a sulcus at the glenohumeral joint are positive findings. A positive test can often suggest that the patient has multidirectional instability, espeically if there are other signs of join instability.

Examination of Nervous System

Higher Mental Functions Examination

- Conscious level
- Appearance, behavior & communication
- Emotional state
- Delusions & hallucinations
- Memory
- Speech & language

Motor System examination

- Movement & strength of muscles
- Tone of muscles
- Reflexes
- Involuntary movements
- Bulk of muscles
- Power of muscles
- Gait

Sensory System examination

- Tactile sensation, localization, discrimination,
- Position sense
- Stereo gnosis
- Graph aesthesia
- Cortical sensations
- To point discrimination

Cranial Nerve Examination

1. Olfactory Conveys sense of smell. The Center is in temporal lobe of cerebral cortex

Test

- Rule out local nasal pathology, eg; rhinitis
- Patient is asked to Close the eyes
- Close the nostril which is not being tested
- Objects of smell- clove oil, peppermint oil, tincture of asafoetida.
- Avoid irritant smell substances- liquor ammonia- stimulate trigeminal nerve endings in nasal mucosa.

Anosmia- it is absence of sense of smell. The Cause may be due to

1. Closed head injury
2. Previous bacterial meningitis
3. Sinusitis
4. Nasal disorders
5. Drugs- copper chelating agents, antibiotics

Parosmia- Perversion of smell

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Cause

1. Head trauma
2. Sinus infection
3. 1st nerve paralysis
4. Intra cranial tumors
5. Chronic meningeal inflammation

2. Optic Nerve: Serves the function of vision, center of vision- Visual cortex (occipital lobe)

Test

- Visual acquity: Is a measure of central visual sensitivity
- Distant vision-

Snellen's Chart

Finger counting, hand movements, perception of light, no perception of light

- Near vision-Jaeger type card

Causes for diminished vision-

Refractory errors, Cataracts

Corneal & vitreal opacities

Retinal & optic nerve disease

- Visual fieldsTest-

Confrontation Method

- By using finger and movement of finger.Test each eye separately. Examiner sits opposite to patient at a distance of about 1 meter.
- For testing patients rightt eye, ask the patient to cover his left eye with left hand & look at examiners left eye. Examiner holds his index finger to the side in b/w himself & pt.
- Examiner brings the index finger into the field of vision from laterally & the patient is asked to respond as soon as he sees the moving finger. Movements should be tested in all directions.

Visual Field Dfects are as follows

- Superior/inferior altitudinal hemianopia- loss od upper/lower halves of the visual field-damage to optic nerve by ischemia/ trauma.

- Bitemporal hemianopia- loss of vision in temporal halves of both fields- lesion in optic chiasma.

  eg; pituitary tumors, perichiasmal inflammatory lesions
- Binasal hemianopia- loss of nasal/inner half of each field

  eg; open angle glaucoma
- Colour vision

  Tested- pseudo isochromatic plates of ishihara

  Red- green colour deficiency

  Acquire colour vision-macular & optic nerve disease
- Subjective Visual Sensations

  Floaters- little grey specks, floating before eyes by looking up the sky/white surface.

  Eg-In the begening of Migrain attack visualising zigzag lines

  Visual hallucinations-delirium tremens, temporal lode disorders, occipito parietal disorders.

  In Acute optic neuritis patient expierences white flashes in visual field.

3.4.5 Occulomotor, trochlear, Abducens N

- Extra ocular muscles & pupils are controlled
- Levator palpabrae superioris

Superior rectus
Inferior rectus
Medial rectus
Inferior oblique
} 3N

Nucleus of 3 N- mid brain

- Superior oblique- 4N

  Nucleus- mid brain
- Lateral rectus- 6N

  Nucleus-pons

Ocular Movements

- Abduction– Horizontal movement of eye laterally
- Adduction– Movement of eye medially
- Elevation– Vertical movement upwards
- Depression– Movement downwards
- Rotation– Eye rolling like a wheel

Superior & inferior recti- act as elevators & depressors when eye is in abduction.

Superior & inferior obliques- act as elevators & depressors when eye is in adduction.

Lateral rectus- outward horizontal movement

Medial rectus- inward horizontal movement

Conjugate eye movement- brain stem integration & 3, 4, 6 N

Cortical centre for conjugate eye movements- frontal eye field, area no 8

Ocular Movement Disturbances

- Infra nuclear lesions- 3, 4 6 N- weakness of eye muscles
- Supranuclear lesions- paralysis of conjugate movements of eyes.

Infranuclear Lesions

- 3N
- Downward & lateral displacement of eye
- Only lateral movement
- Dilated pupil
- Loss of reflex pupillary constriction
- 4N
- Impaired downward movement

On downward gaze the eyeball is rotated

- 6N
- Inability to move the eyeball laterally, diplopia

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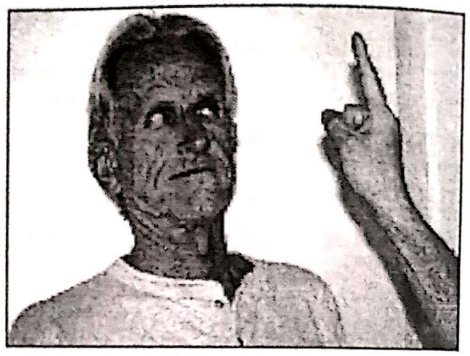
Test for occular movements.



- Ask the patient to look at a clear point- pen/pencil.
- Examiner moves the point in all the 4 directions in the mid line - right, left, up, down.
- Patient should follow the point with his eyes.
- Patient should hold the deviation for 5 sec in each position.
- Check for defective movement

In 3rd Nerve Palsy

- Lateral/divergent squint
- Ptosis
- Dilatation of pupil

Causes

- Midbrain- stroke, demyelination
- Compression of nerve along its course-

Posterior communicating artery aneurysm

Tumors of base of skull

DM, vasculitic conditions

In 4th Nerve Paralysis

- Defective downward movement of involved eye

Test

Person is asked to look downwards in the mid position of gaze.

Features

- Outward rotation of eyeball by unopposed action of inferior rectus.
- Diplopia
- Visible squint is rare

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- Head tilt- in order to avoid diplopia the person tilts the head away from the side of paralyzed muscle.

  Eg; head injury

In 6th Nerve Paralysis

- Inability to move the eye laterally with diplopia on lateral gaze.
- Medial squint

False Localizing Signs of 6N

- Raised intracranial tension
- Downward displacement of brainstem
- Causes of 3 ,4, 6N palsy-
- Cavernous sinus thrombosis
- Superior orbital fissure syndrome
- DM

Strabismus (Squint)

- Abnormality of ocular movement, visual axes does not meet at the point of fixation.

Types

- Acquired/paralytic
- Concomitant/nonparalytic

Features

- **Paralytic**

  May be of sudden onset

  Causes diplopia but no blindness

  Visual axes & images are seperated

  individual eyeball movement is abnormal

  Diplopia is more in the direction of action of paralyitc muscle

  Vertigo may be associated.

- **Non- paralytic**

  Manifests in childhood

  Individual eyeball movement is normal

  Diplopia is not present

  Vertigo is absent

Pupils

Size, shape, reactivity of pupil to light & accommodation

Size- ordinary illumination, bright flash light

Shape- regular/irregular

eg- old iritis

Mobility- pupillary reaction to light is a reflex

Light Reflex Test

- Light is thrown on the cornea on the lateral aspect
- Observe for constriction of pupil on same side & other side
- After light removal observe for pupil dilatation

Normal Pupills

Swinging Light Test

- Test for afferent (optic nerve) pupillary abnormality
- Bright light shown to 1 eye, both pupis contract
- Keep 1 eye shaded & other shown to light
- Observe pupil of unilluminated eye

Optic neuritis , compressive lesion of optic tract-

When light is shown immediately into other eye

Pupil slowly dilate & oscillate.

Accommodation Reaction Test

- Pupils become smaller on accommodating for near objects
- Hold 1 finger close to patients nose
- Ask the patient to look away at the distant object
- Ask the patient to look quickly at the finger
- As the eyes converge pupils become smaller

Accommodation is impaired in occulomotor nerve lesions

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Abnormalities

- Argyll Robertson pupil-pupil is small, irregular, reacts briskly to accommodation, but no pupillar reflex. Site of lesion is in pretectal region.

Causes- neurosyphillis

DM

- Tonic/Adie pupil-

Absent/delayed pupillary constriction to light/accommodation

1ce constricted pupil dilates very slowly to darkness/far gaze.

- Pin point pupil-

Size of the pupil less than 1mm

Causes

- Organophosphorus poisoning
- Opium poisoning
- Pontine hemorrhage
- Horner's syndrome-
- Paralysis of cervical sympathetic nerve (C8, T1)
- Ptosis
- Pupillay constriction
- Absence of pupillary dilatation
- Loss of ciliospinal reflex
- Anhydrosis

6. Trigeminal N

Motor nucleus is in pons. It has 3 branches- ophthalmic, maxillary (sensory), mandibular (motor & sensory).

Test for Motor functions of Temporalis & massester muscle-

- Ask the pt to clench the teeth
- Palpate the muscles above & below the zygomatic arch

Lateral Pterygoid Muscle

- Check the lateral movement of jaw against resistance.
- In Paralysis the jaw is pushed towards paralyzed side.

Test for sensory functions by Sensation for touch, pain & temperature

- **Corneal reflex**

Touch the cornea with the wisp of cotton.

Observe for the closure of the eye on the same side & also opposite Side.

In 5N lesion there is No response on corneal stimulation.

Long term trigeminal nerve paralysis causes ulceration of cornea & dryness of mouth.

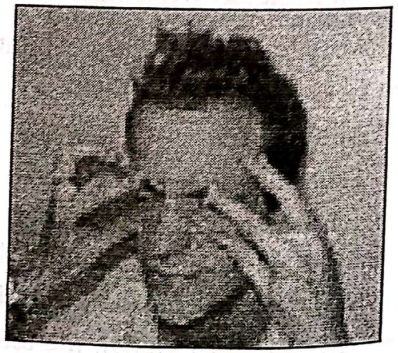
Bilateral weakness of muscles of mastication cause jaw to open & hang loosely.

7. **Facial Nerve**

Supplies all the muscles of the face & scalp, except levetor palpabrae superiori.

Test for Frontal belly of occipito frontalis

- Ask the pt to look upwards
- Observe for wrinkling of forehead
- Wrinkling will be absent in LMN facial palsy



Test for Orbicularis oculi

- Examiner tries to open the eye which has been tightly closed by the patient. In LMN palsy patient cannot close the eye.
- **Buccinator**

Ask the patient to blow the cheek against the resistance. This test is Not possible if the nerve is paralyzed.

- **Platysma**

Ask the patient to show the teeth with open mouth. If the nerve is paralyzed then the mouth is drawn to the normal side.

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- **Taste sensation**
- Patient is asked to protrude the tongue out.
- Apply the taste solutions to the surface of the protruded tongue with the small swab.
- Patient is asked to indicate the perception of taste before the tongue is withdrawn.
- After each test mouth must be rinsed.

8. ***Vestibulocochlear nerve. It has 2 components -Innervates cochlea for hearing that Supplies labyrinth. Semi circular canals for equilibrium, balance, sensations of body displacement***

Nucleus- pontomedullary junction

Cochlear part- pons

Vestibular part- medulla

Abnormal auditory sensations-

- Tinnitus- persistent ringing in the ears
- Hyperacusis- slight sounds are heard with painful intensity

Eg; paralysis of stapedius muscle- facial nerve palsy

- Auditory hallucinations- schizophrenia, Temporal lobe lesions

Tests for Hearing

Rinne's test

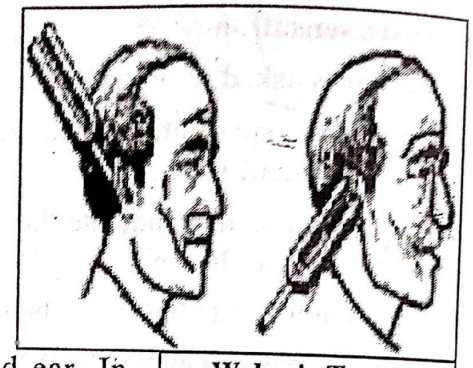
Strike the tuning fork of 512 frequency & keep it near the external auditory meatus of the pt.

When the pt is still hearing the tuning fork sound, change the position of the fork, keep it on the mastoid process till he stops hearing.

Ask the pt in which he heard the sound better

Air conduction is better than bone conduction- rinne's positive

Middle ear disease- bone conduction is better than air conduction- rinne's negative.



Weber's Test

- Weber's test-Vibrating tuning fork is place over the center of the forehead. Ask the pt whether the sound is heard equally/ better in which ear. Normally sound is heard equally in both ears. In Middle ear disease sound is better heard in affected ear. In Sensoneuronial deafness sound is better heard in normal ear. In Vertigo patient describes as dizziness, giddiness, unsteadiness, External objects seem to move around the patient.

9, 10, 11 Glossopharyngeal, vagus, accessory nerve-

- Glossopharyngeal- The Sensory posterior 1/3rd of tongue, proprioceprtors for swallowing, baroceptors in carotid sinus, chemoceptors in carotid bodies.
- Vagus- Sensory part supplies pharynx, larynx, trachea, esophagus, thorax, abdominal viscera. Motor part from medulla oblongata.

* Accessory- The Cranial part comes from lower part of nucleus ambiguous and the Spinal part comes from C1-C5.

Test for glossopharyngeal nerve-

Taste sensation of posterior 1/3rd of tongue is lost in the lesion of the trunk.

Causes- fracture of the base of the skull

invasive tumors of the base of the skull

Test for vagus nerve- It is to look for the Palate movement by Asking the patient to say 'ah' and look for palatal movement.

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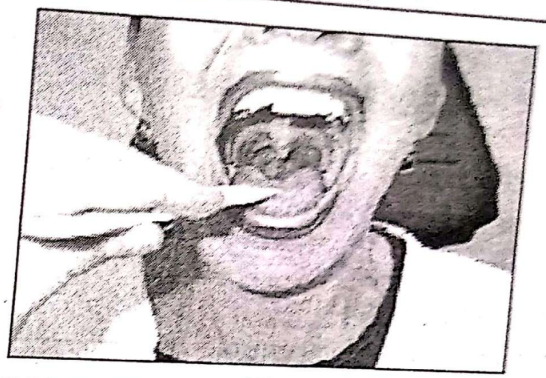
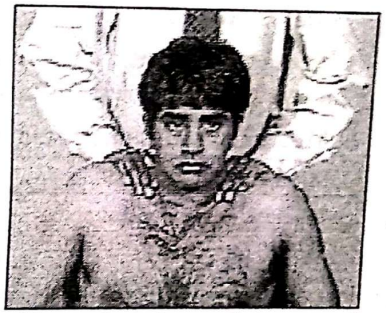


Test for accessory nerve- The nerve Innervates laryngeal & pharyngeal muscles.

Sternomastoid, trapezius muscle.

Trapezius



Ask the patient to raise the shoulder towards his ear against resistance. In case of Paralysis of the muscle there will be flattening of muscle with drooping of arm.

Sternomastoid

Turn the patients neck to one side against the resistance and Observe for contraction of the muscle on the opposite side.

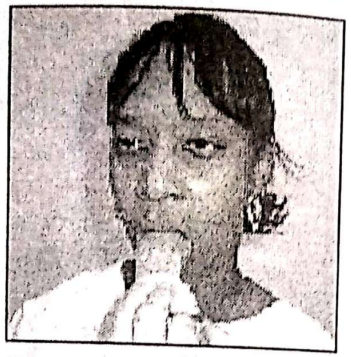
12. Hypoglossal nerve- It Supplies intrinsic muscles of the tongue. The Nucleus is in medial medulla

Test

- Ask the pt to move the tongue side- side slowly & rapidly.
- Ask the pt to protrude the tongue.
- Test the movement of the tongue on either side against the resistance.

Abnormality- in unilateral

paralysis of the nerve there is deviation of the tongue to the affected side.



Motor System Examination

Upper Motor Neuron

- Motor cortex
- Corticospinal/pyramidal tracts
- Synapse in the anterior horn of spinal cord & brain stem.

Lower Motor Neuron

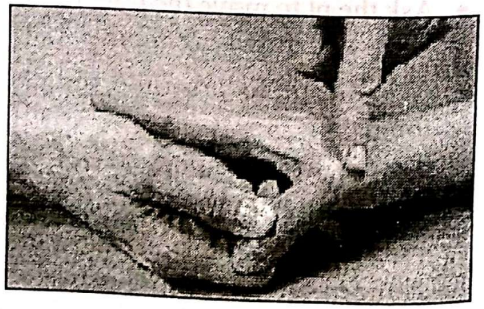
- Anterior horn cells, motor nerve cells in motor nuclei in the brain stem.
- Efferent motor nerve fibers which pass via the anterior spinal nerve roots & peripheral nerves to the muscles.
- Motor end plates on muscle fibers that exited the muscle fibers.

UMN Lesion	LMN Lesion
Weakness in corticospinal distribution-shoulder abduction, finger movements	Weakness - absence of appropriate tendon reflexes
Spastic increase in muscle tone	Decreased muscle tone
Increased tendon reflexes	Absent tendon reflexes
Extensor plantar response	Muscle wasting often severe
Little/no atrophy	Fasciculation in affected muscles

Testing the Muscles of Upper Limb

Abductor Pollicis Brevis

- Ask the patient to abduct the thumb in a plane of right angles to the palmar aspect of the index finger against the resistance



Cause

- Carpel tunnel syndrome

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- Atrophy of thenar eminence is often present
- Opponens pollicis
- Ask the patient to touch the tip of little finger with the point of the thumb.

- Oppose the movement with the thumb/index finger
- First dorsal interosseous- C8, T1.
- Ask the pt to abduct the index finger against resistance.
- Interossei & lumbricals-
- Test the ability to flex the metacarpo- phalangeal joints.
- To extend the distal interphalangeal joints.

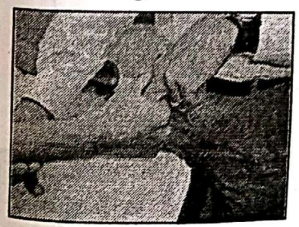
In Ulnar nerve palsy if these muscles are paralyzed then The proximal phalanges are overextended & distal 2 are flexed giving rise to Claw hand deformity.

* Flexors of the fingers- C7, C8, T1

- Ask the patient to squeeze examiners fingers, for hand grip

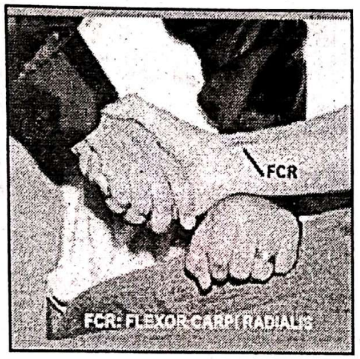
* Extensors of the wrist -C6, C7, C8

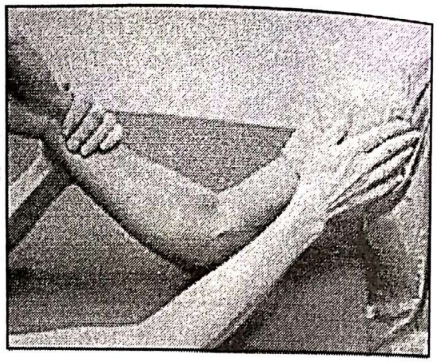
- Ask the pt to make a fist
- Forcibly try to flex the wrist against the patient's effort. In Radial nerve palsy there is weakness/paralysis of muscle leading to wrist drop.



* Flexors of the wrist -C6, C7, C8

- Ask the patient to squeeze the examiners fingers
- Allow the patient to make a fist
- Try to overcome wrist flexion
- Median & ulnar nerve
- Brachioradialis-





- Place the patients arm between prone & supine positions
- Ask the patient to bend the forearm, while opposing the movement by grasping the hand.
- Muscle is felt prominently

* Biceps- C5, C6, musculocutaneous nerve

- Ask the patient to bend up the forearm against resistance
- With the forearm in full supination
- Triceps
- Ask the patient to straighten the forearm against resistance

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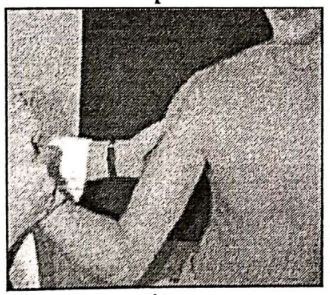
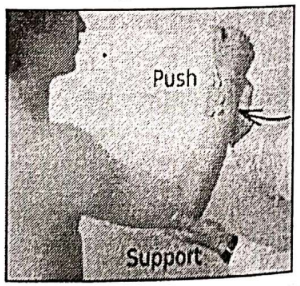
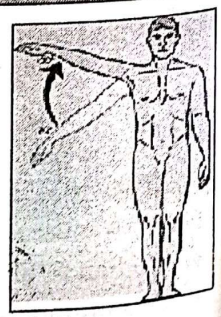




- Supraspinatus-
- Ask the patient to lift the arm straight out at right angles to the side.
- The first 30 degree of movement is by this muscle

* Deltoid- C5, C6- circumflex nerve

- Anterior & posterior fibers draw the abducted arm forwards & backwards.

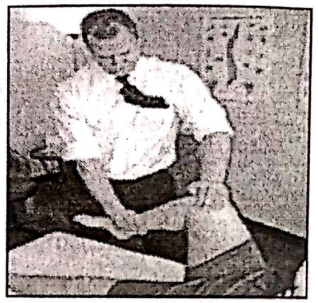


- Babinski's rising up sign- Ask the patient to lie supine with legs extended & then to sit up without using hands. In Spastic paralysis of leg the affected limb rises first.

Testing the Muscles of Lower Limb

* **Dorsiflexion & planatar flexion of the foot**

- Ask the patient to elevate/depress the foot against resistance.



* **Extensors of the knee-** L2, L3, L4- quadriceps.

- Bend the knee of the patient& press the shin.
- Ask the patient to try to straighten it out again.

* **Flexors of the knee-** L4, L5, S1, hamstring

- Ask the patient to raise the leg up from the bed
- Supporting the thigh with the left hand& holding the ankle with the right hand.
- Ask the patient to bend the knee against the resistance.

* **Adductors of thigh-**

- Abduct the limb & ask the patient to bring it back to midline against resistance.

* **Abductors of thigh-**

- Place the patient's leg together
- Ask the patient to separate them against resistance.

According to medical research council, the muscle strength is graded as follows.

Grade	Symptoms
0	Complete paralysis
1	A flicker of contraction only
2	Power detectable only when gravity is excluded by appropriate postural adjustment
3	Limb can be held against the force of gravity, but not against examiners resistance

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4	There is some degree of weakness, usually described as poor, fair/moderate strength
5	Normal power is present

Bulk of Muscles

It is assessed by inspection & palpation

- Wasted/atrophic muscles- smaller, softer, flabby
- Muscular wasting with fibrosis- muscles feel hard & inelastic Eg; muscular dystrophy, polymyosistis
- Generalized muscular wasting-cachexia
- Localized muscular dystrophy- injury/disease of a joint

Tone of Muscles

State of tension/contraction found in healthy muscles

Increase in muscle tone- hypertonia

Causes

- LMN lesions
- Lesions of afferent sensory pathways
- Cerebellar disease
- Sleep
- Drugs- hypnotics, antispasticity agents

Decrease in muscle tone- hypotonia

Causes

- Spasticity due to UMN lesions
- Dystonia- basal ganglia disease
- Parkinson's disease
- Dementia
- Muscles acting across painful joint
- Spasticity-Hypertonia following the lesions of corticospinal system.
- Rigidity-Form of hypertonia due to the disease of basal ganglia

Reflexes

The tendon of a lightly stretched muscle is struck a single sharp blow with a soft rubber hammer , the muscle contracts briefly.

- Tendon reflex

Test for integrity of afferent & efferent pathways & excitability of anterior horn cells in spinal segment.

Types

- superficial reflexes

Corneal

Abdominal

Plantar

Cremastric

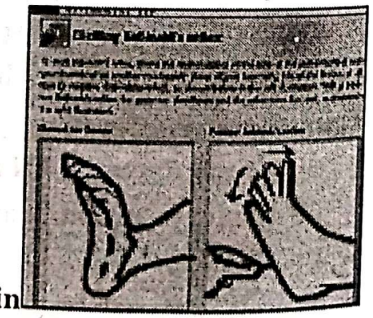
Scapular

Plantar reflex - L5, S1 segments

Strike the outer aspect of the sole of the foot with a non painful object From the heel towards little toe. Observe the movements of foot, toes, lower limb.

Normal- plantar flexion of foot & toes

Abnormal/babinski sign-



- Sorsiflexion of great toe
- Fanning of other toes
- Flexion of knee
- Contraction of tensor fascia lata
- Dorsiflexion of ankle

Plantar Response May be Absent in

- Cold feet
- Relevant muscle paralysis
- Anesthesia of skin of foot

Causes of extensor plantar response apart form UMN-

- Infants below age of 1 yr

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- Comatose patients
- After an epileptic attack
- Deep sleep

Abdominal reflexes -T7, T12 segments

Ask the pt to lie in supine position with abdomen uncovered. Lightly stimulate the abdominal skin from outer aspect to midline.

Reflexes may not be elicited in

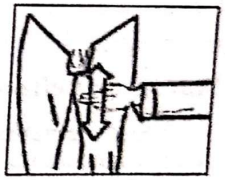
- Elderly
- Obese
- Multiparous women

Abnormality

- UMN lesion
- Multiple sclerosis

Cremastric reflexes-L1., L2 segments

Stroking the skin at upper & inner part of the thigh and Observe for upper movement of testicles.



Abnormality- in UMN lesion.

Reflex may not be elicited in elderly patients.

Deep reflexes -Monosynaptic reflexes

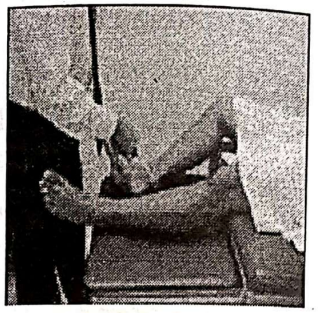
knee Reflex- L2, L3, L4 segments

Ask the pt to lie supine position. Place the left hand under the patient's knee. Tap the tendon of quadriceps with the knee slightly flexed. Observe for the extension of the knee. Normally this reflex is absent.

Ankle Reflex-S1, S2 segments

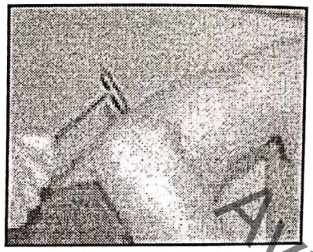
Place the lower limb on the bed everted & slightly flexed. Dorsiflex the foot so that the Achilles tendon stretches. Strike

the tendon on its posterior surface. Observe for the contraction of calf muscles.



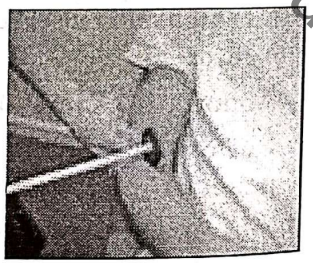
Triceps Reflex- C6, C7 segments

Flex the elbow & allow the fore arm to rest across patient's chest. Tap the triceps tendon just above the olecranon. Observe for the contraction of the muscle.



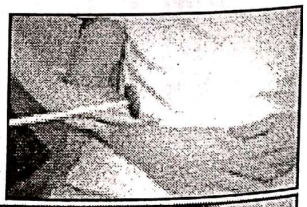
Biceps Reflex- C5, C6 segments

Flex the elbow to right angle and place the forearm in semi pronated position. Strike the biceps tendon. Observe for the contraction of the muscle and flexion of the elbow.



Supinator Reflex-C5, C6 segments

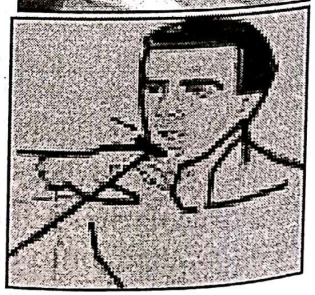
Ask the patient to keep the elbow slightly flexed and pronated. Strike upon the styloid process of the radius. Observe for the supination of the forearm, flexion of elbow, minimal flexion of fingers



Abnormal Reflex- Inverted supinator jerk where there is Only flexion of fingers. This suggests lesion at C5 level.

Jaw Reflex

Ask the pt to open the mouth. Place one finger firmly on the chin and then tap it.Observe for the closure of the jaw. Sometimes the reflex is absent in normal. In UMN lesions there is exaggerated reflex



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Grading the Reflexes

Grades	Symptoms
0	Absent
1	Present (as a normal ankle jerk)
2	Brisk (as a normal knee jerk)
3	Very brisk
4	Clonus

Coordination of Movements

Testing in Upper Limbs

- Ask the patient to touch the their own nose then the examiners forefinger held in front of their face.
- Then as to perform the same with closed eyes

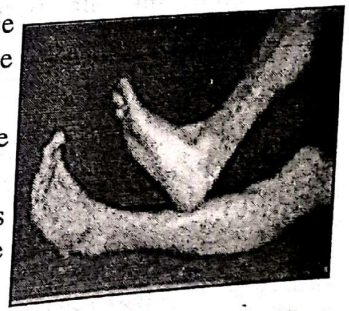
  Eg; cerebellar ataxia
- Ask the patient to flex the elbow to right angle and then alternatively supinate and pronate the forearm

  In Dysdiadochokinesis there is impaired ability to execute rapidly repeated movements. Movements are slow, irregular & after few attempts it is impossible.

Testing in Lower Limbs

Heel- shin Ankle Test

- Ask the patient to lie supine on bed, with the eyes open
- Ask patient to lift one leg straight up in air
- Then bend the knee and place the heel of this leg on opposite leg.



- Then slide the heel down to the shin towards ankle.

  In Cerebellar ataxia there is irregular and side to side movement occurs.
- Romberg's sign-

- Ask the patient to stand with feet close together with eyes closed.

  In Sensory ataxia if romberg's sign positive then patient sways/ falls.
- Walking
- Ask the patient to walk on a straight line

  In ataxia patient will deviate from the straight line

  Gait: Ask the patient to walk freely up and down the room and then along a straight line.

Types

- Spastic– Walks on narrow base, difficulty in bending knees, drags feet along, circumduction of leg. It is seen in spinal cord disease.
- Hemiplegic– It is spastic gait with only one leg affected
- Stamping Gait– Patient raises foot abnormally high and jerks forward. It is seen in sensory ataxia.
- High Stepping– Toes catch ground. Seen in common peroneal nerve palsy.
- Drunken/reeling– Patient walk on broad base, widely planted feet & placed irregularly. Seen in cerebellar ataxia.
- Festinant Gait– flexion dystonia, rapid, short, shuffling steps. Seen in parkinson's disease.
- Waddling Gait– Widely planted feet, body tilted backwards, increased lumbar lordosis. It is due to muscle weakness of pelvis girdle, muscular dystrophy.

Basic knowledge of ECG, USG, X-Ray, CT Scan, MRI

Electro Cardio Graphy

Electrocardiography (ECG or EKG) is a transthoracic interpretation of the electrical activity of the heart over time captured and externally recorded by skin electrodes. It is a noninvasive recording produced by an electrocardiographic device. The etymology of the word is derived from electro, because it is related to electrical activity, cardio, Greek for heart, graph, a Greek root meaning "to write".

Electrical impulses in the heart originate in the sinoatrial node and travel through the intrinsic conducting system to the heart muscle.The impulses stimulate the myocardial muscle fibres to contract and thus induce systole. The electrical waves can be measured at selectively placed electrodes (electrical contacts) on the skin. Electrodes on different sides of the heart measure the activity of different parts of the heart muscle.

- An ECG displays the voltage between pairs of these electrodes, and the muscle activity that they measure, from different directions, also understood as vectors. This display indicates the overall rhythm of the heart and weaknesses in different parts of the heart muscle.
- It is the best way to measure and diagnose abnormal rhythms of the heart, particularly abnormal rhythms caused by damage to the conductive tissue that carries electrical signals, or abnormal rhythms caused by levels of dissolved salts (electrolytes), such as potassium, that are too high or low.
- In myocardial infarction (MI), the ECG can identify damaged heart muscle. But it can only identify damage to muscle in certain areas, so it can't rule out damage in other areas. The ECG cannot reliably measure the pumping ability of the heart; for which ultrasound-based (echocardiography) or nuclear medicine tests are used.

ECG Graph Paper

- Timed interpretation of an ECG was once incumbent to a stylus and paper speed. now allows considerable study of heart rate variability.
- A typical electrocardiograph runs at a paper speed of 25 mm/s, although faster paper speeds are occasionally used. Each small block of ECG paper is 1 mm².
- At a paper speed of 25 mm/s, one small block of ECG paper translates into 0.04 s (or 40 ms). Five small blocks make up 1 large block, which translates into 0.20 s (or 200 ms).
- Hence, there are 5 large blocks per second. A diagnostic quality 12 lead ECG is calibrated at 10 mm/mV, so 1 mm translates into 0.1 mV.

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- A calibration signal should be included with every record. A standard signal of 1 mV must move the stylus vertically 1 cm, that is two large squares on ECG paper.

Leads

- In electrocardiography, the word, "lead" refers to the signals transmitted and received between two electrodes. These electrodes are attached to the patient's body, usually with very sticky circles of thick tape-like material (the electrode is embedded in the center of this circle).
- ECG leads record the electrical signals of the heart from a particular combination of recording electrodes which are placed at specific points on the patient's body.

Electrode Lable (in the USA) Electrode Placement

- RA– On the right arm, avoiding bony prominences (in the UK, it is taught that it is better to place on bony prominences!).
- LA– In the same location that RA was placed, but on the left arm this time.
- LL– On the left leg, avoiding bony prominences.
- RL– In the same place that LL was positioned, but on the right leg.
- V1– In the fourth intercostal space (between ribs 4 & 5) to the right of the sternum (breastbone).
- V2– In the fourth intercostal space (between ribs 4 & 5) to the left of the sternum.
- V3– Between leads V2 and V4.
- V4– In the fifth intercostal space (between ribs 5 & 6) in the midclavicular line (the imaginary line that extends down from the midpoint of the clavicle (collarbone).
- V5– Horizontally even with V4, but in the anterior axillary line. (The anterior axillary line is the imaginary line that runs down from the point midway between the middle of the clavicle and the lateral end of the clavicle; the lateral end of the collarbone is the end closer to the arm).

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- V6–Horizontally even with V4 and V5 in the midaxillary line. (The midaxillary line is the imaginary line that extends down from the middle of the patient's armpit).

Unipolar vs. Bipolar Leads

- There are two types of leads-unipolar and bipolar. Bipolar leads have one positive and one negative pole. In a 12-lead ECG, the limb leads (I, II and III) are bipolar leads. Unipolar leads have only one true pole (the positive pole). The negative pole is a "composite" pole made up of signals from lots of other electrodes. In a 12-lead ECG, all leads besides the limb leads are unipolar (aVR, aVL, aVF, V1, V2, V3, V4, V5, and V6).

Limb Leads

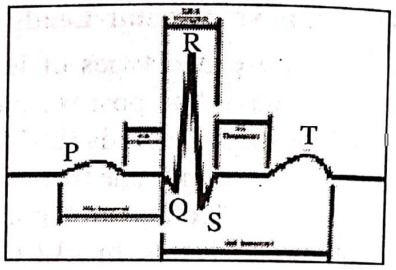
- In both the 5- and 12-lead configuration, leads I, II and III are called limb leads. The electrodes that form these signals are located on the limbs-one on each arm and one on the left leg. The limb leads form the points of what is known as Einthoven's triangle.
- Lead I is the signal between the (negative) aVR electrode (on the right arm) and the (positive) aVL electrode (on the left arm).
- Lead II is the signal between the (negative) aVR electrode (on the right arm) and the (positive) aVF electrode (on the left leg).
- Lead III is the signal between the (negative) aVL electrode (on the left arm) and the (positive) aVF electrode (on the left leg).

Waves and Interval

A typical ECG tracing of a normal heartbeat (or cardiac cycle) consists of a P wave, a QRS complex and a T wave. A small U wave is normally visible in 50 to 75% of ECGs. The baseline voltage of the electrocardiogram is known as the isoelectric line. Typically the isoelectric line is measured as the portion of the tracing following the T wave and preceding the next P wave. The four deflections were originally named ABCDE

but renamed PQRST after correction for artifacts introduced by early amplifiers.

P wave



During normal atrial depolarization, the main electrical vector is directed from the SA node towards the AV node, and spreads from the right atrium to the left atrium. This turns into the P wave on the ECG, which is upright in II, III, and aVF (since the general electrical activity is going toward the positive electrode in those leads), and inverted in aVR (since it is going away from the positive electrode for that lead). A P wave must be upright in leads II and aVF and inverted in lead aVR to designate a cardiac rhythm as Sinus Rhythm.

- The relationship between P waves and QRS complexes helps distinguish various cardiac arrhythmias.
- The shape and duration of the P waves may indicate atrial enlargement.
- Absence of the P wave may indicate atrial fibrillation.
- A saw tooth formed P wave may indicate atrial flutter.

QRS Complex

- The QRS complex is a recording of a single heartbeat on the ECG that corresponds to the depolarization of the right and left ventricles. Ventricles contain more muscle mass than the atria, therefore the QRS complex is considerably larger than the P wave.
- The cardiac nerves coordinate the depolarization of both ventricles, the QRS complex is 0.08 to 0.12 sec (80 to 120 ms) in duration represented by three small squares or less, but any abnormality of conduction takes longer, and causes widened QRS complexes.
- The duration, amplitude, and morphology of the QRS complex is useful in diagnosing cardiac arrhythmias, conduction abnormalities, ventricular hypertrophy, myocardial infarction, electrolyte derangements, and other disease states.
- Q waves can be normal (physiological) or pathological. Pathological Q waves refer to Q waves that have a height of 25% or more than that of the partner R wave and/or have a width of greater than 0.04 seconds

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PR/PQ Interval

- The PR interval is measured from the beginning of the P wave to the beginning of the QRS complex. It is usually 120 to 200 ms long. On an ECG tracing, this corresponds to 3 to 5 small boxes. In case a Q wave was measured with a ECG the PR interval is also commonly named PQ interval instead.
- A PR interval of over 200 ms may indicate a first degree heart block.
- A short PR interval may indicate a pre-excitation syndrome via an accessory pathway that leads to early activation of the ventricles, such as seen in Wolff-Parkinson-White syndrome.
- A variable PR interval may indicate other types of heart block.
- PR segment depression may indicate atrial injury or pericarditis.
- Variable morphologies of P waves in a single ECG lead is suggestive of an ectopic pacemaker rhythm such as wandering pacemaker or multifocal atrial tachycardia.

ST Segment

- The ST segment connects the QRS complex and the T wave and has a duration of 0.08 to 0.12 sec (80 to 120 ms).
- It starts at the J point (junction between the QRS complex and ST segment) and ends at the beginning of the T wave.
- However, since it is usually difficult to determine exactly where the ST segment ends and the T wave begins, the relationship between the RT segment and T wave should be examined together.
- The typical ST segment duration is usually around 0.08 sec (80 ms). It should be essentially level with the PR and TP segment.

- The normal ST segment has a slight upward concavity.
- Flat, downsloping, or depressed ST segments may indicate coronary ischemia.
- ST segment elevation may indicate myocardial infarction. An elevation of >1mm and longer than 80 milliseconds following the . This measure has a false positive rate of 15-20% (which is slightly higher in women than men) and a false negative rate of 20-30%.

T Wave

- The T wave represents the repolarization (or recovery) of the ventricles. The interval from the beginning of the QRS complex to the apex of the T wave is referred to as the absolute refractory period. The last half of the T wave is referred to as the relative refractory period (or vulnerable period).
- In most leads, the T wave is positive. However, a negative T wave is normal in lead aVR. Lead V1 may have a positive, negative, or biphasic T wave. In addition, it is not uncommon to have an isolated negative T wave in lead III, aVL, or aVF.
- Inverted (or negative) T waves can be a sign of coronary ischemia, Wellens' syndrome, left ventricular hypertrophy, or CNS disorder.
- Tall or "tented" symmetrical T waves may indicate hyperkalemia. Flat T waves may indicate coronary ischemia or hypokalemia.

QT Interval

- The QT interval is measured from the beginning of the QRS complex to the end of the T wave. Normal values for the QT interval are between 0.30 and 0.44 seconds.The QT interval as well as the corrected QT interval are important in the diagnosis of long QT syndrome and short QT syndrome. Long QT intervals may also be induced by antiarrythmic agents that block potassium channels in the cardiac myocyte. The QT interval varies based on the heart rate, and various correction factors have been developed to correct the QT interval for the heart rate. The QT interval represents on an ECG the total time needed for the ventricles to depolarize and repolarize.

U Wave

- The U wave is not always seen. It is typically small, and, by definition, follows the T wave. U waves are thought to represent repolarization of the papillary muscles or Purkinje fibers.
- Prominent U waves are most often seen in hypokalemia, but may be present in hypercalcemia, thyrotoxicosis, or exposure to digitalis, epinephrine, and Class 1A and 3 antiarrhythmics as well as in congenital long QT syndrome and in the setting of intracranial hemorrhage.
- An inverted U wave may represent myocardial ischemia or left ventricular volume overload.

Radio Imaging

X-rays have been developed for their use in medical imaging.The use of X-rays is limited to the detection of lesions in bone, and they are generally unsuitable for detecting pathology in soft tissue, such as brain and muscle.

Notable exceptions are the very common chest X-ray, which can identify lung disease (pneumonia, lung cancer, pulmonary oedema), and the plain abdominal film, which can detect ileus (blockage of the intestine), free air (in visceral perforations) and free fluid (in ascites).

In some cases, the use of X-rays is debatable, such as gallstones (which are rarely radio opaque) or kidney stones (which are often visible, but not always).

X-rays are also used "real-time" in angiography and contrast studies of the hollow organs (e.g. barium enema of the small or large intestine). Angioplasty, medical interventions of the arterial system, rely heavily on X-ray-sensitive contrast to identify potentially treatable lesions.

Radiotherapy, a curative medical intervention now used

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almost exclusively for cancer, employs somewhat stronger forms of radiation.

Principles of X-Ray

Physicist Johann Hittorf (1824 - 1914) observed tubes with energy rays extending from a negative electrode.

These rays produced a fluorescence when they hit the glass walls of the tubes.

In 1876 the effect was named "cathode rays" by Eugene Goldstein. Later, English physicist William Crookes investigated the effects of energy discharges on rare gases, and constructed what is called the Crookes tube.

It is a glass vacuum cylinder, containing electrodes for discharges of a high voltage electric current.

He found, when he placed unexposed photographic plates near the tube, that some of them were flawed by shadows, though he did not investigate this effect.

The principle behind these devices is nowadays called the brems strahlung process, in which a high-energy secondary X-ray emission is produced when charged particles (such as electrons) pass through matter.

Medical Applications

- In medicine, the most common use for X-rays is in diagnostic imaging, but there are some applications where the purpose of using the X-rays is to affect tissue, such as radiation oncology.
- It is increasingly common to have images read at a distance from the imaging equipment, distance ranging from an office to a continent away. A standard method for transmitting these images is digital imaging and communications in medicine (DICOM).

Computerised Tomography

Computed Tomography (CT) is a medical imaging method employing tomography. Digital geometry processing is used to generate a three-dimensional image of the inside of an object from a large series of two-dimensional X-ray images taken

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around a single axis of rotation. The word "tomography" is derived from the Greek tomos (slice) and graphein (to write).

CT produces a volume of data which can be manipulated, through a process known as windowing, in order to demonstrate various structures based on their ability to block the X-ray/ Rontgen beam. Although historically the images generated were in the axial or transverse plane (orthogonal) to the long axis of the body), modern scanners allow this volume of data to be reformatted in various planes or even as volumetric (3D) representations of structures.

Principle of CT Scan

The first production X-ray CT machine (in fact called the "EMI-Scanner") was limited to making tomographic sections of the brain, but acquired the image data in about 4 minutes (scanning two adjacent slices), and the computation time (using a Data General Nova minicomputer) was about 7 minutes per picture. This scanner required the use of a water-filled Perspex tank with a pre-shaped rubber "head-cap" at the front, which enclosed the patient's head.

The water-tank was used to reduce the dynamic range of the radiation reaching the detectors (between scanning outside the head compared with scanning through the bone of the skull).

Diagnostic Use

Since its introduction in the 1970s, CT has become an important tool in medical imaging to supplement X-rays and medical ultrasonography. Although it is still quite expensive, it is the gold standard in the diagnosis of a large number of different disease entities. It has more recently begun to also be used for preventive medicine or screening for disease, for example CT colonography for patients with a high risk of colon cancer. Although a number of institutions offer full-body scans for the general population, this practice remains controversial due to its lack of proven benefit, cost, radiation exposure, and the risk of finding 'incidental' abnormalities that may trigger additional investigations.

Chest

- CT can be used for detecting both acute and chronic changes

in the lung parenchyma, that is, the internals of the lungs. It is particularly relevant here because normal two dimensional x-rays do not show such defects. A variety of different techniques are used depending on the suspected abnormality. For evaluation of chronic interstitial processes (emphysema, fibrosis, and so forth), thin sections with high spatial frequency reconstructions are used- often scans are performed both in inspiration and expiration.

- For detection of airspace disease (such as pneumonia) or cancer, relatively thick sections are taken.
- IV contrast may also be used as it clarifies the anatomy and boundaries of the great vessels and improves assessment of the mediastinum and hilar regions for lymphadenopathy; this is particularly important for accurate assessment of cancer.
- CT angiography of the chest is also becoming the primary method for detecting pulmonary embolism (PE) and aortic dissection, and requires accurately timed rapid injections of contrast (Bolus Tracking) and high-speed helical scanners. CT is the standard method of evaluating abnormalities.

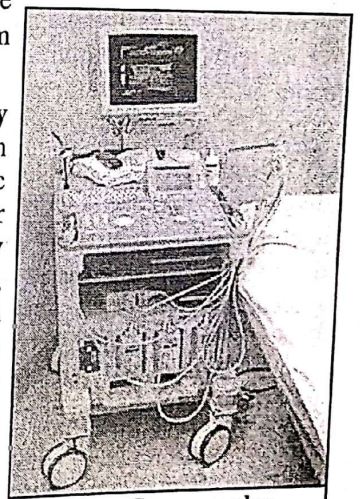
Abdominal and Pelvic

- CT is a sensitive method for diagnosis of abdominal diseases. It is used frequently to determine stage of cancer and to follow progress. It is also a useful test to investigate acute abdominal pain (especially of the lower quadrants, whereas ultrasound is the preferred first line investigation for right upper quadrant pain).
- Renal stones,
- Appendicitis,
- Pancreatitis
- Diverticulitis,
- Abdominal aortic aneurysm
- Bowel obstruction are conditions that are readily diagnosed and assessed with CT.

- CT is also the first line for detecting solid organ injury after trauma.
- CT has limited application in the evaluation of the pelvis. For the female pelvis in particular, ultrasound and MRI are the imaging modalities of choice. Nevertheless, it may be part of abdominal scanning (e.g. for tumors), and has uses in assessing fractures.
- CT is also used in osteoporosis studies and research alongside dual energy X-ray absorptiometry.

Extremities

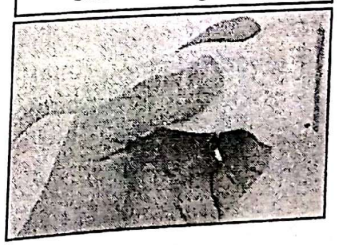
- CT is often used to image complex fractures, especially ones around joints, because of its ability to reconstruct the area of interest in multiple planes. Fractures, ligamentous injuries and dislocations can easily be recognised with a 0.2 mm resolution.



Ultra Sonography

Diagnostic Sonography (Ultrasonography) is an ultrasound-based diagnostic imaging technique used for visualizing internal body structures including tendons, muscles, joints, vessels and internal organs for possible pathology or lesions. The practice of examining pregnant women using ultrasound is called obstetric sonography, and is widely used.

In physics, 'ultrasound' refers to sound waves with a frequency too high for humans to hear. Ultrasound images (sonograms) are made by sending a pulse of ultrasound into tissue using an ultrasound transducer



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(probe). The sound reflects and echoes off parts of the tissue; this echo is recorded and displayed as an image to the operator.

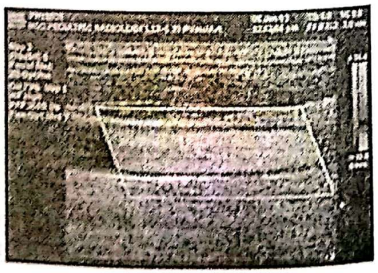
In ultrasonography, a signal generator is combined with a transducer. Piezoelectric crystals in the signal generator convert electricity into high-frequency sound waves, which are sent into tissues. The tissues scatter, reflect, and absorb the sound waves to various degrees. The sound waves that are reflected back (echoes) are converted into electric signals. A computer analyzes the signals and displays the information on a screen. Ultrasonography is portable, widely available, and safe. No radiation is used.

Variations: Ultrasound information can be displayed in several ways.

A-mode: This display mode is the simplest; signals are recorded as spikes on a graph. The vertical (Y) axis of the display shows the echo amplitude, and the horizontal (X) axis shows depth or distance into the patient. This type of ultrasonography is used for ophthalmologic scanning.

B-mode (Gray-scale)– This mode is most often used in diagnostic imaging; signals are displayed as a 2-dimensional anatomic image. B-mode is commonly used to evaluate the developing fetus and to evaluate organs, including the liver, spleen, kidneys, thyroid gland, testes, breasts, and prostate gland. B-mode ultrasonography is fast enough to show real-time motion, such as the motion of the beating heart or pulsating blood vessels. Real-time imaging provides anatomic and functional information.

M-mode– This mode is used to image moving structures; signals reflected by the moving structures are converted into waves that are displayed continuously across a vertical axis. M-mode is used primarily for assessment of fetal heartbeat and in cardiac imaging, most notably to evaluate valvular disorders.



Doppler– This type of ultrasonography is used to assess blood flow. Doppler ultrasonography uses the Doppler effect (alteration of sound frequency by reflection off a moving object). The moving objects are RBCs in blood.

Direction and velocity of blood flow can be determined by analyzing changes in the frequency of sound waves:

- If a reflected sound wave is lower in frequency than the transmitted sound wave, blood flow is away from the transducer.
- If a reflected sound wave is higher in frequency than the transmitted sound wave, blood flow is toward the transducer.
- The magnitude of the change in frequency is proportional to blood flow velocity.
- Changes in frequency of the reflected sound waves are converted into images showing blood flow direction and velocity.

Duplex Doppler ultrasonography combines the graphic display of spectral ultrasonography with the images of B-mode. For color Doppler ultrasonography, color is superimposed on a gray-scale anatomic image. The color indicates direction of blood flow. By convention, red indicates flow toward and blue indicates flow away from the transducer.

Doppler ultrasonography is also used to evaluate vascularity of tumors and organs, to evaluate heart function (eg, as for echocardiography), to detect occlusion and stenosis of blood vessels, and to detect blood clots in blood vessels (eg, in deep venous thrombosis).

Disadvantages

Quality of images depends on the skills of the operator. Obtaining clear images of the target structures can be technically difficult in overweight patients.

Ultrasonography cannot be used to image through bone or gas, so certain images may be difficult to obtain.

Conclusion

Typical diagnostic sonographic scanners operate in the frequency range of 2 to 18 megahertz, though frequencies up to 50-100 megahertz have been used experimentally in a technique known as biomicroscopy in special regions, such as the anterior

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chamber of the eye. The choice of frequency is a trade-off between spatial resolution of the image and imaging depth: lower frequencies produce less resolution but image deeper into the body. Higher frequency sound waves have a smaller wavelength and thus are capable of reflecting or scattering from smaller structures. Higher frequency sound waves also have a larger attenuation coefficient and thus are more readily absorbed in tissue, limiting the depth of penetration of the sound wave into the body.

Sonography (ultrasonography) is widely used in medicine. It is possible to perform both diagnosis and therapeutic procedures, using ultrasound to guide interventional procedures (for instance biopsies or drainage of fluid collections). Sonographers are medical professionals who perform scans which are then typically interpreted by radiologists, physicians who specialize in the application and interpretation of a wide variety of medical imaging modalities, or by cardiologists in the case of cardiac ultrasonography (echocardiography).

Sonographers typically use a hand-held probe (called a transducer) that is placed directly on and moved over the patient. Increasingly, clinicians (physicians and other healthcare professionals who provide direct patient care) are using ultrasound in their office and hospital practices, for efficient, low-cost, dynamic diagnostic imaging that facilitates treatment planning while avoiding any ionising radiation exposure.

Sonography is effective for imaging soft tissues of the body. Superficial structures such as muscles, tendons, testes, breast, thyroid and parathyroid glands, and the neonatal brain are imaged at a higher frequency (7-18 MHz), which provides better axial and lateral resolution. Deeper structures such as liver and kidney are imaged at a lower frequency 1-6 MHz with lower axial and lateral resolution but greater penetration.

Magnetic Resonance Imaging

- Magnetic resonance imaging (MRI), nuclear magnetic resonance imaging (NMRI), or magnetic resonance tomography (MRT) is a medical imaging technique used in radiology to visualize internal structures of the body in detail.
- MRI makes use of the property of nuclear magnetic resonance (NMR) to image nuclei of atoms inside the body.

- MRI can create more detailed images of the human body than are possible with X-rays. An MRI scanner is a device in which the patient lies within a large, powerful magnet where the magnetic field is used to align the magnetization of someatomic nuclei in the body, and radio frequency magnetic fields are applied to systematically alter the alignment of this magnetization. This causes the nuclei to produce a rotating magnetic field detectable by the scanner-and this information is recorded to construct an image of the scanned area of the body.
- MRI provides good contrast between the different soft tissues of the body, which makes it especially useful in imaging the brain, muscles, the heart, and cancers compared with other medical imaging techniques such as computed tomography (CT) or X-rays. Unlike CT scans or traditional X-rays, MRI does not use ionizing radiation.
- MRI machines make use of the fact that body tissue contains lots of water, and hence protons (1H nuclei), which will be aligned in a large magnetic field. Each water molecule has two hydrogen nuclei or protons. When a person is inside the powerful magnetic field of the scanner, the average magnetic moment of many protons becomes aligned with the direction of the field. A radio frequency current is briefly turned on, producing a varying electromagnetic field.
- This electromagnetic field has just the right frequency, known as the resonance frequency, to be absorbed and flip the spin of the protons in the magnetic field. After the electromagnetic field is turned off, the spins of the protons return to thermodynamic equilibrium and the bulk magnetization becomes realigned with the static magnetic field.

Contrast Agents and Implants

- In MRI contrast agents may be injected intravenously to enhance the appearance of blood vessels, tumors or inflammation, may also be directly injected into a joint in the case of arthrograms.
- Unlike CT, MRI uses no ionizing radiation and is generally a very safe procedure. Nonetheless the strong magnetic fields and radio pulses can affect metal implants, including cochlear

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implants and cardiac pacemakers. There are many electronically activated devices that have approval from the US FDA to permit MRI procedures in patients under highly specific MRI conditions. In the case of cochlear implants, the US FDA has approved some implants for MRI compatibility. In the case of cardiac pacemakers, the results can sometimes be lethal, so patients with such implants are generally not eligible for MRI.

●

Basic Laboratory Setup

Staff Required for a Laboratory

Lab technician (DMLT) Lab assistent
Lab attender

Laboratory Safety

- The person working in laboratory is exposed to so many dangers such as.
- Handling of infectious material
- Handling of broken glass wares
- Accidental spill of corrosive reagents
- Swallowing of corrosive reagents such as Concentrated sulpuric acid, HCl, NaOH, Trichloroacetic acid etc.
- Swallowing of infectious specimen
- Inhalation of poisonous fumes
- Potential hazards in the form of inflammable chemicals and gas leakages.

Collection, Transport and Examination of Specieman

Any samples are collected under strict aseptic precausions. The collected samples are soon subjected to examination. Do not delay the procedure or keep in open air. One should collect adequate quantity of sample. Following are the parameters to be kept in mind before sample collection.

- Type of specimen
- Method of dispatch to the laboratory
- Aseptic handling
- Collection time
- Storage

Specimen Collections

- Specimen should contain only those organisms from the site where it was collected.

- Specimen should be collected under strict aseptic conditions.
- It is necessary to avoid contaminating discharges with skin commensals.
- Specimens should be collected in dry sterile, leak proof containers free from all traces of disinfectant.
- Each specimen must be clearly labelled with

a. Patient's name b. Date c. Time d. Ward

Each specimen should be accompanied by a request from which gives.

1. Patient's data.
2. Investigations required.
3. Clinical note giving details of
4. The patient's illness.
5. Suspected diagnosis.
6. Antimicrobial treatment.

Types of Investigation Carried out in Laboratory

1. Clinical Pathology
2. Haematology
3. Clinical Biochemistry
4. Clinical Microbiology and Serology
5. Histology and Cytology

Clinical Pathology:- It is the application of laboratory techniques to find out the cause of a disease. Its Function is to perform qualitative and quantitative analysis on body fluids such as-

- Blood (serum, plasma),
- Sputum,
- CSF
- Urine,
- Faeces,
- Other body fluids and tissues.

Haemetology

Encompasses the study of blood components and coagulation that Includes:-

- Analysis of concentration, structure and functions of the cells and their precursors in the bone marrow.
- Analysis of chemical constituents of plasma, linked with blood cell structure and function.
- Study of functions of the platelets and the proteins involved in blood coagulation.

Routine blood tests- Haematology tests- These determine specific blood levels:

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- WBC 4000-10000 cells/cumm
- White cell differential
- Neutrophils (40-75%)
- Lymphocytes (20-45%)
- Monocytes (2-8%)
- Eosinophils (1-4%)
- Basophils Up to (0- 1%)
- RBC Male : 4.5-5.5 million cells/cumm Female : 4-5 million cells/cumm.
- MCV : 80-99 (fl)
- MCH : 27-33 (pg)
- Haemoglobin : Male : 13.5-18 g/dl Female : 11.5-16.5 g/dl.
- Haematocrit : Male : 0.40-0.54 ml Female 0.35-0.47 ml.
- Platelets : 1.5-4 lakhs/cumm.
- ESR : Depends on technique. Using Westergren method for males it is age (years) divided by 2; for females age + 10 divided by 2.

Routine Urine Tests

1. **Physical Examination of Urine–** Routine urine examination is detailed analysis of urine. It helps detect alterations in the composition of the urine which help in the diagnosis of many disorders.When a sample of urine is submitted to a pathological laboratory, the following examinations are done:

Volume

- Normal volume of an early morning mid-stream sample is 50 - 300ml.
- If it is more than 500ml, it indicates diabetes or polyuria (frequent passing of urine).
- If it is less than 20ml, it indicates some kidney disorder.

Color

- The normal color of urine is pale yellow.
- If it is dark yellow to orange, it indicates some liver disorder.
- If it is white, it shows the presence of pus.

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- If it is pink to red, it indicates the presence of red blood cells.
- If it is brownish black, it indicates the presence of melanin.
- Several other colors indicate other diseases.
- Sometimes, due to the intake of some food or medicines also, one could notice a change in the color or their urine e.g. the intake of beet imparts a reddish color to urine. The intake of vitamin B capsules gives a dark yellow color to it.

Appearance

- Usually, it is clear, sometimes, it is cloudy.
- Sometimes, it is turbid due to the presence of WBCs (White Blood Cells), epithelial cells.
- Sometimes, it is hazy due to mucus.
- Smoky, due to red blood cells.
- Milky due to chyle (lymph).

Reaction

- Usually acidic pH range 4.5 - 7.5.
- If pH less than 4.7 it is more acidic.
- If pH more than 7.5 it is more alkaline.

Odour

- Usually, it is aromatic in normal conditions.
- It has a fruity odor in diabetes.
- Ammoniacal odor in cases of urine retention.
- Foul smelling due to urinary tract infection.

Sediment formation at the bottom of a container after collection.

- Usually, there is no or very little formation of sediment in normal conditions.
- If pus cells, red blood cells, cysts or epithelial cells are present, the sedimentation rate ranges from moderate to high.

Specific Gravity

- Usually varies from 1.003 to 1.060.
- A low special gravity indicates diabetes insipidus or kidney infection (chronic).

- High specific gravity indicates diabetes mellitus or acute kidney infection.

2. Chemical Examination of Urine

Protein:- Normally absent but Present in kidney disorders, dehydration, heart disease, and severe diarrhea.Sometimes, due to an excessive muscular exercise, prolonged cold baths, excessive protein intake or vaginal discharge in the urine, the test shows the presence of protein.

Glucose:- Normally absent. But If present, it indicates diabetes mellitus or hyperactivity of the endocrine glands.It can be present after brain injury or coronary thrombosis.

Ketone Bodies:- They are Normally absent. If test shows ketones, it is due to severe diabetes mellitus, fevers, certain nervous disorders or prolonged diarrhea and vomiting.Even when a person starves, the urine shows a presence of ketone bodies.

Bile pigments:- It is Normally absent in urine. It may be Present in liver disorders.

Bile Salts:- It is Normally absent in urine. It may be Present in liver disorders.

Urobilinogen:- It is Normally present in very low concentrations. It gets Increased in liver disorders.

Blood:- Normally blood is absent in urine. It can be Present in acute kidney infections, kidney cancer, tuberculosis of the kidneys, chronic infections, stone formation in the kidneys, severe burns or a reaction to blood transfusion.

3. Microscopic Examination of Urine

Pus Cells:- Normally 2 to 3 pus cells are present in HPF (high power field of microscope).

If more than 5 it indicates urinary tract infection or non infectious condition such as fever, stress, dehydration irritation to urethra, bladder or urethra.

Epithelial cells:- Normally two to three present in males. Normally two to five present in females.

More than five epithelial cells per HPF indicates tubular damage, pyelonephritis or kidney transplant rejection.

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Casts:- They are Granular cast in urine Normally they are absent. There are hyaline cysts, red cell cysts, white cell cysts, granular cysts, waxy cysts, and fatty cysts. They are present due to kidney disorders.

- Occasional Hyaline cysts may be present due to physical exercise and physiological dehydration.
- Granular cysts may be present after strenuous exercise for a short duration.
- Amorphous Material
- Unusual fine sheaves of Calcium Phosphate
- Amorphous urates of sodium, potassium or calcium are present normally.
- Amorphous phosphates of calcium and magnesium

Crystals are from Uric acid, calcium sulphate, calcium oxalate and ammonium magnesium phosphate (triple phosphate) crystals are indicative of the presence of kidney stones.

Hippuric acid, calcium carbonate, ammonium biurate and calcium phosphate crystals are non-significant. Following crystals, found in acidic urine indicate abnormal metabolism-

- Cystine,
- Leucine,
- Bilirubin,
- Sulphonamides.
- Cholesterol,
- Tyrosine,
- Hematoidin and

Bacteria are Normally absent. If present indicates infection.

Yeast cells are Normally absent. May be present in acidic urine containing sugar.

Parasites are Normally absent. If present, they are Trichomonas Vaginalis (from vagina) or Trichononas Hominis (from rectum).

Clinical Biochemistry

Biochemistry is a science concerned with the chemical constituents of living cells and with the reactions and processes, they undergo. Clinical biochemistry deals with biochemistry laboratory applications to find out cause of a disease. The chemical constituents of various body fluids such as blood, urine,

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CSF, and other body fluids are analyzed in clinical biochemistry laboratory.

Common Blood Chemistry Tests

Blood chemistry tests help evaluate respiratory and metabolic status. The following tests are covered: Urea and electrolytes (sodium, potassium and creatinine); Liver function tests (bilirubin, alkaline phosphatase, albumin, aspartate amino-transferase). Normal ranges are:

- Urea : 3.5-8.8 mmol/l
- Sodium : 135-145 mmol/l
- Potassium : 3.5-5.0 mmol/l
- Creatinine : Mild renal impairment : 150-300 mol/l, Moderate renal failure : 300-700 m̄ol/l, Severe renal failure: 700 m̄ol/l.
- Bilirubin : <18 m̄ol/l; total bilirubin is 3-20 m̄ol/l; indirect bilirubin is 0-14 m̄ol/l.
- Alkaline phosphatase : 90-300 IU/l depending on method of assay.
- Albumin : 30-55 g/l
- ASTMale : 8-46 U/l; Female : 7-34 U/l
- Fasting plasma glucose level ? 7.0 mmol/l (126 mg/dl)
- Plasma glucose ? 11.1 mmol/l (200 mg/dL) two hours after a 75 g oral glucose load as in a glucose tolerance test.
- Symptoms of hyperglycemia and casual plasma glucose ? 11.1 mmol/l (200 mg/dl).
- Glycated hemoglobin (Hb A1C) ? 6.5%
- Total serum cholesterol 3.9-7.8 nmol/l
- Very low density lipoprotein 0.128-0.645 nmol/l
- Low density lipoprotein 0.128-0.645 nmol/l
- High density lipoprotein Male: 0.7-2.0 nmol/l; female: 0.95-2.15 nmol/l.
- Total lipids 4.0-10 g/l
- Hormonal Assay
- Serum electrolytes

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Clinical Microbiology

The chief function of clinical microbiology laboratory is the identification of the infectious organism that causes the disease.

It includes various types of culture methods where from sample micro organism are made to grow in artificial culture media. One the organisms are grown in the media then small part of the growth are is taken and smeared in glass slide. After fixing the smear staining is done. After drying of the glass slide observe under microscope for morphological study of the organism.

After identification of the organism the next step is to find out the sensitivity of organism using various antibiotic discs.

Serology

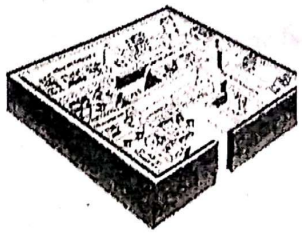
The science that deals with the properties and reactions of serums, especially blood serum.

The characteristics of a disease or organism shown by study of blood serums. Various diseases like typhoid, HIV, syphilis, rheumatic disease are all identified by serological tests (WIDAL, ELISA, VDRL, ASO, RA, C reactive protein. etc).

Histology :- The unit that deals with minute structure, composition and functions of tissues. (lung parenchyma, kidney parenchyma).

Histopathology:- It means the study of diseased tissues (tissue biopsy in assessment of tumor if it is benign or malignant).

Cytology:- It is Microscopic study of individual cell in a smear. (FNAC- Fine needle aspiration cytology done in suspected tumour, ascites, exudate sac).



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