CONTENTS

CHAPTER - 1

I) INTRODUCTION II) HISTORICAL REFERENCES OF VIṢA
III) DERIVATION IV)DEFINITION V) IMPORTANCE

I) Introduction

The foundation of Āyurvēda is based on eight branches (Aṣṭāṅga Āyurvēda) and in those one of the divisions is Agada Tantra (Toxicology) and the rest of the divisions are-Śalyatantra (Surgery), Śalākyatantra (Ophtalmology and Otorhino-laryngology),, Kāyacikista (General Medicine), Grahacikista (Psychiatry), Kaumārabhṛutya (Paediatrics), Rasāyana (Geriatrics) and Vājikarana (the Science of Fertility and Virility). According to the Āyurvēdic classical references, the detailed description about the viṣa (poison), its classifications and its examinations, diseases caused by it, different treatment principles, preventive measures of the poisons etc., are described.

II) Historical References of Viṣa

1) Atharvavēda :

A) We get the references regarding the morbid conditions arising due to different types of poisons and its antidotes. For eg: The jāṅgamaviṣa for the sthāvaraviṣa and viceversa, [7-88-1].

B) Treating the different poisons by reciting the sacred hymns and there is also a reference that the garuḍa(गरुड) mantra in treating the snake poisons (5/13/1-11).

2) Mahābhārata :

While the conversation between the Kāśyapa and Nalanda we get the reference of the visha. (आदि पर्व, ४२/३३-४१, ४३/१-१९, ५०/१७-२७).

3) Saṃhitās

In the Carakasaṃhita cikistasthāna, Suśrutasaṃhitā

kalpasthāna, Aṣṭhāṅgasaṅgraha & Aṣṭāṅgahṛdayam uttarasthāna.

Carakācārya mentioned that the medicine which is mixed with the viṣa will have more potency and acts faster than the normal medicine.

Suśrutācārya tried to give the correct perspective regarding the knowledge of the viṣa elaboratively in the whole kalpasthānam as the co-operative and complementary asset to Toxicology.

4) Rasaratnasamucchaya

It is mentioned that the viṣa mixed with amruta will have more potency than the normal one. And the usage of multiple poisons for the preparation of the medicines along with śōdana are also described.

In addition to the above we can get many references from the Bhāvaprakāśa, Basavarājiyam, Yōgaratnākaram etc, regarding the Agadatantra.

III) Derivation

The word 'Agadatantra' is derived from the combination of the two words - Agada and Tantra.

Agada

The word agada is formed by the combination of

अ	+	गद.
It is derived from 'Ach' (अच्) प्रत्यय		**It is derived from 'Gad' (गद्)प्रत्यय**

a. Poisons in small doses are the best medicines and useful medicines in too large doses are poisons. (William Withering).

b. There is really no boundary between a medicine and a poison, for a medicine in a toxic dose is a poison and poison in a small dose may be a medicine. (C.K.Parikh).

Gada means disease, discomfort, pain, poison. or morbid conditions produced by any type of the poison (such as viṣa, vairōdhikara, vairōdhika), inhaled, absorbed, applied, injected, or developed within the body.

Agada means the medicaments which are used as an antidotes to combat these morbid conditions.

Tantra

Tantra can be defined as 'त्रायते शरिरम् अनेन इति तन्त्रम्'। "means the science through which the positive health of an individual is preserved".

Agada tantra

The science 'Agadatantra' (Toxicology) which deals with the study of the poisons, their actions, their detection and treatment.

IV) Definition[1]

According to the classical Ayurvedic references the Agadatantra can be defined as, 'अगदतन्त्रं नाम सर्पकीटलूता-मूषिकादिदष्टविषव्यञ्जनार्थंविविधविषसंयोगोपशमनार्थञ्च' (सु.सू.१/१४)

Agada tantra deals with the signs and symptoms and also with the management of poisoning, resulting from the bites of snakes, insects and worms, spiders, rodents, etc. and various other poisons produced by improper combinations of substances or drugs .

---

१)a. तस्यायुर्वेदस्य अंगन्यष्टौ, तद्यथा–कायचिकित्सा, शालाक्यं, शल्यापहर्तृकं विषगरवैरोधिकश्शमनं, भुतविद्या, कौमारभृत्यकं, श्सायनं, वाजीकरणमिति । (च.सू.३०/२८)

b. सर्पवृश्चिकलूतानां विषोपशमनी तु या । सा किया विषतन्त्रम् च् नाम प्रोक्ताः मनीषिभिः।। (हा.सं.प्र.२/१८)

c. कायबालग्रहोर्ध्वांगाल्यदंष्ट्रारावृषान् । अष्ट इव अंगानि तस्याहुश्चिकित्सा येषु संश्रिता ।। अ.हृ.सू.१/५

V) Importance

As the field of the Agadatantra is very vast, there is need to understand it in different aspects for which the below described different parameters will throw light in the understanding of the agadatantra field.

1) Classification

There is need to know the divisions and sub-divisions, its merits, demerits, qualities, properties, signs and symptoms etc. of viṣa for concluding the diagnosis and the treatment principles.

2) The character or nature of the poison

This plays a vital role in making the physician to understand not only regarding the nature of poison but also its effects on the vital organs or vital points i.e. marma in which the mixed picture of the signs and symptoms could be manifested of viṣa and marmaghāta. Here the physician has to be very keen in restoring the normal functions of vital organs by reducing the intensity of the poison at the earliest possible.

3) Clinical features

The effect of viṣa on the living beings with respect to its upsurge and post-upsurge signs, the complications etc, which proves its utility to asses the stage and toxicity of the poison.

4) Diagnosis

It is very important to know about the detailed study of the different types of poisons and detailed history of the poisoning to diagnose the case exactly without confusion. When similar toxic manifestations are observed, diagnosis plays a key role for which it is mandatory for the physician to understand the duration, Intensity of signs and symptoms, stages of viṣa and the differential diagnosis(there could be many situations where the signs manifested in a specific

disease may have the similarity with that of the signs of the specific poison consumed. For eg. the signs of Arsenic poisoning are merely same as that of the Visucikā).

So it is necessary to the physician to have the clear perspective to evaluate the causative factor, to decide the specific line of treatment, to have a correct knowledge regarding antidote as it differs to every poison, not to get deluded from the basic truth so that it should not lead a physician into medico-legal complications nor should it affect the health of the patient.

5) Management of the Poisoning case

The physician should be well aware of the signs and symptoms getting manifested by the different types of poisons, its management, therapeutic dose, fatal dose, fatal period etc, to facilitate him to come to reasonable conclusion regarding the treatment aspect whether the case is treatable or untreatable. eg. the poison which spreads internally upto mēdō dhātu is treatable, where as the case in which the where poison pervades all the dhatus is totally untreatable and may lead to death also.

Toxicology

Toxicology deals with the knowledge of, the sources, characters, properties of the poison, the signs and symptoms caused by their administration, fatal doses, fatal period and management of cases of poisoning. Clinical Toxicology mainly deals with human diseases caused by or associated with abdonormal exposure to chemical substances. Toxicology refers to the toxins produced by living organisms which are dangerous to man e.g. poisonous plants, the venom of the snakes, spiders, bees etc. and bacterial and fungal toxins.

CHAPTER - 2

(INTRODUCTION TO VIṢA)

I) DERIVATION OF VIṢA
II) DEFINITION OF VIṢA
III) SYNONYMS OF VIṢA
IV) MYTHOLOGICAL ORIGIN OF VIṢA
V) FORM OF ORIGIN OF VIṢA
VI) SITES OF VIṢA
VII) MOVEMENTS OF VIṢA

I) Derivation (निरुक्ति)-

The viṣa word is derived from the root 'Viṣ' (विष्) by having 'Ka' (क) proportion which means to encompass or to get fully pervaded or to get occupied. Thus the one which pervade the whole body immediately after ingestion is called as viṣa.

II) Definition (परिभाषा)-

1) According to Āyurvēda -

देहं प्रविय यद् द्रव्यं दूषयित्वा रसादिकात् ।
स्वास्थ्यप्राणहरं च स्यात् तद् द्रव्यं विषमुच्यते ।।

The substance immediately after entering into the body causes the vitiation of the healthy dhātus or killing of the healthy person is defined as viṣa.

जगद्विषण्णं तं दृष्टवा तेनासौ विषसंज्ञितः । (च.चि.२३/४)

The substance which cause sadness to the world is called as viṣa.

विषादजननत्वाच्च विष्मित्यभिधीयते । (सु.क.३/२१)

The term viṣa is derived for causing viṣāda (depression of spirits) even for the dēvatās.

2) According to Modern-

A poison is a substance which when administered, inhaled or ingested is capable of acting deleteriously on the human body. Thus almost anything is poison. There is really no boundary between a medicine and a poison, for a medi-

cine in a toxic dose is a poison and a poison in a small dose may be a medicine. In total the real difference between a medicine and a poison is the intent with which it is given. If the substance is given with intention to save life it is a medicine but if it is given with the intention to cause bodily harm it is a poison.

III) Synonyms of Poison (विष पर्याय)-

1) **Acc. to Amarakōśa-** kṣvēḍa, garala, viṣa.

2) **Acc. to Rasataraṅgaṇi-** 'viṣa, kṣvēḍa, garala, kālakūṭa, tanmatam' (14/2).

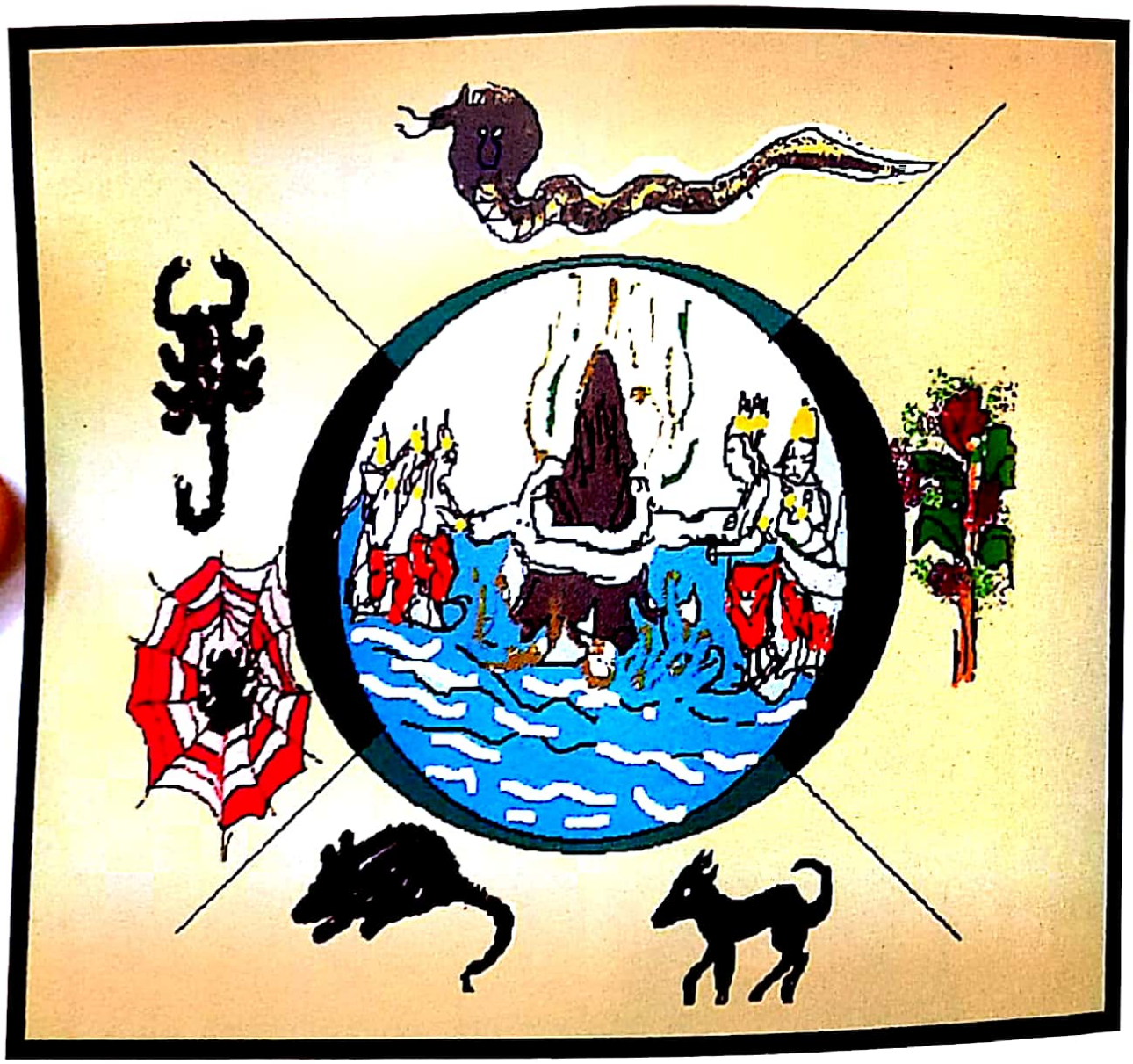
IV) Mythological origin of Poison (विष प्रागुत्पत्ति)[१]-

1) According to Acārya Suśruta

प्रजामिमामात्मयोनेर्ब्रह्मणः सृजतः किल ।
अकरोदसुरो विघ्नं कौटभे नाम दर्पितः ।।
तस्य ऋद्धस्य वै वक्त्राद् ब्रह्मणस्तेजसो निधेः ।
क्रोधो विग्रहवान् भुत्वा निपपातातिदारूणः ।।
स तं ददाह गर्जन्तमन्तकाभं महाबलम् ।
ततो असुरं घातयित्वा तत्तेजो अवर्धताद्भुतम् ।।
ततो विषादो देवानामभवतं निरीक्ष्य वै ।
विषादोजननात्वाच्च विषमिरत्यभिधीयते ।।
ततः सृष्ठवा प्रजाः शेषं तदा तं क्रोधमीश्वरः ।
विन्यस्तवान् स भुतेषु स्थवरेषु चरेषु ।।

(सु.क.३/१८-२२)

Like good and bad, day and night, light and darkness, viṣa and amṛuta, also have their origin from the same stem in creation like two diverse pages of the same leaf. It is stated in the scriptures that a demon named Kaiṭabha out of his ego created obstructions in many ways during the creation of the cosmos by the originator Bramha. And at that time the Omnipotent God got very angry and ultimately resulted in the



F1- Mythological origin of poison

production of a very dreadful person who killed the demon Kaiṭabha. Then the anger increased profusely and created sadness or depression (Vīśāda) among the gods. So the term viṣa (poison) is called for filling the gods with viṣāda (depression or sadness). Soon after the completion of the creation; the creater Bramha casted the 'Teasing dreadful anger (विष) into sthāvara and jāṅgama viṣās for the benifit of the creation.

2) According to Acārya Caraka[1a, F1]

In the days of Yore, while the ocean was being churned by the gods and the demons for obtaining ambrosia, even prior to the production of ambrosia, a ferocious-looking person who was respledent with aura, and who had four fangs, twany hairs and fiery eyes emerged (Viṣapuruṣa). The world become despaired (viṣaṇṇa) at his sight because of which he was called viṣa or poison.

Lord Brahmā deposited this poison in jaṅgama and sthāvara things (of his creation). Therefore, poison which originated from water is of two types. It resembles fire. Its action is manifested in eight virulent stages, it has ten attributes and the ailments caused by its affliction can be treated by twenty four principles of therapeutic measures. Almost similarly Acārya Vāgbaṭa has also explained[1b].

Whatever may be the significance of the historical events but from the scientific point of view the viṣa, can be understood in the following ways.

१.a. अमृतार्थं समुद्रे तु मथ्यमान सुरासुरैः। - - - - - - तदम्बुसंथ्भवं तस्माद् द्विविधं पावकोपमम् ।। (च.चि.२३/४-६)

b. पुरा खल्वमृजार्थं सुरासुरैः सलिलनिधेविमथ्यमानात् - - - - - - विनयमानो ब्रह्मानुनीयौरषधिषु स्यरूतवान् ।। (अ.स.उत्तरस्थान ४०/ २-३)

A) Ambusambhavatā (अम्बुसंभवता)[1]- Because its origination was from the sea water, so it was called as Ambusambhavatā and Jalasambhava. It got liquified and flowed like jaggery in rain there after it was destroyed by Agastya (appearance of Agastya constellation in sky) and such poison becomes mild in action after rainy season.

B) Pāvakōpamatā (पावकोपमता) - The viṣa characters are similar to fire(agni), so it gives rise to paittika symptoms in the body. So it gets pacified by water because of its śaitya property which is opposite to the fire.

C) Dvividhatā (द्विविधता) - The poisons are of two types one is Sthāvara and another one is Jaṅgama. So in the treatment of poisonous conditions usage of an opposite poison is indicated, for e.g. using of Jaṅgamaviṣa as a antidote to sthāvaraviṣa poisonings and similarly using of sthāvaraviṣa as a antidote in the jaṅgamaviṣa poisonings.

D) Amṛtatvaṃ (अमृतत्वं) - The origin of the viṣā and amṛta are same, if poison is used in therapeutic doses it acts like amṛtaṃ. So it is called as amṛtaṃ.

V) Form of Origin of Poison (विषयोनि)

जंगमस्थावरयां तद्यौनो ब्रह्म न्ययोजयत् (च.चि.२३/६)

The viṣayōnis are of two types one is sthāvara (plant origin) and another one is jaṅgama (animal origin).

VI) Site of Poison (विष अधिष्ठान)

The site is said to be that part and parcel of the origin where it resides or the media through which the viṣa gets manifested. Āyurvēda has considered major sites are ten for the sthavaraviṣa and sixteen for the jaṅgamaviṣa.

---

१. तव्दर्षास्वम्बुयोनित्वात् संल्कंदं गुडवद्रतम् ।। (च.चि.२३/७)

1) Sthāvaraviṣa Adhiṣṭhāna

मूलं पत्रं फलं पुष्पं त्वक्क्षीरं सार एव च ।
निर्यासो धातवश्चैव कन्दश्च दशमः स्मृतः ।।

(सु.क.३/३)

A) Root (मूलं), B) Leaf (पत्रं), C) Fruit (फलं), D) Flower (पुष्पं), E) Bark (त्वक्), F) Milk (क्षीर), G) Pith (सार), H) Gum (निर्यास), I) Minerals (धातु), G) Bulb (कन्द):

The sites of this poison is elaborately explained by the Suśruta in the Kalpasthāna[1].

A) Root poison (मुलविष)- This contains nine poisons. These are : klitaka, aśmāra, guñjā, sugandha, gargaraka, karaghāṭa, vidyucchikhā and vijayā.

B) Leaf poison (पत्रविष)- This contains five poisons. These are : viṣapatrika, lambā, varadāru, karambha and mahākarambha.

C) Fruit poison (फलविष)- This contains totally twelve poisons. These are : kumudvatī, vēṇukā, karambha, mahākarambha, karkōṭaka, rēṇaka, khadyītaka, carmarī, ibhagandhā, sarpaghātī, nandana and sārapāka.

D) Flower poison (पुष्पविष)- This contains five poisons. These are : vētra, kādamba, vallīja, karambha, and mahākarambha.

E) Bark, Pith and Gum poison (त्वक्, सार, निर्यासविष)- These are seven in total. These are : antrapācaka, kartarī, saurīyaka, karaghāṭa, karambha, nandana and nārācaka.

F) Milk poison (क्षीरविष)- This contains three poisons. These are : kumudaghnī, snuhī and jālakṣīrī.

G) Metallic poisons (धातुविष)- This contains two poisons. These are :phēnāśma and haratāla.

H) Bulbar poisons (कन्दविष)- This contains thirteen poi-

१. सु. क. २/ ५.

sons. These are : kālakūṭa, vatsanābha, sarṣapa, pālaka, kardamaka, varāṭaka, mustaka, śruṅgīviṣa, prapuṇḍarīka, mūlaka, hālāhala, mahāviṣa and karkaṭaka.

Unlike Suśruta, Caraka mentioned in the following way about the sthāvaraviṣa adhiṣṭhāna[1]: Mustaka, pauṣkara, akrauñca, vatsanābha, valāhakama, karkaṭa, kālakūṭa, karavīraka, pālaka, indrāyudham, taila, mēghakam, kuśapuṣpakama, rōhiṣam, puṇḍarīka, lāgamla, amlam-ābhakam, saṅkōca, markaṭa, śṛṅgīviṣa, hālāhalama.

2) Jaṅgamaviṣa Adiṣṭhāna

जंगमस्य विष्योक्तान्यधिष्ठानानि षोडश ।
समासेन मया यानि विस्तरस्तेषु वक्ष्यते ।।
तत्र दृष्टिनिःश्वासदंष्ट्रानखमूत्रपूरीषशुक्रलार्तवमुख-संन्दंशविर्धिततुण्डास्थिपित्तशुकशवानीति ।।

(सु.क.३/३-४)

A) Sight (**दृष्ट**), B) Breath (**निःश्वास**), C) Teeth (**दंष्ट्रा**), D) Nail (**नख**), E) Urine (**मूत्र**), F) Stools (**पूरीष**), G) Semen (**शुक्र**), H) Saliva (**लालास्त्रव**), I) Menstrual blood (**आर्तव**), J) Stings (**मुख**), K) Belchings (**संन्दंश**), L) Anus (**विर्धित**), M) Bones (**तुण्डास्थि**), N) Bile (**पित्त**), O) Bristles (**शुक**), P) Dead body of an animal (**शव**).

About these sites Suśruta described in the following way[2] :

A) **Dṛṣṭhi and Ni:Śrvāsa** - Divya Sarpa.

B) **Damṣṭrā** - Bhaumasarpa.

C) **Damṣṭrā and Nakha** - Marjāra, Aśva, Vānara, Makara, Maṇḍūka, Pākamatsya, Gōha, Śambuka, Pracalāka, Gṛhagōdhika, Catuṣāda and Kīṭa.

---

१. च. चि. २३/ ११-१३.
२. सु. क. ३/ ५.

D) **Mala-Mūtra** - Cipiṭa, Picciṭaka, Kaṣāya, Vāsika, Sarṣapaka, Tōṭaka, Varca, Kīṭa and Kauṇḍinyaka.

E) **Śukra** - Mūṣika.

F) **Lālāsrāva** - Lūta.

G) **Āra** - Vṛśrcika, Viśrvambhara, Varaṭī, Rājīvamatsya, Ucciṭiṅga and Samṛdravṛścika.

H) **Mukha, Sandaṃśa, Viśardhita Mūtra and Mala** - Citraśira, Śarāva, Kurdiśata, Dārūkāri, Maṇḍhaka and Sārikāmukha.

I) **Mukhasandaṃśa** - Makṣikā, Kaṇabha and Jōṅka.

J) **Asthi** - The bones of animal whose death occured due to poison, teeth of the snake and the bone of the varati fish.

K) **Pitta** - Śakulī, Matsya, Raktarājī, Varaṭī Matsya.

L) **Śūka and Tuṇḍa** - Sūkṣmatuṇḍa, Ucciṭiṅga, Varaṭī, Śatapadī, Śūka, Valabhikā, Śṛṅgī and Bhramara.

M) **Śēvaviṣa** - Dead insects and snakes.

The jaṅgamaviṣa adhiṣṭhanas has been described by the Caraka in following way[1]:

Sarpa (snake), Kīṭa (insects), Undura (rats), Lūtā (spiders), Vṛśrcika (scorpion), Gṛhagōdhika (houselizard), Jalauka (leach), Matsya (fish), Maṇḍūka (frog), Kaṇabhā: (hornets), Kṛkalāsaka (lizards), Śrvasiṃha (dog), Vyagrā (tiger), Āyutarakṣa (jackles), Nakulādaya (hyena).

VII) Movement of Poison (विषगति)

जंगमं स्यादधोभागमूर्ध्वभागं तु मूलजम् । (च.चि.२३/१७)

The animal poison is situated below, while the vegetable poison is situated above. Hence one counteracts the other.

●

---

१. च. चि. २३/ ९-१०.

CHAPTER - 3
CLASSIFICATION OF POISON
(विष वर्गीकरण)

I) CLASSIFICATION OF POISON ACCORDING TO ĀYURVĒDA
II) CLASSIFICATION OF POISON ACCORDING TO MODERN
III) POISONING

The classification of the poison differs from text to text in Āyurvēda. The Āyurvēda and the modern science has kept different basic criteria for the classification of the poison.

I) Classification of Poison according to Āyurvēda

According to Āyurvēda Saṃhitas the viṣā classification is based on its origin (yōni) and its site(adhiṣṭhāna). In the Rasaśāstra, the viṣa is classified into two types on the basis of their properties(guṇa) one is Mahāviṣa and another is Upaviṣa.

1) According to Saṃhitas

A) According to Caraka

जंगमस्थवरायां तद्यौनो बाह्या न्ययोजत् ।
तदम्बुसम्भवं तस्मद् द्विविधं पावकोपमम् ।।

(च. चि. २६/५)

The poisons are mainly classified into two categories. One of them is Jaṅgamaviṣa (animal poison) and the another is Sthāvaraviṣa (plant and mineral poisons). In other context the Caraka has described another type of the viṣa i.e. Garaviṣa[1], under the classification of Saṃyōgajaviṣa (un-natural poison or. chemically prepared poison), which is other than the sthāvara and jaṅgamaviṣa and is prepared by the toxic combination of either non-poisonous or poisonous sub-

---

१. गरसंयोजं चान्यद्गरसंज्ञं गदप्रदम् । (च.चि.२३/१४)

stances. Cakrapāṇi in his commentary has described the Saṃyōgajaviṣa is of two types, one which is prepared by non-poisonous substances called as Garaviṣa and another one which is prepared by poisonous substances called as Kṛtrimaviṣa[1].

B) According to Suśruta

स्थावरं जंगमं चैव द्विविधं विषमुच्यते ।
दशाधिष्ठानमाद्यं तु द्वितीयं षोडशाश्रयम् ।। (सु.क.२/३)

The poison is classified into two types. One of them is Sthāvaraviṣa and its sites are ten and the another one is Jaṅgamaviṣa and its sites are sixteen. In other context while describing about the action of the poison, Suśruta has described about the Kṛtrimaviṣa[2].

C) According to Vāgbhaṭa

स्थावरं जंगमं चैति विषं प्रोक्तंमकृत्रिमम् ।
कृत्रिमं गरसंज्ञं तु क्रियते विधौषधैः ।। (अ.हृ.उ.३५/५)

The poison is classified into two types. One of them is the Akṛatrimaviṣa(natural poison). and this is again subdivided into two i.e. sthāvaraṃ and jaṅgamaṃ. The other one is the kṛtrimaviṣa which is called as Garaviṣa (unnatural or chemically prepared poison).

D) According to Bhāvāprakāśa

According to Bhāvaprakāśa, the basic classification of the poison is same as like that of ancient saṃhitās, but he classified the Kṛtrimaviṣa in different manner. The Kṛtrimaviṣa classification is as follows[3]: The one which is prepared by

---

१. निर्विषद्रव्यसंयोगकृतं, तथा सविषद्रव्यसंयोगकृतं च, तत्राद्यं – गरसंज्ञम्, उत्तरम् तु कृत्रिममिति व्यवस्थ ।। (च.क.च.चि. २३/१४)

२. स्थावरं जंगमं यच्च कृंत्रिमं चापि यद्विषम् । सद्यो व्यापादयेत्ततु ज्ञेयं दशगुणन्वितम्।। (सु.क.२/२४)

३. कृत्रिमं विषं व्दिविधम् । एकं सविषं दूषीविषसंज्ञम्, अपरमविषं तदेव गरसंज्ञम् । तथा च काश्यपसंहितायाम् — - - -
संयोगजंच द्विविधं द्वितीयं विषमुच्यते । दूषिविषं तु सविषमविषं गर उच्यते ।।

non-poisonous substances is called as Garaviṣa and other one which is prepared by poisonous substances is called as Dūṣiviṣa.

2) According to Rasaśastra

A) According to Rasataraṅgaṇī

विषं क्ष्वेडंच गसलं कालकूटञ्चन्मतम् ।
स्थावरं जंगमञ्चेति द्विविधं विषमुच्यते ।।
विषं चोपविषं चेति द्विविधं स्थावरं विषम् ।
प्रथमं वत्सानाभादि द्वितीयं तिन्दुकादिकम् ।।

(रसतरंगणी.चतुर्विंशस्तरंग. २/६)

The basic classification of the poison is same as like Jaṅgamaviṣa and Sthāvaraviṣa, but he sub-classified the Sthāvaraviṣa into two types. One of them is Mahāviṣa having high potency and another one is Upaviṣa having less potency.

A) Mahāviṣa[1] -

These are nine. 1. Hālāhala, 2. Kālakūṭa, 3. Śruṅgaka, 4. Pradīpana, 5. Saurāṣṭrika, 6. Brahmaputra, 7 Hāridraka, 8.Saktuka, 9. Vatsanābha. Vatsanābha plays significant role in the rasakriya and rasāyanakarma.

B) Upaviṣā[2] -

1. Viṣatinduka seeds, 2. Ahiphēna, 3. Rēcakam, 4. Dhattūra seeds, 5. Vijayā, 6. Guñja, 7. Bhallātaka, 8.Arkakṣīraṃ, 9. Snuhīkṣīraṃ, 10. Lāṅgalī, 11. Karavīraka.

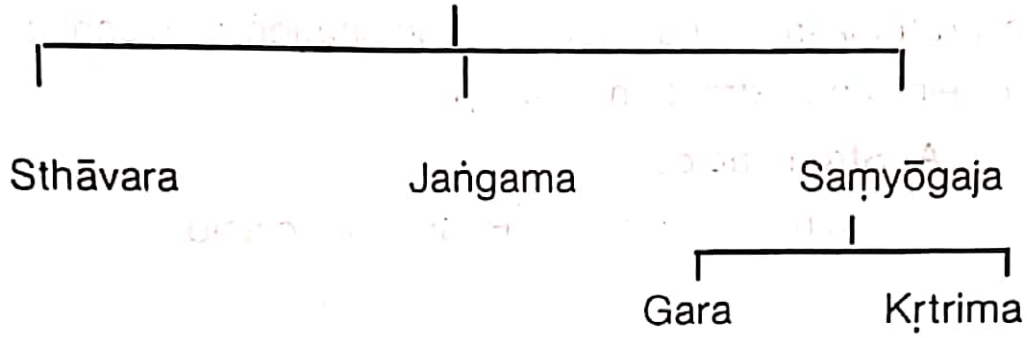
---

१. हालाहलः कालकूटः श्रृंगकश्च प्रदीपनः । सौराष्ट्रको ब्रह्मपुत्रो हारिद्रः सक्तुकस्था ।।
वत्सनाभ इति ज्ञेया विषभेदा अमी नव । रसे रसायनादौ च वत्सनाभः प्रशस्यते ।।
(रसतरंगणी.चतुर्विंशस्तरंग. ७ ते ८)

२. विषतिन्दुकबीजं च त्वाहफेनश्च रेचकम् । धत्तूरबीजं विजया गुंञ्जा भल्लातकस्त्वयः ।।
अर्कक्षीरं स्नुहीक्षीरं लांगली करवीरकम् । समाख्यातो गणे यं तु बुधैरूपविषाभिधः ।।
(रसतरंगणी.चतुर्विंशस्तरंग. १६३ ते १६४)

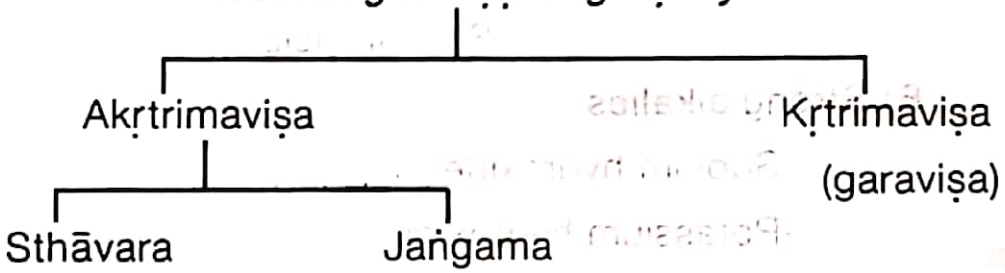
After considering all the classifications of the poisons we can explain the classification and briefly as follows :

1. According to Caraka & Suśruta's Classification

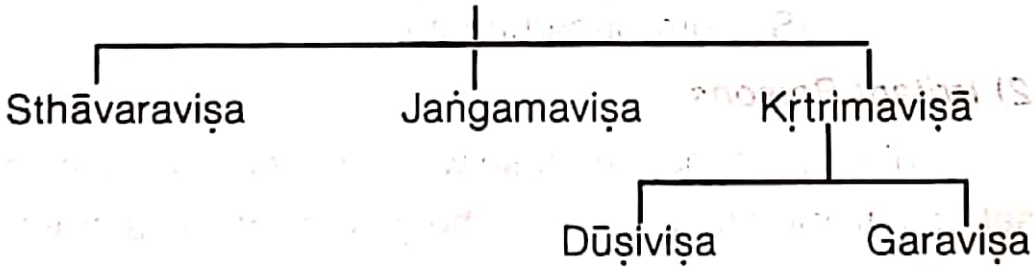


Note- Here the Duṣiviṣa is considered as a part of the Sthāvara and Jaṅgamaviṣa only.

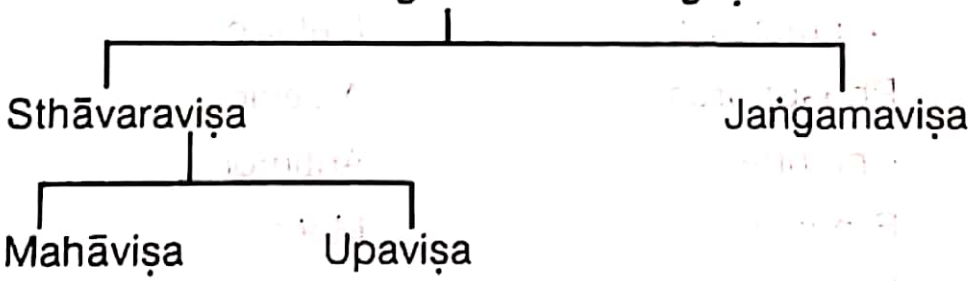
2. According to Aṣṭhāṅgahṛdaya



3. According to Bhāvaprakāśā



4. According to Rasataraṅgaṇi



II) Classification of Poison According to Modern

1) Corrosives
2) Irritants
3) Neurotics

1) Corrosive Poisons

Corrosive poisons are those substances which cause destruction of the parts with which they come to contact, due to protoplasmic coagulation, precipitation or dissolution of proteins and extraction of water.

A) Strong acids

e.g. Mineral acids - -Hydrochloric acid
-Sulphuric acid
-Nitric acid

Organic acids - -Acetic acid
-Carbolic acid
-Salicylic acid

B) Strong alkalies

-Sodium hydroxide
-Potassium hydroxide
-Ammonium hydroxide
-Sodium-bi-carbonate

2) Irritant Poisons

Irritant poisons are those which by their specific action, set up inflammatory action in the gastro-intestinal tract.

A) Inorganic

Nonmetallic	Metallic
Phosphorus	Arsenic
Chlorine	Antimony
Bromine	Mercury
Iodine	Copper, Lead, Zinc.

B) Organic

Vegetable -

- Castor oil seeds
- Croton oil seeds
- Madar and Aloes

Animal - - Cantharides
- Snakes
- Insect bites

C) *Mechanical* - Diamond dust
- Powdered glass
- Hair etc.

3) Systemic

A) Cerebral (affects the brain)

i) Somniferous - e.g. Opium.

ii) Inebriants - e.g. Alcohols, Ether, Chloroforms.

iii) Deliriants - e.g. Dhatura, Belladona, Hyoscyamus, Cannabis indica.

B) Spinal - e.g. Strychnine.

C) Cardiac - Aconite, Digitalis, Tobacco, Hydrocynic acid.

D) Asphyxiants - poisonous gases e.g. Carbondioxide, Carbon monoxide, Coal gas etc.

E) Acting on peripheral nerves - e.g. Curare.

III) POISONING

Poisoning may result either for criminal purposes e.g. with an intent to kill or to cause serious injury(i.e. homicidal purpose) or for stupefying to facilitate a crime e.g. robbery or rape or to procure abortion or as a result of suicidal attempt or accidentally e.g. from swallowing poison by mistake for inocuous substance, inhalation through ignorance, accidentally taking a large dose of medicine, excessive self medicine, bite by poisonous animals, consuming food infected with bacteria or their toxins, injudicious use of remedies by quacks.

Poisoning in India - Both suicidal and homicidal poisoning are common in India than in the West. The important

factor behind this is the availability of poisons in India. The increased development of chemical industry has led to an increase in accidental poisoning.

Insecticides have become the commonest poisons in India. Alcohol, Barbiturates, Opium and Dhatura form a bulk of poisoning cases. Dhatura is more often used as stupefying agent to facilitate the intention of theft and robbery.

1) Human Poisoning

A) Ideal Homicidal Poison - The characters of an homicidal poison should be : (A) Cheap, (B) easily available, (C) colourless, odourless and tasteless, (D) capable of being administered, either in food, drink or medicine, without producing any obvious change to prevent suspicion, (E) highly toxic, (F) signs and symptoms should resemble to natural disease or serious ill-effects should be delayed sufficiently long for accused to escape suspicion, (H) there should not be any antidote, (I) there should be no post-mortem changes, (J) should not be detected by chemical tests, or other methods, and (K) must be rapidly destroyed or made undetectable in the body.

e.g. - Arsenic
- Salts of Mercury
- Antimony salts
- Thallium
- Opium(common in children)

B) Ideal Suicidal Poison - The characters of an ideal poison should be : (A) cheap, (B) easily available, (C) highly toxic, (D) tasteless or of pleasant taste, (E) capable of being easily taken in food or drink and (F) capable of producing painless death.

e.g. - Organophosphorous compounds
- Endrin and Barbiturates

C) **Accidental Poisoning** - House hold poisons.

e.g. - Alcohol.

- Copper sulphate in children,

D) **Stupefying** - Datura, cannbis indica, chloral hydrate.

E) **Abortion** - Calotropis, oleanders, aconite, lead, etc.

F) **Rare** - Bacteria, insulin.

2) Cattle Poisoning

The usual motive is destruction of cattle of an enemy, or to obtain the hides. The usual poisons are abrus precartorius, oleanders, calotrpis, aconite, arsenic, organophosphorous, zinc phosphide, nitrate.

3) Arrow Poisons

Abrus precartorius, croton oli, calotropis, aconite, strcnine, curare and snake venom are used as arrow poiosns.

TYPES OF POISONING

Fulminant - Produced by a massive dose of a poison by which death occurs very rapidly, sometimes without preceding symptoms, i.e., the patient appears to collapse suddenly.

Acute - Produced by a single large dose or several small doses taken in a short period. Onset of signs and symptoms is usually abrupt.

Chronic - Produced by small doses taken over a long period. Onset is usually insidious.

Subacute : Some poisons also show a subacute type of poisoning which lies somewhere between the later two extremes mentioned above.

●

CHAPTER - 4

PROPERTIES AND ACTION OF POISON

(विषगुण कर्म)

I) PROPERTIES OF POISON
II) PROPERTIES OF ŌJAS
III) DIFFERENCE BETWEEN VIṢA, MADYA & ŌJAS
IV) ADMINISTRATION OF THE POISON
V) ACTION OF THE POISON ON THE BODY
VI) FACTORS MODIFYING ACTION OF THE POISON
VII) EFFECT OF POISON ON THE BODY
VIII) ROLE OF POISON IN VITIATING THE DŌṢĀS
IX) SPREADING OF THE POISON IN THE BODY
X) SEVERITY OF POISON
XI) IMPULSES OF THE POISON
XII) VIṢA VĒGĀNTARA
XIII) POISONOUS IMPULSES GENERAL FEATURES
XIV) ROUTES OF ELIMINATION OF POISON
XV) CRITICAL / FATAL PERIOD IN POISONING

It is very important to know about the properties of poison and the action of the poison on the body. Which are going to be discussed below.

I) Properties of Poison (विष गुण)

1) According to Caraka

लघु रूक्षमाशु विशदं व्यवायि तीक्ष्णं विकासि सूक्ष्मं च ।
उष्णमनिर्देश्यरसं दशगुणमुक्तं विषं तज्ज्ञैः ।।

(च.चि.२३/२४)

A) Light (laghu), B) Rough (rūkṣa), C) Quick-acting (āśu), D) Non-slimy (viśadaṃ), E) Quickly absorbed (vyavāyi),

F) Sharp (tīkṣaṇaṃ), G) Depressant(vikāsi), H) Minute (sūkṣmaṃ) and I) Undefinable taste (anirdēśyarasaṃ).

2) According to Suśruta

रूक्षमुष्णं तथा तीक्ष्ण सूक्ष्ममाशुव्यवायि च ।
विकासि विशदं चैव लघ्वपाकि च स्मृतम् ।।

(सु.क.२/१९)

Suśruta mentioned same of the properties of the poison as like Caraka, but in the place of anirdēśyarasaṃ he mentioned āpākī .

3) According to Vāgbhaṭa

Vāgbhaṭa[1] mentioned avyaktarasa and other properties are same as above mentioned by Caraka and Suśruta

In Śāraṅgadharasaṃhitā the properties of the Viṣa are described in the following way :

व्यवायि च विकासि स्यात्सूक्ष्मं छेदि मदावहम् ।
आग्नेयं जीवितहरं योगवाहि स्मृतं विषम् ।।

(शा.सं.प्र. ४/२२, २३)

The drugs possessing vyavāyi, vikāśi, sūkṣma, chēdi, madāvaha, āgnēya, jīvitahara and yōgavāhi, is called as Viṣam.

The ten properties can be explained in thefollowing way :

Laghu (Lightness)[2] - is opposite to the guru (heaviness), which also helps to do the lēkhanakarma [A] and which is easily digestible and causes the lightness in the body[B].

---

१. द्विविधमपि चैतद्विषं तीक्ष्णोष्णरूक्षविशदसूक्ष्मव्यवाय्याशूकारि विकाशिलघ्वव्यक्तरसैर्दशभिर्गुणैर्युक्तमपाकि च।। (अ.स.उ.४०/३१)

२) a) लघुस्तद्विपरीतः स्याल्लेखन । (सु.सू. ४६/५१८)

b) लघु पथ्यं परं प्रोक्तं वफघ्नं शीघ्रपाकि च । (भा.प्र.)

Rūkṣa (Rough)[1] - is opposite to the snigdha and causes the stambhana (withholding), kharatva (harsh), kaṭhinatva (hardness) [A], and responsible for the śōṣaṇtva (emaciation) of the body [B].

Āśu (Quick acting)[2] - due to its quickness spreads all over the body like the oil which spreads immediately on water.

Viśada (Non-slimy)[3]- is opposite to its picchila and removes moistness and helps healing of ulcers.

Vyavāyī (Quickly absorbed)[4] - It first spreads all over the body and then gets digested.

Tīkṣṇa (Sharpness)[5] - gives rise to a burning sensation encourages suppuration and increases secretions.

Vikāsī (?Depressant)[6] - while spreading all over the body produce looseness of the ligaments.

Sūkṣma (Minuteness)[7] - property due to its minuteness enters into the minutest of channels.

Uṣṇa (Hotness)[8] - is opposite to the śīta.

Anirdēśya Rasa (Tasteless) - which does not have any speciiic rasa or taste.

---

१) a) रूक्षस्तद्विपरीतः स्याद् विशेषत् स्तम्भनः खरः । (सु.सू. ४६/५१६)
b) यस्य शोषणे शक्तिः स रूक्षः । (भा.प्र.)
२) आशुकारी तथाशुत्वाद्धावत्यम्भसि तैलमवत् । (सु.सू. ४६/५२३)
३) विशदो विपरीतो अस्मात् क्लेदाचूषणरोपण । (सु.सू. ४६/५१७)
४) व्यवायी चाखिलं देहं व्याप्य पाकाय कल्पते । (सु.सू. ४६/५२२)
५) दाहपाककरस्तीक्ष्णः स्रावणो मृदुरन्यथा । (सु.सू. ४६/५१८)
६) विकासी विकसन्नेवं धतुबन्धन् विमोक्ष्येत् । (सु.सू. ४६/५२३)
७) सूक्ष्मस्तु सौक्ष्म्यात् सूक्ष्मेषु स्रोतः स्वनुसर स्मृतः । (सु.सू. ४६/५२५)
८) उष्णस्तद्विपरीतः स्यात्पाचनश्च विशेषतः । (सु.सू. ४६/५१५)

Apākī or Avipākī (Indigestible) - which is not digestible.

While describing about the origin of the viṣa, Suśruta described another property of the viṣa. Just as the atmospheric water which has imperceptible and undeveloped taste, acquires the specific taste of the ground or soil on which it fall upon, so it is the very nature of the tasteless viṣa that it partakes up the specific taste (rasa) of thing or animal in which it exists[1].

The nature of the viṣa is considered exactly opposite to that of the ōjas, so when viṣa is administered or enters the body; causes the destruction of ōjas which leads to death. Ōjas is a substance through which all living beings gets nourished and thus helps to sustain the life of an individual. It is only the foremost substance responsible for the union of śukra and śōṇita and thus leads to the formation of fetus. This is the essence of all the seven dhatus[2].

II) The properties of ōjas (ओज गुण)

These are ten:

गुरू शीतं मृदु श्लक्ष्णं बहलं मधुरं स्थिरम् ।
प्रसन्नं पिच्छिलं स्निग्धमोजो दयागुणं स्मृतम् ।।

(च.चि. २४/३१)

Heaviness (gurū), Coldness (śītaṃ), Soft (mṛdu), Smooth (ślakṣṇaṃ), Viscous (bahulaṃ), Sweet (madhuraṃ), Stable (sthiram), Clear (prasannaṃ), Slimy (picchilaṃ), Unctuous (snigdha).

---

१) यथा अव्यक्तरसं तोयमन्तरीक्षान्महीगतम् । तषु तेषु प्रदेशेषु रसं तं तं नियच्छति ।।
एवमेव विषं यद्यंद् द्रव्यं व्याप्यावतिष्ठते । स्वभावादेव तं तस्य रसं समनुवर्तत ।।
(सु.क.३/२३-२४)

२) तत्र रसादीनां शुक्रार्तानां धातूनां यत्परं तुजस्तत् खल्वोजस्तदेव बलमित्युच्यते स्वशास्त्रकसिद्धान्तात् । (सु.सू. १५/२४)

Scanned with CamScanner

III) Differences between viṣa, madya and ōjas

Viṣa	Madya	Ōjas
Laghu	Laghu	Gurū
Rūkṣa	Rūkṣa	Snigdha
Tīkṣaṇa	Tīkṣaṇa	Mṛdu
Uṣṇa	Uṣṇa	Śīta
SūKṣma	Sūkṣma	Bahula
Āśukārī	Āśukārī	Prasāda
Vyavāyī	Vyavāyī	Sthira
Vikāsī	Vikāsī	Ślakṣṇa
Viśada	Viśada	Picchila
Anirdēśya Rasa	Amla	Madhura

IV) Administration of the poison

Powerful enemies and even the servants and relations of the king out of anger and jealousy would be in search of an opportunity to avenge themselves on the king. These enemies having vitiatec .nind after geting proper opportunity used to kill the powerful king by administering the poison. In this regard Suśruta has explained very clearly about the detection of the poison administrater (poisoner) and role of the doctor in the given condition.

1) Characteristic features of Poisoner (विषदाता लक्षण)[1]

An intelligent physician who is well qualified to ascertain the true state of one's feelings from the speech, conduct, demeanour and distortions of the face, would be able to discover the true culprit(poisoner) from the following external indicators. A giver of poison does not speak nor does he answer when a question is put to him, he swoons or breaks off

---

१) इङितज्ञो मनुष्याणं व.क्चेष्टामुखवैकृतैः ।- - - - - - - - वर्तते विपरीतं तु
विषदाना विचेतनः ॥ (सु.क. १/१८-२२)

suddenly in the middle of his statement, and talks incoherently and indistinctly like a fool. He is found suddenly and listlessly to press the joints of his fingers or to scratch the earth, to laugh and to shiver. He will look frightened at the sight of others (indifferently), and will cut(straw or hay) with his finger-nails, and his colour changes constantly. He will scratch his head in an agonised and confused state, and will look this and that way, trying to slip away by a back or side door, thus betraying his guilty conscience by his confusion.

2) Modes of Administration of Poison[1]

If the poison is going to be administered it should be easily adminstered and it should not be detectable easily. These things explained by Suśruta while protecting the king from the different modes of administration of poison. Those are boiled rice, drink, tooth-twigs, unguents, combs, cosmetics, infusions, washes, anointments (with sandal pastes, etc.), garlands (of flowers, etc.), clothes, beds, armour, ornaments, shoes, foot-cushions, the backs of horses and elephants, snuffs (nasya), dhuma(tobacco smoking), collyrium and such other things reserved for the use of the king. These objects should be examined by the servants before they we used by the king.

Viṣakanya

Vṛddhavāgbhaṭa has given the description for the first time about the Viṣakanya(poisonous women) in an unique

---

१) अन्ने पाने दन्तकाष्ठे तथा अभ्यंगे अवलेखने ।
उत्सादने कषाये च परिषेक अनुलेपने ।।
स्रक्षु वस्त्रेषु शय्यासु कवचाभरणेषु च । पादुकापादपीठेषु पृष्ठेषु गजवाजिनाम् ।।
विषजुष्टेषु चान्यषु नस्यधूम अंजनादिषु । लक्षणानि प्रवक्ष्यामि चिकित्सामप्यनन्तरम् ।।
(सु.क. १/२५-२७)

Scanned with CamScanner

way. This Viṣakanya used to be prepared by administrating the small doses of poison to her, right from the birth so that the lady could be responsible to kill the enemies just by her touch or respiration or with the sexual interaction. The Viṣakanya can be diagnosed as follows- the flowers on the head will dry immediately, mites will die on her bed, death of the insects or organisms in her bath water[1].

3) Routes of Administration of Poison

A) Oral

B) Sublingual

C) Applied on the unbroken surface of the body eg. Application of organic phosphates, nicotine, some organic solvents and lewisite gas can penetrate the skin and produce intoxication and death.

D) Application to a wound

E) Introduction into natural orifices, e.g. rectum, vagina, urethera, etc.some drugs can be given by rectal route to produce systemic effect, e.g., asprin, barbiturates, etc.

F) Parentral route -

- Subcutaneous
- Intramuscular
- Intravenous, etc.

G) Inhalation - Inhaled in gaseous or vapourous form. e.g., hydrogen sulphide, carbon monoxide, methane, tetrachloride, methyl chloroform.

---

१) आजन्मविषसंयोगात् कन्या विषमयीकृता ।। स्पर्शेच्छ्वासाकदभिर्हन्ति तस्यास्त्वतत्परीणम् ।
तन्मस्तकस्य संस्पर्शाम्लायते पुष्पपल्लवैः ।। शय्यायां मत्कुणैर्वस्त्रै यूकाभिः स्नानवारिणि । (अ.सं.सू. ८/ ५४-५६)

V) Action of the Poison on the Body

(विष कार्य)[1]

1) According to Āyurvēda

Properties(Guṇa)	Action(Kārya)
Rūkṣā (Roughness)	Aggravates the bodily vāyu.
Uṣṇa (Heatness)	Vitiation of rakta and pitta.
Tīkṣṇa (sharpness)	It overwhelms the mind (produces unconsciousness) and tends to disintegrate the limbs and muscles.
Sūkṣma (Minuteness)	It penetrates even into minute channels and deranges the physiology.
Āśu (Quick-actness)	Instantaneous in their action and proves speedily fatal.
Vyavāyī (Quickly-absorbed)	It spreads through out the entire organism (which is the very nature of a drug) on account of its rapid permeating or expansive quality.
Vikāsī (Depression)	It destroys the root-principles (dhātus) as well as the dōṣas and the malās of the body.

---

१) तद्रौक्ष्यात् कोपयेव्दायुमौष्ण्यात् पित्तं सशोणितम् ।।
मतिं च मोहयेत् तैक्ष्ण्यान्मर्मबन्धान् छिनति च ।
शरीरावयवान् सौक्ष्म्यात् प्रविशेच्छिदिकरोति च ।।
आशुत्वादाशु तद्धन्ति व्यवायात् प्रकृतिं भजेत् । क्षपयेच्च विकाशित्वाद् दोषान्धतून्मलानपि ।।
वैशद्यादतिरिच्येत दुश्चिकित्स्यं च लाघवात् । दुर्हरं चाविपाकित्वातस्मात् क्लेशयते चिरम् ।।
(सु.क.२/२०-२३)

Scanned with CamScanner

Viśada (Non-viscid)	It does not adhere to any part of the body.
Laghu (Lightness)	Thus becomes unremediable on account of the extreme lightness.
Avipākī (Indigestible)	It cannot be assimilated owing to its innate indivisibility. It thus proves troublesome for a long time.

2) According to Modern

Action of the poison may be direct i.e. local, indirect i.e. remote and combined.

A) Direct Action

i) Corrosive action - as by strong acids and alkalies.

ii) Inflammation and irritation - as by irritants like - As, Hg or dilute mineral acids.

iii) Neural effects - tingling and numbness by aconite or change in shape of the pupils by atropine and escerine.

B) Indirect Action

i) Shock - caused by large corrosive poison.

ii) Tetanic spasm - as in Nux vomica poisoning.

iii) Syncope - as in tobacco, aconite or oleander poisoning.

C) Combined Action

Certain poisons like arsenic, carbolic acid, phosphorous and oxalic acid acts locally by their irritant effects on the alimentary canal and also produce toxic effects after being absorbed into the system.

VI) Factors modifying action of the Poison

1) According to Ayurveda

A) According to Patient - The effect of poison increases

from these - hunger, thirst, increased heat, weakness, anger, grief, fear, exertion, indigestion, diaorrhoea, increase of pitta and vāta, smelling the flowers and fruits of tila, by fumes of the earth, thunder, sound of roaring of the elephant, squecking of mice, sound of musical instruments, during viṣa saṅkaṭa(fatal period), direct breeze, fragrance of utpala and madana(sexual desire)[1].

B) According to Season[2] - Poison being born from water becomes very moist like jaggery (treacle) and spreads to all places during varṣa (rainy season) . It is made to become weak by star Agastya and during śarat (autumn season) poison is mild in potency.

2) According to Modern

The action of the poison on the body depends on the following points.

A) Quantity of the poison
B) Form of the poison
C) Mode of administration
D) Condition of the body

A) Quantity of poison

It is generally accepted that large dose causes death more rapidly but in certain cases e.g. Copper Sulphate in large dose induces vomiting and the poison is thrown out, similarly the arsenic poison in large dose causes shock and death, moderate dose causes irritant symptoms and small dose produces therapeutic action.

---

१) क्षुत्तृष्णाघर्मदौर्बल्यक्रोधशोकभयश्रमैः । अजीर्णवंर्चोद्रवतापित्तमारूतवृद्धिभि ।।
तिलपुष्पफलाघ्राणभुवाष्पघनर्जितैः । हस्तिमूषिवादित्रनिःस्वनैर्विषसंकटैः ।।
पुरोवातोत्पलादोदमदनैर्वर्धते विषम् । (अ.हृ.उ. ३५/ ६१-६२)

२) वर्षासु चाम्बुयोनिम्वात्संक्लेदं गुडवद्रतम् ।। विसर्पति घनापाये, तद्गस्त्यो हिनस्ति च । प्रयाति मन्दवीर्यत्वं विषं तस्माद्घनात्यये ।। (अ.हृ.उ. ३५/ ६३-६४)

B) Form of the poison

It may be : i) Physical
ii) Chemical
iii) Mechanical

i) Physical - The order of action is :
a) Gases and vapours act most rapidly.
b) Liquids.
c) Fine powders.
d) Coarse solids.

ii) Chemical- Certain chemical combination are non-poisonous e.g.
a) $Agno_3$ + HCl are non-poisonous but in dividually they act as poisons.
b) Acids + Alkalies.
c) Strychnine + tannic acid becomes inert on combination.

iii) Mechanical - action is altered on combining with certain substances. e.g.
a) Heavy metal + water may not be harmful as it settles at the bottom.
b) Dilution of acid and then if taken on full stomach is less effective.
c) Alkaloids + Animal charcoal are rendered inert.

C) Mode of Administration

i) Intravenous route is more rapid in action and deleterious.

ii) Absorption from stomach is better than from rectum.

iii) Absorption is more from abraided skin than from intact skin.

D) Condition of the Body

i) Age - Poisoning is more harmful in extremes of age e.g. opium is not tolerated by children.

ii) Idiosyncrasy and hyper-sensitivity may be shown by certain individuals to particular substances, e.g., pencillin, sulpha drugs, food articles, quinine.

iii) Habit - An addict can tolerate larger dose than a non-addict e.g. morphine, alcohol, barbiturates.

iv) Health status of an individual e.g. liver and kidney disorders, if the poison is not eliminated properly and may have a cumulative effect. In lowered body resistance poison is not tolerated well.

v) Sleep and intoxication - The effect of the poison is retarded.

vi) Cumulative Action - Poisons which are eliminated slowly may accumalate in the body when given in repeated doses for a long time and may ultimately produce symptoms of poisoning.

VII) Effect of Poison on the Body (विष प्रभाव)-

After getting entered into the body the poison, immediately vitiates the blood then simultaneously it vitiates all the tridōṣas and its respective sites and at last proves to be fatal for an individual after getting entered into the hṛdaya(heart)[1].

The blood after getting vitiated by poison leads to tingling or pricking sensation all over the body, leads to red colour of patches on the skin, sweating, horripulation, feeling of the ants moving over the body, severe aches and pains all over the body, yawning, desire for the food stuffs having

---

१) विषं हि देहं सम्प्राप्य प्राग्दूषयतिम् ।।
कफपित्तानिलांश्चानु समदोषं सहाशयान् ।
ततो हृदयमास्थाय देहोच्छेदाय कल्पते ।। (अ.सं.उ. ४०/१७)

Scanned with CamScanner

cold potency. The dominant or the potency of tridōṣas also gets debilited and looses their potency by mixing up with the blood which gets vitiated by the poison, thus leading to the death or hampering of the health[1].

The poison first vitiates that specific dōṣā by which it is predominant(if poison is pitta predominance first it vitiates pitta dōṣa only), where the poison gets localised (either in organ/seat) produces the diseases first related to that organ/seat[2].

If the poison is present in the seat of **vāta** (vātāśaya) produces diseases of vāta as well as diseases of ślēṣma (kapha). If the poison is present in the seat of **pitta** (pittāśaya) produces diseases of pitta and kapha, similarly if it is present in the seat of **kapha** (kaphāśaya) produces diseases of kapha as well as pitta[3].

Among these, when the poison is present in the head, there is swelling of the head associated with appearance of rashes, especially seen around the eye, lips, nose and mouth, tingling of the teeth, dryness of the palate, pain in the head, tingling inside the mouth; improper functioning of the sensory organs and stiffness (and pain) of the lower jaw. The presence of poison in other places should be understood by the

---

१) शरीरं दूषिते रक्ते सर्व चिमचिमायते ।। कोठः समण्डलः स्वेदो रोमहर्षश्च जायते। क्षुद्रकीटा इवाँगे मे विसर्पतीति मन्यते ।। विनामयति गात्राणि जृम्भते शिशिरप्रियः। व्यापिनस्तस्य दुष्टस्य द्रुतस्य विषतेजसा ।। वातादयो वशं यान्ति बलिनोप्यबला इव । (अ.सं.उ. ४०/१८-२०)

२) विषं यद्धोषभूयिष्ठं प्रपद्यते ।। - - - - - विकारान् कुरुते यान् सर्वषूपदेक्ष्यति ।। (अ.स.उ. ४०/४२-४३)

३) वाताशयस्थं कुरुते - - - - - - - - तद्वत् पित्तकफोद्भवान् ।। (अ.सं.उ. ४०/४४)

appearances of such symptoms[1]. Thus spreading all over the body and causing obstruction to the channels, the poison expels the life of the person very quickly just like poison[2].

VIII) Role of Poison in vitiating the Dōṣās[3] -

The viṣa possess all the tīkṣṇa(sharp) properties . Hence poison should be considered as aggravating and deranging factor to all the dōṣās . The aggravated dōṣās lose their own specific functions. Hence the poison never gets digested and which causes harm to the body. It get obstructed by deranged kapha and stops the respiration. After that immediately it brings the poisoned person to the unconscious state even when life is present within his body.

IX) Spreading of the Poison in The Body (विष प्रवेश)[4]-

Without getting mixed up with the blood the poison cannot vitiate the body and by mixing with the blood in the fraction it gets rapidly spreaded in the body like an oil on the water.

---

१) तत्रापि चोत्तमाङस्थे सकोठं शूयते शिरः।।
विशेषदक्षिकूटौष्ठनासास्यं हृष्टदन्तता । तालुशोषो रुजा मूर्ध्नि वक्त्रे चिमिचिमायनम् ।। अर्थेषु चक्षुरादीनामप्रवृत्तिर्हनुग्रहः । इत्यन्यत्रापि च विषं स्थितमङे भिलक्षयेत ।। (अ.सं.उ. ४०/४५-४६)

२) व्याप्यैवं सकलं देहमुरुध्य च वाहिनी । विषं विषमिव क्षिप्रं प्राणानस्य निरस्यति।।
(अ.सं.उ. ४०/४७)

३) विषे यस्माद् गुणाः सर्वे तीक्ष्णाः प्रायेण सन्ति हि।
विषे सवर्मतो ज्ञेयं सर्वदोषप्रकोपणम ।।
ते तु वृत्ति प्रकुपिता जहित स्वां विषार्दिताः ।
नोपयाति विषं पाकमतः प्राणान् रूणद्धि च ।।
श्लेष्मणा आवृतमार्गत्वादुच्छवासो अस्य निरूध्यते ।
विसंज्ञः सति जीवे अपि तस्मातिष्ठति मानवः ।। (सु.क. ३/२५-२७)

४) विषं नाहेयमप्राप्य रक्तं दुषयते वपुः ।।
रक्तमण्वपि तु प्राप्तं वर्द्धते तैलमम्बुवत् । (अ.सं.उ. ४१/३८-३९)

Scanned with CamScanner

X) Severity of Poison[1]-

A poison of what so ever sort, whether animal, vegetable, or artificial, if it proves instantaneously fatal should be considered that it is possessing all the ten aforesaid qualities.

XI) Impulse of the Poison (विष वेग)[2]-

The poison is found to attack successively the seven kalās or facia described in śārira sthāna. The interval of time during which a deadly poison leaves one kalā to preceding kalā is called as viṣavēga (impulse of the poison), gives rise respectively to the seven stages (seven impulses of the poison) and finally it invades the ōjas. Because of this. Śuśruta and Vagbhaṭa described seven impulses of the poison, but Caraka considered the death (mṛtyu) as the eighth impulse of the poison and described eight impulses of the poison[3] .

In animals, the impulses of the poison are four and in the birds the impulses of the poison are three[4].

XII) Viṣa Vēgāntara[5]-

The interval which takes place while poison driven by Vayu crosses one kalā to the other is known as Vēgāntara (the intervening stage).

---

१) स्थावरं जंगमं यच्च कृत्रिमं चापि यद्विषम् ।
सद्यो व्यापादयेत्तत्तु ज्ञेयं दशगुणान्वितम् ।। (सु.क. २/२४)

२) धात्वन्तरेषु या सप्त कलाः सम्परिकीर्तिता । तास्वेकैकामतिक्रम्य वेगं प्रकुरुते विषम् ।। (सु.क. ४/४०)

३) च.चि. 23/18-20

४) नृणां चतुष्पदां स्याच्चतुर्विधः पक्षिणां त्रिविधः ।। (च.चि. २३/२१)

५) येनान्तरेण तु कलां कलाकल्पं भिवनत्ति हि ।
समीर नो ह्यमानं तत्तु वेगान्तरं स्मृतभ् ।। (सु.क. ४/४१)

XIII) Poisonous impulse General Features

(विष वेग सामन्य लक्ष्ण) -

1) In Human beings -

According to Caraka the viṣavēgas are - eight and explained the same features according to viṣa vēga for both sthāvara and jāṅgama viṣas.

According to Suśruta and Vāgbhaṭa the viṣavēgas are seven. Ācarya Suśruta explained specific features according to viṣa vēga for the both sthāvara and jāṅgama viṣas.

A) According to Caraka

i) First Impulse (प्रथम वेग) -

तृण्मोहदन्तहर्षप्रसेकवमथुक्लमा भवन्त्याद्ये।
वेग रसप्रदोष (च.चि. २३/१८)

During the *first impulse*, the poison exhibits symptoms such as thirst, mental confusion, sensitiveness of teeth, excessive salivation, vomiting and exhaustion due to vitiation of **Rasa**.

ii) Second Impulse (द्वतीय वेग) -

असृप्रदोषाद्वितीये तु ।। वैवर्ण्यभ्रमवेपथुमुर्च्छाजृम्भांग
चिमिचिमातकाः दुष्टंपिशिता । (च.चि. २३/१९)

Symptoms in the *second impulse*, are abnormal complexion, giddiness, trembling, fainting, yawning, irritation, sensation and feeling of darkness due to vitiation of **Rakta**.

iii) Third Impulse (त्रृतीय वेग) -

त्रृतीये मण्डलकण्डूश्वयथुकोठाः ।। (च.चि. २३/१९)

In the *third impulse*, **māṃsa** is affected which give rise to circular patches, itching, swelling and urticaria.

iv) Fourth Impulse (चतुर्थ वेग) -

वातादिजाश्चतुर्थे दाहच्छर्द्य अंगशुलमूर्च्छाद्याः । (च.चि. २३/२०)

In the *fourth impulse* burning sensation, vomiting, body-pain, fainting etc, arise due to vitiation of **vāta** etc. (dōṣas).

Scanned with CamScanner

v) Fifth Impulse (पंचम वेग) -

नीलादीनां तमश्च दर्शनं पंचमे वेग । (च.चि. २३/२०)

In the *fifth impulse*, one sees the objects as blue etc. and the vision becomes dark.

vi) Sixth, Seventh and Eight Impulses

(षष्ठि, सप्तम : अष्ठम विष वेग)-

षष्ठे हिक्का, भंगः स्कन्धस्य तु सप्तमे अष्ठमे मरणम् ।

(च.चि.२३/२१)

In the *sixth impulse* there is hiccup, in the *seventh* one shoulder falls down and in the *eighth* one the patient dies.

B) According to Suśruta-

i) First impulse

If the poison over-crossing the kala which is present in between the **rasa** and **rakta dhātu**.

ii) Second impusle

If the poison is over-crossing the kala which is present in between the **rakta** and **māṃsa dhātu**.

iii) Third impulse

If the poison is over-crossing the kala which is present in between the **māṃsa** and **mēdō dhātu**.

iv) Fourth impulse

If the poison is over-crossing the kala which is present in between the **mēdō dhātu** and **kapha**.

v) Fifth impulse

If the poison is over-crossing the kala which is present in between the **kapha** and **purīṣa**.

vi) Sixth impulse

If the poison is over-crossing the kala which is present in between the **purīṣa** and **pitta**.

vii) Seventh impulse

If the poison is over-crossing the kala which is present in between pitta and śukra[1].

2. In animals and birds -

नृणां चतुष्पदां स्यात् चतुर्विधः, पक्षिणां त्रिविधः ।।
सीदत्याद्ये भ्रमति च, चतुष्पादो वेपते, ततः शून्यः ।
मन्दाहारो म्रियते श्वासेन हि चतुर्थवेगे तु ।।
ध्यायति विहगः प्रथमे वेगे, प्रभात्रम्यति द्वितीये तु ।
स्रस्तांगश्च तृतीये विषवेगे याति पंचत्वम् ।।

(च.चि. २३/२१-२३)

In *animals* there are **four impulses**, while in *birds* there are only **three impulses**.

A) In Animals -

First Impulse - The animals gets depression and giddiness.
Second Impulse - Giddiness then it trembles.
Third Impulse -The animal feels emptiness (sunya) and stops eating.
Fourth Impulse - And lastly it dies because of obstruction to respiration.

B) In Birds -

First Impulse - Looks anxious.
Second Impulse - Feels giddiness.
Third Impulse - The bird develops slothness of the limbs resulting in death.

XIV) Routes of Elimination-

The posion can be eliminated from the body either as

---

१. सु.क.डल्हणटिक.. ४/४०

such or in their chemical modifications.

Routes -

1) Urine.
2) Faeces.
3) Sweat.
4) Milk - can be source of poisoning in the breast fed babies.
5) Saliva and other mucous or serous routes.

XV) Critical/fatal period in Poisoning (विषसंकट) -

विषप्रकृतिकालान्नदोषदूष्यादिसंगमे ।
विषसंकटमुद्दिष्टं शतस्यौकोत्र जीवति ।।

(अ.हृ.उ. ३५/६०)

The combination of all the factors like viṣa-prakṛti (pitta prakṛti), viṣa-kāla (varṣakāla or grīṣmakāla), anna (kaṭurasa, kulathī, sarasōṃ, etc.), dōṣa (pitta), dūṣya (rakta), ādi (like hunger, thirst etc.) during the specific time or period is called as viṣā saṅkaṭa (fatal period), and in such conditions one out of hundred (persons reaching this stage) survives.

CHAPTER - 5

DIAGNOSIS OF POISONING
(विष परिक्षा)

I) ACCORDING TO ĀYURVĒDA

II) ACCORDING TO MODREN

III) DUTIES OF MEDICAL PRACTITIONER IN CASE OF SUSPECTED POISONING

I) According to Āyurvēda

Regarding the examination and diagnosis of the poisoning which can be understood in the following way.

1) Pāñcabhautika Parikṣā (पांचभौतिक परिक्षा)

The evolution of the whole world has taken place from the pañcamahābhutas and all the gross and fine elements present in this world are made up of pañcamahābhutas only. The elements are named accordingly on the basis of the theory of vyapadēśastu bhuyastha (व्यपदेशस्तु भुयस्थ): For e.g. the element having pṛthvī mahābhuta will be termed as pārthiva dravya. Thus the viṣa dravyas also are composed of pañcamahābhutas and are present with specific characters i.e śabda, sparśa, rūpa, rasa, gandha which is been explained by Ḍalhaṇa in his Suśruta commentary[1] in the context of the Viṣaanna parikṣa (examination of poisonous food) explained in the following way:

Śabda Parikṣa (शब्द परिक्षा)- When poisoned food burns making louds cracks.

Rupa Parikṣa (रुप परिक्षा)- When cast into the fire it acquires the colour of a peacock's neck.

Gandha Parikṣa (गंध परिक्षा)- When it burns it emits irri-

---

१) रसरुपादिभस्तल्लिंगमुद्दिशन्नाह - - - - - - - एवं शब्दादिभिः पंचभिः (चतुर्भिः) विषज्ञानं प्रतिपाद्यापरेणपि प्रकारेण। सु.क. १/२८-३३ Ḍalhaṇa commentory

tating fumes and it cannot be speedily extinguished.

Rasa Parikṣa (रस परिक्षा)- Jivajivakas(flies) die after flying over the poisonous food.

Sparśa Parikṣa (स्पर्श परिक्षा) - Feature are explained in the context touch of poisonous food (details in page no 87).

2) Examination of Poison on the basis of the Features (लक्षण अनुसार विष परिक्षा)

According to the Āyurvēdic Saṃhitās, the poisons are divided into Sthāvara and Jaṅgama on the basis of its origin and the type of the poison can be known by its poisonous features.

A) Jaṅgama Viṣa Lakṣṇas (Animal poison features)

निद्रां तन्द्रां क्लमं दाहां सपाकं लोमहर्षणम् ।
शोफ्र चैवातिसारं च जनयेज्जंगमं विषम् ।।

(च. चि. २३/१५)

The animal poison produces sleep, drowsiness, exhaustion, burning sensation, inflammation, horripulation, edema and diarrhoea.

B) Sthāvara Viṣa Lakṣṇas (vegetable poison features)

स्थावरं तु ज्वरं हिक्कां दन्तहर्ष गलग्रहम् ।
फेनवम्यरूचिश्वासमूर्च्छाश्च जनयेव्दिषम् ।।

(च.चि. २३/१६)

The vegetable poison produces fever, hiccup, sensitiveness of the teeth, spasm in the throat, frothy saliva, vomiting, anorexia, dyspnoea and fainting.

II) According to Modern

Poisoning may be suicidal, homicidal or accidental, and a definite history of the ingestion, or contact with a known poisonous substance may or may not be available. Therefore, the possibility of poisoning should always be consid-

ered in a puzzling situation when differential diagnosis presents a difficult problem. Accordingly, it is essential that one should be familiar with the outstanding symptoms and signs of poisoning in the living persons together with its effects as found in the examination of the dead.

1) Diagnosis of Poison in the Living

A) Acute Poisoning

The following considerations may be taken into account:

i) The symptoms appear suddenly in a healthy person.

ii) Proper history taking may be difficult in homicidal or suicidal cases.

iii) Sudden onset of symptoms after meals in the previously healthy individual and gradual increase in severity of symptoms point out to a positive diagnosis.

iv) Other family members if affected uniformly.

v) Detection of poison can be attempted in stool according to poisons used.

e.g. - corrosive poisons leave external marks.
- Irritants produces cholera like symptoms.
- Spinal poisons stimulate convulsions etc.

vi) A strong evidence in favour of poisoning is the detection of the poison in the food, medicine, vomit, urine or faeces. Therefore in all the suspected cases of poisoning these samples must be sent for chemical analysis to the laboratory.

B) Chronic Poisoning

i) The symptoms are exaggerated after the administration of suspected food, fluid or medicine.

ii) Malaise, cachexia, depression and gradual deterioration of general condition of the patient is seen.

iii) Repeated attacks of diarrhoea, vomiting, etc., are seen.

Scanned with CamScanner

iv) When the patient is removed from his usual surroundings the symptoms disappear.

v) Traces of poison may be found in the urine, stools or vomit.

2) Diagnosis of Poisoning in Dead

A detailed history of the quality and quantity of the poison administered, the character of the symptoms with reference to their onset, and the time that passed between the intake of the poison and development of symptoms, the duration of illness, the treatment given and the time of death, should be obtained from the relatives of the deseased.

The following consideration should be made into account :

A) Postmortem examination.

B) Chemical examination of viscera.

C) Experiment in animals.

D) Collection of oral and circumstantial evidence.

A) Postmortem Examination

All deaths due to poisoning are medico-legal cases and in all probability will have to be subjected to a detailed autopsy. The general procedure of examination as in any other unnatural death is carried out with particular reference to those aspects which can give a clue to the detection, and identification of poison.

i) External Examination

ii) Internal Examination

i) External Examination

a) Stains or marks of vomit, faeces, etc.

b) Colour of postmortem lividity, certain poisons impart characteristic colouration for example :

- Phosphorous - Yellowish or brownish colouration.

- Cyanide - Brick red.
- Carbon monoxide - Cherry red.

c) Injection marks, (some poisons are injected).

d) Extent of putrefication - Some poisons are reputed to retard putrefaction of the dead body, e.g., arsenic, organophosphates, etc.

e) Condition of pupils and hands if relaxed or clenched.

f) Orifices of the body for marks of corrosion or foreign body.

g) Odour, especially around the mouth and the nose, which can be explained in the following table.

Poison	Nature of Odour
Cyanide	Bitter almonds
Ethyl alcohol	Fruity
Hydrogen sulfide, disulfiram	Rotten eggs
Marijuana(cannabis)	Burnt rope
Nitirobenzene	Shoe polish
Paraldehyde and chloral hydrate	Pear-like(acrid)
Phosphorous, arsenic, malathion, thallium, etc.	Garlicky
Zinc phosphide	Musty(fishy)

Phenol (carbolic acid) and camphor have characteristic odour difficult to describe.

ii) Internal Examination

a) Odour always helps before opening the skull, since many poisons impart a faint odour to brain tissues, e.g., alcohol, phenol, cyanide, etc.

b) Examination of the gastrointestinal tract

1) *Hyperemia* or redness of the mucous membrane is maximum at the cardiac end of the stomach and the greater

Scanned with CamScanner

curvature. The colour is deep crimson, the hyperemia may be diffused or patchy e.g. In arsenic poisoning the colour is velvety appearance.

Discoloration may be present due to various substances e.g. fruit juice etc. Nitirc acid stains the gut yellow. Hyperemia must be distinguished from generalised venous congestion which may occur in asphyxial death. The differentiating feature from hyperemia that is due to disease is that, it is uniformly spreaded over the mucus membrane is more involved in poisoning.

2) *Softening* occurs due to corrosive poisons, mostly with alkalies seen in the stomach cardiac end and greater curvature, mouth, throat and oesophagus. When due to disease process it is confined to the stomach alone. Also to be differentiated from postmortem softening which occurs in the most dependent part and affects all the layers of the wall of the stomach. There is no zone of inflammation around the softened patch.

3) *Ulceration* is seen mostly on the greater curvature of the stomach and has to be differentiated from a peptic ulcer which occurs mostly on the lesser curvature and is sharply defined with a localised zone of hyperemia around it.

4) *Perforation* occurs rarely except with sulphuric acid poisoning. Perforation could also occur : as a result of chronic ulcer, but the perforation in this case is commonly oval or rounded, the margins are punched out, the stomach shows signs of adhesions to the neighbouring organs.

c) Contents of the GI -tract - Sometimes the poisonous substance in the form of tablets, powder or fluid may still be present. There may be distinct odour.

d) State of the liver and kidneys - Congested, necrosis or degenerative changes are produced by some poisons.

e) Heart - Subendocardial haemorrhages are characteristically seen in arsenic poisoning.

B) Chemical Examination

In every case of poisoning, an attempt must be made to demonstrate the presence of poison by accepted analytical methods. For this purpose, certain body fluids and viscera must be sent to nearest Forensic Science Laboratory (FSL), through the police. When sending viscera or body fluids for chemical analysis, appropriate preservatives must be used.

For the chemical analysis the following two points are important -

i) Collection of the Viscera.

ii) Preservatives for the Viscera and Body Fluids.

i) Collection and Preservation of the Viscera

Detection of poison in the blood, faeces, urine or in the organs of the body is the surest proof of poisoning. Poison may be detected in the stomach, intestine and sometimes in the liver, spleen and kidney.

The viscera collection is done in two ways

a) Routine Viscera - These should be preserved routinely for analysis, in every case of poisoning.

b) Special Viscera - All or any one of these should be preserved in addition to routine viscera, in certain specified cases of poisoning.

a) Routine Viscera

Materials	Quantity
1. Stomach	Entire
2. Stomach contents	upto 300 ml
3. Small intestine	100 to 200 cm (entire in infants)
4. Small intestinal contents	Upto 100 ml

Scanned with CamScanner

5. Liver(portion containing gall bladder)	500 gms
6. Kidneys	One half of each kidney (both kidneys in infants)
7. Urine	Upto 200 ml
8. Blood	5 to 10 ml

b) Special Viscera

Materials	Quantity	Poison
1. Cerebrospinal fluid	As much as can be withdrawn	Alcohol.
2. Brain	Half (One hemisphere)	Barbiturate Carbon monoxide Anaesthetics Cyanide Strychnine, Opiates, Alcohol.
3. Spinal cord	Entire length	Strychnine gelemium.
4. Lung (in airtight container)	One lung	Inhaled poisons.
5. Skin (with under laying tissue)	Affected portion	Corrosive, injected poison.
6. Long bone (preferably femur)	10 cm length	Heavy metals.
7. Scalp hair	5 gm	Heavy metals.

If during autopsy any organ is removed from the body, it should never be on any surface, or in any container which is not clean. If this is not done, a doubt may arise, whether the poison found might have been accidentally introduced in

the vessel used. If a refrigerator is available, all organic substances should be kept in it, as soon as possible after removal from the body. Chemical compounds should not be added, as they may confuse the tissue. Decomposition may produce substances not in the original stomach, but allowances can almost always be made for these without confusion.

ii) Preservatives for the Viscera and Body Fluids

a) Rectified spirit.

b) Sodium chloride (saturated solution).

Rectified spirit cannot be used in certain poisons e.g. in alcohol, carbolic acid, phosphorous paraldehyde.

Formalin should not be used as it hardens the tissues. Hence extraction of poison becomes very difficult.

Material	Preservatives
1. Viscera	Saturated solution of common salt.
2. Blood	For every 10 ml, use of 30 mg, potassium oxalates and 10 ml sodium fluoride.
of	
3. Urine	Saturated solution of common salt or 5 ml conc. HCl for every 250-500 ml.

C) Animal Experimentation for detection of poison[1]

In Ayurvēda using of the animals in the detection of the poisons is described by Suśruta in the Kalpasthānaṃ i.e. on the sight of poisonous food, Chakora bird loses its redness of eyes instantaneously, Jivajivaka dies under a similar condition. The voice of the Cuckoo (Kōkila bird) becomes abnormal, Krauncha (heron) becomes excited. A Muyūra (peacock) becomes unsta-

---

१) सु. क. १/३०-३४

Scanned with CamScanner

ble and agitated, and a Śuka and Śārikā scream(in fear). A Haṃsa(swan) roams excessively, and a Bhriṅgarāja (it is a type of bird) rises its inarticulate voice. A Piṣata (a species of spotted deer) sheds tear and a monkey defaecates. Hence keeping these birds and animals in the royal palace for show and entertainment as well as for the protection of the sovereign master.

In the modern medicine this is not the ideal test, for signs and symptoms may be due to other causes. Absence of signs and symptoms may be due to insusceptibility of the animal to the particular poison, e.g. rabbits are insusceptible to belladona, hyocyamus and stramonium, pigeons are not affected by opium. Cats and dogs are affected by poisons almost in the same way as man. They may be fed with the suspected food, or with the poison after it is seperated from the viscera and the symptoms noted.

D) Collection of oral and circumstantial evidence

Such evidence may consists of motive, the evidence of witness about the recent purchase of the poison, his behaviour before and after the committing of the offence, and the recovery of the poison from the possession of the accused.

III) Duties of Medical Practitioner in the Case of Suspected Poisoning

The duties are two-

I) Medical - Care and treatment of the patient.

II) Legal - Assist the police to determine the manner of death.

1) Note preliminary particulars of the patient, i.e., age, sex, address, date and time, identification marks, etc.

2) In case of suspected homicidal poisoning, the doctor must confirm his suspicion before expressing his opinion.

For this the doctor must:

A) Collection of vomitus and urine, and should submit for analysis some part of the content should also be preserved in his custody.

B) Carefully observe and record the symptoms in relation to food, in case if it is food poisoning origination from a public eatry (canteen, cafe, hotel, etc.), the public authorities must be notified.

C)The opinion of another doctor is worthwhile.

D) Wherever possible the case should be shifted to the hospital.

E) The doctor should keep detailed records of the number of his visits, the symptoms and signs observed and treatment given time to time.

3) Once the suspicions are confirmed, he should request the shifting of the patient to hospital. If the victim is an adult who retains his mental faculties, it might be desirable to speak to him about the steps to be taken.

4) Noncompliance is punishable under S.201, I.P.C. if it is proved that the doctor did with the intention of protecting the accused.

5) If a private practitioner is convinced that the patient is suffering from homicidal poisoning, he is bound under S.39, Cr.P.C. to inform the Police Officer or Magistrate. Non-compliance is punishable under S.176, I.P.C.

6) If he is sure that patient is suffering from suicidal poisoning, he is not bound to inform the police, since S.309 of the I.P.C. is not included in the section of the I.P.C for which information has to be given under S.39, Cr.P.C.

7) If the practitioner is summoned by the investigating

police officer, he is bound to give all information regarding the case that has come to his notice under S.175, Cr.P.C. If he conceals the information, he is liable to be prosecuted under S.202, I.P.C. If he gives false information, he is liable to be charged with the offence of giving false information under S. 193, I.P.C.

8) A government medical officer is required to report to police all the cases of suspected poisoning.

9) If the condition of the patient is serious, he must arrange to record the dying declaration.

10) If the patient dies, he should not issue a death certificate, but he should inform the police.

***Rājavaidya Lakṣṇās*[1]-**

Powerful enemies, even the servants and relatives of the King in subdued anger to avenge themselves on the Sovereign sometimes administration of strong poisonous compounds to kill. Sometimes the ladies(of royal house-hold) are found to administer to the king various preparations (of food and drink), which often prove to be poisonous from a foolish motive of securing his affection and graces, and sometimes it is found that by the embrace of poisoned girl (viṣakanya), he dies almost instantaneously. Hence it is the main duty of the royal physician to protect of the King against such poisoning.

A King should appoint a physician. He should be well-paid and posses the following qualifications. He should come from a respectable family, should be virtuous in conduct, and always be watchful of the health of the king. He should be greedless, straight-forward, god-fearing, grateful, good looking, and devoid of anger, roughness, vanity, arrogance and

१. सु.क. १/८-११

laziness. He should be forbearing, self-controlled,merciful, clean, with good conduct and compassion, intelligent, untiring, sincere, well-wisher, soft-spoken, bold, skilful, dextrous and ever-ready physician endowned with these qualities, respected by the experts in the field and possesing anti-poisonous remedies should be appointed by the King.

Scanned with CamScanner

CHAPTER -6
TREATMENT OF POISON
(विष चिकित्सा)

I) ASSESSMENT OF THE PATIENT'S CONDITION II) TREATMENT III) FEATURES OF RECOVERY FROM THE POISONING

A poisoning case is usually an enigma in clinical medicine. Unlike the average clinical case, many overdosed patients are brought to hospital in an unconscious (comatose) condition. Even if a poisoned patient is conscious and alert, he is usually unco-operative. Added to these problems is the unfortunate absence of specific signs and symptoms (toxic syndromes), in relation to many poisonous substances. In this condition, assessing the patient is very important which is been described by Suśruta and Vagbhaṭa and it is ultimately beneficial for the treatment.

I) Assessment of the Patient`s Condition

1) According to Āyurvēda

देशप्रकृकतसात्म्यर्तुविषवेगबलाबलम् ।
प्रधार्य निपुणं बुद्धया ततः कर्म समाचरेत् ।।

(सु.क. ५/३५)

A wise physician should treat a case of poisoning with a full regard to the nature of the country, body constitue, compatability, season, poisonous impulse and intensity of poison. In similar way Vāgbaṭa has also explained[1].

---

१. इति प्रकृतिसात्म्यर्तुस्थानवेगबलाबलम् ।
आलोच्य निपुणं बुद्धया कर्मानन्तरमाचरेत् ।। (अ.हृ.उ. ३५/६५)
The wise physician should determine the appropriate treatment only after considering the nature, accustomisation, season, location, stage, strength and weakness (of the poison and the patient).

2) According to Modern

First of all find out whether the patient is in more dangerous stage (i.e.whether it is an emergency). In such a case, the initial priority should correct immediate life-threatening problems of airway, breathing, circulation and CNS depression. In the absence of a crisis, a thorough examination of the patient must be conducted with particular reference to the following :

A) Level of Consciousness

This is to be assessed as per Reed's classification described as follows -

Group 0 Arousable

Group 1 Respond to painful stimuli and have intact reflexes.

Group 2 Do not respond to painful stimuli - most reflexes are normal.

Group 3 Do not respond to painful stimuli - most reflexes are absent.

Group 4 Deeply comatose, with respiratory and / or circulatory failure.

B) Respiratory status

This must be assessed after a clear airway has been established, by means of arterial puncture and measurement of blood pH, pCO_2 and plasma bi-carbonate. A simple method to measure the respiratory minute volume by Wright's Spirometer. If this is less than 4 liters / min, respiratory insufficiency is present.

C) Cardiac status

It is assessed by recording and monitoring the pulse, blood pressure and urinary output. Various poisons cause abnormalities in these measurements. The poisons which affects on these systems as follows :

Scanned with CamScanner

principles. The specific treatment principles is carried in specific type of poisoning which will be described elaboratively in the concerned chapters.

Principles of General Treatment

A) In all the kinds of poisons and in all the states of poisoning, *four therapies* viz **sraṃsana** (mild purgation), **pralēpa** (application of paste on the skin) **bhōjya** (food) and **auṣadha** (drug recipe), should not be done without the addition of ghṛta (ghee). There is no other medicine equal to ghee (in the treatment of poisons) especially so when anila (vāta) is predominant[1].

B) Poison which possesses qualities of **ślaiṣmika** (kapha) should be **mitigated by emesis**, application of paste of drugs having the hot, dry and penetrating qualities (uṣṇa, rūkṣa, tīkṣaṇa) and the use of foods having astringent, pungent and bitter tastes(kaṣāyaya, kaṭu, and tikta rasas)[2].

C) Poison which possesses qualities of **pitta** should be **mitigated by mild purgations**, bathing, application of pastes (lepas) etc which has the qualities of cold (śītala guṇa), with foods of astringent, bitter and sweet tastes(kaṣāya, madhura and tikta rasas) added with ghee[3].

D) Poison[4] which possesses qualities of **vāta** should be passified by use of foods which is having sweet, unctous, sour, salt tastes(madhura, snigdha, āmla and lavaṇa) added

---

१. नाघृतं स्रंसनं शस्तं प्रलेपो भोज्यमौषणम् । सर्वेषु सर्वावस्थासु विषेषु न घृतोपमम्। विद्यते भेषजं किंचिद्विशेषात् प्रबलानिले ।। (अ.सं.उ. ४०/१६८)

२. श्लैष्मिक वमनैरूष्णरूक्षतीक्ष्णैः प्रलेपनैः । कषायकटुतिक्तैश्च भोजनैः शमयेद्विषम्। (अ.सं.उ. ४०/१६५)

३. पैत्तिकं स्रंसनैः सेकप्रदेहर्भृशशीतलैः । कषायतिक्तमधुरैर्घृतयुक्तैश्च भोजनै : ।। (अ.सं.उ. ४०/१६६)

४. वातात्मकंजयेत् स्वादुन्स्निग्धाम्ललवणान्वितैः । सघृतैर्भोजनालेपैस्तथैव पिशिताशनैः।। (अ.सं.उ. ४०/१६७)

with ghee applications of paste of similar qualities on skin and eating meat (as food).

E) Poison localised in the āśaya (seats) of the dōṣās that should be treated first without contradicting the concept of Āśraya and āśrayi.

F) Caraka described twenty four types of the general treatment principles of the poisoning and can be applied according to the condition of the poisoning[2].

The twenty-four remedial measures for the poisoning can be understood in the following way[3]-

a) To Check Entry and Circulation of Blood

i) Ariṣṭa bhandana	Binding
ii) Utakartana	Incision
iii) Niṣpīḍana	Compression
iv) Cūṣana	Sucking
v) Agni	Heating
vi) Pariṣēka	Sprinkling
vii) Avagāha	Bath

b) Eliminative Therapy

viii) Raktamōkṣaṇa	Blood-letting
ix) Vamana	Emesis
x) Virēka	Purgation
xi) Nasya	Snuffing

---

१. आशये यस्य दोषस्य विषं तिष्ठति तं पुरः । आश्रयाश्रयिणोर्विद्वानविरोधेन साधयेत् ।।
(अ.सं.उ. ४०/१७३)

२. मन्त्रारिष्टोत्कर्तननिष्पीडनचूषणाग्निपरिषेकाः । अवगाहरक्तमोक्षणवमनविरेचकोधानानि ।।
हृदयावरण अंजननस्यधूमलेहौषधमाननि । प्रतिसारणं प्रतिविषं संज्ञासंस्थापनं लेपः ।।
मृतसंजीवनमेव च विंशतिरेते चतुर्भिरधिकाः ।
स्युरूपक्रमा यथा ये यत्र योज्याः श्रृणु तथा तान् ।। (च.चि. २३/३५-३९)

३. Visha vijyanana by Dr. K.M Shyamsundar

Scanned with CamScanner

c) Symptomatic Therapy

xii) Hṛdayāvaraṇa	Protection of heart
xiii) Sañjñasaṃsthāpana	Resuscitation
xiv) Mṛtasañjīvana	Revivation

d) Counteracting Measures

xv) Mantra	Incantation
xvi) Ouṣadha	Other medicament
xvii) Prativiṣa	Antidotes

e) Pacificatory Measures

xviii) Lēpa	Pastes
xix) Pratisāraṇa	Local application
xx) Anjana	Collyrium
xxi) Pradhamana	Blowing up through nose
xxii) Dhumana	Smoking
xxiii) Lēha	Linctus
xxiv) Upadhāna	Medication on incised scalp

i) Mantra (मन्त्र)

a) Definition

Mantra is termed as a word or the combinations of the words, if recited in a prescribed manner the person is able to reach the God or could possess the immortal power which is considered to be the best and most effective among all types of the treatments.

b) Importance[1]

The mantras full of energy with the nature of truth and divine communion delivered by dēvarṣi and brahmarṣis. These never fail to eliminate the poison from the system. Even these

१. देवब्रह्मर्षिभिः पोक्ता मन्त्रः सत्यतपोमयाः ।
भवन्ति नान्यथा क्षिप्रं विषं हन्युः सुबुस्तरम् । ।विषं तजोमयैमंन्त्रैःसत्यब्रह्मतपोमयैः ।
यथा निवार्यते क्षिप्रं प्रयुक्तैर्न तथौषधैः ।। (सु.क. ५/९-१०)

will act immediately in terrible poisoning. Poison will get eliminated very quickly by mantras than the medicines.

c) Method of Recitation of Mantra[1]

While learning the mantras one should be abstaining from women, meat, wine, honey. One should take little food, maintaining the hygene of the body and should sleep on the mattress which is made with kuśa grass.

For accomplishment of the mantras one should also worship the gods devotedly with offerings of perfumes, garlands, oblations, repeated chanting of the mantras (japa) and sacrificial oblations.The mantras do not fulfil their objects if pronounced in faulty way or deficient in accent and letters, in such conditions anti-poisonous drugs has to be used. The mantra specified for all types of poisonings are described in the *Āyurvēda* Prakāśa[2].

In todays era of technology and science, as advancement is taking in every field, the perception of the peoples are getting changed day by day even though the effect of the mantra cannot be perceived practically, but if the mind is tuned in the spiritual aspect thoroughly, definitely the effect of the mantra can be proved which is obviously beyond the materialistic view of the common person.

ii) Ariṣṭā Bandhana (अरिष्ट बन्धन)[F2]- Binding or Ligature

Ariṣṭa means unfavourable or which gives the indica-

---

१. मन्त्राणां ब्रहणं कार्य स्त्रीमांसमधुवर्जिना । मिताहारेण शुचिना कुशास्तरणशाःीयना।।
गन्धमाल्योपहारैश्च वलिभिश्चापि देवताः । पूजयेन्मन्त्रसिद्धचर्थ जपहोमैश्च यत्नतः।।
मन्त्रास्त्वविधिना प्रोक्ता हीना वा स्वरवर्णतः ।
यस्मात्र सिद्विमायान्ति तस्माद्योज्यो अगदक्रमः।। (सु.क. ५/११-१३)

२. नमो भगवति श्रीघोणे हर २ दर २ पर २ वर २ वध २ लर २ लीं २ हर २ भां २ सर २ शं २ क्षव २ क्षीं २ ह्रीं २ भगवति श्रीघोणे यः ३ सः ३ वर २ रं सं ४ खण्डावररूपे ह्रीं ३ वर विहंगम मानुषयोगक्षेमं वद शेख रिरखः स्वाहा इति मन्त्रः। (आ.प्र. ६०/ ९६)

Scanned with CamScanner

tion of death. Obviously when the intensity of the poison increases, it signifies the ariṣṭa . As poison starts combining with the blood and gets spreaded all over the body, successively it invading the other organs in the body. Thus to prevent or stops the disasters which could be created by the poison, the physician has to opt the bandhana (ligature procedure). To stop the ariṣṭā can be called as ariṣṭā bandhana.

a) Materials[1]

Cloth, skin, soft fiber or any other soft articles can be used for ligature.

b) Procedure

The ligature should first of all be bound to four fingers apart above the seat of the bite in the event of its occurring in the extremities, in as much as such a proceeding would arrest the further (upward) course of the poisoning in the body[1]. If it is tied with the mantra by a physician who is well-versed in the mantras of anti-venomous potency will act very effectively[2].

c) Precautions

Vṛudha Vāgbhaṭa specified that the depending on the nature of the place, it is beneficial to tie it neither very tight nor very loose; very tight binding produces bad smell, swelling etc at the site; where as loose binding will be unable to prevent the spread of poison to other places[3]. Just as water

---

१. सर्वैरेवादितः सर्पैः शाखादष्टस्य देहिनः । दंशस्योपरि बध्नीयादरिष्टाश्चतुराङ्गुले।। प्लोतचर्मान्तवल्कानां मृदुना अन्यतमेन वै । न बच्छति विषं देहमरिष्टाभिर्निवारितम्।। (सु.क. ५/३-४)

२. अरिष्टामपि मन्त्रैश्च बध्नीयान्मन्त्रकोविदः । सा तु रज्ज्वादिभिर्बद्धा विषप्रतिकरी मता ।। (सु.क. ५/८)

३. बन्धो देशानुसारेण नातिगाढश्लथो हितः । दंशपूतित्वशोफादीन् कुरूते ह्यतिपीडितः। अशक्तः शिथिलो रोध्दुं विषं देशान्तरं व्रजत् ।। (अ.सं.उ. ४२/६)

F2-arista bhandana

F3- Utkartana

F4- Chushana

is obstructed from moving(out) by the dam, so also poison should be obstructed by the arista bandhana and it does not flow through the vessels[1].

iii) Utkartana (Incision)[F3]

तरोरिव मूलच्छेदाद्दंशच्छेदान्न वृद्धिमेति विषम् । (च.चि.२३/४४)

Poison does not advance after incision of the bite like a tree after cutting its root, which means the spreading of the poison can be stopped.

iv) Nispidana (Compression)

निष्पीड्य चोद्धरेद्दंशं मर्मसन्ध्यगतं तथा ।
न जायते विषवेगो बीजनाशादिवांकुरः ॥
मर्मणि प्राप्नुयान्मृत्युं सन्धिस्थे विकलांगताम् ।
(अ.सं.उ. ४२/८-९)

Expelling of the poison by squeezing the area of bite where the incision is not advisable. This method helps in removing the poison from the body just like destroying of the seed before sprouting. This procedure should not be done if the bite is present on vital parts and joints, if it is performed on the vital parts may lead to death, similarly on the joints leads to distortions of the body.

v) Cūṣaṇa (Sucking)[F4]

आचूषेत् पूर्णवक्त्रो वा मृद्भस्मागदगोमयैः ।
प्रच्छायान्तररिष्टायां मांसलं तु विशेषतः ॥
(अ.सं.उ. ४२/११)

The physician should suck the poison (along with blood) filling his mouth earlier with either mud, ash, medicinal recipe or cowdung, through an incision made below the Ariṣṭa bandana on the site of the bite. This method should be especially adopted on fleshy parts.

---

१. अम्बुवद् सेतुबन्धेन बन्धेन स्तभ्यते विषम् ।
न वहन्ति सिराश्चास्य विषं बन्धाभिपीडिताः ॥ (अ.सं.उ. ४२/७)

vi) Agnikarma (Cauterisation)

Except (the site of bite) of maṇḍali (snake with patches) which is pitta predominant (causing aggravation of pitta) all other bites, should be burnt (cauterised) by heated rods of gold, iron etc or even by a burning faggot. The fire converts everything into ash immediately, even earlier than a second[1]. This is mainly indicated in the **tvak** (skin) and **māṃsagata** (flesh) viṣa[2].

vii) Pariṣēka (Sprinkling)[3]

Suśruta has described the above said treatment after the raktamōkṣṇa in poisonous conditions. It is prepared by the decoction of the Candana and Uśira. Then the decoction should be sprinkled on the affected part to pacify the aggravated dōṣas. Caraka also described that the application of cold paste or sprinkling of cold decoction helps in the condensation of the blood thus helping to pacify the intensity of the poison as it is said that the blood is the only media for the spreading of the poison in the body[4].

viii) Avagāha (Bath)

Avagāha means immersion or dipping the affected part in a medicated decoction or oil.

ix) Raktamōkṣaṇa (Blood-letting)

a) Importance

'विषं स्रवाणं हरति रक्तात्' च.चि. २३/४५

Blood-letting eliminates the poison from the blood as

---

१. दंशं मण्डलिनां मुक्त्वा पित्तलत्वादथापरम् ।
प्रतप्तैर्हेमलोहाद्यैर्दहेदाशुल्मुकेन वा ।
करोति भस्मसात् सद्यो वह्निः किं नाम क्षणात् ।। (अ.सं.उ. ४२/९)

२. त्वक् मांसगतं दाहो दहति विषं (च.चि. २३/४५)

३. चन्दनोशीरयुक्तेन वारिणा परिषेचयेत् ।। (सु.क. ५/१६)

४. प्रदेहसेकैस्तत् । शीतैः स्कन्दति तस्मिरन् स्कन्ने व्यपयाति विषवेग ।।
(च.चि. २३/४२)

the blood is the major media which blow up the poison just like how air blows up the fire[1] .That's how the blood-letting procedure plays an important role in controlling the intensity of the poison.

b) Indications

Blood-letting should be speedily restored in the case where the poisoned area has become discoloured, rigid, swollen and painful[2]. And also if the poison has spread to distant areas, venesection should be done which is the best treatment. If (poisoned) blood is not removed out, the poison removes (destrous) everything, vitiated blood spreading through out the body which surely causes death[3].

c) Contra-indications

In the case of an infant, an old man, or a pregnant woman in these patients it is contra-indicated[4].

d) Selection of the vein

The expert clinician should puncture veins around the site of the bite. In case the poison has spread, veins at the end of the extremities or in fore head should be punctured[5].

e) Procedure

Blood letting should be performed by scraping, application of horn, leach or venesection. The blood afflicted

---

१. रक्तं हि विषध्मानं वायुरिवाग्नेः (च.चि. २३/४२)

२. विवर्ण कठिने शूने सरूजे अंगे । तूणैविस्रवणं कार्यमुक्तेन विधिना ततः ।। (सु.क. ५/३६)

३. विषे प्रविसृते विध्येत् सिरां परमा क्रिया ।। रक्ते निर्ह्रियमाणे हि कृत्स्नं निह्रियते विषम् । (अ.स.उ. ४२/१२)

४. गर्भिणीबालवृद्धानां सिरव्यधनवर्जितम् ।। (सु.क. ५/३०)

५. सु.क.५/१४

by poison causes vitiation of other tissue elements in the body leading to death. From site of bite if the blood does not comes out , then rubbing therapy (pragaharṣaṇa) should be employed for proper flow of the blood. For the purpose of rubbing should be done with the help of the powders of the trikaṭu, gṛhadhūma, rajani, pañcalavaṇa, gōrōcana and vārtākā[1]. Vāgbaṭa has explained that while doing the venous puncture if vein is not available due to edema, in such conditions for blood letting either śruṅga or leach should be used[2]. And the veins of the fore-head and extremities should be opened in the case where the poison would be found to have spreaded through out the whole body[3].

f) Features of poisonous blood

The poisonous blood will have bad odour and if it is put into the fire, makes the crackling sound[4].

g) Precautions

As the features are showing the flow of pure blood should be arrested. After the blood letting therapy the remaining amount of blood which is exsisting in the body if gets liquified by the influence of heat of the poison, should be stopped immediately by the intensive cold procedures repeatidly and helps in restricting the blood flow. If the blood does not clot due to the power influence of the poison leads to fainting, toxicity, cardiac complications etc develops. These should be treated by cold therapies and fanning the patient till he gets horripilations[4].

---

१. प्रच्छन्नश्रृंगजलौकाव्यधनैः सारव्यं ततो रक्तम् ।। रक्ते विषप्रदुष्टे दुष्येत् प्रकृतिस्ततस्त्यजेत् प्राणान् । तस्मात् प्रघर्षणैरसृगर्तमानं प्रवत्यं स्यात् ।। त्रिकटगृहधूतरजनीपंचलवणरेचनाः सवार्ताकाः । (च.चि. २३/३९-४१)

२. अ.सं.उ. ४२/१६

३. समन्ततः सिरा दंशाव्विध्येत्त् कुशलो भिषक् । शाखागे वा ललाटे वा व्यण्यास्ता विसृते विषे ।। (सु.क. ५/१४)

४. अ.सं.उ. ४२/१६-१८.

x) Vamana (Emesis)

During the first phase the ingested poison should be eliminated by emesis, which means if the poison is in the stomach emesis is indicated[1]. This procedure is also indicated in other conditions such as the patient who is affected with a poison marked by a predominance of aggravated kapha and bitten in the winter would have cold salivation, fainting and intoxication and should be treated with strong emetics[2]. In Aṣṭāṅga Saṅgraha Uttarasthāna the acārya tells other than the above, that this vamana could be done if the snake bite is above the umbilicus[3] and by the different procedures of the hṛdayāvaraṇa kapha gets increased and accumulates in the heart producing feeling heaviness, salivation and nausea, hence patient should be made to vomit using emetic drugs which are antipoisonous[4].

a) Precautions

Avoiding use of liquids such as sour gruel, soup of horsegram, oil, wine etc so that kapha does not spread to the entire body[4].

xi) Virēcana (Purgation)

In the second stage of the poisoning the purgation is indicated. Which means if the poison is in the pakvaśaya the purgation can be done[5].

---

१. पीतं वमनैः सद्यो हरेद्विरेकैद्वितीये तु ।। (च.चि. २३/४५)

२. शीते शीतप्रसेकार्ते श्लैष्मिकं कफद्विषम् । वामयद्वमनैस्तीक्ष्णैस्तथा मूर्च्छामदान्वितम्।। (सु.क. ५/३९)

३. अ.सं.उ. ४२/६३

४. हृदयावरणेनास्य श्लेष्मा हृद्युपचीयते । प्रवृत्तगौरवोत्क्लेशहृल्लासं वामयेत्ततः ।। द्रवैः कांजिककौलत्थतैलमद्यादिवर्जितैः । वमनैर्विषहृभ्दिश्च नेवं व्याप्नोति तद्वपुः।। (अ.सं.उ. ४२/२३,२४)

५. सद्यो हरेद्विरेकैर्द्वितीये तु ।। (च.चि. २३/४५)

This procedure(virēcana) can be followed in the conditions such as a patient affected by the poison with marked symptoms like pain and burning sensation in the abdomen, ādmāna (distension of abdomen), retention of urine, stool and flatus, painful urination and other troubles of the deranged pitta[1]. Vāgbaṭa describes more along with that, the person of pitta constitution bitten by a snake of pitta predominant features, the bite below the umbulicus and if it is localised in the pakvāśaya requirs the virēcana[2]. After vomiting and purgations the patient should drink antipoisonous yavāgu[3].

a) Precautions

The patient suffering from poisoning should be made to purge lying on the cot which has a hole (for passing the faeces) because frequent getting up will cause aggravation of vāta[3].

xii) Upadhāna Karma (Medication on incised scalp)[4]

When the channels of kapha gets vitiated by poison, then this causes obstruction in the channels because of which the movement of vāyu gets obstructed. As a result of this, the patient breathes as if he is going to die very soon. If he is free from signs and symptoms of incurability, then the incisions

---

१. कोष्ठदाहरुजाध्मानमूत्रसंगरुगन्वितम् । विरेचयेच्छकृद्वायुसंगपित्तातुरं नरम् ।। (सु.क. ५/४०)

२. अ.सं.उ. ४२/६३

३. अ.सं.उ. ४२/६७

४. विषदूषितकफदार्गः स्रोतः संरोधरूद्धवायुस्तु ।
मृत इव श्वसेन्मर्त्यः स्यादसाध्यलिंगैर्विहीनश्च ।।
चर्मकषायाः कल्कं बिल्वसमं मूर्ध्नि काकपदमस्य।
कृत्वा दद्यात्कटभी कटुकट्फलप्रधमनं च ।।
छागं गव्यं माहिषं वा मासं कौक्कुटमेव वा ।
दद्यात् काकपदे तस्मिंस्ततः संक्रमते विषम् ।। (च.चि.२३/६५-६७)

should be made on his scalp resembling the paw of the crow (kākapāda) and one bilva quantity of the paste of carmakāśa, or meat of goat, cow, buffalo or cock should be applied which will absorbs the poison from the body. Apart from the above said procedures Vāgbaṭa has stresssed regarding the procedure with respect to site of bite. If the snake bite is in the lower parts of the body incision should be made on the scalp, similarly if it is on the upper parts of the body the incision should be made on the feet[1].

xii) Prdhamana (blowing up through nose)[2]

After the upadāna in the patient's nostrils blow up the powder of kaṭabhi, kaṭuka and kaṭphala.

xiii) Hṛdayāvaraṇa (Protection of heart)[3]

Poison by its penetrating property weakens the heart, so in order to protect it, the patient should be made to drink pure ghee, ghee mixed with honey or anti-poisonous drugs added with more ghee.

xiv) Anjana (Collyrium)

Pippalī, marica, yavakṣāra, vacā, saindhava and śigru, macerated with the bile of rōhita fish and applied as collyrium, destroys the poison present in the eye[4]. After the use of strong nasal drops and collyrium, ghee should be drunk in larger dose, because poison by its penetrating property destroys the eye which is dry and irritating[5].

---

१. अ.सं.उ. ४१/४६-४७

२.च.चि.२३/६५-६७

३. विषं कर्षति तीक्ष्णत्वाद्हृदयं तज्ञय गुप्तये । पिबेद् घृतं धृतक्षौद्रमगदं वा घृताप्लुप्तम्।। (अ.सं.उ: ४२/१९)

४. पिप्ली मरिच क्षारवचासैन्धव - - - - - - - अंजनात् ।। (अ.सं.उ. ४२/४८)

५. तीक्ष्णनस्या अंजनान्ते - - - - - - - समीरितम् ।। (अ.सं.उ. ४२/५८)

a) Indications

Collyrium should be applied (along the eyelids) in the case of a swelling of the eyeballs, somnolence, discolouration of the eye, blurred vision and discoloured appearance of all objects[1].

xv) Nasya (Nasal medication)[2]

When poison is present in the head, nasal medication should be done with the juice of root of bandhujīva, bhāraṅgī and asita surasā, or the powder of pippali, hiṅgu, vṛśrcikālī, manaśśilā, śiriṣabījā, apāmārga, lavaeṇaṃ, blown into the nose, restores consciousness.

xvi) Dhūmana (Smoking)

Dhūma means medicated smoke which helps to clear off all blocked channels due to which the respiration process gets stabilised. This anti toxic medicated smoke enters in the body and nullifies the adverse effect of the poison. Due to this medicated smoke the toxic ants, flies also leaves their place, we get many such combinations of this medicated smoke in the classics, e.g- dhūmaagada : tagara and kuṣṭha mixed with ghee, head of the king serpent and śiriṣa flowers make dhūmāgada (antipoison fumigation) which alleviates all types of poison and swelling[3]. Also it prevents the entry of the snakes to those places.

In another context Ācārya Suśruta has told that where ever the swedana was contra-indicated, there the dhupana karma was indicated. e.g. Vṛśrcikāviṣa[4].

---

१. शूनाक्षिकूटं निद्रातं विवर्णाविललोचनम् । विवर्ण चापि पश्यन्तमंजनैः सतुपाचरेत्।। (सु.क. ५/४१)

२. शिरोगते विषे मूलं नस्यकमाणि योजयेत् । (अ.सं.उ. ४२/४६)

३. घृतयुक्तं नतिकुष्ठे भुजगपतिशिरः शिरिषपुष्पं च । धूमागदः स्मृतः अयं सर्वविषघ्नः श्वयथुहृच्च ।। (च.चि. २३/९९)

४. सु.क. ८/४६

xvii) Lēhya (Linctus)

Lēhya means the preparation of the medicine in the palatable form. Generally in the poisoned conditions the dryness of throat and mouth is most common and in this condition as to avoid the adverse effects of the poison, the immediate medication should be administered which also should be easily digestible. Thus in this condition lēhyas are generally used as a anupāna. The most preferred one is the combination of honey and ghee.

xviii) Ouṣadha (Other medicament)

Using of different medicines in different complications which are arised due to the poisoning.

xix) Pratisārana (Rubbing of antipoisonous powders)[1]

While doing the blood letting at the site of the snake bite, if the blood is not coming out, it should be impelled by application of rubbing powders such as śuṇṭhī, marica, pippali, gṛhadhūma, haridrā, pañcalavaṇa, bṛhati.

xx) Prativiṣa (Antidotes)-

When the effects of poison does not subside by curative hymns and drug administration, after the lapse of the fifth stage and before the lapse of the seventh stage, counter-poison has to be administered, after duly informing the king(master or authority) but never without intimating some one (other than the patient)[2].

a) Procedure of Administering Antidotes (प्रतिविष प्रयोगविधि)[3]-

The patient who has been purified by the use of ghee who is partaking only healthy foods, who is pure in mind

---

१. तस्मात् प्रघर्षणैरसृगवर्तमानं प्रवर्त्येस्यात् ।। त्रिकटुगृहधूमरजनीपंचलवणरोचनाः सवार्ताकाः। (च.चि. २३/४०-४१)

२. विषे प्रतिविषं योज्यं मन्त्रैतन्त्रैरसिध्यति । अतीते पंचमे वेगे सप्तमस्यानतिक्रमे । प्रभोर्निवेद्य प्रयतो नैव वा अख्याय कस्यचित् । (अ.स.उ. ४८/१)

३. अ.सं.उ. ४८/२२-२६

should be administered counter-poison after sunrise and during winter and spring seasons generally, and in summer for emergency diseases only.

It should not be administered during rainy season and on cloudy days, not to those who are in anger, suffering from the diseases of pitta, the impotent, the king, the brāhmaṇa (dvijē), who is troubled very much from hunger, thirst, exertion, sun, light, long walk or diseases, pregnant women, children, the aged, those who are dry (emaciated greatly) and those suffering from diseases of vital organs.

Though the use of counter-poison becomes a daily habit, accustomed things forbidden should be avoided such as use of pungents, sours, oils, salts, day sleep, sunlight, fire and dry foods especially in these conditions there will be always fear of indigestion.

b) Selection of the Counter-Poison (Antidote)[1]-

Sthiraviṣa(vegetable and mineral poisons) generally posses properties similar to ślēṣma and spread upwards, where as jaṅgamaviṣa(animal poison) posses properties of pitta and spread downwards, thus the two kinds of poison possessing opposite qualities when put together destroy each other. Hence patient who is bitten (by snake etc.) should be administered poisonous roots (vegetable poison) in the form of internal and external application. The person who has consumed poison (vegetable) should be got bitten by snake by the clever physician ; nothing is equal to poison to neutralise the poison (one kind) to nullify the effect of the other kind.

१. श्लेष्मतूल्यगुणं प्रायः स्थिरमूर्ध्वगमं विष्म् । प्रायः पित्तगुणैर्युक्तमधोगामि च जंगमम्।।
गुणैरिति विपर्यस्तैर्निहतस्ते परस्परम्। युंज्यान्मूलविषं तरमाद्दष्टानां पानलेपयोः।।
विषपीतं च कुशलो दंशयेत् पवनाशिभिः । न विषप्रतिमं किंचिन्निर्विषीकरणं विषे।।
(अ.स.उ. ४८/३-५)

c) Dose of the Counter-Poison -

For a patient of snake (sarpa) bite, vegetable (sthāvara) poison of the quantity of four, six and eight yava are the minimum, moderate and maximum doses. For a patient of vegetable poison, the dose can be as is found appropriate. For the patient bitten by insect (kīṭa) it will be two yava and in the case of scorpion (vṛśrcika) bite it will be of the size of a tila (sessame seed). When the poison (any kind) is localised in the blood no counter-poison should be administered.

For a case of spider (lūta) bite, oral administration of counter-poison is not advisable. Determining the site of the bite exactly, it should be incised and counter-poison should be applied over it.

Counter-poison acts like nectar when applied/administered to wounds or persons who have poison in them. Whereas it acts like poison only if the wound or person is not having poison. Powerful counter-poisons administered to weak persons gives rise to many complications/diseases, so also when improperly administered[1].

d) Precautionary Measures

In cases of doubt whether a wounded person /person is having poison or not, in such conditions an agada (anti-poisonous recipe) which is harmless should be administered, in a wounded person /person not having poison it (agada) acts as gada (produces diseases), similarly an agada (anti-poisonous recipe) administered after the lapse of the suitable stage (of drug administration) also causes diseases. Hence the physician should understand the presence of poison by all efforts[2].

---

१. अ.सं.उ. ४८/६-८

२. अ.सं.उ. ४८/९-१०

xxi) Sañjñāsaṃsthāpana (Resuscitation)-

This is a very important procedure which plays a vital role in regaining the conscious state of an unconscious person. The procedure is as follows : Nasya should be blown into the nostrils of the patient suffering from the effects of poisoning, in the case where symptoms such as loss of consciousness, upturned eyes and drooping of the neck would set in. The venous-section should be done immediately to the veins of the patient's forehand and extremities. If the desired bleeding does not appear by venous-section the expert surgeon should immediately do the superficial incisions on the scalp in the shape of cow's feet (Kakapada) by the instrument. By doing such wound, the bleeding will start. After that on that incision flesh or the decoction or paste carmavṛkṣa should be applied over the scalp . Small drums (Dundubhis) smeared with anti-venomous plasters should be sounded around the patient. The patient thus restored to consciousness should be treated with both purgatives and emetics. Complete elimination of the poison from the system is a very difficult task but it is very necessary since least remnant of the poison may again be aggravated in course of time and cause lassitude, loss of complexion, fever, cough, headache, swelling, emaciation, blindness, cold, aversion of the food to the patient[1].

xxiii) Lēpa (Pastes)[2] -

Due to force of poison causes narcosis, fainting, affliction and palpitation of heart, these should be averted with

---

१. नष्ठांङ्गं विवृत्ताक्षं भग्नग्रीवं ------ तेषु चापि यथादोषं प्रतिकर्म प्रयोजयेत्।।
(सु.क. ५/४३-४९)

२. घर्षणमतिप्रवृत्ते वटादिभिः शीतलैलेपः । विषवेगान्मदमूर्च्छाविषादहृदयद्रवाः प्रवर्तन्ते।
(च.चि.२३/४१-४२)

cold applications, which pacify the poison like ceasing of the fire by sprinkling of water.

xxiv) Mṛtasañjīvana (Revivation)-

Mṛtasañjīvana is one of the ancient classical therapy through which the life of an individual can be regained. But nowadays this therapy has got vanished. This therapy could be considered as broad spectrum or universal antidote which can be used to nullify the toxic effects of almost all the types of toxins.

2. According to Modern

The basic principles of treatment of poisoning are :

A) Prevention of further exposure to the poison.

B) Removal of unabsorbed poison.

C) Use of an antidote.

D) Removal of absorbed poison.

E) Symptomatic treatment.

A) Prevention of further exposure to the poison

This is mainly useful in the inhaled and injected poisons. If the poison has been given by inhalation, then remove the patient from that atmosphere, begin artificial respiration (avoid mouth to mouth resuscitation, as far as possible), administer oxygen, if there is severe bronchospasm, administer the broncho-dialators, if there is pulmonary edema, give diuretics like furosemide (40mg) or corticosteriods like hydrocortisone (100mg IV 6 hourly) e.g. as in Carbon-Monoxide poisoning.

In some cases where the poison has been introduced by a subcutaneous injection or by a bite an immediate ligature, ice cold pack or sucking could prevent the absorption of the poison.

Washing with water is useful where the poison has been

introduced into vagina, rectum or urinary bladder. However if the nature of the poison is known a specific solvent could prove to be more useful.

B) Removal of unabsorbed poison (Decontamination)-

Since most of the poisons are ingested, decontamination is usually achieved by evacuation of the stomach. This is done either by inducing emesis (vomiting) or by performing a stomach wash (gastric lavage).

i) Emesis -

This must be attempted only in the conscious and alert patient. Due to the danger of inhaling gastric contents, vomiting should only be induced when a conscious patient is lying on his side with head dependent. The methods are :

a) Put the finger in the mouth and tickle the posterior wall of the pharynx. This is one of the best method.

b) As a first aid useful household emetics -

- Drink copious amount of warm water.
- A table spoonful of mustard powder in a tumbler (200 ml) of warm water.
- Two table spoonful of sodium chloride in warm water produce emesis.

c) Zinc sulphate 20-30 grains in 4 ozs of water. If necessary repeat the process.

d) 20-30 grains of Ipecacuanha (root of small shrub - Cephalis ipecacuanha and Cephalis acuminda, grows well in West Bengal, it contains Cephaeline and Emetine active principles) dissolved in water.

e) Copper sulphate 5-10 grains in one oz. of water. This is never to be used in Arsenic poisoning because cupric Arsenic is formed which is more harmful than Arsenic itself.

f) Apomorphine injected 1/20 to 1/10 grains subcuta-

neously acts as a centrally acting emetic. The effect comes in three or four minutes. An important side effect which could be dangerous to the patient is cardiac irregularity. This should be countered by injection. Nalorphine and Injection Atropine. The use of Apomorphine is avoided in patients in coma.

The above methods d & f are avoided in these days because of its adverse effects.

Contraindications to emesis -

- Corrosive poisoning - because of the possibility of perforation stomach.
- Kerosene poisoning - The main danger is the aspiration pneumonia which has proved fatal in many cases.
- Strychnine poisoning - If vomiting is induced there is the possibility of inducing convulsions.
- Unconscious patient - Because of the danger of aspiration leading to aspiration pneumonia.

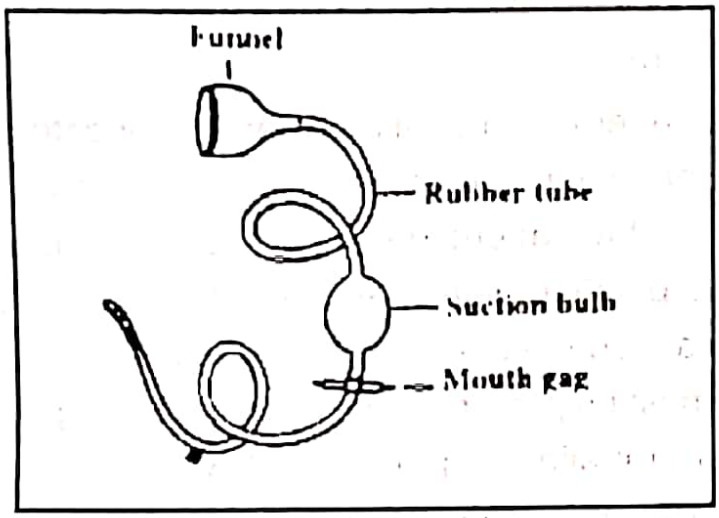
ii) Gastric Lavage(stomach wash)[F5]

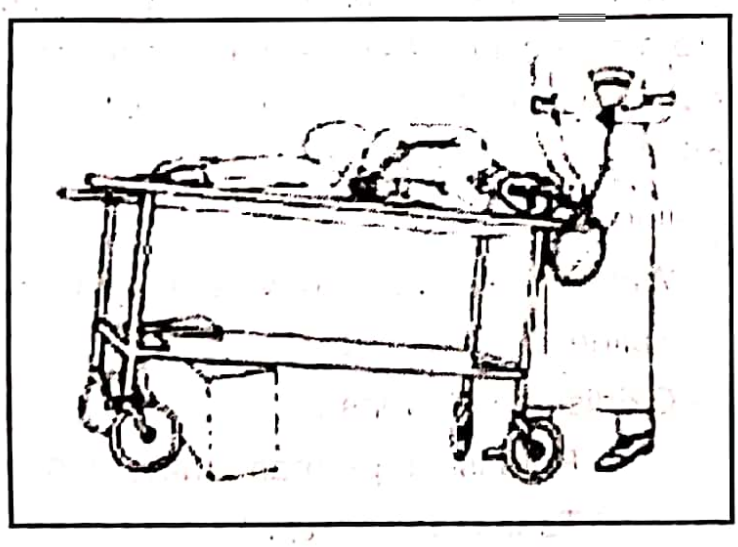
a) Indication -

This is useful in ingestion type of poisoning and must be undertaken only in the conscious, alert patient. If the patient is unconscious, inert a cuffed endotracheal tube in the airway before attempting to wash out the stomach. Gastric lavage must preferably be done within 4 to 6 hours of ingestion of the poison. But in the case of certain drugs (salicylates, phenothiazines, tricyclic antidepressants, etc,) it can be of benefit even upto 12 to 18 hours post-ingestion.

b) Type of tube -

- Adult : 30 to 40 French Ewald tube or 30 gauge jacques tube.
- Child : 16 to 28 French Organic type tube or Ryle's tube





F5-stomach wash tube and position of the patient

c) Length of tube to be inserted -

- Adult : 50 cm
- Child : 25 cm

d) Procedure -

The preferred route of insertion of lubricated tube is oral. Passing the tube nasally can damage the nasal mucosa considerably. The patient must be placed in the left lateral decubitus position, with the head at a lower level than the feet. Use a mouth gag so that the patient will not bite on tube. A funnel must be present at the end of the lavage tube through which 300 ml aliquots(portions) of warm water or saline is then poured at a time, (100ml in a child). After the funnel empties, lower it below the patient and let the fluid drain by gravity into a collecting basin. Always retain the first washing (done with plain water) for chemical analysis. This is continued until the returning fluid becomes clear.

e) Lavage fluid -

- Warm water(even tap water is sufficient)
- Saline (0.9% or 0.45%)
- Oxidising solutions :
  * Potassium permanganate (1:5000)
  * Tannic acid (4%)
  * Iodinated water

These are preferred in alkaloidal poisons, salicylates, etc.

- Sodium thiosulphate solution (25%) for cyanide
- Castor oil and warm water (1:2) for carbolic acid

f) Complications -

- Vomiting
- Aspiration pneumonia
- Damage to oesophageal and gastric mucosa (rarely perforation)

g) Contraindications -

- Corrosives (except carbolic acid)
- Convulsants
- Foreign body ingestion
- Oesophageal varices
- Petroleum distillates

At the end of stomach wash, the stomach can either be left empty, or a specific antidote solution (if available) for the particular poison may be left behind.

C) Use of The Antidotes in Poisoning -

An antidote is a substance which counteracts the effects of the poison. In popular fiction, miraculous properties are attributed to antidotes. They are usually projected as "magic bullets" which fly to heart of the problem, effecting a dramatic recovery in the patient. Strangely, this myth is perpetuated even in some textbooks on toxicology. It is true that there are a few poisons for which genuine antidotes exist, but the vast majority unfortunately are without such magic remedies.

i) Types of the antidotes -

a) Mechanical.

b) Chemical.

c) Physiological.

a) Mechanical antidotes -

These are substances which render a poison inert by their mechanical action e.g.

- Bulky food in cases of poisoning by glass powder, diamond dusts and other mechanical poison as it prevents their action by entangling their particles within its meshes.

- Egg albumin as it forms a coating along with the layers of the mucosa and does not allow the poison to get absorbed from the gut.
- Charcoal dust acts by absorbing the organic poison and partly mineral poison by absorbing and retaining in its pores.

b) Chemical Antidote -

These are substances which after chemical combination with poison renders the poison inert:

- Weak acids for strong alkali poisons.
- Weak alkalis for strong acid poisons.
- Lime for oxalic acid poisoning.
- Potassium permanganate is a very important chemical antidote because of its strong oxidising property. It can be used for
  - * Phosphate poisoning
  - * Quinine poisoning
  - * Phosphorus poisoning
  - * Hydrocyanic acid poisoning

The chief disadvantage of potassium permanganate is in the detection of poison. An alternative to potassium permanganate is a dilute solution of tincture of iodine (15 drops in 100 ml of water). It is useful as it precipitates most of the alkaloids.

c) Physiological Antidotes -

These are substances which act on tissues of the body and produce certain symptoms exactly opposite to those produced by the poison. A perfect physiological antidote exactly counteracts all harmful effects produced by a poison. Most of the known physiological antidotes. Atropine and physostigmine are the real physiological antidotes. The

physiological actions of these two drugs could be compared as :

Atropine	Physostigmine
1. Paralyses the vagus nerve hence the heart rate is accelerated.	1. Stimulates the vagus nerve, hence the heart rate is decreased.
2. The third cranial nerve endings are paralysed hence the pupils are dilated.	2. The third cranial nerve endings are stimulated, hence the pupils are constricted.
3. The secretions of the glands are decreased.	3. The secretion of the glands are increased.

The examples are :

1. Physostigmine or neostigmine for Dhatura or Atropine poisoning.

2. Bemegride for Barbiturate poisoning.

3. Nalorphine for opium or morphine poisoning.

4. Barbiturates for Nuxvomica poisoning.

5. BAL (British Anti Lewisite)- chemically it is 2.3 Dimercapto propanol.

A. Action - It is on cellular level and dislodges the metals from its combination with sulphydryl radical in the tissues enzymes and carries it to the tissue fluids, to the plasma and finally to the urine.

B. Useful in poisoning with - Arsenic, Mercury, Bismuth, Gold, Organic antimony, Other heavy metals.

C. Dose - In severe poisoning condition a dose of 3 to 4 mg/kg. is given. 3 ml of 10% BAL and 20% Benzyl Benzoate in arachis oil is injected deep intramuscularly 4th hourly for the first 2 days, and then twice daily for 10 days or till recovery.

D. Toxic manifestations - Restlessness, salivation, vomiting, convulsions, coma. If these appear it is useful to administer Ephedrine sulphate 2ml.

E. Contraindications - Hepatocellular damage.
- Kidney damage.
- If injected for long it induces tetany because of elimination of large quantities of calcium from the body. Hence calcium gluconate I/V should be given along with.

6. EDTA (Ethylene diamine tetra acetic acid) - It acts like BAL, as chelating agent. It is useful in lead poisoning. The formed product is water soluble and nontoxic. It is excreted intact in the urine.

A. Dose - Given in a drip form in 50 - 500 cc of normal saline. The dilution being one 5 cc ampoule of 20% solution in 250 - 500 cc of normal saline. It is to be given in morning and in evening for 5 days.

B. Toxic Effects - Nephrotoxicity, mayalgia, fever, rigors.

C. Contraindications - Renal disfunction.
- Hepatocellular damage,
- Calcium deficiencies.

7. Penicillamine - It is aminoacid derivative of penicillin. It is useful in poisoning from : Lead, gold, copper, mercury.

A. Dose - 200 - 300 mgm per day orally for 10 days. The dose may be increased to 4 gms a day.

B. Toxic Effects - Thrombocytopenia
Agranulocytosis
Renal damage

8. Desferrioxamine - Acts as a chelating agent, useful in poisoning from iron

Dose - 10 gms in 100 ml water orally or 1 - 3 per day I.M.

D) Removal of Absorbed Poison -

i) Renal Excretion - Whatever poison is absorbed could be got rid out of the body by giving I/V fluids and simultaneously using safe diuretics as frusemide, mannitol or chlorthiazide.

ii) Purging - 30 gms. of sodium sulphate with large amounts of water, hastens the elimination of poison in the stools.

iii) Peritoneal and Haemodialysis Dialysis - In most cases, it is doubtful whether this speeds up the excretion of toxic agents. But it can be used in renal failure.

E) Symptomatic Treatment -

The following measures are commonly employed.

i) Raising of the foot end of the bed.

ii) Vasopressors used in cases where the B.P. is falling e.g. Mephentine I/V, dose depending upon the severity of the case.

iii) Replacement of electrolytes is done in cases where dehydration is extreme for e.g. in Arsenic.

Poisoning there is severe gastroenteritis with loss of fluids.

iv) In cases of severe pain and shock morphine 1/8 to 1/4 grain S/C or pethidine 50 mg to 100 mg Intramuscularly is the best choice. The depressive effect of these drugs on the central nervous system has to be carefully watched henceforth it is best avoided in poison which depress the central nervous system.

Scanned with CamScanner

v) In cases where anaphylactic shock is evident. Adrenaline 1 ml in a : 1000 is given S/C followed if necessary by a I/V drip of nor adrenaline. Steroids are a must in addition to the above treatment.

vi) In the respiratory failure, passage of the air is kept clear, oxygen is given and drugs which stimulate respiration are to be given e.g. coramine.

vii) If the patient has fever antipyretics are used.

viii) The nutrition of the patient should be maintained.

दृश्यशब्दागदैरस्य विषशेषं निवर्तयेत् ।
अल्पमप्यवशिष्टं हि व्याधये मरणाय वा ।।
(अ.स.उ. ४७/४८)

*In treating the poisoning, it is very important to remove the residual poison from the body by use of drugs, by sight and sound. Even slight remnant of poison causes either diseases or death.

III) FEATURES OF RECOVERY FROM THE POISONING (विष मुक्त लक्षण)

प्रशान्तदोषं प्रकृतिस्थधातु माहारकामं सममूत्रविट्कम् ।
प्रसन्नवर्णेन्द्रियचित्तचेष्टं वैद्योवगत्छेदविषं मनंष्यम् ।।
(अ.सं.उ. ४७/८२)

After the treatment, the physician should examine the patient free from the poison, when the dōṣās have been subsided, the tissues have become normal, who is desirous of food, is normal in respect of urine and faeces, has pleasing colour/complexion, good working of the sense organs and the mind.

* **Notes** - Look by the peacock, seeing precious stones and divine herbs are examples for antipoisonous drugs of sight, application of paste of antipoisonous herbs on kettle drums, musical instruments etc and beating them to fill the air with antipoisonous dust is the example of drugs of sound.

FEATURES AND TREATMENT ACCORDING TO MODE OF POISONING

I) Poisonous food -

1) Features of poisoned drinks and vegetables

In case of poisoning, all liquids-milk, wine etc.- develop streaks, froth and bubbles, shadows in them are not visible and if visible they are twins, holed, smaller or abnormal.

Vegetables, pulses, rice, etc. and meat become moistened and state-like immediately losing their normal taste and aroma; other edibles also lose their aroma, colour and taste; fruits if ripe, get rotten and if unripe get ripened[1]. The poisoned food features were described in the chapter of viṣaparikṣa.

2) Features of poisonous food vapour [2]

If the poisoned food served the vapours get spreaded upwards causes pain in the heart, abnormal movements of eyes and headache[1].

The treatment in such cases is snuff and collyrium of kuṣṭha, lāmajjaka, nalada and honey should be applied. Śirīṣa, Haridra and Candana should be used as paste, particularly of candana in the cardiac region which gives relief.

3) Features on touch of poisonous food[3]

If the poisoned food comes in contact with hand, it causes burning sensation in hand and falling of nails.

In this case, paste of śyāma, indra, gōpā, sōma and utpala is useful .

---

१. सु.क. १/४४-४७
२. सु.क. १/३४-३६
३. सु.क. १/३७

4) Features of poison on ingestion

If by carelessness or ignorance, one takes the food the tongue becomes stony hard, loses the taste sensation, has pricking pain, burning sensation and salivation[1].

A) Āmāśayagata viṣalakṣṇās

If the poisoned food goes to stomach, it may cause fainting, vomiting, diarrhoea, flatulence, burning sensation, trembling and abnormality of sense organs[2].

B) Pakvāśayagata viṣalakṣṇās

If the poison reached to the intestines produces burning sensation, fainting, diarrhoea, thirst, abnormality of sense organs, gurling sound, pallor and emaciation[3].

The treatment should be followed during initial stages for ingested poisons as like to the vapour-poison and poisoned tooth brush[4].

For the āmāśayagata viṣa emesis should be given immediately with fruits of madana, bitter gourd, bimbī and kōśātaki mixed with curd and butter milk or rice-water[5].

For the pakvāśayagata viṣa nīlinī fruits should be administered with ghee for purgation, or dūṣīviṣāri formulation be drunk with curd mixed with honey[6].

II) Poisonous tooth twig(viṣa dantakāṣṭha)

If the twig for cleaning teeth is poisoned, the brushy ends drops drown and swelling arises in tongue, gums and lips[7].

---

१. सु.क. १/३८-३९
२. सु.क. १/४०
३. सु.क. १/४२
४. सु.क. १/३९
५. सु.क. १/४१
६. सु.क. १/४३
७. सु.क. १/४८

The treatment for this, the site of swelling should be scarified and then rubbed with dhātaki flowers, harītakī and seeds of jambū fruit mixed with honey; or root of ankōṭa or bark of saptaparṇa or seeds of śrīṣa mixed with honey should be used as rubbing recipe[1].

III) Poisonous tongue-scraper and gargling (viṣayukta jihvanirlēkhana, kavala lakṣṇa)

Features and treatment as like described for poisonous tooth twig[2].

IV) Poisonous features of massage oil (viṣayukta abhyaṅga lakṣṇa)

If the material for massage (oil etc.) is poisoned, it becomes slimy, thick or discoloured. When applied, it causes eruption of boils, pain, discharge, suppuration of skin, sweating, fever and tearing of muscles[3].

The patient should be bathed with cold water and then paste of candana, tagara, kuṣṭha, uśīra, vēṇupatraka, sōmavalli, amṛta, svētā, kamala, kālīyaka and tvak should be applied. The same should be used as drink along with the juice of kapittha and cow's urine[4].

V) Poisonous features of utsādana and parīṣēka

Poisoning of an ointment, bath decoction (or powder), after-paste, bed, clothes and armour should be known by the signs and symptoms as in the case of massage[5].

---

१. सु.क. १/४९-५०
२. सु.क. १/५१
३. सु.क. १/५१
४. सु.क. १/५३-५४
५. सु.क. १/५५

Scanned with CamScanner

VI) Poisonous features of comb(viṣayukta kēśaśāta lakṣṇa)

In case of the use of poisoned comb, there are falling of hairs, headache, bleeding from passages and appearance of cysts on head[1].

In such case paste of black earth impregnated with bile of ṛṣya (deer), ghee, śyāma, pālindi and tanḍulīyaka should be applied repeatedly or paste of cowdung juice or juice of jāti or mūṣikāparṇi or soot is useful[2].

Massaging oil to head (śirōbhyaṅga), protective wearings to head (śirāstrāṇṃ), shampoo, turban and garland, if these things are poisoned the features manifeted will be same as that of features of poisoned combing and treatment adopted in this should be same as that of poisoned combing[3].

VII) Poisonous features of cosmetics

If the poisoned cosmetic is applied on face, the face becomes blackish and exhibits the features of poisoned massage. It also gets covered with eruptions like padminikaṇṭaka[4].

For this drink of honey and ghṛta mixed together should be used and also the paste of candana, ghṛta, payasyā, madhuka, phañji, bandhujīva and punarnavā[5].

VIII) Poisonous features of nasya and dhūmapāna

Haemorrhage from passages, headache, excessive discharge of mucous and abnormality in sense organs - these are the signs of poisoned snuff and smoking[6].

१. सु.क. १/५६
२. सु.क. १/५७-५८
३. सु.क. १/५९
४. सु.क. १/६०
५. सु.क. १/६१
६. सु.क. १/६३

Here ghee cooked with milk of cow along with ativiṣa and added with śvēta and madyantika is useful as drink and snuff[1].

IX) Poisonous features of flowers

In case of poisoning flowers, lose smell and colour, by smelling them one suffers from headache and tearful eyes[2].

This should be managed with recipes as prescribed for poisoned vapour or facial cosmetics[3].

X) Poisonous features of karṇataila

If ear-oil is poisoned it produces disorders of hearing, swelling, pain and discharge from ear[4].

This should be treated with ear-filling with the juice of śatāvari mixed with ghee and honey. The juice of somavalka (kaṭphala) is also for ear filling[5].

XI) Poisonous features of anjana

In case of poisoned collyrium there are slimness due to lachrymation, burning sensation, pain, defects of vision and even blindness[6].

In this case ghee should be used immediately as saturating filling in eyes and same mixed with pippali should be taken internally. The following should be used as collyrium - juice of mēṣaśruṅgi, varuṇa, muṣkaka and ajakarṇa or samudraphēna mixed with gōrōcana. The flowers of each kapitta, mēṣaśruṅgi, bhallātaka, bandūka and ankōṭa should also be used as collyrium[7].

---

१. सु.क. १/६४
२. सु.क. १/६५
३. सु.क. १/६६
४. सु.क. १/६७
५. सु.क. १/६७
६. सु.क. १/६७
७. सु.क. १/७०-७१

XII) Poisonous features of foot wear

Poisoned wooden foot wear causes inflammation, discharge, numbness and eruptions of boils in feet[1].

The cases of poisoned foot-wear and ornaments should be treated with the recipes as prescribed for massage[2].

XIII) Poisonous features of ornaments

Poisoned ornaments lose their brilliance and shining as before. Moreover, they cause in their respective sites, burning sensation, suppuration and tearing[3]. The treatment as like to the massage[4].

●

१. सु.क. १/७२
२. सु.क. १/७४
३. सु.क. १/७४
४. सु.क. १/७४

Scanned with CamScanner

CHAPTER - 7

COMPLICATIONS OF POISONING

(विष के उपद्रव)

I) POISONING COMPLICATIONS

दृश्यशब्दागदैरस्य विषशेषं निवर्तयेत् ।
अल्पमप्यवशिष्टं हि व्याधये मरणाय वा ।।

(अ.स.उ. ४७/४८)

In the treatment of the poisoning cases it is very important to remove the residual poison from the body by the use of drugs, by sight and sound. Even slight remnant of poison causes either diseases or death*.

I) Poisoning Complications (विष उपद्रव)

ज्वरकासवमिश्वासहिध्मा तृष्णा अतिमूर्च्छनम् ।
विशोथेदो अतिकाठिन्यमानाहो बस्तिमूर्ध्दरूक ।।
श्वयथुः पूतिदंशत्वं रक्तस्त्रावो विषानिलः ।
इति षोडश निर्दिष्टा विषार्तानामुपद्रवाः ।
गच्छन्त्युपेक्षिता नाशं यैर्जुष्टा विषरोगिणः ।।

(अ.सं.उ. ४७/१-३)

Fever, cough, vomitting, dyspnoea, hiccup, severe thirst, fainting, diarrhoea, very hard faeces, flatulence, pain in the bladder and head, swelling, bad smell, bleeding and aggravation of vāta from poison these sixteen are mentioned as the complications / secondary diseases of patients affected by poison; if neglected patients of poisoning get killed by these diseases.

1) Jvara Cikitsā (treatment of fever)

Decoction of fruits of rajavṛkṣa, uśāīra, kāśamarya, ghana and padmaka added with sugar and honey if consumed

is best to cure fever due to poisons[1].

Decoction of triphalā, āragvadha and vyāgharī cures fever and constipation, decoction of unripe bilva fruit, vacā, mustā and punarnavā cures fever, weakness of digestion arising from poison[2].

2) Svāsa- Kāsa Cikitsā (treatment for dyspnoea and cough).

Vaidēhi, rāmantaka, juice of kapitta, saindhava added with sugar and honey and licked cures difficulty of breathing, cough and fever[3].

The sight or the sound agada (anti-poison) are those which if seen or heard nullifies the bad effects of the poisons.

3) Vami Cikitsā (treatment of vomiting)

Decoction of the root of bilva is added with the powder of marica, or powder of root of bilva, dhātrī parūṣaka and madhuka, should be consumed along with milk, for the cure of vomiting[4].

4) Hidhmā Cikitsā (treatment of hiccup)

In hiccup (due to poison) powder of śaṅkha, kanaka, katuka and svarṇagairika or of vella, śuṇṭhī, kaṇā, uśira and the two rajanī should be licked with honey[5].

5) Tṛṣṇa - Mūrchā Cikitsā (treatment of thirst and fainting)

In thirst and fainting the entire body including the head

---

१. राजवृक्षफलोशीर काश्मर्य - - - - - - - - - विषज्वरहरः परम् ।। (अ.सं.उ. ४७/४)

२. त्रिफलारग्वधव्यघ्री - - - - - - - - ज्वाग्निसाश्वयथून्निहन्ति विषसम्भवान् ।। (अ.सं.उ. ४७/७)

३. वैदेहिकाराठकं - - - - - - - - - श्वासकासज्वरापहम् ।। (अ.सं.उ. ४७/८)

४. विषवम्यां पिबेत् - - - - - - - - मधूकं पयसा द्रुतम् ।। (अ.सं.उ. ४७/११)

५. हिध्मायां शंख कनक - - - - - - - - व्दितयानि वा ।। (अ.सं.उ. ४७/१७)

is covered with the paste of or poured with the water of ambhōjanāla, kusuma, candana, uśīra, mauktika, vaihāyasasita tōya (rain water), milk ghee and sugar cane juice made cool[1].

6) Atisāra Cikitsā (treatment of diarrhoea)

Equal quantities of bhūnimba, mustā, trāyantī and indrayava - together making one part, two parts of citraka and eight parts of kutaja, should be powdered nicely and consumed with water, this cures diarrhoea , cough, dyspnoea and fever arising from poison[2].

7) Bastirujādi Cikitsā (treatment of pain of the bladder)

If there is pain in the bladder, upward movement and flatulence, phalavarti (rectal suppositories prepared from fruits) should be introduced. Aragvadha, trivṛt, upakulyā, haritakī, should be consumed with ghee can also be consumed[3].

8) Śirōruja Cikitsā (treatment of headache)

Kākōlī, bark of Kṣīravṛkṣa (Pañcavalkala), Drākṣā, Yaṣṭayāhva and Śarkarā, made into nasal drops with cold water cures headache caused by poisoning[4].

9) Śvayathu Cikitsā (treatment of swelling)

For swelling, after purifying the alimentary tract, it is beneficial, to drink (cows) milk boiled, with viśvabhēṣaja, vaidēhi, kaṭukā and dēvadāru, or goat milk boiled with root of surasā or pippali[5].

---

१. तृष्णामूर्च्छयोराशिरसो - - - - - - क्षुरसाप्लुतै : ।। (अ.सं.उ. ४७/२०)
२. भूनिम्बमुस्तक - - - - - - - - कासश्वज्वरापहम् ।। (अ.सं.उ. ४७/२४)
३. बस्तिरूग्वर्तनाहेषु - - - - - - बस्तिशूलादिनाशिनीम् ।। (अ.सं.उ. ४७/२६)
४. काकोली - - - - - - - - शीतवारिणा ।। (अ.सं.उ. ४७/२९)
५. श्वयथु - - - - - - पिप्पलीश्रृतम् ।। (अ.सं.उ. ४७/३०)

Scanned with CamScanner

10) Pūtidaṃśa Cikitsā (treatment of bad smell of the wound)

The wound of bite emits bad smell (undergoing putrefaction) even by slight mistakes, poison does not tolerate medicines which possess penetrating and hot (potency) qualities, so in the treatment of wounds due to poison, drugs which possess sweet taste (madhura rasa), unctous (snigdha) and cold (śīta) properties only should be used . Liquids for pouring on the body and pastes for application should be done with the decoction of (bark of) Kṣīravṛkṣās (Pañcavalkala) added with milk[1].

11) Raktasrāva Cikitsā (treatment of bleeding)

When there is copious bleeding (from the wound) the patient should be made to drink ghee processed with marica or root of taṇḍulīyaka or sitā (sugar)[2].

12) Vṛdha Vāta Cikitsā (treatment of increased vāta)

If too much of blood is lost in a person who is emaciated, or if the person indulges more in foods and activities of are very dry, or by the very nature of poison, mātariśva (vāta) gets increased in the body giving rise to insanity, convulsions, mental disorders, epilepsy, etc., for this, oleation enema, nasal medication, insufflation and collyriums (which mitigate vāta), are desirable[3].

Pathya (Suitable foods and activities)

Old ṣaṣṭika rice, kōradūṣa, priyaṅgu, mudga, harēṇu, tuvarī, paṭōla, vētrapallava, taṇḍulīyaaka, jīvanti, vārtāka, sunişaṇṇaka, meat of animals of desert - like regions, dāḍima,

---

१. अल्पेनाप्यपचारेण - - - - - - - - कषायैः क्षीरिवृक्षजैः ।। (अ.सं.उ. ४७/३५)

२. रक्ते स्रावत्यतिभृशं - - - - - - - - वा समन्वितम् ।। (अ.सं.उ. ४७/३७)

३. कृशस्यातिस्रुतै - - - - - - - - बस्तिनस्यप्रधमन अंजनम् ।। (अ.सं.उ. ४७/४१)

dātri, kapitha, saindhava, sitā and such others which do not cause heartburn, whose properties are best known should be given to patients of poison, side dishes could be made with drugs which are astringent (kaṣāya) and anti-poisonous and the use of medicated ghee such as kalyāṇaka ghṛta etc. should be done.

Rain water, water of lakes and wells, or any other which is boiled and cooled and then added with honey and āmalaka should be advised to drink by the patient. Water of rivers and tanks are to be rejected especially during rainy season.

He should put on white dress, partake well processed flour of yava, with buttermilk, and ghee, which are best to remove the poison.

APathya (Unsuitable foods and activities)

Even after relief from poison, the person should avoid, tila (sesame) wine, horsegram, hunger, anger, fear, exertion, copulation, and especially sleeping during the day time[1].

●

१. शालयः षष्टिका जीर्णाः कोरदूषाः प्रियंगुवः । - - - - - - - - वर्जयेद्विषमुक्तोपि दिवास्वप्नं विशेषतः ।।
(अ.सं.उ. ४७/७७-८२)

Scanned with CamScanner

CHAPTER - 8

VEGETABLE AND STATIC POISONS

(स्थावरविष)

I) VEGETABLE POISON GENERAL FEATURES

II) FEATURES OF VEGETABLE POISON ACCORDING TO SITE

III)) FEATURES OF THE VEGETABLE POISON IMPULSES

IV) TREATMENT OF VEGETABLE POISON ACCORDING TO THE IMPULSE

V) TREATMENT OF POISONING ACCORDING TO SITE

The classification and sub-classification of the Sthāvaravisa is already been described in previous chapters. Thus directly the following objectives will be discussed.

I) Vegetable poison General features (स्थावरविष सामान्य लक्षण)

स्थावरं तु ज्वरं हिक्कां दन्तहर्ष गलग्रहम् ।
फेनवम्यरूचिश्वासमूर्च्छाश्च जनयेद्विषम् ।।

(च.चि. २३/१६)

The vegetable poison produces fever, hiccup, sensitiveness of the teeth, spasm in the throat, frothy saliva, vomiting, anorexia, dyspnoea and fainting.

II) Features of the Vegetable poison according to the Site (अधिष्ठानुसार विशिष्ट लक्षण)

1) Root (मूल) - Poisons or poisonous roots produces a twisting pain in the limbs, delirium and loss of consciousness[१]

---

१. उद्वेष्टनं मूलविषैः प्रलापो मोह एव च । जृम्भा अंगोद्वेष्टनश्वासा ज्ञेयाः पत्रविषेण तु ।। मष्कशोफः फलविषैर्दाहो अन्नद्वेष डव च ।भवेत् पुष्पविषैश्छदिराध्मानं मोह एव च।। त्वकसारनिर्यासविषैरूपयुक्तैभवन्ति द्यिआस्यदौगैन्ध्यपारूष्यशिरोरूक्कफ संस्रावाः।। फेनागमः क्षीरविषैविड्भेदो गुरूजिह्वता । हृत्पीडनं धातुविषैर्मूर्च्छा दाहश्च तालुनि ।। प्रायेण कालघातीनि विषाण्येतानि निर्देशेत्।। (सु.क. २/७-१०)

2) Leaf (पत्र) - It gives rise to yawning, difficult in breathing and twisting pain in the limbs.

3) Fruit (फल)- It causes swelling of the scrotum, a burning sensation in the body and an aversion towards food.

4) Flower (पुष्प)- Poison leads to vomiting, distension of the abdomen and loss of consciousness.

5) Bark, Pith and Gum (त्वक्, सार वृदङ्ग निर्यास)- Poisons are marked by a froth in the mouth, roughness of the body, headache and a secretion of Kapha (mucus from the mouth).

6) Milk (क्षीर) - The poison causes foaming from the mouth, loose stools and a curvature of the tongue.

7) Mineral (धातु)- The poison gives rise to pain in the heart, fainting and burning sensation in the region of the palate.

8) Bulb (कंन्द) - Poisons which are very strong (tīkṣaṇa) in their actions, and the following types, of the poisons produces different effects on the body.

A) Kālakūṭa - Produces complete anaesthetia, shivering and numbness[1].

B) Vatsānābha - Produces paralysis of the neck and yellowness of the stool, urine and of the eyeballs are the symptoms produced[1].

C) Sarṣapa - Produces the retention of stools and urine (anāha), disorders of the palate and appearance of glands[1].

D) Pālaka - Produces the loss of speech and weakness of the neck[1].

E) Kardamaka - produces watery loose stools (diarrhoea) and yellowness of the eyes[1].

F) Varāṭaka - produces pain in the limbs and diseases of the head[1].

G) Mustka - Produces shivering and numbness of the

१. सु.क. २/११-१७

limbs[1].

H) Śṛṅgīviṣa - Produces the lassitude, a burning sensation in the body and enlargement of the abdomen is marked[1].

I) Prapuṇḍarīka - Produces the enlargement of the abdomen and redness of the eyes are symptoms[1].

J) Mūlaka - Produces the discolouration of the complexion, vomiting, hiccup, swelling and loss of consciousness[1].

K) Hālāhala - Produces difficulty in breathing and tawny brown colour of the skin is marked.

L) Mahāviṣa - Produces the aneurysm (granthi) on the region of the heart and a piercing type of the pain.

M) Karkaṭaka Viṣa - Produces laughing, gushing of the teeth and jumping up (without any cause).

III) Features of the Vegetable Poison Impulses (स्थावरविष वेगलक्षण)

1) First Impulse (प्रथम वेग)

स्थावरस्योपयुक्तस्य वेगे तु प्रथमे ।
श्यावा जिह्वा भवेस्तब्धा मूर्च्छा श्वासश्च जायते ।।

(सु.क. २/३४)

In this stage, the tongue becomes dark brown and numbness of the body and epileptic fits and difficulty of breathing follows.

---

१. कन्दजानि तु तीक्ष्णानि तेषां वक्ष्यामि विस्तरम् ।। स्पर्शाज्ञानं कालिकूटे वेपथुः स्तम्भ एव च । ग्रीवास्तम्भो वत्सनाभे पीतविण्मूत्रनेत्रता ।। सर्षपे वातवैगुण्यमानाहो ग्रन्थिजन्म च । ग्रीवादौर्बल्यवाक्संर्ग पालके अनुमताविह ।। प्रसेकः कर्दमाख्येन विड्भेदो नेत्रपीतता । वैराटकेनांगदुःखं शिरोरोगश्चजायते ।। गात्रस्तम्भे वेपथुश्च जायते मुस्तकेन तु । श्रृंगिविषेणा अंगसाददाहोदरविवृध्दयः ।। पुण्डरीकेण रक्तत्वमक्ष्णोर्वृध्दिस्तथोदरे । वैवर्ण्य मूलकैश्छदिहिक्क शोफप्रमूढताः ।। चिरेणोच्छ्वसिति श्यावो नरो हलाहलेन वै । महाविषेण हृदये ग्रन्थिशूलोद्रमौ भृशम् ।। कर्कटेनोत्पतत्यूध्वे हसन् दन्तान् दशत्यपि । (सु.क. २/११-१७)

2) Second Impulse (द्वितीय वेग)

द्वतीये वेपथुः सादो दाहः कण्ठरूजस्तथा ।
विषमामाशयप्राप्तं कुरूते हृदि वेदनाम् ।।
(सु.क. २/३५)

In this stage, it is marked by symptoms such as shivering, perspiration, burning sensation, itching and pain in the body; when seated in the āmāśaya (stomach) it causes pain in the region of the heart.

3) Third Impulse (तृतीय वेग)

तालुशोषं तृतीये तु शूलं चामाशये भृशम् ।
दुर्वर्ण हरिते शूने जायेते चाम्य लोचने ।।
पक्वामाशययोज्ञतोदोहिक्का कासो आन्त्रकूजनम् ।
(सु.क. २/३६)

In this stage, it is marked by a dryness of the palate and severe (colic) pain in the stomach. The eyes become discoloured, yellow-tinted and swollen. When it is seated in the pakvāśaya (intestines) it produces hiccups, cough, and sort of pricking pain and gurgling sound in the āntrās (intestines).

4) Fourth Impulse (चतुर्थ वेग)

चतुर्थे जायते वेगे शिसश्चातिगौरवम् ।।
(सु.क. २/३५)

In this stage, it is extremely marked with the heaviness of the head.

5) Fifth Impulse (पंचम वेग)

कफप्रसेको वैवर्ण्य पर्वभेदश्च पंचमे ।
सर्षदोषप्रकोपश्च पक्काधाने च वेदना ।।
(सु.क. २/३८)

In this stage, it is marked by salivation, discolouration of the body and a breaking pain in the joints. It is also marked by the aggravation of all the dōṣās and pain in the pakvādhāna

(intestines).

6) Sixth Impulse (षष्ठि वेग)

षष्ठे प्रज्ञाप्रणाशश्च भृशं चाप्यतिसार्यते ।

(सु.क. २/३९)

In this stage, it is characterised by loss of consciousness or excessive diarrhoea.

7) Seventh Impulse (सप्तम वेग)

स्कन्धपृष्टकटीभंगः सन्निरोधश्च सप्तमे ।।

(सु.क. २/३९)

In this stage it is marked by a breaking pain in the back, the shoulders and the waist and complete stoppage of respiration.

IV) Treatment of the Vegetable Poison (स्थावर विष चिकित्सा)

Suśruta and Carakacāryas described the treatment of the poison according to the impulses of the poison.

1) First Impulse Treatment (प्रथमवेग विषचिकित्सा)

Application of heat (cauterisation) burns the poison situated in the twak (skin) and māṃsa (flesh). Blood-letting eliminates it from blood. During the first phase the ingested poison should be eliminated by emesis and during the second one by purgation[1a].

Suśruta mentioned that in the first stage the patient should be made to vomit followed with drinking of cold water. After that an agada (anti-poisonous remedy) mixed with honey and clarified butter should be given to him[1b].

---

१ a. त्वक् संगतं दाहो दहति विषं स्रावणं हरति रक्तात् । पीतं वमनैः सद्यो हरेद्विरेकैर्द्वितीये तु ।। (च.चि. २३/४५)

१ b. प्रथमे विषवेगे तु वान्तं शीताम्बुसेचितम् । अगदं मधुसर्पिभ्यां पाययेत समायुतम् ।। (सु.क. २/४०)

2) Second Impulse Treatment (द्वितीयवेग विषचिकित्सा)

First of all, heart of the patient should be protected with the available medicaments immediately such as (1) honey, ghee, bone marrow, milk and gairika (ochre) or (2) the juice of cowdung or (3) well boiled sugarcane juice or juice prepared from the meat of crow or (4) blood of goat , or (5) ash or mud mixed with water should be given to the patient to drink[1a].

Suśruta mentioned that in the second stage, the patient should be first made to vomit as in the preceding stage and then purgative should be given to him[1b].

3) Third Impulse Treatment (तृतीयवेग विषचिकित्सा)

During the third impulse, use of kṣāraragada (alkaline antidotes) along with reducing with anti-swelling drugs mixed with honey-water are desirable[2a].

Suśruta mentioned that along with the antidotes, usage of the medicated snuff (nasya) and anjanas are desirable[2b].

4) Fourth Impulse Treatment (चतुर्थवेग विषचिकित्सा)

During the fourth impulse, cowdung juice mixed with kapittha, honey and ghee is administered[3a].

Suśruta mentioned that administration of the agada (anti-poisonous portion) with the sneha (clarified butter) is efficacious[3b].

5) Fifth Impulse Treatment (पंचमवेग विषचिकित्सा)

During the fifth impulse, application of drops and col-

---

१ a. आदौहृदयं रक्ष्यं पिबेद् यथालाभम् । मधुसर्पिर्मज्जपयोगैरिकमथ गोमयरसं वा ।। सुपक्वमथवा काकं निष्पीडच तद्रसं वरणम् । छागादीनां वा असृग्भस्म मृदं वा पिबेदाशु ।। (च.चि. २/४६-४७)

१ b. द्वितीये पूर्ववद्वान्तं पाययेत्तु विरेचनम् । (सु.क. २/४१)

२ a. क्षारागदस्तृतीये शोफहरैर्लेखनं समध्वम्बु । (च.चि. २३/४८)

२ b. तृतीये अगदपानं तु हितं नस्यं तथा अंजनम् ।। (सु.क. २/४१)

३ a. गोमयरसश्र.चतुर्थे वेगे सकपित्थमधुसर्पिः ।। (च.चि. २३/४८)

३ b. चतुर्थे स्नेहसम्मिश्रं पाययेतागदं भिषक् । (सु.क. २/४२)

lyrium in eyes and snuffing with the juice of kākāṇḍa and śirīṣa should be done[1a].

Suśruta mentioned that in the fifth stage the patient should be given an anti-poisonous medicine with the decoction of Yaṣṭimadhu[1b].

6) Sixth Impulse Treatment (षष्ठवेग विषचिकित्सा)

During the sixth impulse resuscitative measures should be applied and the patient should be given haridrā with cow's bile or mañjiṣṭha, marica and pippali[2a].

Suśruta mentioned that in the sixth stage the treatment should be as in the case of diarrhoea and the use of the medicated snuff in the form of an avapīḍa is recommended[2b].

7) Seventh Impulse treatment (सप्तमवेग विषचिकित्सा)

At the end (during the seventh impulse) intake of vegetable poison in the case of poisonous animal bite and bite by an animal in the case of vegetable poison should be adopted[3a].

Suśruta mentioned that in the seventh stage avapīḍanasya should be applied as well and the scalp after being shaved, a small incision in the shape of a kāka-pada (crow's calw) should also be incised. The incised flesh and the vitiated blood should also be removed. By this the poison can be excreted out[3b].

8) Eighth Impulse Treatment (अष्टमवेग विषचिकित्सा)

This was only mentioned by Caraka. During the eighth

---

१ a. काकाण्डशिरीषाभ्यां स्वरसेनाश्च्योतना अंबने नस्यम् । स्यात्पंचमः अथ - (च.चि. २३/४९)

१ b. पंचमे क्षौद्रमधुकक्वाथयुक्तं प्रदापयेत् ।। (सु.क. २/४२)

२ a. षष्ठे संज्ञायाः स्थापनं कार्यम् ।। गोपित्तयुता रजनी मंजिष्ठामरिचपिप्पलिपानम् । (च.चि. २३/४९-५०)

२ b. षष्ठे अतीसारवत् सिध्दिरवपीडश्च - (सु.क. २/४३)

३ a. विषपानं दष्टानां कवषपीते दंशनं चान्ते ।। च.चि. २३/५०

३ b. मूर्ध्नि काकपदं कृत्वा सासृग्वा पिशितं क्षिपेत् । सु.क. २/४३

impulse, palāśa seeds mixed with half peacock's bile acts as good resuscitative anti-poison in almost dead patients. Caraka described the different formulations (agada) to be taken in this serious poisonous condition. 1) vārtāku, phāṇita, gṛhadūma, gōpitta and nimba acts in similar way. 2) Pills made of surasā, granthi, haridrā and dāruharidrā, madhuka and kuṣṭha mixed with gōpitta or the juice of śirīṣa flowers and kākāṇḍa are recommended like nectar. 3) kākāṇḍa, surasa, Idrāyaṇa, punarnavā, vāyasī, śirīṣa and madanaphala combined together are administered in the form of paste, applications on incised scalp, snuffing and the intake in cases of apparent death by hanging or strangulation, poisoning or drowning[1].

V) Treatment of Poisoning According to Site

When the person gets affected by viṣa, dhamanī-bhandha (Binding of vessels), avamārjana (rubbing the site in reverse direction) and ātmarakṣana (self protection) should be performed with help of mantras.

In the beginning, the dōṣa in whose place the poison is located should be treated first. If the poison is in the site of vāta, one should do fomentation and advised to the patient to drink which is prepared by the paste of nata and kuṣṭha along with curd.

If the poison is in the site of pitta, then the ghee, honey, milk and water should be given to the patient to drink. And also bath and affusion (avagāha and sēka) should be given to the patient.

---

१. शिखिपित्तार्धयुतं स्यात् पलाशबरजमगदो मृतेषु वरः ।
वार्ताकुफाणितागारधूमगोपित्तनिम्बं वा ।।
गोपित्तयुतैर्गुटिकाः सुरसाग्रन्थिद्विरजनीमधुककुष्ठैः ।
शस्ता अमृतेन तुल्या शिरीषपुष्पकाकाण्डकरसैर्वा ।।
काकाण्डसुरसगवाक्षीपुनर्नवावायसीशिरीषफलैः ।
उद्बन्धविषजलमृते लेपौषधिनस्यपानानि ।। (च.चि. २३/ ५१-५३)

Scanned with CamScanner

In case if the poison is situated in the site of kapha, fomentation, venesection should be performed and administration of kṣārāgada (antidotes of poison containing alkalies). Should be dose.

If the person afflicted with the dūṣiviṣa or if the poison is in blood, then venesection and five evacuative measures should be given. Thus the physician should prescribe medicines taking all aspects into consideration. In the beginning the dōṣa of the locality (where the poison is located) should be carefully alleviated so that the effects of poison which is located there are not augmented[1].

When the channel of kapha gets vitiated by poison, then this leads to obstruction in the channel because of which the vāyu gets obstructed. As a result of this the patient respires as if he is gong to die very soon and if he is free from features of incurability, one should make incision on the patient's scalp resembling the paw of the crow(kākapāda) and one bilva quantity of carmaṇakāśā paste should be applied over it. And also blow up the powder of kaṭabhī, kaṭu and kaṭphala into the nostrils of the patient[2]. The same was described by Suśruta in the seventh impulse for the poisonous treatment.

ACONITE (वत्सनाभ)[F6]

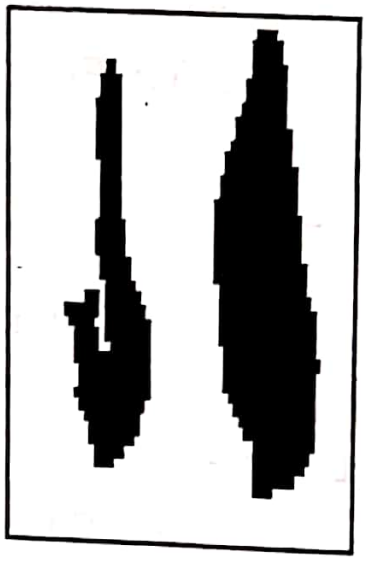
This plant is known as Aconitum napellus or mokshood. In India, it is grown in the Himalayan ranges. It is often grown in gardens for its showy flowers. All parts of the plant are poisonous, the root being mostly used for the purpose. The dry root is conical tapering in shape, usually shrivelled, and with longitudinal wrinkles. It is 5 -10 cms long, 1 - 2 cms thick at the upper

---

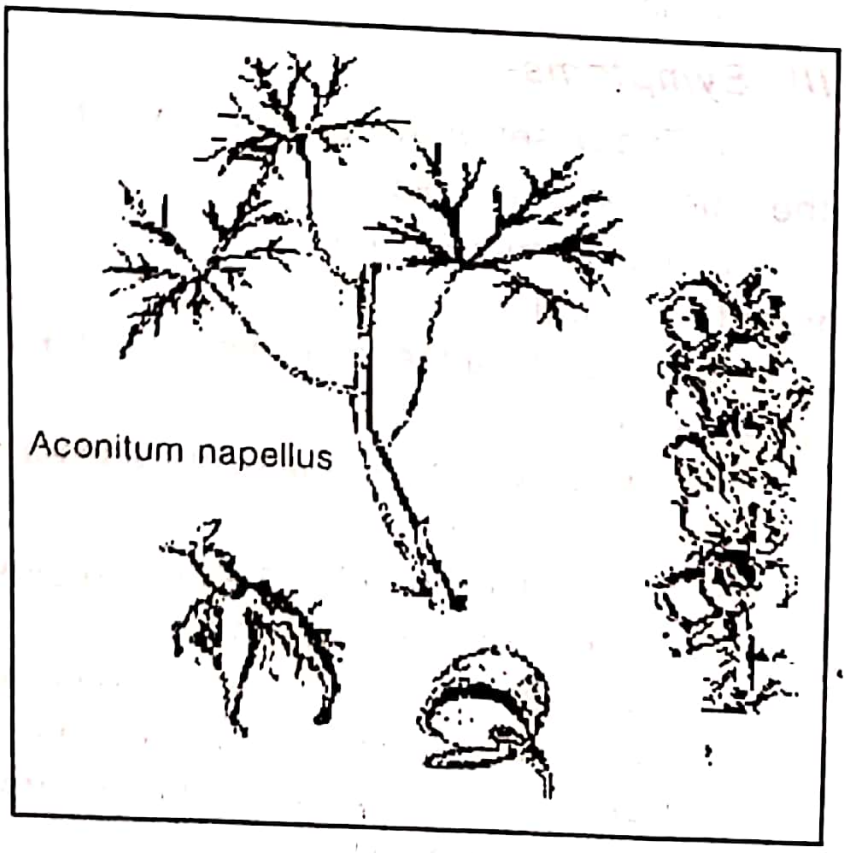
१. मन्त्रैर्धमनीबन्धो अवमार्जनं कार्यमात्मरक्षा च । - - - - - - - - - स्थानं जयेध्दिपूर्वं स्थानस्थस्याविरूध्दं च ।। (च.चि. २३/६१-६४)

२. विषदूषितकफमार्ग/ स्त्रोत/ सरोरूध्दवायुस्तु । - - - - - - - - - कृत्वा दद्यात्कटुकट्फलप्रधमनं च ।। (च.चि. २३/६५-६६)

Aconitum ferox



Vatsanabha F6



Aconitum napellus

extremity, and dark brown externally. When freshly cut it is whitish and starchy internally but becomes pink on exposure to air. It has no odour but somewhat sweetish taste, which gives it the name mitha bish (mitha = sweet; bish = poison). It is sparingly soluble in water.

I) The Active Principles -

1) Aconitine.
2) Picraconitine.
3) Aconine.
4) Alkaloids of aconitic acid.

The chief is aconitine.

II. Uses -

1) In Ayurveda aconite is macerated with cow's urine for a week and then used in high doses as a stimulant (without apparently any toxic effects).

2) In rural areas usage of aconite is done in the treatment of various ailments like neuralgia, rheumatism, gout, etc.

3) Tincture of aconite is claimed to be effective antipyretic.

III. Symptoms-

1) The onset of symptoms is within a few minutes after the ingestion of the plant.

2) Initially there is intensive burning and tingling of lips, throat and mouth.

3) Gradually a feeling of anaesthetia supervenes in the upper G.I.T .

4) Nausea, vomiting, dysphagia, and pain in the abdomen.
5) Pupils dilate.
6) Intense feeling of headache and giddiness.
7) Pulse becomes slow and irregular.
8) Respiration becomes slow and laborious.
9) Gradually the temperature becomes subnormal.
10) Death occurs because of respiratory failure or ventricular fibrillation.

Scanned with CamScanner

III. Fatal dose-

. One gram of the aconite root.
. 250 mg of the extract.
. 25 drops of the tincture or 4 mg of the alkaloid .

IV. Fatal period -

The shortest period is three-quarter of an hour, the longest is twenty four hours, and the average is about six hours.

V. Management-

1) According to Modern -

A) Stomach wash should be immediately done to remove the unabsorbed poisons. Animal charcoal or tannic acid may be added to the solution of stomach wash.

B) The patient should be kept in a warm atmosphere.

C) Cardiac arrhythmias should be properly treated with drugs like novocaine.

D) If the Blood pressure is very low, a drip of nor-adrenaline or mephentine should be started. Dosage will depend upon the condition of the patient.

E) Respiratory stimulants should be given.

2) According to Āyurvēda -

पटवणस्य वृक्षस्य रसो पलप्रमाणतः ।
शर्करायुक्तपानेन वत्सानागविषं हरेत् ।।
(अनुपानमंजरी ३/४)

Administration of the paṭavaṇas plant juice for about one pala will remove the poisonous effects of the vatsanābha.

VI. Postmortem appearances -

No specific signs. The poison is often difficult to detect by chemical analysis. Excretion mainly in the urine and traces in saliva, sweat and bile. Aconite is extremely unstable and is destroyed by putrefiction.

Scanned with CamScanner

VII. Medicolegal Importance -

1) Aconite is often projected as an ideal homicidal poison, but its actual use in murder cases has indeed been rare.

2) Most of the cases of aconite poisoning are actually accidental in origin arising mainly out of confusion of the root of this plant with the edible horse-radish root. An important point of differentiation between the two is the appearance of the cut surface. A pinkish tinge gradually develops if it is aconite while there is no such colour change in horse-radish. Sometimes, aconite extract is added to alcohol to potentiate its effects; fatalities may result from such a dangerous combination.

3) Suicidal ingestion of aconite root is said to be relatively common in rural areas, but few cases have been reported in medical literature.

4) Sometimes, aconite is used as an abortifacient.

OLEANDER (करवीर)

This is mainly cardiac poison and it is mainly of two types.

I) Nerium odorum (White Oleander)[F7]

II) Cerebra thevetina (Yellow Oleander)[F8]

WHITE OLEANDER

There are two main species of Nerium, which is a large ornamental shrub belonging to family Apocynaecae. Nerium oleander is the European species while N. odorum is commonly seen in India. Leaves are long and pointed, while the flowers are white or pink and arranged in clusters. All parts of the plant are toxic, particularly the seeds, stem and root.

1. Active principles -

Nomenclature of oleander glycosides is confusing.

F7- White Oleander

F8- Yellow Oleander

with different authorities naming them differently. The following are generally accepted names :

A) Oleandrin
B) Neriin
C) Folinerin
D) Rosagenin.

2. Uses -

A) Used commonly by quacks in the treatment of various ailments (leprosy, malaria, skin and veneral diseases, etc.).

B) Illicit abortifacient.

3. Sings and symptoms -

A) Nausea, vomiting

B) Tachycardia, ventricular fibrillation, AV block. Death usually results from cardiac failure.

4. Fatal dose -

Leaves - 5 to 15

Root - 15 gms

5. Fatal period -

Usually dies within 24 hrs.

6. Management -

A) According to Modern -

i) Decontamination and ii) ECG monitoring

iii) Sodium molar lactate transfusion with glucose and one mg. atropine, two c.c. adrenaline and two mg. noradrenaline is beneficial for the correction of cardio-vascular abnormalities.

iv) Correction of fluid and electrolyte balance.

B) According to Āyurvēda -

सितायुक्त सदा देय दधि वा माहिषं पयः ।
तथा चार्कत्वचा पीता कर्णवीरविषापहा ।।

(अनुपानमंजरी ३/१३)

Buffalow curd mixed with sugar or Buffalow milk or the

powder of arkatvaka (kariratvaka) mixed with water if consumed orally it cures all poisonous effects of kaṇavira or karavira.

7. Postmortem appearances -

There are no specific signs. Mucosa of the GI tract is usually congested, and petechiae are often seen on the heart. Nerium resists putrefaction and even burning, and can be detected long after death.

8. Medico-legal Importance -

A) Because of the easy availability of this poison especially, in rural areas, it is very often encountered in India as a suicidal agent. Usually a decoction of the root is prepared and consumed.

B) Accidental poisoning can result from its misuse by quacks for therapeutic purposes.

C) It is sometimes used to procure illegal abortions.

YELLOW OLEANDER[F8]

This is a large, ornamental shrub with oblong leaves and clusters of orange or yellow tubular flowers. It belongs to family Apocynaceae and various species include Thevetia peruviana, Cerebra thevetia. All parts of the plant are toxic, especially the leaves and fruits. Fruits are black, globular and fleshy.

1) Active principles -

A) Theventine

B) Cerberin

2) Signs and symptoms -

A) Burning pain in the mouth, oesophagus and stomach followed by dryness, a sensation of tingling and numbness of the tongue.

B) Vomiting and diarrhoea.

C) Headache, dizziness and sense of fainting.

D) Pulse becomes irregular blood pressure falls and the patient dies of peripheral circulatory failure. Heart block is common.

E) Convulsions may precede death.

3) Fatal dose -

8 to 10 seeds

4) Fatal period -

Within 24 hrs

5) Management -

A) Gastric lavage

B) Symptomatic

7) Medico-legal points -

A) The plant is used as abortifacient.

B) As suicidal poison.

C) As homicidal poison.

D) As cattle poison.

CALOTROPIS (अर्क)[Fg]

It is a shrub which grows wild in the countryside all over India. There are two vanities : Calotropis gigantea (purple flowers) and Calotropis procera (white flowers). The leaves and stem when incised or crushed yield a whitish, milky, acrid juice.

I. Active principles -

1) Calotropin

2) Caltoxin

3) Uscharin

II. Uses -

1) The juice is used by rural folk for certain skin conditions, as a depilatory.

Scanned with CamScanner

2) Leaves may be used as a poultice for pain relief.

3) Root extract is sometimes used as an emetic.

4) In addition, village quacks use it for a wide variety of systemic diseases including syphilis, gonorrhoea, asthma and even impotence.

III. Signs and Symptoms-

1) In contact with skin, produces inflammation and vesication. Eye contact results severe conjunctivitis.

2) On ingestion there is abdominal pain, vomiting, diarrhoea, convulsions and sometimes death. Pupils may get dilated.

IV. Fatal dose -

Uncertain.

V. Fatal period -

The fatal period is about 12 hrs.

VI. Management -

1) According to Modern -

A) Gastric lavage with warm water.

B) Administration of demulcents, stimulants.

C) Other drugs as indicated symptomatically.

2) According to Āyurvēda -

चिंचापत्रं जले पिष्ट्वा मर्दयेत् शान्तिकृत् ।
हैमगिरिजले पाने स्नुही चार्कविकानुन ।।

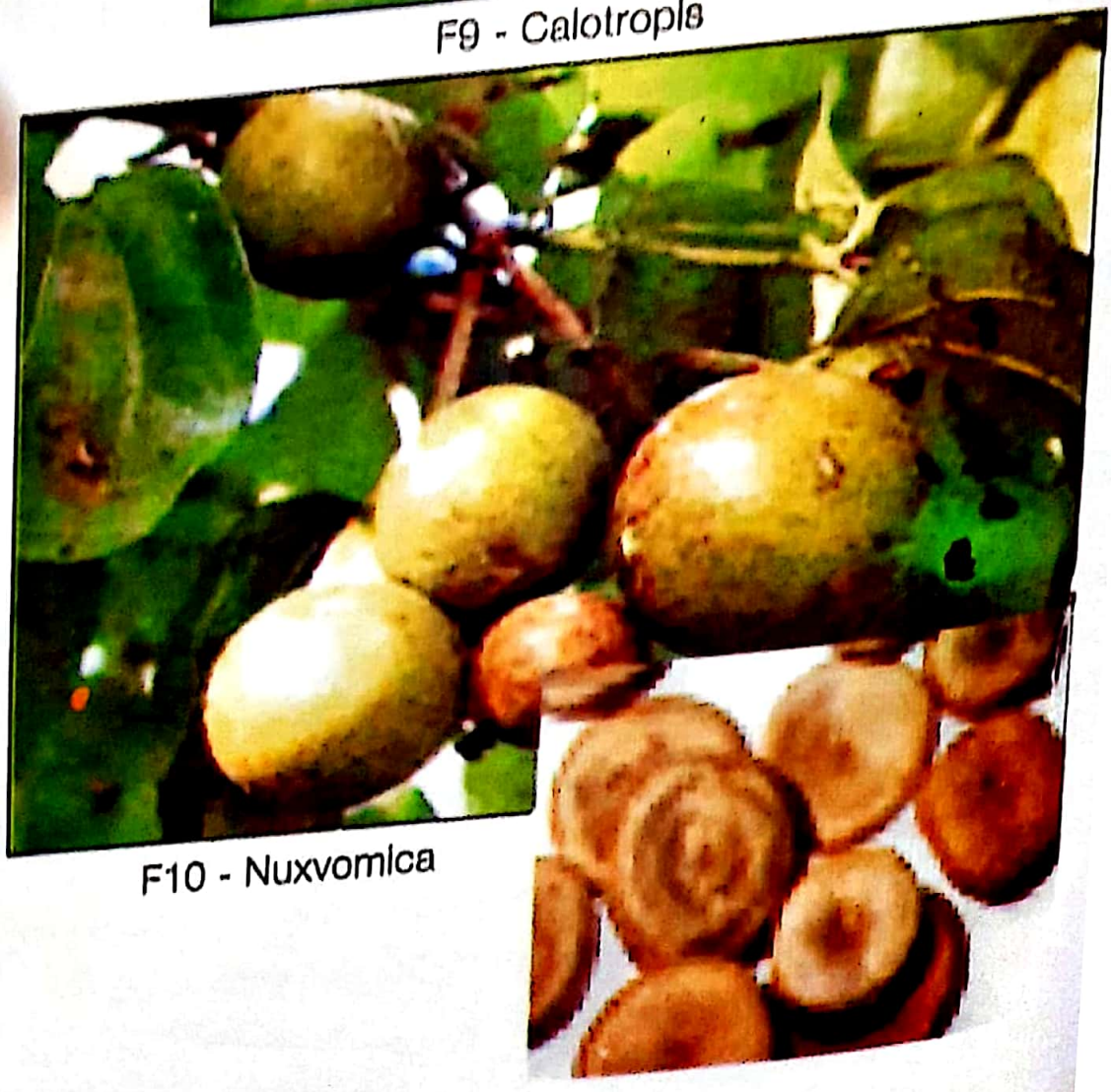
(अनुपानमंजरी ३/१५)

The leaves of the tamarind plant should be churned in water and if this application is rubbed over the body and the oral intake of the medicated water prepared with gairīka subsides all the poisonous effects of snuhī and arka.

VII. Postmortem appearances -

These includes dilated pupils, froth in the nostrils, sto-

F9 - Calotropis



F10 - Nuxvomica

matitis, and acute inflammation of alimentary tract. The stomach may show an acute ulcer or even perforation. The viscera including the brain and its meninges are congested.

VIII. Medico-legal Importance -

1) Illicit abortifacient (local application).

2) Malingerers may use it to produce an artificial bruise or conjunctivitis.

3) Ingestion through therapeutic misuse may result in overdose.

4) Cattle poison.

NUX-VOMICA (कुचला)[F10]

It is an alkaloid obtained from the tree "Strychnos nux vomica" of family Loganiaceae. It grows well in South India and Bengal. Seeds are the most toxic part. They are disc-shaped with a central depression, and measure an inch in diameter. The seeds are having high concentration of the alkaloids and extremely bitter in taste. The signs and symptoms are developed only when the crushed seeds are swallowed.

I. Active principle -

1) Strychnine
2) Brucine
3) Loganine

Strychinine is a white, crystalline powder. Today this potent alkaloid is mainly used as a rodenticide, and for killing stray dogs (Nux vomica seeds are therefore sometimes referred to as "dog buttons").

Mode of action - Strychnine acts as a direct stimulant to spinal cord causing tetanic spasms. Death occurs either from asphyxia due to spasm of the muscles of respiration or from

collapse, occurring in the interval between the spasms. The main action said to be on the anterior horn cells.

II. Uses -

Strychnine was previously used in therapeutics as :

1) Purgative.
2) Appetite suppressant.
3) Aphrodisiac.
4) Constituent of "nerve tonics"

III. Signs & Symptoms -

The onset of symptoms depends upon the route. It is immediate when the form of poison is given by the injectable route. If the poison is given by the oral route it may take few minutes to one hour. The patient has first :

1) A bitter taste in the mouth and a cocking sensation in the throat which leads to a sense of suffocation and difficulty in swallowing.

2) Then the patient becomes uneasy and restless, followed by twitching in various parts of the body.

3) Convulsions are evident after a short while. They are of the clonic type in the start then it is of the tonic type. Convulsions may start in any group of muscles.

During a fit of convulsion the face is cyanosed, eyes open and become staring type, the eye balls become slightly bulging and the pupils dilated. The angles are drawn backwards - and the appearance is called Risus Sardonicus. The mouth is subsequently covered with froth.

4) The body may take one of the shapes due to the contract of muscles :

A) Opisthonos - The body being arched on heels and head.

B) Emprosthotonos - The body being arched forward

resting virtually on the knee and forehead.

C) Pleurosthonos - The body being arched laterally. This position is comparatively rare.

5) When the muscles of diaphragm are affected the patient feels a sense of suffocation due to respiratory distress. It also causes a sever epigastric pain.

6) Redeeming feature of this poisoning is that the patient remains conscious till end.

7) Reflex excitability is increased. Exposure to a torch leads to the precipitation of convulsions.

8) Vomiting is usually absent. Once it sets in it remains till death.

9) The prognosis of a case can be assessed by the duration and frequency of convulsions. Many of the feature of strychnine poisoning resemble the clinical picture seen in a case of tetanus.

Strychnine poisoning	Tetanus
1) Circumstantial evidence	History of injury of poisoning.
2) Sudden onset	Gradual onset
3) Trismus is a late feature	Usually begins with trismus
4) All muscles are simultaneously	Not so effected
5) Relaxation of muscles in between convulsions	Sustained rigidity even between convulsions
6) Chemical analysis may reveal the poison	Chemical analysis yields nothing

IV) Fatal dose -

Two grams of powdered nux vomica are equal to one seed and contain 20mg of alkaloid. The fatal dose strychnine is about 15 - 30 mg.

9.

V) Fatal period -

The usual fatal period is 1-2 hrs. However, life may be prolonged for several hours after onset of symptoms.

VI) Management-

1) Neuromuscular paralysis may have to be induced with succinyl choline to facilitate endotracheal intubation, Curare or pancuronium bromide can be used instead of succinyl choline.

2) Oxygen therapy

3) Convulsions can be controlled with diazepam or barbiturates.

4) Induction of emesis and stomach wash to be avoided as far as possible, since they can provoke convulsions. When there is suspicion that substantial amount of the poison is still present in the stomach. Stomach wash can be done after convulsions have been controlled.

5) Acidification of urine can significantly enhance the excretion of strychnine.

6) Treat the patient in a quiet, dark room with minimal external stimuli.

VII) Postmortem appearance -

1) Rigor mortis is rapid and persists for a longer time.

2) Postmortem caloricity is sometimes encountered, i.e., the body temperature shows a slight rise for a while after death instead of the usual fall.

3) Strychnine is said to be resist putrefaction and can be detected by chemical analysis long after death.

4) Asphyxial signs are usually seen.

5) In addition to routine viscera, preserve also heart and spinal cord.

VIII) Medicolegal Importance -

1) It is sometimes used for homicide in the form of alka-

loid, or as powdered nux vomica seeds, inspite of bitter taste.

2) Suicide is rare because of the painful death.

3) Accidental deaths are more common, due to an overdose of medicinal preparation, or the poison being given by mistake, or in children by eating the seeds.

4) Sometimes, the seeds are used for killing the cattle, and as arrow poison.

5) In India nux vomica is taken as an aphrodisiac.

OPIUM (अहिफेन)[F11]

The term somniferous means "sleep producing". Though there are numerous examples of drugs which produce drowsiness and sleep, this group includes only those which are derived from opium, i.e., the opiates and those which have a similar action but are not derived from opium, i.e., opioids.

Opium is the latex obtained by incision from the capsule of a small plant : Papaver somniferum (Poppy). It belongs to family Papaveraceae and is a herb growing upto 1 meter in height. Each plant bears 5 to 8 capsules. Flowers are white. Since opium is highly addictive, there are strict restrictions regarding the cultivation of the poppy plant. It can only be grown for therapeutic purposes, and permission must be sought from the government for its cultivation and subsequent sale of the extract to pharmaceutical companies. India produces 70 to 80% of opium used worldwide for therapeutic purposes. The plant is widely cultivated in the states of Rajasthan, Uttar Pradesh and Madhya Pradesh in India. Poppy seeds present inside the poppy capsule are innocuous since they do not contain any active principles. Infact they are popular as flavouring agent in Indian cuisine.

I) Active principles -

Crude opium is a dark brown or grey, irregular mass with a characteristic odour and bitter taste. The composition of opium is highly complex, containing more than 25 alkaloids in combination with meconic, sulphuric and lactic acids. These are classified in the following :

1) Phenanthrene group - Morphine, Codeine and Thebaine.

2) Benzyl isoquinoline group - Papaverine and Noscapine.

Natural derivatives (opiates) - Herion (diacetylmorphine), apomorphine, oxymorphone, hydromorphone, paregoric (camphorated tincture of opium), etc.

Synthetic derivatives (opioids) - Pethidine (meperidine), methadone, pentazocine, proxyphene, levorphanol, diphenoxylate, fentanyl, etc.

Mode of action - The opiates and opioids occupy certain receptors in the brain which in the normal state are occupied by endorphins and enkaphilins (associated with pain threshold), altering pain perception. Most of them therefore act as analgesics. There is also depression of the CNS with narcosis and respiratory inhibition. The vomiting centre is however stimulated.

II) Acute poisoning -

The signs and symptoms appear within half hour of the ingestion of poison. If taken in injectable form as morphine the signs and symptoms start appearing within a few minutes. The three stages manifested are :

1) Signs and Symptoms -

A) Stage of Excitement -

This is the stage of short duration and may not be manifested if, a heavy dose is ingested. This is the stage of a sense of well being and increased mental and physical activi-

ties are noticed as below :

i) Freedom from anxiety.

ii) Restlessness.

III) Hallucination.

iv) Flushing of face.

v) Increased action of heart.

vi) In children it may present with convulsion.

The excitement is so much that the patient becomes a maniac.

B) Stage of Stupor-

This stage lasts from a few minutes to a few hours and is invariably present in all cases of opium poisoning. The patients are frequently brought for medical aid at this stage. This is the stage when depressive actions start appearing. This is noticed by :

i) Headache.

ii) Heaviness of body.

iii) Fatigue.

iv) Giddiness.

v) Drowsiness and intense desire to sleep, from where the patient can be aroused but likes to sleep.

vi) The pupils are contracted and pin point.

vii) The face and lips are slightly cyanosed.

viii) The pulse and respiration is normal.

C) Stage of Coma -

i) This is the stage of coma where the person cannot be aroused. There is no response on talking and shaking.

ii) Later on there is no response to deep pain.

iii) The muscles are relaxed and reflexes are lost.

iv) All secretions are depressed and suspended.

v) Pupils are contracted, pin point and insensitive to light. They dilate only when asphyxia sets in, which is a terminal

feature of poisoning.

vi) Respiration is slow, deep in character and subsequently laboured - Chyne stokes type.

vii) Pulse is feeble and slow, gradually it becomes irregular and imperceptible.

viii) Rarely there could be convulsions before death.

Unusual Symptoms -

i) Vomiting and purging.

ii) Tetanoid convulsions.

iii) Dilated pupils - even in the beginning stages also.

iv) Syncope and heart failure.

v) Rebound phenomenon may be seen. The patient apparently recovers but suddenly because of increased intestinal absorption goes into stuporose condition again.

2) Fatal dose -

The toxic dose is very variable especially as a considerable tolerance can be acquired. In a person not addicted to opium, 200 mg of morphine and its equivalent of opium (2 gms) is a fatal dose. Death has occurrs in adults much larger doses are taken.

3) Fatal period -

Death may occur within 45 minutes. The usual period is about 9 to 12 hours but it may extend to two days.

4) Management -

A) According to Modern -

i) Supportive mesures-

a. Maintenance of patient airway.

b. Endotracheal intubation, assisted ventilation.

ii) Stomach wash (In oral ingestions).

iii) The antidote for most opiates is nalorphine or

naloxone. The usual dose is 0.4 to 2 mg for naloxone and 5 to 10 mg for nalorphine, repeated as required. Both may be given intravenously.

iv) Physostigmine salicylate 0.04 mg/Kg IV may be given to reverse respiratory depression if both the regular antidotes are not available. Physostigmine is claimed to increase acetylcholine content of the reticular formation of brainstem which is suppressed by opiates especially heroin.

v) Amiphenazole 20 to 40 mg IV can also be given and repeated as required (no more recommended today).

vi) Supportive measures include vasopressors for hypotension, diuretics and antibiotics for pulmonary edema, etc.

vii) Convulsions may be treated with benzodiaepines in the usual manner, though this is frequently not necessary if naloxone is available.

B) According to Āyurvēda -

बृहत्क्षुद्ररसः दुग्धं पलमाननिषेणात् ।
नागफेनविषं नश्येत् स जीवति चिरं पुमान् ।।
(अनुपानमंजरी. ३/१)

The juice extracted from the plant bṛhatkṣudrā in the quantity of the one pala mixed with milk if taken orally cures all the ill effects of the opium and the person thus gets rid from the death.

5) Differential diagnosis -

Opium or morphine poisoning clearly resembles A) Intracranial lesions such as cerebrovascular accidents especially pontine haemorrhage. B) Metabolic conditions such as uraemic coma and diabetic coma. C) Alcohol poisoning. D) Carbolic acid poisoning. E) Organophosphorus poisoning and F) Other comatose conditions such as epileptic coma, hysterical coma and barbiturate poisoning, form which it needs to be distinguished.

III) Chronic poisoning -

1) Signs and Symptoms -

Tolerance is seen, i e., on subsequent occasions the dose has to be increased to get the same effect as before : A) Dermal scars resulting from repeated injections, B) Constricted pupils, C) Anorexia D) Amentia, confusion hallucinations, E) Constipation, F) Impotence.

2) Management -

A) The drug intake should not be abruptly stopped but gradually withdrawn in progressively diminishing amounts.

B) At the same time as the drug of addiction is being withdrawn, a less potent drug must be given as a substitute to take care of the minimal withdrawal symptoms that are likely to develop. The best drug for this is methadone, which must be begun at a dose of 30 to 40 mg / day and then gradually tapered off.

C) A beta adrenergic blocker like propranolol (80 mg) is said to be quite effective in relieving the anxiety and craving associated with opiate addiction, but has no effect on physical symptoms. In addition, newer approaches are being tried with drugs like clonidine and naltrexone (a recently introduced, long acting antagonist).

D) Anti-spasmodics can take care of abdominal cramps, vomiting, diarrhoea, etc.

E) Tranquillisers or bed time sedation can be administered, if necessary.

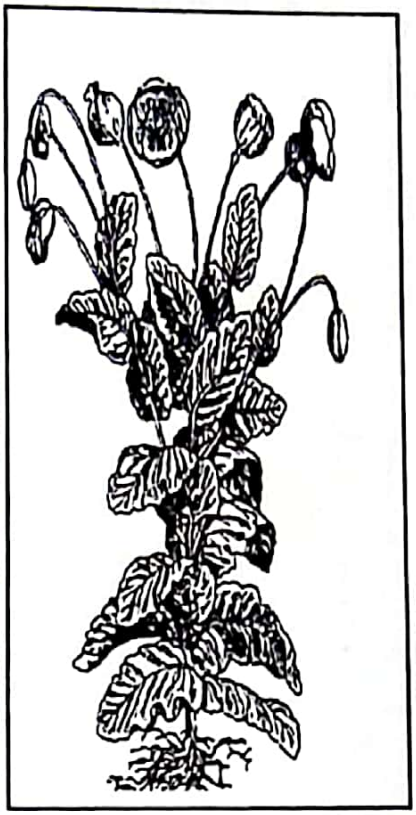
F) Psyschiatric counselling is frequently necessary.

IV) Postmortem appearances

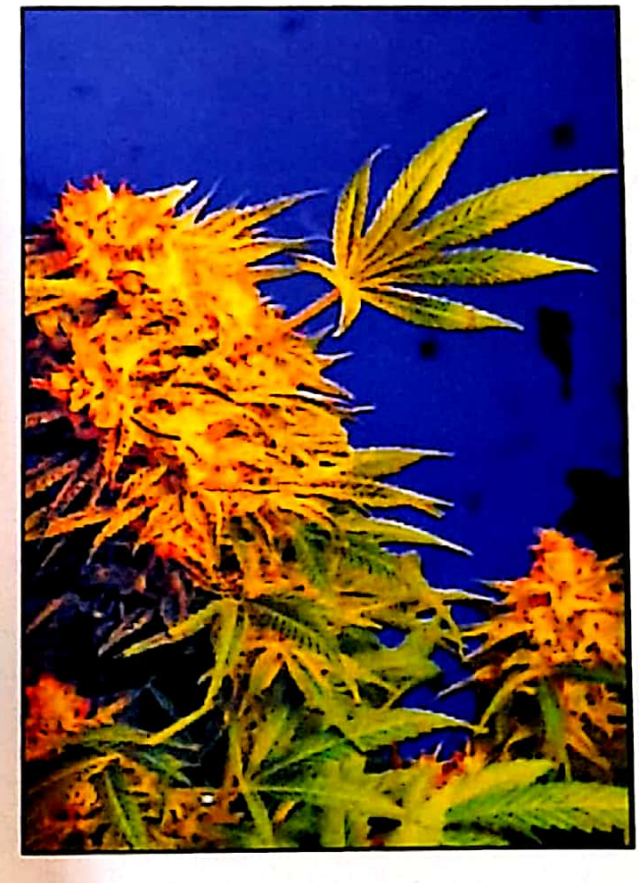
1) External appearance

A) Injection marks, dermal abscesses, scarring. Look for injection marks in the antecubital fossae, forearms, back of the hands, neck, groin and ankles.

Scanned with CamScanner



F11 - Ahiphena



F12 - Bhanga

B) Tattooing, (a common feature of the drug subculture).

C) Emaciation.

D) Blueish of finger nails and face.

E) Presence of white, fine froth around the face and nose.

F) Petechial haemorrhages in the skin and other parts.

2) Internal appearance -

A) The stomach may contain dark brown lumps. The walls may or may not be congested.

B) Gross pulmonary oedema with froth exuding out of mouth and nostrils, especially in sudden heroin-related death.

C) Cerebral edema.

D) Congestion of liver with enlargement of hepatic lymph nodes. Chemical analysis of lymph nodes may reveal presence of morphine.

V) Medicolegal Importance -

1) It is the commonest drug used for suicidal purposes, primarily because the death is painless, 40% of all the suicidal cases are caused by opium. In the urban community morphine is used more frequently.

2) For homicidal purposes opium is rarely used because of bad taste.

3) Accidental poisoning is more frequent in children.

CANNABIS INDICA (भंगा)[F12]

The term Cannabis refers to the flowering and fruiting tops of Cannabis sativa of family Cannabinaceae, which is a tall weed growing upto 15 feet in height. It is a dioecious plant, i.e., the sexes are separate. Both male and female plants contain the active principle which however is more abundant in the latter. Highest drug concentration is in the flowering tops (bracts) followed by leaves, stem, seeds and root.

I) Active principle -

Tetrahydrocannabinol (THC)..

II) Cannabis preparations -

It is CNS stimulant. It is used in the following forms:

1) Bhang /Patti - It is prepared from dried leaves and fruits and contains 15% of the active principle. It is used as an infusion in the form of beverage, which produces intoxication of sensuous character. The intoxication produced results in singing and dancing of the individual. After a few hours sleep supervenes.

2) Majun - This is basically Bhang prepared with sugar, flour, milk and butter. The person feels a sense of great contentment after ingestion. The appetite is enhanced and so is the desire for sex. A sensation of grandeur is also felt by the individual.

3) Ganja - This preparation is smoked in hukkas and pipes. This is prepared from flower tops of female plants. The active principle content is 15 - 25%. It is largely consumed by the sadhus of India.

4) Charas or Hashish - It is the resin from the leaves and stems of the plant. The active principle is 24 - 40%. It is smoked in a pipe of hukka.

III) Uses -

Formerly, cannabis was widely used in the therapeutics for the treatment of ailments like asthma, convulsions, anorexia, and was even employed as an analgesic and sedative. Because of its addictive potential, the medical use of cannabis has been stopped and now it is treated as a banned drug all over the world.

IV) Acute poisoning -

1) Symptoms -

Because of its effects primarily on the central nervous system its symptoms can be divided into stages :

A) Stage of Excitement -

The patient is delightful and excited and he has :

i) Hallucination.
ii) Laughs.
iii) Sings.
iv) Talks loudly.
v) Irrelevent muscular movements.
vi) No perception of time and space.

B) Stage of Narcosis -

i) Muscular weakness.
ii) Giddiness.
iii) Loss of co-ordination of movements.
iv) Drowsiness.
v) Dilatation of pupils.
vi) In some of the cases the patient is in a state of general anaesthesia.

2) Fatal dose -

To the non-addict, 10 minims of the tincture or 1.5 gms (is equivalent to three cigarettes) can cause serious excitement. The minimum lethal dose of charas is about 2000 mg, of ganja about 8000 mg, and of bhang about 10,000 mg per kilo body weight.

3) Fatal period -

Death may occur in 12 hours.

4) Treatment -

A) According to Modren -

A) Evacuation of stomach so as to make sure that the non-absorbed poison is taken out.
B) Cold bath.
C) Stimulants.
D) Artificial respiration and O_2 inhalation.
E) Symptomatic treatment if and when needed.

B) According to Āyurvēda -

गोदधि शुंठीयुक्तं च पाने भंगाविकारनुत्।
आर्द्रकसंदेसडा तद्वत् जले पिष्टवा पिवेन्नर ।।

(अनुपानमंजरी. ३/८)

The cow's curd mixed with śuṇṭhī and the fresh root of sandēsaḍā (Poinciantic elata) crushed in water if consumed subsides all the poisonous effects of the bhaṅgā.

V) Chronic poisoning -

1) Signs and symptoms -

A prolonged consumption of any form of Cannabis Indica leads to -

A) Loss of appetite
B) General weakness.
C) Emaciation.
D) Trembling.
E) Decrease / loss of sexual desire.
F) Toxic psychosis. It may be in the form of mania, depression or dementia.

2) Treatment -

A) Gradual withdrawal of the drug.
B) Diazepam for sedation.
C) Haloperiodol for psychotic reactions.
D) Psychotherapy.

VI) Postmortem Appearance -

No characterstic features have so far been described because fatalities are rare.

VII) Medicolegal Importance -

1) Majun and Charas are used primarily for robbery purposes.

2) Accidental poisoning by Bhang is common.

3) Before committing crime some people use to make the nerves steady.

THORN APPLE (धतूरा)[F13]

It is a small shrub growing 4 to 5 feet high and belongs to family Solanaceae. Common species encountered in India include. D.fatuosa, D.atrox, and D.metel, D.fatuosa is of two varieties - Niger (with purple flowers) and alba (white flowers). Leaves are dark green with pointed margins, flowers are tubular and the fruit capsule has spines, and contains up to 500 reniform (kidney - shaped) seeds. The seeds are very bitter to taste and resemble those of capsicum (chilli).

I) Active principles -

1) Hyoscine (scopolamine)
2) Hyoscyamine
3) Atropine.

II) Uses -

1) Mydriate (inophthalmic practice)
2) Antispasmodic
3) Antidote (for organophosphates and carbamates)
4) Pre-anaesthetic medication (to inhibit salivation and dry up respiratory secretions)
5) Bronchial asthma (not recommended now-a-days)

Mode of action - Peripheral effects are predominant and result from anticholinergic (parasympatholytic) action. Central effects involve initial stimulation of the CNS, with excitement and restlessness followed by subsequent depression, delirium and coma.

III) Signs and Symptoms -

1) According to Modern -

Summarised in the classic phrase, "Blind as a bat, hot as a hare, dry as a bone, red as a beet and mad as a wet hen". Main features include :

A) Sense of nausea and vomiting.

B) Dryness of mouth, throat and unquenchable thirst.
C) Dysphagia.
D) Burning pain in throat and stomach.
E) Dysarthria (difficulty in talking)
F) Bad taste in the mouth.

These are soon followed by -

G) Giddiness, staggering gait.
H) Flushing of face.
I) Skin becomes dry, hot and the temperature rises. It may be upto 42° C. A scarlet rash may also be observed.
J) Dilatation of pupils, photophobia and loss of accommodation.
K) Initially the pulse is full and bounding, gradually as the condition deteriorates the pulse becomes weak and slow. Later it becomes irregular and collapsing.
L) The patient may become unconscious.
M) Respiration is slow, then the rate increases.
N) Rarely convulsions are seen before death.
O) Death is due to -
   i) respiratory failure.
   ii) Cardiac failure.

The important signs and symptoms can be summarised under 9Ds, viz : 1) dryness of the mouth and throat 2) difficulty in talking 3) dysphagia 4) dilatation of cutaneous blood vessels 5) dilatation of pupils 6) dry hot skin 7) drunken gait 8) delirium, and 9) drowsiness.

2) According to Āyurvēda -

धुर्धरकोपयोगेन सर्वं पश्यति पीतकम् ।
कम्पलालामदच्छर्दिस्मृतिभ्रंशभ्रमान्वितः ॥
(अ.स.उ. ४०/१४४)

By consuming durdhuraka (dhatūra) as poison, the per-

son sees all things yellow, develops tremors, salivation, toxicity, vomiting loss of memory and giddiness.

IV) Fatal dose -.

50 to 100 seeds.

V) Fatal period -

Usually occur within 24 hrs.

VI) Treatment -

1) According to Modern -

A) Decontamination (emesis or stomach wash, activated charcoal and cathartic)

B) Physostigmine is the antidote, which should be given only in severe poisoning at a dose of 1 to 2 mg IM or IV repeated after half hour, if necessary. Watch for side effects (bradycardia, heart block, excessive secretions) . Pilocarpine is a less satisfactory alternative.

C) Diazepam for convulsions.

D) Supportive measures.

2) According to Āyurvēda -

तं वामयेत मधुरैः पाययेद्वा सितापयः ।।

(अ.स.उ. ४०/१४४)

He should be made to vomit by using drugs of sweet taste or drink milk added sugar.

वृन्ताकफलबीजस्य रसो हि पलमात्रया ।
भक्षणात् भुक्तधत्तूरविषं नश्यति निश्चितम् ।।

(अनुपानमंजरी. ३/३)

The juice extracted from the fruit of vṛntāka if consumed in a dose of one pala it erradicates the poisonous effects of datura.

VII) Postmortem appearance -

Nothing specific.

VIII) Medicolegal importance -

1) Used primarily for criminal purposes such as highway robbery and kidnapping. Occasionally the quantity may exceed leading to death of the individual.

2) Suicidal poisoning is rare.

3) Accidental poisoning may occur in children or adults by taking the fruit by mistake. In some cases quacks have used for medicinal purposes resulting in tragedies.

4) The excretion of the unchanged active principle of dhatura takes about 24 hrs. Hence it is advisable to preserve a sample of urine to subject it to chemical analysis whereas the stomach may not respond to the test.

Generally the dhatura seeds and capsicum seeds are similar to each other and every chance to adulterate, so it is very important to know about it-

	Dhatura	Capacicum
1)Size	Large and thick	Smaller and thin.
2) Shape	Kidney	Round.
3) Colour	Brownish or	Dark yellow Pale yellow
4) Surface	Tiny depressions	Smooth
5) Odour	Odourless	Pungent
6) Taste	Slightly bitter	Pungent
7) Embryo	Curved outwards	Curved inwards.
8) Eye test	Wide dilatation of pupil	No effect.

ABRUS PRECATORIUS (गुंजा)[F14]

It belongs to family Leguminosae, and is a slender, twining vine with compound leaves having 10 to 15 pairs of narrow leaflets. Flowers are pea like and may be variously col-

F13 - Datura

F14 - Gunja

oured. Seed pod is small and splits open when ripe revealing 4 to 6 seeds which are less than 1cm in size and are bright red in colour with a black spot on one side.

I) Active principles -

1) Abrin (toxabumen) 2) Abrine (amino acid)
3) Abralin (gulcoside) 4) Abric acid

II) Uses -

1) Formerly used in ophthalmic practice for treating conjunctivitis and corneal opacities (in the form of an infusion of crushed seed).

2) The seeds are often used in rosary beads, necklaces, etc., especially by native folk.

3) Jewellers in India sometimes use the seeds as a measure to weigh gold, precious stones, etc.

III) Signs and Symptoms -

1) Mainly take the form of a severe gastroenteritis which may become haemorrhagic.

2) If an extract of the poison is injected there will be local inflammation with cardiovascular manifestations which may lead to death.

IV) Fatal dose -

1 to 2 doses or 90 to 120 mg of abrin.

V) Fatal period -

24 to 72 hrs.

VI) Management -

1) Decontamination
2) Anti-abrin should be given.
3) Supportive measures.
4) The urine should be maintained in alkaline pH.

VII) Postmortem appearance -

1) Congestion of gastro-intestinal tract and other viscera.

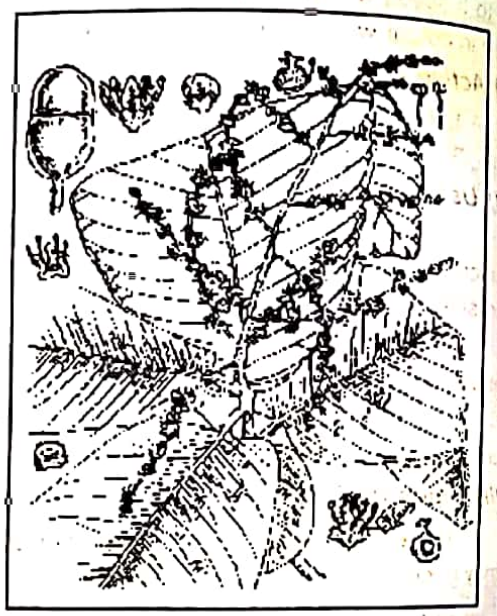
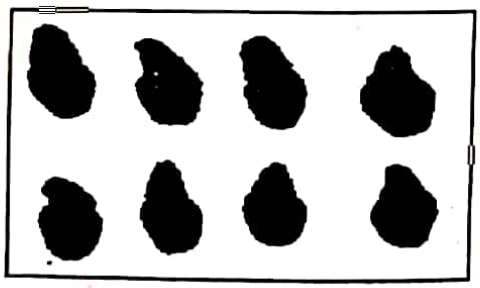


Figure of Bhallataka F15



Bhallataka Seads

2) If injected, local signs of inflammation are seen.

VIII) Medicolegal Importance -

1) Most of the cases arise out of accidental ingestion of the attractive seeds by children. Seeds must be crushed or chewed for harmful effects to occur.

2) A few homicidal cases are reported by injecting with needles.

3) Cattle poisoning - This is the primary use of the poison. The seeds are taken out, powdered and made into a thin paste. To this is added Opium, Dhatura and Onion. They are made into spikes of average 1 inch length, when dried in sun they are ready for use. These are pierced into the skin of the animal. An intense cellulitis develops and killing the animal within 24 hrs.

SEMECARPUS ANACARDIUM (भल्लातक)[F15]

In English it is called as Marking nut. It belongs to family Anacardiaceae, and it is a tree bearing hard nut-like fruit, the acid juice of which is blackish in colour and is used by washermen (dhobis) to mark clothes.

I) Active principles -

The juice contains

1) Semecarpol

2) Quack remedies for syphilis, nervous disorders, etc.

II) Signs and Symptoms -

1) Contact with skin produces inflammation and vesication.

2) Ingestion causes severe gastroenteritis, hypotension and delirium. Death is uncommon.

III) Fatal dose -

Fatal dose is uncertain but considered to be about 10 gms.

IV) Fatal period -

May produce death within 12 to 24 hrs.

V) Management -

1) According to Modern -

1) This is symptomatic. When applied externally, the parts should be washed with warm water and bland liniments applied.

2) According to Āyurvēda -

रसो हि मेघनादस्य नवनीतसमन्वितः ।
भल्लातसंभवं शोफं हन्ति लेपेन देहिनाम् ।।
दारूसर्षपमुस्ताभिः नवनीतेन लेपयेत् ।
भल्लातकविकारे अयम् सद्यो गच्छति देहिनाम् ।।

(अनुपानमंजरी. ३/४-५)

The juice extracted from mēghanāda (Ameranthus tricolor) mixed with butter if applied locally subsides the swelling caused by bhallātaka. The mixture of dēvadārū, sarṣapa and mustā mixed with butter if applied on the body subsides all the complications caused by bhallātaka.

VI) Postmortem appearance -

Signs of gastro-intestinal irritation.

VII) Medicolegal importance -

1) Illicit abortifacient (local application)

2) Juice may be applied to the skin to create fabricate injury (usually a bruise). However, unlike a bruise the resultant injury is usually associated with blister formation.

3) Accidental poisoning may result from therapeutic misadventures at the hands of unqualified quacks.

CROTON TIGLIUM (जयपाल)[F18]

It belongs to family of Euphorbiaceae and is a tropical

hedge plant seen all over India. Seeds are oval, dark brown longitudinal lines, and resemble one variety of castor seeds.

I) Active principles -

1) Crotin (toxalbumin)
2) Crotonoside (glycoside)

II) Signs and Symptoms -

1) These are similar to poisoning by rici.
2) The oil causes blistering externally.
3) On ingestion causes severe gastro-intestinal irritation with burning pain in the abdomen, vomiting, powerful purging, and frequently a burning pain at the anus.
4) In substantial dosage, collapse precedes death.

III) Fatal dose -

In children - One seed will causes severe symptoms and 3 drops of the oil have proved fatal In a child of one year.

In adults - Four seeds have produced death, and 20 drops of the oil have proved fatal to adults, though recovery has been recorded after 15 ml of the impurity.

IV) Fatal period -

Death may occur in a few hours, about four to six, or may be delayed for a few days, about three to six.

V) Management -

1) Decontamination (stomach wash, activated charcoal and cathartics)
2) Maintenance of fluid and electrolyte balance.
3) Supportive measures.

VI) Postmortem appearance -

Gastro-intestinal and renal congestion.

VII) Medico-legal importance -

1) Most of the cases are accidental in nature arising out

F16 - jayapala & seeds

F17 - Langali

of therapeutic misuse or mistaken ingestion of seeds, especially by children.

2) Suicidal and homicidal cases are rare.

GLORIOSA SUPERBA (लांगुलि)[F17]

This belongs to Liliaceae. It is an elegant, climbing hedge plants grows in Mysore and in low jungles throughout India and flowers are bloom about the end of the monsoon. Its root is juicy, tuberous and flattened or cylindrical.

I) Active principle -

It contains an active bitter principles. Superbine, a glycoside and colchinie.

II) Uses -

It is used for stomache and is antipyretic in 0.3 to 0.6gm doses. Up to 0.75gm, it is not poison but beyond that it has possibly the same poisonous action as squill.

III) Signs and symptoms -

Burning and numbness in the mouth and throat, nausea, purging, ataxia, spasm, convulsions, profuse sweating and collapse and respiratory failure.

IV) Fatal dose and Fatal period -

Not definite.

V) Management -

Treat shock and maintain blood pressure.

VI) Postmortem appearance -

No specific features.

VII) Medico-legal importance -

Generally used as a abortifacient.

ARSENIC POISONING
(हरिताल, मनःशिल, सोमल)

The salts of arsenic are :

-Oxides of As - As_2O_3
-Arsinites.
-Sulphides of As - As_2S_3, As_2S_2
-Organic compounds.

Metallic arsenic is not poisonous but its salts are poisonous. It irritates tissues, depresses the nervous system and prevents the tissue respiration.

I) Properties -

It is colourless, odourless (As_2O_3) and tasteless. Its appearance is like a grinded powder. It is insoluble in water. Very small quantities can kill a person. A pinch of arsenic oxide can kill six or seven people.

II) Uses of Arsenic -

In various printing and dye factories, as an insecticide, particularly in killing rats, in the manufacture of drugs.

III) Forms of Arsenic used as Poison -

1) Arsenous oxide or arsenous acid.
2) Sodium and potassium arsenite.
3) Sheel's green.
4) Arsenic sulphide.
5) Arsenic chloride.
6) Arsenic Acid.

IV) Mode of Action of Arsenic -

All arsenial compounds exert both a local and a remote effect.

1) Local effects -

In the early stage the action of the poison is purely local and consists of acute irritation in the gastric and other mucous membranes with which it comes in contact.

2) Remote effects -

With the absorption of the poison, the remote action is

depression of the nervous system is superadded. This brings about a general prostration with rapidly increased depression of the heart and respiration associated with spasms of muscles, cramps and occasionally convulsions.

The cellular metabolism is deranged by the inhibition of the sulphydryl enzyme system. It is considered a capillary poison and causes dilatation of the capillaries.

V) Acute Arsenic Poisoning -

1) Features -

A) According to Modern- Acute poison may be of two kinds-

i) Gastro-enteric type in which the symptoms gastro-intestinal irritation are early in appearance and prominent due to the local action of the poison.

ii) Narcotic type the effects of the local action are, more or less, overshadowed by the early onset and the severity of nervous symptoms.

i) Gastro-enteric type Features -

The onset of symptoms is usually within half-an-hour, when the stomach is empty and arsenic is in powder form and the features are as follows :

a) The patient first of all complaints of a feeling of faintness, depression and nausea.

b) Burning in throat, retrosternum and epigastrium.

c) Increased salivation, intense thirst associated with nausea.

d) Severe vomiting starts - the vomited matter at first contains the ordinary contents, but later contains mucus and blood in streaks and spots.

e) Tenesmus associated with dark stools containing blood and plenty of fluids like rice water stools of cholera.

f) It affects the kidney resulting in of depression of for-

mation of the urine. It contain R.B.C. and albumin in urine and later renal failure.

g) Severe cramps in calf muscles usually commence with purging.

h) Restlessness and marked dehydration.

i) Patient passes in a state of collapse.

j) Later convulsions and coma precede death.

k) The intellect generally remains clear to the end.

ii) Narcotic type -

It results from the ingestion of massive dose under conditions favouring rapid absorption e.g., a fasting stomach existence of the poison in a readily soluble form and in this type gastro-intestinal symptoms are absent. It is characterised by :

i) Giddiness

ii) Precordial distress.

iii) Formation of tenderness in muscles.

iv) Delirium and coma ending in death.

B) According to Āyurvēda[1] -

If haritāla (orpiment/yellow sulphide of arsenic) has been consumed, there will be burning sensation and catching pain in the chest, flatulence, sour vomiting, diarrhoea with yellow and deep yellow coloured faeces and symptoms produced by the bite of maṇḍalisarpa (viper snake) also appear.

2) Fatal Dose - 3 grains or 180 m.gm.

3) Fatal Period - 12 - 48 hours.

When a large dose is taken, death may occur from shock without producing any symptom within a short period of 45 minutes. In mild or subacute case, life may be prolonged for several weeks.

१. अ.सं.उ. ४०/ १७७.

4) Differential Diagnosis -

Acute arsenic poisoning has to be diagnosed from cholera as the symptoms of both are similar in many respects. The following are differentiating points :

Symptoms	Arsenic poisoning	Cholera
1. Pin in the throat	Before vomiting	Not so.
2. Purging	Follows vomiting	Usually precedes vomiting.
3. Vomited matter	Contains mucous, bile and streaks of blood.	Is watery.
4. Stools	Rice-watery in the early stages and later bloody.	Rice-water liquid and passed in continuous involuntary jet.
5. Tenesmus and anal irritation	Present	Absent
6. Voice	Not affected	Peculiar, rough and whistling.
7. Conjuctivae	Inflamed	Not so.
8. Analysis of excreta	Arsenic present	Cholera vibrio present
9. Circumstantial evidence	Of arsenic poisoning may be present.	Other cases of cholera in locality.

5) Diagnosis-

A) Urine level: If the 24 hour excretion of arsenic exceeds 100mg. It is indicative of toxicity.

B) Blood level: This is less reliable than urine level be-

cause of short half-life of arsenic in the blood.

C) Hair level: Although considered to be an important diagnostic criteria, it may be virtually useless since it cannot discriminate between external deposition and toxic accumaltion.

6) Management -

A) According to Modern -

i) Prevention of further exposure to poison. The patient is not allowed to bear the source of poison.

ii) Removal of Unabsorbed Poison:

a) Emesis: Should be done perfectly by mechanical means e.g.tickling the uvula.

This may be considered as the first and most essential step. It could prove to be rewarding if done effectively and early. If the stomach is full this can be done.

b) Stomach wash with stomach tube by hydrogenated ferric oxide solution should be done. As it combines with arsenic oxide to form a harmless insoluble compound ferric arsenide. After this powdered charcoal plus magnesium oxide in equal parts-mixed in water are pushed in the wash tube.

c) Magnesium sulphate or castor oil could be used. This washes away the unabsorbed poison in intestine and causes diarrhoea.

iii) Antidote:

a) BAL in the dose of 2 ml - Deep I.M 6 hourly by substrate competition.

b) Eggs and albumin should be used for the demulcent action. It prevents further absorption of arsenic by the formation of a smooth coating on gastric mucosa.

iv) Penicillamine 0.6 1.5 g. to be administered orally divided in 4 equal doses daily for about 7 days or in slow normal saline drip 1 to 3 g. daily for 2 - 4 days. It is most effective for mobilisation and excretion of heavy metals.

v) Symptomatic treatment :

a) Replacement of fluids by I.V drips.

b) Peripheral vaso-constriction in cases of peripheral circulatory failure.

c) Morphine for severe pain.

B) According to Āyurvēda[1] -

The treatment for this should be planned carefully considering the dōṣās, aggravated as follows-first the person should be purified both upward (emesis) and downward (purgations), then the paste of aṃkōla, jālinībija, śukanāsā, priyaṅguka, lōdhra, dhyāmaka, tālīsa, nata, yaṣṭacāhva, guggulu, hībēra and bhadrakāṣṭhaṃ should be licked mixed with honey and ghee, the same paste should be added with bile of mangoose or cow should be used as nasal drops and collyrium to the eye.

6) Postmortem Appearance -

1) Externally:

Signs of dehydration, e.g., sunken eyes, prominent malar bones.

2) Internally :

a) Mouth The mucosa is usually normal but may show signs of inflammation.

b) G.I.T. The mucosa is inflamed and red with submucous haemorrhage. The mucus membranes become rugosed and in between the rugae we find tenacious entangling the particles of poison. The stomach contents are dark.

१. विभज्य योजयेत् - उर्ध्वमधः संशोधितं च तम् । अंकोलजालिनीबीजशुकनासाप्रियंगुकाः । लोध्रध्यामकतालीसनतयष्ट्याह्वगुग्गुलुः ।। हीबेरं भद्रकाष्ठं च लेहयन्मधुसर्पिषा । दद्यान्नकुलगोपित्तयुक्तं नस्य अंजने च तत् ।।
(अ.सं.उ. ४०/ १७८, १८०)

c) Lungs are congested with subpleural echymoses.

d) There may be oedema of brain with patchy necrosis or haemorrhagic encephalitis.

e) Subendocardial haemorrhages are often seen in the heart.

f) There may be evidence of fatty degeneration of heart, liver and kidneys.

g) Nephritis, particularly of glomerular type is frequent.

VI) Subacute Poisoning -

The appearance of symptoms takes more time and the neurotic symptoms predominate for e.g., Multiple peripheral neuritis. Pin in the calf muscle and paralysis of the muscles. Associated with the above are the G.I.T. symptoms - pain in abdomen, vomiting, dark coloured stool with blood. Jaundice may also set in later stage.

VII) Chronic Arsenic Poisoning -

1) Causes -

Due to accidental ingestion of repeated small doses by those working with the metal or by taking food or drink which there are traces of drug or may be homicidal nature due to repeated small doses.

2) Features -

A) C.N.S - Poly neuritis, anaesthesia, paraesthesias.

B) Skin - Pigmentation consists of a finely mottled brown change mostly on the temples, eyelids and neck (Raindrop type) which persists for many months. It may be resembling fading measles rash.

C) Eyes - Congestion, watering of the eyes, Photophobia.

D) *G.I.T* - Cirrhosis of the liver, nausea, vomiting, abdominal cramps, diarrhoea.

E) C.V.S and kidneys - Chronic nephritis, cardiac failure, dependent oedema.

F) Hepatic - Hepatomegaly, jaundice.

G) Haematologic - Bone marrow suppression, hypoplasia, anaemia, thrombocytopania, leukaemia.

H) General - Anaemia and weight loss.

I) Respiratory system - Cough, haemoptysis, dyspnoea.

3) Treatment -

A) Removing the patient from the source of exposure.

B) Administration of BAL.

C) General nutrition must improve.

4) Postmortem Appearance -

A) The stomach may be normal or may show a chronic gastritis or some rugae may show patchy inflammatory redness.

B) Small intestine is dilated, reddened with thickened mucosa.

C) The liver may be fatty or there may be severe cirrhosis or there may be jaundice.

D) The kidneys show tubular necrosis.

VIII) Medico-legal -Importance -

1) Homicidal -

A) It is cheap.

B) Easily available.

C) Colourless, odourless, tasteless.

D) Small quantity is required to cause death.

E) Can be easily administered with the food or drink.

F) Onset of symptoms are gradual and symptoms similate those of cholera.

2) Accidental poisoning

May occur due to mistaken identity.

3) Suicidal poisoning is rare.

4) It is used frequently for cattle poisoning.

MERCURY POISONING

It is a liquid metal bright silvery and volatile at room temperature. It contains two series of compounds as mentioned below.

I) Mercuric compounds which are soluble and intensely poisonous.

II) Mercurous compounds which are less soluble and therefore less active.

In the metallic form if the mercury is swallowed does not prove to poisonous as it does not get absorbed. If mercury vapours inhaled or swallowed as vapour or if applied on the skin or mucous membrane finely in divided state, it get absorbed and acts as a poison.

I) Acute Mercurial Poisoning -

1) Features -

1) Acid metallic taste and feeling of constriction in throat, hoarse voice, difficulty in breathing.

2)The mouth, tongue and face become corroded, swollen and show a greyish white coating.

3) Hot burning pain in the mouth extending down to the stomach and abdomen followed by nausea, retching and vomiting. The vomit contains greyish, slimmy mucoid material with blood and shread of mucous membrane.

4) This followed by diarrhoea with blood stained stools.

5) Collapse sets in, with cold calmy skin, pale anxious face, sunken eyes, dilated pupils, rapid feeble pulse, sighing respiration, syncope, convulsions and general insensibility

usually precede death which may take place in a few hours.

6) If death is not rapid, on second or third day, salivation may develop, the gums may become swollen and inflamed, and the foul breath. Involvement of the kidneys from the nephrotoxicity is due to effect of mercury. The urine contains albumin and blood. The output diminishes or stop and death ensues from uraemia.

2) Fatal Dose -

Mercuric chloride - 1 - 2 gms

Mercurous chloride - 400 mg

3) Fatal Period -

For 3 - 5 days.

4) Diagnosis -

The differentiation has to be made from Arsenic poisoning. In Mercury poisoning, the following are more pronounced

1) Onset is more rapid.

2) Constriction of throat is more marked.

3) Blood in vomitus and stool is more often present.

4) Kidney involvement is more common.

5) Excretion of more than 500 micro grams of mercury in urine in 24 hours suggests mercury poisoning.

5) Treatment -

1) Emetics should be given, if vomiting has not occurred.

2) The following mixture is introduced into stomach :

White of eggs	:	2 or 3
Glucose	:	1 oz.
Soda Bicarbonate	:	1/3 oz.
Milk	:	1 pint.

This results the formation of an insoluble compound mercury albuminate. This is further given a wash out with the following mixture :

Warm water. Magnesium carbonate. Animal charcoal.

3) 10 gm. Of sulphoxylate in 100 to 200 c.c. of distilled water by slow i.v injection and repeated after 4 to 6 hours acts as an antidote.

4) BAL in the dose of 300 mgm I/M, which can be repeated as per requisitions.

5) EDTA could also be used as a chelating agent.

6) Symptomatic treatment :

- For severe pain : Morphine.
- For severe burning sensation in stomach : Demulcent.
- For peripheral circulatory collapse : I/V fluids.
- For collapse of heart : Cardiac stimulants.

6) Post- Mortem Appearance -

1) The upper G.I.T shows signs of corrosions and the membrane becomes softened. At some sites there may be acute ulcers.

2) The kidneys are congested and enlarged with heamorrhagic spots all around.

3) Liver and heart may show fatty changes. This is more so in cases of chronic mercury poisoning.

II) Chronic Mercurial Poisoning -

1) Causes - *This may result from :*

1) Continuous accidental absorption by the workers.

2) Excessive therapeutic use.

3) Recovery from large dose.

4) If ointment is used as external application for a long time.

2) Features -

1) Excessive salivation, Inflammation of gums, occasionally a blue line at their junction of gum and teeth, sore mouth and throat.

2) Chronic nausea, loss of appetite and colicky pain in abdomen.

3) Loosening of teeth, gastro-intestinal disturbances.

4) Loss of weight, chronic inflammation of kidneys.

5) Mercurial tremors are observed. After prolonged effect the speech becomes stammering and hesitating.

6) Paralysis of speech muscles occurs.

3) Treatment -

1) Avoid further exposure to poison.

2) BAL or EDTA - A course should be given.

3) Maintaining oral hygiene, demulcent drinks and saline purgatives.

4) Medico - Legal Importance -

Accidental poisoning far exceeds homicidal and suicidal cases in mercury poisoning. Sometimes it is introduced into the vagina as a contraceptive or producing abortion.

LEAD POISONING

Lead is poison in the metallic form, as well as in its salts form. The principle salts which produce toxic effects are :

1) Lead carbonate (White lead).
2) Lead monoxide(Litharge).
3) Lead tetroxide (Red lead or Sindur).
4) Lead sulphide.
5) Lead acetate.

I) Acute Lead Poisoning -

The lead acetate is the one which is most commonly responsible for acute poisoning.

1) Features -

A) An astringent and metallic taste, dry throat, thirst.

B) Burning abdominal pain.

C) Nausea, vomiting.

D) Some times diarrhoea.

E) Peripheral circulatory collapse, headache, insomnia, paraesthesias, depression, coma and death.

2) Fatal Dose -

Lead acetae - 20 gms.

Lead carbonate - 40 gms.

3) Fatal Period -

1 to 2 days.

4) Treatment -

The principle of treatment of de-leading which can be carried as follows :

A) Gastric lavage with 1% of solution of sodium or magnesium sulphate or simple emetics in absence of stomach tube.

B) Demulcent, such as milk, egg white or barley water.

C) The combination of B.A.L. and calcium disodium vesinate is effective.

D) Penicillamine.

E) Calcium chloride 5 mg of 10% of solution i.v. cause deposition of lead in the skeleton from the blood.

F) Injection of morphine and atropine for severe pain.

G) Peritoneal or Haemodialysis if needed.

5) Post -Mortem Appearances -

A) Signs of acute gastro-enteritis are present.

B) Stomach: Mucous membrane may be thickened and softened with eroded patches and covered with a greyish white deposits.

C) Duodenum : Same appearances are observed in duodenum.

II) Chronic Lead Poisoning (plumbism) -

Chronic lead poisoning is most common than the acute poisoning. The chronic poisoning is common among the following causes and categories of workers.

1) Causes -

A) Inhalation of lead dust and fumes by makers of white lead, type setters, compositors, gas fitters, lead paint manufacturers, type founders.

B) Continuous absorption of minute amounts from drinking water in lead cisterns and pipes.

C) Absorption through raw or intact skin, vermilion applied to the scalp.

D) The practice of storage of Ghee in brass or copper vessels lined inside with tin. The ghee becomes impregnated with lead derived from the tin and thereby results in chronic lead poisoning.

2) Features -

A) A - anaemia, arthralgia, anorexia, etc.

B) B - Basophilia(punctate), blue line gums.

C) C - Colic and constipation.

D) D - Drowsiness, wrist drop, foot drop.

E) E - Encephalopathy, emaciation, exhaustion.

F) F - Foul smell in breath.

G) G - Gout, general weakness.

H) H - Headache, optic atropy.

I) I - Impotency.

3) Diagnosis -

A) History.

B) Clinical features.

C) Aminolaevuinic acid in urine (ALAU) more than 5 mg indicates poisoning.

D) X-ray evidence of increased radio opaque bands of lines at the metaphysis of long bones is seen in children.

4) Treatment -

A) The patient is removed from contact of lead.

B) Sodium or potassium is given in the dose of 1-2 gm. three times a day. It helps to eliminate lead through the kidneys.

C) Calcium in the form of gluconate is given by i.v route. This is particularly helpful in cases where colicky pains in the abdomen is a prominent feature.

D) Chelating agents such as EDTA or BAL should be used.

E) Symptomatic treatment.

5) Prophylactic Measures -

A) Adequate exhaust ventilation should be provided in lead manufactories.

B) Scrupulous personal cleanliness should be advised.

C) Periodic medical examination should be advised.

D) A diet rich in calcium together with lot of milk should be taken daily.

E) Water containing minute doses of sulphuric acid should be taken.

F) Weekly saline purgatives.

6) Post-Mortem appearances -

A) A blue line is seen on the gums.

B) Paralysed muscles show fatty degeneration.

C) The stomach and intestines may show ulcerative or haemorrhagic changes and are contracted and thickened.

D) The liver, kidney are contracted.

E) The brain is very pale and greatly swollen.

III) Medico- Legal Importance -

1) Acute lead poisoning is rare. Chronic lead poisoning is more common among workers exposed to lead salts in various industries. Therefore it has been regarded as an industrial occupation disease. Accidental acute poisoning by lead acetate is known.

2) Chronic lead poisoning is usually accidental. Homicidal and suicidal poisoning is a very rare occurrence.

3) Lead has been used as an abortifacient because of its action on the uterus.

COPPER POISONING

Copper itself is non poisonous. But the salts of copper are poisonous. The common poisonous salts used are :

1) Copper sulphate.

2) Copper carbonate.

The therapeutic uses of copper sulphate as an astringent and emetic.

I) Acute Copper Poisoning -

1) Features -

A) Symptoms starts to appear in 15 to 30 minutes.

B) There is a metallic taste, increased salivation, burning pain in the stomach with colicky abdominal pain.

C) Thirst, nausea, eructions.

D) Repeated vomitings, the vomitted matter is blue or green. It becomes bile stained after some time.

E) Diarrhoea, oliguria.

F) Severe muscle spasm, convulsions.

G) Difficulty of breathing, severe headache.

H) In some cases paralysis of limbs is followed by drowsiness, insensibility, coma and death.

2) Fatal Dose - 30 gms.

3) Fatal Period - 1 - 3 days.

4) Treatment -

A) Stomach wash with 10% solution of potassium ferrocyanide which acts as an antidote by forming insoluble cupric ferrocyanide.

B) Demulcent are given, e.g., egg with milk, barley water or olive oil. They form a coating on the stomach wall and prevent action of copper sulphate on the stomach wall.

C) EDTA in usual doses should be administrated.

D) B.A.L in usual doses.

E) Nor adrenaline or mephentine is given in drip to raise blood pressure.

F) Bowel wash is to be given in cases of constipation.

F) Symptomatic treatment.

5) Post-Mortem Appearance -

A) The skin may be yellow.

B) Greenish - blue may be present at mouth and nostrils.

C) The gastric mucosa and stomach contents are greenish or blue.

D) Inflammatory changes in the kidneys.

II) Chronic Copper Poisoning -

It may occur in workers with the metal due to inhalation of dust or from food being contaminated with verdigris.

1) Features -

1) Constant copper taste. A green line on gums.

B) Feverishness and constant headache.

C) Recurrent colicky pain in epigastrium.

D) Laryngitis, bronchitis and anuria may develop.

E) Peripheral neuritis and atrophy.

F) Jaundice.

G) Urine is in green colour.

2) Causes of death -

1) Secondary infection due to lowered resistance.

2) Hepatic failure.

3) Treatment -

1) Avoid further exposure of patient to poison.

2) Use of masks for person working in copper industry. This helps in avoiding inhalation of copper fumes.

3) Regular medical check up of workers.

4) Drugs which helps in excretion of copper, e.g., BAL.

4) Post-Mortem Appearance -

1) Liver- Necrosis and cirrhosis of liver.

2) Kidney- There is degeneration of epithelial cells in addition to the enlargement of the kidney.

III) Medico- Legal Importance -

As a suicidal poison, it is very common because of its easy availability. Accidental poisoning may occur in children. As a homicidal poison is very rare because of its deep blue colour and disagreeable.

ZINC POISONING

Zinc is a bluish white lustrous metal. It is extensively used for the coating of iron utensils. The toxic effects of zinc are confined mainly to the use of three salts of the metal, namely, the sulphate, the action of which is irritant ; the chloride, which is corrosive ; and the phosphide which is used as a rodenticide.

I) Features -

The symptoms of zinc sulphate are mainly :

Gastro-intestinal irritation and consists of metallic taste in the mouth, pain in throat, stomach and abdomen, vomiting and diarrhoea. Collapse ensues when considerable quantity has been swallowed. The chloride has a stronger corrosive action, destroying the mucous membrane of the mouth, throat, and stomach. Vomiting is severe, there is purging with tenesmus and blood, and symptoms of shock. There may be remission of symptoms followed by recurrences.

The symptoms and signs of chronic poisoning are closely allied to those of lead and copper.

II) Fatal Dose -

Zinc sulphate -15 gms.

Zinc chloride - 400 mg having proved fatal.

III) Fatal Period -

Zinc sulphate - death is rare. Though death occurs after 2 hrs after consuming 90 gms of poison and on the fifth day after taking 15 gms.

Zinc chloride - death occurs within a few hours from shock or the patient may recover and die after several weeks from its side effects.

IV) Treatment -

Emetics should not be given as zinc sulphate induces vomiting. This should be washed out unless marked vomiting has removed the poison. There is no specific antidote. Sodium bicarbonate in tepid water should be administered freely. Demulecents should also be given and the cases treated on general lines.

INORGANIC ACIDS
(Mineral Acids)

Acids are hydrogen containing substances which on dissociation in water produce hydronium ions. They are powerful desiccants and produce coagulation, necrosis and eschar formation on dermal or mucosal coat.

SULPHURIC ACID
(Oil of Vitriol)

Physical appearance : Heavy, oily, odourless, colourless, non-fuming liquid. Has great affinity for water and evolves tremendous heat when mixed with it.

I. Uses :

1. Storage batteries
2. Pipe and drain cleaners
3. Laboratory
4. Industry

II. Signs and Symptoms

1. Dehydration and carbonisation of skin and tissues (brown eschars on lips and mouth)
2. Severe burning pain in the mouth and throat with strenuous retching.
3. Dysphagia (and sometimes dysphonia).
4. Retrosternal and epigastric pain (may involve the entire abdominal area).
5. Teeth (and sometimes the tongue) may become chalky white.
6. Vomiting (of brown or black material) and diarrhoea. Sometimes there is constipation.
7. Acidaemia, followed by generalised shock.
8. Rarely there are respiratory manifestations : dysp-

noea, cough and glottic edema.

9. Complications :

A. Perforation of GIT

B. Stricture formation (especially of oesophagus).

C. Secondary infections.

D. Renal failure

III. Fatal dose :

10 to 15 ml

IV. Treatment :

1. No stomach wash or induction of emesis.

2. Neutralise with milk of magnesia or lime water (i.e., calcium hydroxide with water) or soap suds. This part of treatment is however not advocated by some clinicians.

3. Demulcents

A. Milk (especially canned condensed milk)

B. Milk of magnesia

C. Aluminium hydroxide gel

D. Vegetable oils

E. Egg white (beaten)

F. Starch solution

4. Crushed ice to relieve thirst

5. Morphine, or other powerful analgesics to relieve severe pain that is commonly present.

6. Antibiotics for prophylaxis (ampicillin or other pencillin derivatives).

7. Corticosteriods can minimise stricture formation. But there is controversy as to their efficacy.

8. IV fluids and electrolytes. Give nothing by mouth until swallowing can be performed with ease.

9. Maintenance of airway.

10. Skin lesions must be washed with soap and water, followed by application of a paste of sodium bicarbonate.

11. Eye involvement necessitates copious irrigation with water or normal saline, keeping the eyes open. A buffer solution can preferably be used, instead of plain water or saline. Referral to an ophthalmologist is advisable.

12. Take chest abdominal X-rays to rule out aspiration and visceral perforation.

13. Oesophagoscopy (with a flexible, fibre-optic tube) can be done in 12 to 24 hours, to assess the extent and severity of burns.

V. Postmortem Appearances

1. Corroded areas of skin and mucous membranes appear brownish or blackish. Stomach mucosa shows the consistency of wet blotting paper.

2. Inflammation, necrosis and perforation of GIT.

VI. Medicolegal Importance

1. Accidental poisoning : Mainly due to confusing sulphuric acid with glycerine or castor oil.

2. Suicidal : Sulphuric acid (or for that matter any acid) is a rare choice.

3. Homicidal : Extremely rare.

4. Vitriolage (vitriol throwing) : Throwing of sulphuric acid on another individual is known as vitriolage. Jelous or disgruntled persons may throw a corrosive to disfigure and harm their enemies. Blindness may occur if the eyes are involved. Death may result from shock or toxaemia, if excessive area is involved. The burns are painless. They are penetrating and the acid devitalises the tissues and predispose to infection.

5. Disposal of a dead body : Sometimes sulphuric or other acids may be used with an attempt to dissolve a dead victim of murder.

NITRIC ACID
(Aqua fortis)

Physical Appearance : Colourless or yellow fuming liquid with an acrid odour. It is a powerful oxidising agent and reacts with organic matter (protein) to produce pioric acid, there by staining the tissues yellow (xanthoproteic action).

I) Uses

1. Munitions
2. Laboratory
3. Industry

II) Signs and Symptoms

Same as sulphuric acid with the following differences.

1. Yellow stains on clothing and tissues (including crowns of teeth).
2. More severe eructation and abdominal distention due to gas formation
3. Perforation of GIT is less common.
4. Inhalation of fumes can produce lacrimation, coughing and difficulty in breathing.

III) Fatal dose

10 to 15 ml

IV) Treatment

Same as sulphuric acid

V) Postmortem Appearances

1. Corroded areas of skin and mucous membranes appear yellowish.
2. Gastro-intestinal perforation is less common.

VI) Medicolegal importance

Same as for sulphuric acid. Mistaking it for glycerine or castor oil however is rare because it is a fuming liquid.

HYDROCHLORIC ACID
(Muriatic Acid)

Physical appearance : Colourless, fuming liquid. It is less corrosive than sulphuric and nitric acids.

I) Uses

1. Metal cleaner
2. Toilet cleaner
3. Flux for soldering
4. Laboratory
5. Industry

II) Signs and Symptoms

Same as for sulphuric acid, but less intense. Corroded areas may be greyish or brownish. Respiratory symptoms are usually more pronounced.

III) Fatal dose

15 to 20 ml

IV) Treatment

Same as sulphuric acid.

V) Postmortem appearances

Same as for sulphuric acid. Corroded areas are more likely to be greyish. Pulmonary edema is more common.

VI) Medicolegal importance

Same as for nitric acid.

ORGANIC ACIDS

Organic acids differ from inorganic acids in two major respects.

1. They are weaker in action.
2. They are usually absorbed into circulation and so have both local and remote action.

CARBOLIC ACID
(Phenol)

Physical appearance : Colourless, needle like crystals which turn pink and liquefy when exposed to air. Commercial phenol is a brownish liquid with several impurities. It has a characteristic odour.

I) Uses

1. Disinfectant
2. Preservative (for vaccines and sera)
3. Medicinal : Antipruritic
4. Industry.

Derivatives : Important derivatives of phenol include cresol, creosote (coal tar), thymol, menthol and tannic acid (a component of the once popular, and now obsolete "universal antidote").

II) Signs and Symptoms

Phenol is rapidly absorbed from skin and mucous membranes. Locally it acts like a corrosive, but since it damages nerve endings, there is very little pain. It precipitates protein and coagulates cell contents. There may be necrosis of tissue with sloughing of whitish eschars.

1. Headache, vertigo and tinnitus.
2. Vomiting and diarrhoea may occur.
3. Abdominal pain.
4. Muscular spasms and sometimes convulsions.
5. Thready pulse, profuse sweating and hypothermia (producing cold, calmy skin). Sometimes there is hyperthermia.
6. Hypotention.
7. Respiratory alkalosis and metabolic acidosis.
8. Hepatic damage with abnormal liver function tests.

9. Carboluria - Renal damage with oliguria and excretion of scanty, dark coloured urine, which on standing turns smoky green. It contains phenolic metaboljtes like pyrocatechol and hydroquinone.

Death may result from respiratory or circulatory failure. Methemoglobinemia is a characteristic feature in severe cases.

III) Fatal dose

10 to 15 ml

IV) Treatment

1. Stomach wash : Carbolic acid is one of the few corrosive where one can perform stomach wash, because though it corrodes the gastric wall and also hardens it (in contrast to the softening produced by the other corrosives). Gastric lavage must preferably be carried out with vegetable oil, e.g., castor oil in water 1:2 olive oil etc.
2. Activated charcoal in the usual dose.
3. Demulcents.
4. Sodium bicarbonate IV
5. Methlene blue IV, if there is severe methemoglobinemia.
6. Haemodialysis, if there is renal failure.
7. Skin lesions : wash copiously with saline or water.
8. Supportive measures.

V) Postmortem Appearances

1. Corroded areas of skin and mucous membranes appear brownish.
2. Characteristic odour around mouth and nostrils, and in the gastric contents.
3. Stomach mucosa may appear pale and hardened ("scaled mucosa"). Perforation is uncommon.

4. Cerebral or pulmonary edema.
5. Congestion of viscera.

VI) Medicolegal importance

1. Accidental incidence of accidental poisoning with phenol has come down drastically in recent years, since it has largely been replaced in hospitals by safer alternatives. Today many of the accidental poisoning results from therapeutic misuse by quacks.

2. Suicidal deaths once common with phenol, have also become rare today.

3. Homicide Extremely rare. The distinctive odour and disagreeable taste make it difficult to administer without arousing the victim's suspicion.

Poisoning with phenoic derivatives causes similar but less serious manifestations and must be treated on the same lines. Dettol is sometimes consumed chronically by alcoholic addicts deprived of liquor, since it contains 13% alcohol. A case has been reported of a woman who consumed Dettol in moderate quantities daily for many years to "purify" herself, since she believes she had syphilis. She developed anorexia, ascities, pedal edema and pneumonic signs, but recovered after treatment.

OXALIC ACID
(Acid of Sugar)

Colourless, prismatic crystals similar to magnesium and zinc sulphate. The taste is bitter.

I) Uses

1. Ink remover
2. Rust remover
3. Bleaching agent
4. Industry

II) Signs and Symptoms

Locally it behaves like a corrosive. After absorption from the gut it combines with serum calcium and produces features of tetany (tingling and numbness of extremities, corpopedal spasm, tonic spasms of the limbs, etc.).

1. Burning pain
2. Dysphagia
3. Vomiting and diarrhoea. Vomitus has the appearance of "coffee grounds".
4. Features of hypocalcemia-tetany and convulsions.
5. Bradycardia
6. "Oxaluria" - Oliguria, haematuria, excretion of casts and calcium oxalates crystals in the urine.
7. Corrosion of skin is usually not marked.

III) Fatal dose and Fatal period

15 to 20 gms,

Death usually occurs within an hour.

IV) Treatment

1. Stomach wash can be done with caution using lime water (calcium hydroxide in water) or a suspension of chalk (calcium carbonate in water) or solution of calcium gluconate.
2. Calcium gluconate IV (10 ml of a 105 solution) repeated as required.
3. Demulecents.
4. Supportive measures.

V) Postmortem Appearances

1. Corrosion of skin is not pronounced.
2. Corroded mucosa appears whitish.
3. Congestion of brain, liver and kidneys.
4. Microscopy of the kidney may reveal cloudy swelling,

necrosis and hyaline degeneration of tubules.

VI) Medicolegal Importance

1. Fatal accidental poisoning may results from therapeutic errors (e.g., substituting oxalic acid for epsom salt, i.e., magnesium sulphate which is a cathartic). Milder forms of poisoning may rise out of eating vegetables rich in oxalates like rhubarb, cabbage, etc.

2. Suicidal poisoning is uncommon.

3. Homicide with oxalic acid is extremely rare owing to its bitter taste which is difficult to mask.

●

CHAPTER-9

IMPOVERISHED OR WEAK POISONS

(दूषीविष)

I) Introduction-

In the Āyuvēdic context the poison is been divided into three subtypes i.e. Sthāvara, Jaṅgamma and Garaviṣa. There is no separate classification of the Dūṣīviṣa but Āyurvēda has defined it as that either Sthāvara, Jaṅgamaviṣa or Kṛtrimaviṣa after its treatment, when it becomes less potent and when its effects are not nullified radically because of which it resides in the body, that particular less potent part of the above said poisons is called Dūṣīviṣa.

II) Derivation (निर्वचनम्)-

The word Dūṣī (दूषी) is derived from the root word 'Dūṣa' (दूष) and with a suffix 'Nic' (णिच्) and 'In' (इन्). The word Dūṣī means impure or possessing the property to vitiate.

III) Definition of Dūṣīviṣa (निरूक्ति)-

दूषितं देशकालान्नदिवास्वप्नैरभीक्ष्णशः ।
यस्माद् दूषयते धातून् तस्माद् दूषीविषं स्मृतम् ॥
(सु.क.२/३३)

A constant exposure to particular time (i.e. time-is meant a cloudy and windy day, as well as rainy season), place (i.e.

place-is meant a anūpadēśa, extensive windy cold rainy place) and diet (i.e. diet-is meant wine, sesamum, kulutha, pulse) as well as constant and regular **day-sleep** tends to vitiate the **dhātus** (fundamental root-principles) of the body and this poison is consequently known as the Dūṣīviṣa.

It can be concluded that along with the Sthāvara, Jaṅgamaviṣa and Garaviṣa depending on the stages these could become the Dūṣīviṣa. Though the Garavlṣa is slow acting in nature can effect like Dūṣīviṣa. But the severity of the Garaviṣa will vary depending on the potency of the combinations of the poisonous drugs. But Dūṣīviṣa will be always of slow acting nature, as it is entangled by the kapha, causing the discomfort to the body by residing in the body years together.

IV) Etiology (निदान) -

A poison either sthāvara, jaṅgama or kṛtrima, when ever not fully eliminated from the body and attenuated by anti-poisonous remedies or gets dried up by dāvāgni, vāta, tāpa (the fire, the wind and the sun) or when the foresaid natural ten qualities of poison becomes less potent is called as Dūṣīviṣa. Because of its mild potency does not prove fatal for an individual and as it get enveloped by the kapha it resides in the body for many years.[1].

V) Aggravating Time (प्रकोपकाल) -

कोपं च शीतानिलदुर्दिनेषु यात्याशु, पूर्व श्रृणु तत्र रूपम ।।

(सु.क. २/२९)

It gets aggravated on the body on a cloudy day and by exposure to cold and wind.

१. यत् स्थावरं जंगमकृत्रिमं वा देहादशेषं यदनिर्गतं तद् । जीर्णं विषघ्नौषधिभिर्हतं वा दावाग्निवातातपशोषितं वा ।। स्वभावतो वा गुणविप्रहीनं विषं हि दूषीविषतामुपैति। वीर्याल्पभावान्न निपातयेत्तत् कफावृतं वर्षगणानुबन्धि ।। (सु.क. २/२४-२६)

VI) Prodormal Features (पूर्वरूप) -

निद्रा गुरूत्वं च विजृम्भणं च विश्लेषहर्षावथव अंगमर्दः ।।

(सु.क. २/२९)

Sleepiness, heaviness, yawning, a sense of looseness (in the joints), horripilation and aching of the limbs.

VII Features (दूषीविष लक्षण) -

तेनार्दितो भिन्नपुरीषवर्णो विगन्धवैरस्यमुखः पिपासी ।
मूर्च्छन् वमन् गद्गदवाग्विषणो भवेच्च दूष्योदरलिंगजुष्टः।।

(सु.क. २/२७)

The person troubled by this will develop diarrhoea, discolouration of the skin, becomes a patient of vitiated blood, suffers from thirst, anorexia, fainting, vomiting, stammering speech, delusion and accompanied with symptoms of dūṣyōdara.

VIII) Features According to Site (स्थानुसार दूषीविषलक्षण) -

When it is localised in the āmāśaya, the patient suffers with diseases of kaphavāta, when it is localised in the pittāśaya suffers with diseases of vātapitta accompanied with loss of hair, loss of strength, appearing like a bird which has lost its wings, when it is localised in the rasa and other dhatus it gives rise to different kinds of peculiar symptoms (dhātujavikārās)[1].

IX) Impact of Dūṣīviṣa on The Body -

By the aggravated Dūṣīviṣā impact on the body is as follows, sense of intoxication after meals, indigestion, anorexia, eruptions of circular patches (Mandala) on the skin,

१. आमाशयस्थे कफवातरोगी पक्वाशयस्थे अनिलपित्तरागी । भवेन्नरो ध्वस्ताशिरोह अंगो विलूनपक्षः स यथा विहंगः ।। स्थितं रसादिष्वथवा विचित्रान् करोति धातुप्रभवान्विकारान् ।। (सु.क. २/२८-२९)

urticaria (Kotha), mental confusion, alleviation of dhātūs(dhātukṣaya), oedema in the face and extremities, ascites, vomiting, diarrhoea, discoluration, fainting, intermittent high fever(viṣamajvara) and an unquenchable thirst. Moreover some of these poisons produce insanity, other produces anāha (characterised by an obstinate constipation of the bowels), others diminishes semen, others produce muffled voice, while other causes kuṣṭha and respective disorders of various type[1].

X) Prognosis (साध्यता-असाध्यता) -

A case of Dūṣīviṣa poisoning in a prudent and judicious person, and of recent growth is easily cured, while palliation is the only relief that can be offered in a case of more than a year standing. In an enfeebled and intemperate patient, it should be considered as incurable[2].

XI) Treatment (चिकित्सा) -

1) Śōdhana

A patient afflicted with the effects of Dūṣīviṣa inherent in the system should be first fomented and cleansed by both emetics and purgatives. The following anti-poisonous Agada should be taken daily.

2) Agadapāna

The agada is prepared as follows; pippali, dhyāmaka, māṃsī, śāvara, paripēlavama, suvarcikā, sasūkṣmailā, tōya, kanakagairikam should be prepared with honey. It destroys the Dūṣīviṣa. It is called the viṣahariagada and its efficacy extends also to cases of other kinds of poisoning[1].

१. ततः करोत्यन्नमदाविपाक वरोचकं मण्डलकोठमोहान् ।। धातुक्षयं पादकशास्यशोफ दकोदरं छर्दिमथातिसारम् । वैवर्ण्यमूर्च्छाविषमज्वरान् वा कुर्यात् प्रपृष्ठा प्रबलां तृषां वा ।। उन्मादमन्यज्जयेत्तथ अन्य दानाहमन्यत् क्षपयेंच शुक्रम् । गात्रद-मन्यज्जनयेच्च कुष्ठं तांस्तान् विकाराश्च बहुप्रकारान् ।। (सु.क. २/३०-३२)

२. साध्यमात्मवतः सद्यो याप्यं संवत्सरोत्थितम् । दूषीविषमसाध्यं तु क्षीणस्याहितसेविनः।। (सु.क. २/५५)

XII) Treatment To The Complications (उपद्रवों की चिकित्सा) -

In cases of fever, burning sensation in the body, hiccough, constipation of the bowels, loss of semen, swelling, diarrhoea, epileptic fits, heart-disease, ascites, insanity, shivering, and such other supervening symptoms on the effect of a Dūṣīviṣa, should be treated with remedies laid down under the respective heads of the aforesaid diseases is accompanied).

१. दूषीविषार्त सुस्विन्नमूर्ध्व चाधश्च शोधितम् । पाययेतागदं नित्यमिमं दूषीविषापहम्।। पिप्पल्यो ध्यामकं मांसी शावरः परिपेलवम् । सुवर्चिका ससूक्ष्मैला तोयं कनकगैरिकम्।। क्षौद्रयुक्तो अगदो ह्येष दूषीविषमपोहति । नाम्ना दूषीविषारिस्तु न चान्यत्रापि वार्यते।। (सु.क. २/५०-५२)

२. ज्वरे दाहे च हिक्कायामानाहे शुक्रसङ्क्ष्ये । शोफे अतिसारे मूर्च्छायां हृद्रोगे जठरे अपि च ।। उन्मादे येपथौ चैव ये चान्ये स्युरूपद्रवाः । यथास्वं तेषु कुर्वीत विषघ्नैरौषैः क्रियाम् ।। (सु.क. २/५३-५४)

CHAPTER -10
ARTIFICIAL POISON
(गरविष)

I) DERIVATION
II) DEFINITION
III) METHOD OF POISONING
IV) FEATURES
V) PROGNOSIS
VI) TREATMENT

I) Derivation (निरुक्ति)-

The 'Gara' word is derived from the root word gṛ (गृ) with the suffix ac (अच्) which means to diglute or could be digluted which generally indicates the liquid forms. From one aspect this word (Gara) meaning also comes as a poison. In Āyurvēda the Garaviṣa is considered as one of the forms of kṛtrimaviṣa which gets formed by the combination of two or more than two poisonous or non-poisonous drugs and ultimately affects the whole body by vitiating all the dhātus in the body. It can go to such extent that it alleviates the dhātus drastically which in turn could prove to be fatal.

II) Definition (निर्वचनम्) =

नानाप्राण्यंगशमलविरूध्दौषधिभस्मनाम् ।।
विषाणां चाल्पवीर्याणां योगो गर इति स्मृतः ।
(अ.हृ.उ. ३५/४९-५०)

Combination of parts of the body and excreta of different animals, incompatable drugs, ashes and poisonous substances of mild potencey is known as Garaviṣa.

गरसंयोगजं चान्यद् गरसंज्ञं गदप्रदम् ।
कालान्तरविपाकित्वात्न तदाशु हरत्यसून् ।।
(च.चि. २३/१४)

'Gara' is a toxic combination of substances, non-poisonous or, which exerts toxic effect after interval of some time and as such does not kill the patient instantly.

III) Method of Poisoning (गरविष प्रयोग)-

सौभाग्यार्थं स्त्रियः स्वेदरजोनाना अंगजान् मलान् ।
शत्रुप्रयूक्तांश्च गरान् प्रयच्छन्त्यन्नमिश्रितान् ।।
(च.चि. २३/२३३)

This was described by the Carakācārya, that women serve food mixed with their sweat, menstrual blood or different types excreta of their body to gain favour from their husbend or under the influence of enemies they may administer garaviṣa along with food.

IV) Features of Garaviṣa (गरविष लक्षण)-

By this poison, the person becomes pale, emaciated and with poor digestion and suffers from palpitation of heart, flatulence, oedema in hands and feet, udararoga, grahani disorder, kṣya (tuberculosis), gulma, wasting, fever and signs and symptoms of such other disorders. In dreams, he mostly sees cats, jackals, fierce animals, mongoose, monkey, dried rivers and trees. In dream, having lost his sense organs, he sees himself as fair complexioned though actually being dark-complexioned or devoid of ears and nose[1].

Yōgaratnākara explained that the garaviṣa consumption shows its impact on the body after fifteen days or one month of the duration leading to the manifestation of the symptoms like lazyness, heaviness, cough, dyspnoea, loss of strength, heamorrhage, oedema and yellow discolouration of the eyes[2].

१. तैः स्यात् पाण्डुः कृशो अल्पाग्निगरश्चास्योपजायते । मर्मप्रघमनाघ्मानं श्वयथुं हस्तपादयोः ।। जठरं ग्रहणीदोषो यक्ष्मा गुल्मः क्ष्यो ज्वरः । एवंकवघस्य चान्यस्य व्याधोर्लिगानि दर्शयेत् ।।स्वप्नें मार्जारगोमायुव्यालान् सनकुलान् कपीन् ।। प्रायः पश्यति नद्यादीं छुष्कांश्च सवनस्पतीन् ।। कालश्च गौरमात्मानं स्वप्नं गौरश्च कालकम् । विकर्णनासिकं वा अपि प्रपश्येद् विहतेन्दियः ।।
(च.चि. २३/२३४-२३७)

२. कृत्रिमंतु विषं - - - - । (योगरत्नाकर विषचिकित्स अध्याय)

V) Prognosis

Vāgbhaṭa has described further that suffering from these and many other difficult and dreadful secondary affections; the patient of artificial poisoning dies, very soon who does not get immediate treatment[1].

VI) Treatment of Garaviṣa (गरविष चिकित्सा) -

1) Assessing the Patient-

Before starting the treatment, the physician should examine and should ask as to what, when and with whom he has eaten. After obtaining the information he should start the treatment[2].

2) Treatment -

A) Śōdhana

i) After ascertaining the above facts, the patient should instantaneously be given emetic therapy by the physician.

ii) Should be administer fine powder of copper along with honey for cleansing the heart (हृद्विशोधन).

B) Hēmaprāśana

When the heart is cleansed, the patient should be given one śāṇa of the powder of hēma (gold). Hēma controls all poisons and poisonous combinations. Poison does not adhere in the body on taking hēma like water on lotus leaf[3].

---

१. एतैरन्यैश्च बहुभिः क्लिष्टो घोरैरूपद्रवैः । गरार्तो नाशमाप्नोति कश्चित्सद्यो अचिकित्सितः ।। (अ.उ. ३५/५४)

२. तमवेक्ष्य भिषक् प्राज्ञः किं कैः कदा सह । जग्धमित्यवगम्याशु प्रदद्याद् वमनं भिषक् ।। (च.चि. २३/२३८)

३. सूक्ष्मं ताम्ररजस्तस्मै सक्षौद्रं हृद् विशोधनम् । शुध्दे हृदि ततः शाणं हेमघूर्णस्य दापयेत् ।। हेम सर्वविषाण्याशु गरांश्च विनियच्छति ।। न सज्जते हेमपात्रे विषं पद्मदले अंबुवत् ।। (च.चि. २३/२३९-२४०)

C) Agadapāna

Buffalo-ghee cooked with nāga-dantī, trivṛt, dantī, dravantī, milky latex of snuhī and madana-phala, along with one āḍaka of cow's urine is useful in curing patients suffering from the poisons of snakes, insects and from gara[1].

3) Treatment to Complications -

पारावतामिषशठीपुष्कराह्व्यश्रृतं हिमम् ।
गरतृष्णारुजाकासश्वावसहिध्माज्वरापहम् ।।
(अ.हृ.उ. ३५/५९)

Decoction prepared from the meat of the piegon, śaṭhī and puṣkarāhva cooled and consumed cures artificial poisoning, thirst, pain, cough, dyspnoea, hiccup and fever.

4) Treatment to Mandāgni [2]-

The powders of mūrvā, amṛtā, nata, kaṇa, paṭōla, cavya, citrakān, vacā, musta, viḍaṅga, mixed either buttermilk, warm water, water of curds, meat soup or sour liquid should be consumed by the person having digestive fire destroyed by artificial poison.

---

१. नागदन्तीत्रिवृत् ----- गरार्तानां च शान्तये ।
(च.चि. २३/२४१-२४२)

२. मूर्वामृतानतकणापटोलीचव्यचित्रकान् ।। वचामुस्तविडंगानि तक्रकोष्णाम्बुमस्तुभिः । पिबेद्रसेन वा अम्लेन गरोपहतपावकः ।। ----- (अ.हृ.उ. ३५/५७-५८)

CHAPTER - 11
ALCOHOL POISONING
(मद्यज विषाक्तता)

I) DERIVATION
II) DEFINITION
III) PROPERTIES OF ALCOHOL
IV) MERITS AND DEMERITS OF ALCOHOL
V) EFFECT OF THE ALCOHOL ON THE BODY
VI) STAGES OF MADA
VII) MADYAPĀNA VIKĀRĀS
VIII) TREATMENT
IX) POSTMORTEM APPEARANCE
X) MEDICO-LEGAL IMPORTANCE

Nowadays the alcohol consumption has become passion for the people and without knowing its proper utilisation and its effects, persons are getting addicted for the alcohol which in turn obviously may deteriorate the health and life span. But Acharya Caraka has focused importance separately on alcohol (surā) its utilisation and its effects on the body. Actually in the olden days the alcohol was consumed with great respect, i.e. worshipped by the gods led by their king from the early times; offered as oblation in Sautrāmaṇī sacrifice; honoured by priests[1].

I) Derivation (निरुक्ति)-

Mada (मद) generally means addiction, lusty or madness. From medical point of view it means the partial loss of intellect, consciousness and discriminating power. The word Madya is derived from the root word 'mad' (मद्) with suffix 'yat' (यत्), which could be defined as mādhyati janōnēna iti (माध्यति जनोनेन इति), means after consumption which makes the person to loose his sense is called as madya (wine).

II) Definition (निर्वचनम्) -

बुध्दिं लुम्पति यदि द्रव्यं मदकारि तदुच्यते ।।

१. च.चि. २४/३-४.

तमोगुणप्रधानं च तथा मद्यसुरा अधिकम् ।
(श.सं.प्र. ४/२१-२२)

In Śāraṅgadharasaṃhita while defining about the madakāri property the madya is also included in the classified drugs i.e. drugs possessing tamōguṇa predominantly and cause derangement of the mind are called as Madakāri (intoxicants) for example surā and the madya.

III) Properties of Alcohol (मद्य की गुण)-

लघूष्णतीक्ष्णसूक्ष्माम्लव्यवाय्याशुगमेव च ।
रूक्षं विकासि विशदं मद्यं दशगुणं स्मृतम् ।।
(च.चि. २४/३०)

The wine possessing the ten properties such as light (लघु), hot (उष्ण), sharp (तीक्ष्ण), finely entering (सूक्ष्म), sour (अम्ल), quickly absorbed (व्यवायी), quick acting (आशु), rough (रूक्ष), depressant (विकासि), and non-slimy (विशद). This wine is having the opposite to the ten qualities of the Ojus, so if it is taken in an improper manner it will act like a poison.

From the modern aspect the poisonous effects caused by the alcohol is called as Alcohol poisoning or Alcoholism. The alcohol is two types :

1) Ethyl alcohol (C_2H_5OH)
2) Methyl alcohol (CH_3OH)

Generally the term alcohol is applied to the ethyl alcohol. Alcohol is a cerebral poison - Inebrient or intoxicant. Pure alcohol is transparent, volatile liquid and has a characteristic odour.

Its presence in various beverages is :

1. Absolute alcohol	:	99.9%.
2. Rectified spirit	:	90%.
3. Methylated spirit	:	95%.
4. Rum and liquors	:	50-60%.

5. Whisky, Gin and Brandy : 40-45%.
6. Port, Sherry : 20%.
7. Wines : 10-15%.
8. Beers : 4-8%.
9. Indigenous country liquor : 5-10%.

IV) Merits And Demerits of Alcohol -

बहुद्रव्यं बहुगुणं बहुकर्म मदात्मकम् ।
गुणैर्दोषैश्च तन्मद्यमुभयु चोपलक्ष्यते ।।
(च.चि. २४/२६)

The wine is made of multiple ingredients possessed of many properties and actions, and they are intoxicating in nature, due to this it is characterised by both merits and demerits. It is like the nectar if consumed according to prescribed method, in proper quantity, in proper time, with wholesome food, in accordance with one's own strength and cheerful mind, alcohol works like ambrosia.

On the contrary it acts like poison for those who indulge in the consumption of wine in unwholesome manner, irrespective of time of consumption and quantity, whose body constitution is rough (rūkṣa) in nature and who indulges continuously in the physical activites[1].

1) Merits (मद्य लाभ) -

Alcohol taken in appropriate manner produces exhilaration, energy, happiness, nourishment, good health, excellent virility and pleasant intoxication instantaneously[2]. Wine improves appetite, digestion, tones up the heart, promotes voice and complexion. It brings feeling of refreshment, perfectuance,

१. विधिना मात्राया काले हितैरन्नैर्यथाबलम् ---------- रूक्षव्यायामनित्येन विषवद्याति तस्य तत् ।। (च.चि.२४/२७-२८)
२. हर्षमूर्जं मुदं पुष्टिमारोग्यं पौरूषं परम् । युक्त्या पीतं करोत्याशु मद्यं सुखमदप्रदम्।। (च.चि. २४/६१)

strength and removes fear, grief and fatigue. It induces sleep for the insomnia, stimulates speech in timid persons, awakens those who are in oversleep or in sleepy mood, corrects the constipation and gives relief to those who are mentally disturbed. Even the disorders caused by the wine are counteracted by wine itself[1].

2) Demerits (मद्य विष लक्षण) -

The person addicted (to alcoholic drinks) does not differentiate between the right and the wrong, happiness and unhappiness, good and bad, suitable and unsuitable, he does not even know how to behave and take the wine[2].

Wine creates great agitation of mind as a terrific storm does to the tree on river bank. The fools overcome by rajas and tamas become addicted to wine and feels it as the solution for their unhappiness[3].

The wine addiction produces confusion, fear, grief, anger, death and diseases like insanity, intoxication, narcosis, epilepsy and convulsions. The wine which is responsible for the derangement of memory, though composed of other good qualities is totally contraindicated for the consumption. So the physician who is well aware of such demerits of the wine always makes the effort to contradict for its consumption[4].

१. रोचनं दीपनं हृद्यं स्त्रवर्णप्रसादनम् । ---------- मद्योत्थानां च रोगाणां मद्यमेव प्रबाधकम् ।। (च.चि. २३/६२-६४)
२. धर्माधर्मं सुखं दुःखमर्थानर्थं हितातिम् । यदासक्तो न जानाति कथं तच्छीलयेदबुधः।। (अ.सं. नि. ६/९)
३. प्रेत्य चेह च यच्छेयः श्रेयो मोक्षे च परम् । मनः समाधौ तत् सर्वमायत्तं सर्वदेहिनाम्।। मद्येन मनसश्चास्य संक्षोभः क्रियते महान् । महामारुतवेगेन तटस्थस्येव शाखिनः।। (च.चि. २४/ ५२, ५३)
४. मद्ये माहो भयं शोकः क्रोधो मृत्युश्च संश्रितः । सोन्मादमदमूर्च्छायाः सापस्मारापतापकः।। यत्रैकः स्मृतिविभ्रंशस्तत्र सर्वमसाधुवत् । इत्येवं मद्यदोषज्ञा मद्यं गर्हन्ति यत्नतः।। (च.चि. २४/ ५६, ५७)

V) Effect of the Alcohol on the Body (मद्य प्रभावम्).

I) Effect on the Ojas -

Madya (wine) after intake enters into the heart counteracts the ten properties of Ojas with its corresponding ten properties and give rise to mental distortions. Carakācārya explained the same as follows; 1) heaviness (गुरु) by lightness (लघु), 2) coldness (शीत) by hotness (उष्ण), 3) sweetness (मधुर) by sourness (अम्ल), 4) softness (मृदु) by sharpness (तीक्ष्ण), 5) clarity (प्रसाद) by quick action (अशु), 6) unctuousness (स्नेह/स्निग्ध) by roughness (रूक्ष), 7) stability (स्थिर) by quick absorption (व्यवायी), 8) smoothness (श्लक्ष्ण) by depressant action (विकासि), 9) sliminess (पिच्छिल) by non-sliminess (विशद) and 10) viscosity (सान्द्र) by subtleness (सूक्ष्म). Thus wine due to its opposite qualities to ojus disturb the mind(satvam) which is the seat of ojas and produces narcosis (मद)[1].

2) Effect on the Heart -

Heart is the seat of the channels of the rasa, vāta, etc., psyche (सत्वम्), intellect (बुध्दी), senses (इन्द्रियों), soul (आत्म) and paraojas. Hence excessive drinking results consequent damage of ojas thereby vitiating the heart which in turn hampers all the factors for which it is the prime seat.[2].

When the heart is afflicted by the excessive intake of wine exerts the features like exhilaration, thirst, enjoyment, happiness and other peculiar rājas and tāmas mental aberra-

१. गुरूत्वं लाघवच्छैत्यमौष्ण्यादम्लस्वभावतः । माधुर्यं मार्दवं तैक्ष्ण्यात्प्रसादं चाशुभावनात्। रौक्ष्यात् स्नेहं व्यवायित्वात् स्थिरत्वं श्लक्ष्णतामपि । विकस्रशिभावत्पौच्छिल्यं वैशद्यात्सान्द्रतां तथा ।। सौक्ष्म्यान्मद्यं निहन्त्येवमोजसः स्वगुर्णगुणान् । सत्वं तदाश्रयं चाशु संक्षोभ्य जनयेन्मदम्।। (च.चि. २४/३२-३४)

२. रसवातादिमार्गाणां सत्वबुध्दीन्द्रियात्मानाम् । प्रधानस्यौलसश्चैव हृदयं स्थानमुच्यते।। आतिपीतेन मद्येन विहतेनौजसा च तत् । हृदयं याति विकृर्ति तत्रस्था ये धातवः ।। (च.चि. २४/३४-३५)

tions arise culminating in unconsciousness . This derangement caused by wine is called as Vibhrama or Mada[1].

From the modern aspect the alcohol is absorbed unaltered from the gastrointestinal tract about 80% from small intestine and 20% from the stomach. It is about 90% of the alcohol absorbed is oxidised in the liver and remaining 10% is excreted chemically unchanged in the urine. Alcohol is excreted mainly by the kidneys, the sweat and the breath.

Alcohol is a CNS depressant (though initially there is suppression of inhibitory neurons causing paradoxical CNS stimulation). Alcohol depresses primarily the reticular activating system. The frontal lobes are sensitive to low concentrations (resulting in mood changes) followed by the occipital lobe (visual disturbances) and cerebellum (loss of coordination).

VI) Stages of Mada (मद की अवस्थायें) -

पीयमानस्य मद्यस्य विज्ञातव्यास्त्रयो मदाः ।
प्रथमो मध्मो अन्त्यश्च्य लक्षणैस्तान् प्रचक्ष्महे ।।
(च.चि. २४/४१)

The wine on drinking produces three stages of intoxication - first (प्रथम), second (मध्म), last (अंतिम). But in the Mādavanidāna four stages are described.

1) First stage (प्रथमावस्थ) -

In the first stage the intoxication starts when the heart is stimulated but the ojas is not affected[2a] and the person would be more inclined towards sexual acts, there will be an increase in the seminal fluid, more pleasure, loud speech[2b].

१. हृदि मद्यगुणाविष्टे हर्षस्तर्षो रति सुखम् । विकाराश्च यथासत्वं चित्रा राजसतामसाः।। जायन्ते मोहनिद्रान्ता मद्यस्यातिनिषेवणात् । स मद्यविभ्रमो नाम्ना मद इत्यभिधीयते।। (च.चि. २४/३९-४०)

२(a). ओजस्यविहते पूर्वो हृदि च प्रतिबोधिते । मध्यमो विहते अल्पे च विहते तूत्तमो मदः।। (च.चि. २४/३७)

२(b). पूर्वेवीर्यति प्रीति हर्षमाष्यादि वर्धनम् । (सु.उ. ४७/११)

In the exerts the features like exhilaration, pleasure, interest in food and drinks, invokes in instrumental and vocal music, humour and stories. It gives sound sleep and fresh awaking, does not affects intellect, memory and perception by senses. Thus it is a stage of inducing pleasure[1c].

2) Second stage (द्वितीय अवस्था) -

In the middle stage the person often recollects and forgets the things, he has indistinct speech and voice, simultaneously speaks sense and nonsense. His movements, posture, drinking, eating and talking all are incoherent and funny[2a].

The person becomes predominant in rajas and tamas crossed the limit of the middle stage not reached the third stage one behaves unwholesomely, no wise person would like to enter into this stage which is with serious complications like insanity with the journey of unhappy destination. Finally becomes himself a victim of this stage[2b].

As per the Ācārya Mādavakāra the second and third stages can be taken into second stage which is described by Ācārya Caraka. According to Mādavakāra in this stage (second & third) the person indulges in irrelevant functions of wisdom (buddhi), memory (smṛti), speech (vāk) as well as other body activities. His appearance and behaviour seems to be like psychic, drowsy and lazy. He loses his self control,

१(c). प्रहर्षण प्रीतिकरः पानात्रगुणदर्शकः । वाद्यगीतप्रहासानां कथान्नं च प्रवर्तकः ।।
न च बुध्दिस्मृतिहरो कवषयेषु न चाक्षमः । सुखनिद्राप्रबोधश्च प्रथम सुखदो मदः ।। (च.चि. २४/४२-४३)

२(a). मुहः स्मृतिर्मूहुर्मोहो अव्यक्ता सज्जति वाङ्मुहुः । युक्तायुक्तप्रलापश्च प्रचलायमेव च ।। स्थानपानात्रसांकथ्ययोजना सविपर्यया । लिंगान्येतानि जानीयादाविष्टे मध्यमे मदे ।। मध्यं मदमुत्क्रम्य मदमप्राप्य चोत्तमम् । किंचित्राशुभं कुर्युर्नरा राजसतामसाः ।।
को मदं तादृशं विव्दानुन्मादमिव दारूणम् । गच्छेदध्वानमस्वन्तं बुहुदोषमिवाध्वगः ।। (च.चि. २४/४४-४७)

२(b). प्रलापो मध्यमे मोहोयुक्तायुक्त क्रिया स्तथा । (सु.सं.उ. ४७/१२)

discrimination power of do's and don'ts. He disregards the elders, eating the non eatables, thus his conscious gets lost and due to the influence of the mada the person expels the secrets of mind[1].

3) Third stage (तृतीय अवस्था) -

In the third stage of intoxication the person becomes motionless like a cut wood, his mind becomes narcosis, confusion and he appears as dead. He neither perceives the pleasurable senses nor he recognise his friends. He does not get enjoyment for which wine is taken. He becomes incapable in recognising good and bad, useful and harmful. So no wise person ever like to place himself in such a stage of intoxication. He is condemned and disliked by all and finally he is proned to miserable diseases as a complication[1a]. These features were described in the fourth stage of mada by Mādavakāra[1b].

VII) Madyapānavikārās (Diseases Due To Improper Use Of Wine) -

The wine produces different types of disorders if used by persons who are in rage, frightened, thirsty, in grief or

१. अव्यक्तबुध्दिस्मृतिवाग्विचेष्टः सोन्मत्तलीलाकृतिरप्रशान्तः । आलस्यनिद्राभिहतो मु
----------ीये पुरूषो अस्वतन्त्रः ।।(मा.नि. १८/८-९)

१(a). तृतीयं तु मदं प्राप्य भग्नदार्विव निष्क्रियः । मदमाहावृतमना जीवन्नपि मृतैः समः ।।
रमणीयान् स विषयान्न वेति न सुहृज्जनम् । पदर्थ नीयते मद्यं रतिं तां च न विदन्ति ।।
कार्याकार्ये सुखं दुःखै लोके यच्च हिताहितम् । यदवस्थो न जानाति को अवस्थां तो व्रजेद्बुधः ।। स दूष्यः सर्वभैतानां निन्द्यश्चाग्राह्य एव च । व्यसनिन्वादुदर्के च स दुःखं व्याधिमश्नुते ।। (च.चि. २४/४८-५१)

१(b). चतुर्थे तु मदे मूढो भग्नदार्विव निष्क्रियः । कार्याकार्यविभागज्ञो मृतादप्यपरो मृतः ।।
को मदं तादृशं गच्छेदुन्मादमिव चापरम् । बुहुदोषमिवामूढः कान्तारं स्ववशः कृती ।। (मा.नि. १८/१०-११)

१(c). विसंज्ञः पश्चिमे शेते नष्टकर्मक्रियागुणाः । (सु.सं.उ. ४७/१२)

hungry or are exhausted due to physical exercise, weight lifting or excessive walking and also those who have suppressed the natural evacuatory urges, have overloaded their stomach with excessively sour food, or have eaten while the previous meal was still undigested and those who are weak or are suffering from heat exhaustion[1a]. And also the person who drinks wine on empty stomach, alone and daily develops many troublesome diseases and ultimately his body gets destroyed[1b].

The disorders are pānātyaya (madātyaya of four types according to the dōṣās), pramada, pānājīrṇa, and the serious condition pānāvibhrama. Their signs and symptoms are now described[1c].

1) Pānātyaya / Madātyaya (Alcoholic Intoxication) -

A) General Features of Madātyaya -

Their general symptoms are - severe delusions, pain in heart (or disturbances of the mind), diarrhoea, constant thirst, fever having both heat and cold (rigeors), loss of appetite, pain in the head, flanks and bones; tremors (shaking), cutting pain in vital parts, catching pain in triangle of the back (meeting place of the shoulder, backbone and scapula), obstruction in the chest, blindness or unconsciousness, cough, dyspnoea, loss of sleep, excessive perspiration, indigestion and stasis of food inside the abdomen, for long time; swelling, disorders of the mind, irrelevant talk, vomiting excess

१(a). क्रुध्देन भीतेन पिपासितेन शोकाभितप्तेन बुभुक्षितेन । व्यायामभाराध्वपरिक्षतेन वेगावरोधाभिहतेन चापि ।। अत्यम्बुभक्षप्रक्तातोदरेण साजीर्णभुक्तेन तथा अबलेन । उष्णाभितप्तेन च सेव्यमानं करोति मद्यं विविधान्विकारान्।। (मा.नि.१८/१३-१४)

१(b). निर्मक्तमेकान्तत एव मद्यं निषेव्यमाणं मनुजेन नित्यम् । आपादयेत्कष्टतमान्विकारानापादयेच्चापि शरीरम् ।। (मा.नि. १८/१२)

१(c). पानात्ययं परमदे पानाजीर्णमथापि वा । पानाविभ्रममुग्रं च तषां वक्ष्यामि लक्षणम्।। (मा.नि. १८/१५)

salivation, giddiness and bad dreams[1].

B) Specific Features of Madātyaya -

Madātyaya is of four kinds; one each from vāta, pitta, kapha and one from all of these combined(sannipataja); each kind has tridōṣas vitiation but named differently on the basis of the predominance of dōṣa[2].

i) Vātaja Pānātyaya[3]-

In this, there is stiffness of the limbs, bodyache, precordial discomfort, pricking sensation, tremors and headache.

ii) Pittaja Pānātyaya[3]-

In this, there is excessive sweating, delirium, dryness of the mouth, burning sensation, fainting and yellowness of the body and eyes.

iii) Kaphaja Pānātyaya[3]-

In this, there is vomiting, chills and salivation.

iv) Sannipāja Pānātyaya[3]-

In this due to vitiation of all the three dōṣās there will be mixed symptoms.

2) Features of Paramada (Hangover)-

A sensation of warmth and heaviness of the limbs, loss of sensation of taste in the mouth, increased secretion of mucous, anorexia, headache and pain in the joints are said

१. सामान्यं लक्षणं तषां प्रमोहो हृदयव्यथा । विड्भेदः सततंतृष्णासौम्याज्वरो अरूचिः।। शिरः पार्श्वास्थिरुक्कम्पो मर्मभेदस्त्रिकग्रहः । उरोविबन्धस्तिमिरं कासश्वासप्रजागराः।। स्वेदोअतिमात्रंविष्टम्भः श्रवयथुश्चित्तविभ्रमः प्रलापश्छर्दिरूत्क्लेशो भ्रमोदुःस्वप्नदर्शनम्।। (अ.सं.नि. ६/१५-१७)

२. वातात् पित्तात् कफात् सर्वैश्चत्वारः स्युर्मदात्ययाः । सर्वे अपिसर्वैर्जायन्तव्यपदेशस्तु भूयसा ।। (अ.सं.नि. ६/१४)

३. स्तम्भांगमर्दहृदयग्रहतोदकम्पाः । पानात्यये अनिलकृते शिरसो रूजश्च ।। स्वेदप्रलापमुखशोषणदाहमूर्च्छाः पित्तात्मके वदनलोचनपीतता च ।। श्लेष्मात्मके वमथुशीतकफप्रसेकाः सर्वात्मक भवति सर्वविकारसंपत् ।। (सु.सं.उ. ४७/१८-२०)

to be symptoms of paramada according to the experts[1].

3) Features of Pānājīrṇa (Alcoholic gastritis)-

Flatulence, vomiting, acid eructions and pyrosis are known to be the features of indigestion due to drinks in excess (pānājīrṇa). The physician should also remember that the symptoms due to the aggravation of pitta are also definitely present here[2].

4) Features of Pānavibhrama -

Pricking pain in the cardiac region and in the body, vomiting, fever, a feeling as if the throat is full of smoke, fainting, expectoration of mucous, headache, pyrosis and an aversion to the various preparations of wine and food : the prudent have mentioned all these as the features of pānavibhrama[3].

VIII) Treatment -

1) Madātyaya Cikitsa -

The treatment for madātyaya can be explained in the following ways :

A) Samānya Cikitsa (General management).

B) Viśiṣṭha Cikitsa (Specific treatment).

A) Sāmanya Cikitsa -

i) Treatment According to Dōṣa (दोषानुसार चिकित्सा)-

All the types of alcoholism are tridōṣaja, hence the physician should first treat the dōṣa which is predominant therein.

१. उष्माणमंगगुरूतां विरसातत्वं । श्लेष्माधिकत्वमरूचिं मलमूत्रसंगम् ।।
लिंगपरस्य तु मदस्य वदन्ति तंज्ञ । स्नुष्ण रूजां शिरसि सन्धिषु चापि भेदम् ।।
(सु.सं.उ. ४७/१९-२०)

२. आध्मानमुद्गिरणमम्लरसोविदाहो । अजीर्णस्य पानजनितस्य वदन्ति लिंगम् ।।
ज्ञेयानि तत्र भिषजा सुविनिश्चितानि । पित्तप्रकोपजनितानि च कारणानि ।।
सु.सं.उ. ४७/२०

३. हृद्गात्रतोदवमथुज्वरकण्ठधूम मूर्च्छाकफस्रवणमूर्धरूजो विदाहः ।
द्वेषः सुराव्यिकृतेषु तं पानाविभ्रममुशन्त्यखिलेन धीराः ।। (सु.सं.उ.४७/२०)

Otherwise in alcoholism the treatment should be started from kapha because it is predominantly situated flanked by pitta and vāta[1].

ii) Administration of Madya (मद्य प्रयोग)-

The diseases which arise from inadequate, improper and excess drinking of liquors, get cured by the same (drinking wine) if administered properly. Carakacārya explains more about the usage of this wine that vāyu obstructed in channels due to dōṣa excited by wine produce intense pain in head, bones and joints. In such cases for liquifying the dōṣa particularly wine should be given because of its properties like quick absorption, sharpness and hotness unlike of other remedial measures.

Wine removes the obstruction of channels, carminates vāta, improves relish, stimulates digestive fire and becomes suitable by practice. On removal of obstruction in channels and carmination of vāta, pain subsides, disorders are alleviated and narcosis and its complications are also pacified[2].

iii) Administration of Milk (दुग्ध प्रयोग) -

If by these tested measures the alcoholism does not subside one should advise the intake of milk leaving the above measures relating to wine. After discontinuing wine, when kapha is diminished, debility and lightness arises due to lightening (langhana, digestives (pācana), evacuative (śōdhana) procedures and pacificatory (śamana) measures and vāta and pitta becomes predominate in the patient in-

१. सर्वं मदात्ययं विद्यात् त्रिदोषमधिकं तु यम् । दोषं मदात्यये पश्येत् तस्यादौ प्रतिकारयेत् ।। कफस्थानानुपूर्व्या च क्रिया कार्या मदात्यये । पित्तमारूतपर्यन्तः प्रायेण हि मदात्ययः ।। (च.चि. २४/१०७-१०८)

२. मद्योत्क्लिष्टेन दोषेण रूध्दः स्रोतः सु मारूतः - - - - - - - - - निवर्तन्ते विकाराश्च शाम्यन्त्यस्य मदोदयाः ।। च.चि. (२४/११७-१२०)

flicted by wine, so milk administration acts as a boon like rains for the tree which is extremely dried in summer. After some days milk also should be withdrawn slowly with substitutes of pathyadravyas[1].

iv) Psychological Measures (हर्षणक्रिया) -

Alcohol does not cause alcoholism without causing agitation of the mind and causing morbidity in the body hence exhilarating measures necessary[2]. Following measurements may help in fast recovering from madātyaya. Beautiful parks, ponds with lotus flower, good food and drinks, pleasing companions, garlands, perfumes, washed clothes, melodious music, entertaining parties, ample arrangement of talks, jokes and songs and beloved and submissive women etc. alleviate alcoholism[3].

Administration of drugs to cure alcoholic intoxication should be done after the lapse of seven or eight days; by this time the wine that is residing in unusual (wrong) channels becomes digested, such of the diseases which continues after period should be treated appropriately with drugs suitable for alcoholic intoxication[4].

B) Viśiṣṭha Cikitsa -

i) Vātaja Madātyaya Cikitsa -

For controlling the vātaja madātyaya cukra, marica, ardraka, dīpya and kuṣṭa with a little of sauvarcala should be

१. आभिः क्रियाभिः सिध्दाभिः शमं याति मदात्ययः । न चेन्प्रद्यविधिं मुक्त्वा क्षीरमस्य प्रयोजयेत् ।। लंघनैः पाचनैर्दोषशोध्नैः शमनैरपि । विमद्यस्य कफे क्षीणे जाते दौर्बल्यलाघवे ।। तस्य मद्यविदग्धस्य वातपित्ताधिक्स्य च । ग्रीष्मोपतप्तस्य तरोर्यथा वर्षं तथा पयः ।। (च.चि. २४/१९५-१९६)

२. नाक्षोभ्य हि मनो मद्यं शरीरमविहत्य च । कुर्यान्मदात्ययं तस्मादोष्टव्या हर्षणी क्रिया ।। (च.चि. २४/१९४)

३. वनानि - - - - - नाशयन्ति मदात्ययम् ।। (च.चि. २४/१९१-१९३)

४. सप्ताहमष्टरात्रं वा कुर्यात् पानात्ययौषध्म् । जीर्यत्येतावतापानंकालेनविपथाश्रितम्।। परंततो अनुबध्नातियोरोगस्तस्य भेषजम् । यथायथं प्रयुज्जीतकृतपानात्ययौषधम्।। (च.चि. २४/१९०-९१)

taken with wine, or pṛthvīka, dīpyaka, mahauṣadha and hiṅgu along with sauvarcala salt should be dispensed as a beneficial recipe.

One should use nice ṣāḍavasa or drinks prepared with fruits of āmra, āmrātaka dāḍima and mātuluṅga should be given. Or the patient should use meat-soup etc. mixed with (mātuluṅga) fruit juice and also meat of marshy animals added with flavouring agents[1].

ii) Pittaja Madātyaya Cikitsa -

In case of pittaja madātyaya, wine should be mixed with the decoction of madhura group of drugs along with honey, sugar and the good flavours is beneficial. After drinking this wine, one should take concentrated sugarcane juice, and after waiting for a short while it should be brought out completely by vomiting. Non-sourish meat juice of lāva, aiṇa and tittira, or else mudga soup with sugar and ghṛta should then be given to drink for benefit[2].

iii) Kaphaja Madātyaya Cikitsa-

In case of madātyaya of kaphaja origin, vomiting should be induced (kapha should be eliminated) by using wine mixed with the juice of bimbi and vidula.

Meat soup of wild fatty animals with bitters and pungents should then be given; further (pulse) soups processed with bitter and pungent spices are also beneficial. Various preparations of barley cereal, meat of wild animals as well as other kapha- alleviating articles which are harmless and salutary[3].

iv) Sannipātaja Madātyaya Cikitsa -

In the case of madātyaya due to all three dōṣās measures to counteract all of them should be undertaken; how-

१. सु.उ. ४७/२४-२५
२. सु.उ. ४७/२६-२७
३. सु.उ. ४७/२७-२८

ever, in a case with dual dōṣās involvement, having assessed both of them the main one should be treated first. In addition, all other beneficial measures, as also those which please the mind are described should be carried out[1].

2) Paramada Cikitsa -

Kāśmarya, dārū, viḍa, dāḍima and pippali, along with drākṣa, should be added to water and drink should be made, to which bījapūraka juice should be added and if this is quickly taken as drink the condition of paramada gets totally relieved in no time.

Drākṣa, sugar, madhuka, jīraka, dhānya, kṛṣṇ and trivṛt should be similarly prepared and taken as a drink.

In the same way meat soup of wild fatty animals with sauvarchala (salt) and citreous fruit juices (should be taken). A bath water processed with bhāraṅgi is also beneficial[2].

3) Pānājīrṇa Cikitsa -

Ikṣvāku, dhāmārgava, vṛkṣaka and kākāhvayōdamabarika should be cooked with milk and given in an anjali pramāṇa (measure) to induce vomiting.

Further in the evening the patient of pānājīrṇa should drink wine again (to restore the agni, i.e. the digestive power)[3].

4) Pānavibhrama Cikitsa[3] -

i) A syrup prepared from drākṣa, kapitha, citreous fruits and dāḍima with lot of honey and sugar cures pānavibhrama. ii) In the same way, āmrataka and kōla should be used as a syrup. (iii) A syrup prepared from kharjūra, vētraka, karīra, drākṣā, trivṛt and śrīparṇi with sugar should be used in the cold state; or (iv) tender leaves of latex trees, bisa, jīraka, nāgapuṣpa, patra, ilavālu, sitasārlva, padamaka, ārāta,

१. सु.उ. ४७/२९
२. सु.उ. ४७/३४-३६
३. सु.उ. ४७/३७

bhavya, karamarda, kapitha, kōla, vṛkṣāmla, vētraphala, jīraka and dāḍima should be taken after adding yasti and utpala as a cold drink.

One who after discontinuing the intake of wine starts taking it in excessive quantity suffers from the diseases named dhvammasaka and vikṣaya. They are curable with difficulty particularly in one debilitated by disorders.

Dhvaṃsaka[1] -

Excessive salivation, dryness of throat and mouth, intolerance to sound, excessive drowsiness as well as sleep these are the symptoms of dhvaṃsaka.

Vikṣaya[2] -

Abnormality in heart and throat, mental confusion, vomiting, pain in the body, fever, thirst, cough and headache - these are symptoms of vikṣaya.

Treatment[3] -

The management is the same as that of the vātika type of madātyaya (alcoholism). Such patients should be given basti (medicated enema), sarpis (medicated ghee), milk, ghee, massage, unction, bath, food and drinks which cause alleviation of vāta. By the above mentioned therapeutic measures, Dhvaṃsaka and Vikṣaya get alleviated. Disorder due to drinking does not arise in a person who takes wine properly.

१. श्लेष्मप्रसेकः कण्ठास्यशोषः शब्दासहिष्णुता । तन्द्रानिद्रातियोश्च ज्ञेयं ध्वंसकलक्षणम्।। (च.चि. २४/२०१)
२. हृत्कण्ठरोगः संमोहश्छर्दिरंगरूजा ज्वरः । तृष्णा कासः शिरःशूलमेतद्विक्षयलक्षणम्।। (च.चि. २४/२०५)
३. तयोः कर्म तदेवेष्टं वातिके यन्मदात्यये।तौ हि प्रक्षीणदेहस्य जायेते दुर्बलस्य वै।। बस्तयः सर्पिषः पानं प्रयोगः क्षीरसर्पिषोः । अभ्यंगोदूर्तनस्यानान्यन्नपानं च वातनुत्।। ध्वंसको विक्षयश्चैव कर्मणा अनेन शाम्यति । युक्तमद्यस्य मद्योत्थो न व्याधिरूपजायते।। (च.चि. २४/२०३-२०५)

According to Modern -

Alcohol poisoning could be two types :

A) Acute

B) Chronic

A) Acute alcohol poisoning -

i) Features -

Whatever the stages were described for the mada from the Āyurvēdic texts which are considered as acute alcohol poisoning from the modern aspect. There are totally three stages of acute alcohol poisoning and are described as follows :

a) Sense of well being -

The patient is conscious and because of depression of higher inhibitory centres, this is called release phenomenon. The duration of the period is a long one. It is seen in all cases. There is :

a) Flushing of face. b) The patient is very talkative. c) There is loss of self control. d) There is loss of minor movements e.g. drinking water, threading a needle. e) Rude behaviour. f) Sentimentalism. g) In co-ordination. h) Pupils become slightly dilated and react to light. i) Alcoholic smell.

And gradually he passes on to a stupurose depressive stage of confusion.

b) Stage of Confusion -

This is because of depression of other centres and is associated with : a) Inco-ordination - Ataxia and slow movements. b) They cannot walk straight. c) Speech is slurred, incoherent and of nasal variety. d) Vision is blurred. And the patient goes into a semi-conscious state, finally into an unconscious state. In this stage the patient can come around

on calling loudly or pinching.

c) Stage of coma -

The stage of coma is now reached, when the patient gradually passes into unconsciousness and coma with a) Breathing becomes slow and stertorous. b) Pulse is rapid and feeble. c) The person cannot be roused even after vigorous shaking. d) Temperature is subnormal. e) Pupils are constricted slightly and finally death occurs due to :

1) Depression of higher centres.

2) Acute central anoxia.

3) Pneumonia or pulmonary death.

ii) Features of Acute alcohol poisoning according to concentration of alcohol in the blood

Blood Alcohol concentration (mg/100ml)	Stage of intoxication	Clinical Features
0-50	Sobriety	Near normal behaviour.
50-100	Euphoria	Feeling of well being, sociability, talkativeness, increased self confidence, decreased inhibitions, fine movements affected.
100-150	Excitement	Emotional instability, impairment of memory and comprehension, increased reaction time, mild ataxia.

150-200	Confusion	Disorientation, confusion, vertigo, diplopia, ataxia, slurred speech, staggering gait.
200-300	Stupor	General inertia, diminished response to stimuli, inability to stand or walk, vomiting.
300-500	Coma	Unconsciousness, abolished reflexes, subnormal temperature, incontinence of urine and faeces, respiratory compramise.
> 500	Death	Death due to respiratory failure.

iii) Diagnosis-

a) Bedside test -

Place 1ml of unknown solution plus 1ml of acetic acid and 1 drop of H_2SO_4 in a test tube and heat gently for 1 minute. A characterstic, strong fruity odour (due to ethyl acetate) is positive for ethanol.

b) Blood alcohol level -

The blood alcohol concentration (BAC) can be estimated by microdiffusion technique or by an electrochemical method. The latter is a rapid qualitative test which can be done in the emergency department.

iv) Fatal dose -

This will depend on the age and habits of the patient and the strength of the liquor. A concentration of 0.4 - 0.5 percent (400-500mg%) and above of alcohol in blood or 150ml to 250ml of absolute alcohol consumed in one hour is generally sufficient to cause death. Prolonged coma due to alcohol consumption sometimes leads to irreversible hypoxic brain damage which in turn may cause death. The blood alcohol level in such cases is commonly low as would be expected after survival for considerable time. Death usually occurs from large quantity taken in a short time.

v) Fatal period -

In cases where large quantities are taken with a non habituated individual, death may occur in minutes. The usual period is 12 -24 hours, prolonged in some cases upto 5-6 days.

vi) Treatment -

a) Airway protection, ventilatory support.

b) Stomach wash.

c) Thaimine 100mg i.v.

d) 50% dextrose (50ml to 100ml) i.v.

e) Intravenous fluids.

f) Hot drinks such as coffee and tea should be given orally.

g) Keep the patient warm.

h) To counteract acidosis, give soda bicarb by mouth.

I) A variety of drugs have been tried to hasten the elimination of ethanol or reverse its intoxicating effects, including naloxane, physostigmine and caffeine. None of them have been proved to be truly effective. Recently, flumazenil (3mg i.v) has been shown to be effective (in experimental studies) in reversing the respiratory depression associated with ethanol ingestion.

j) Antibiotic should be given prophylactically for pulmonary infections.

While assessing the patient, the hopeful signs of recovery are :

- Return from the state of confusion.
- The size of the pupil starts returning to normal.
- Nausea and vomiting set in.

B) Chronic Alcohol Poisoning -

This is as a result of taking alcohol for a prolonged period. They are either psychotic or neurotics and usually to take alcohol as a means to escape from realities of life.

i) Features -

a) Loss of appetite, nausea, vomiting and diarrhoea.

b) Tremors of the hands and tongue.

c) Impairment of memory and judgement.

d) After fairly long time there is hypo-proteinemia resulting in dropsy and general anasarca.

e) Added to the psychological stress peripheral neuritis and dementia supervene in the last stages.

f) The patient suddenly goes into coma and collapses.

ii) Medical complications of alcoholism -

a) GIT - Gastritis, periodic diarrhoea, increased incidence of oropharyngeal and oesophageal cancer;

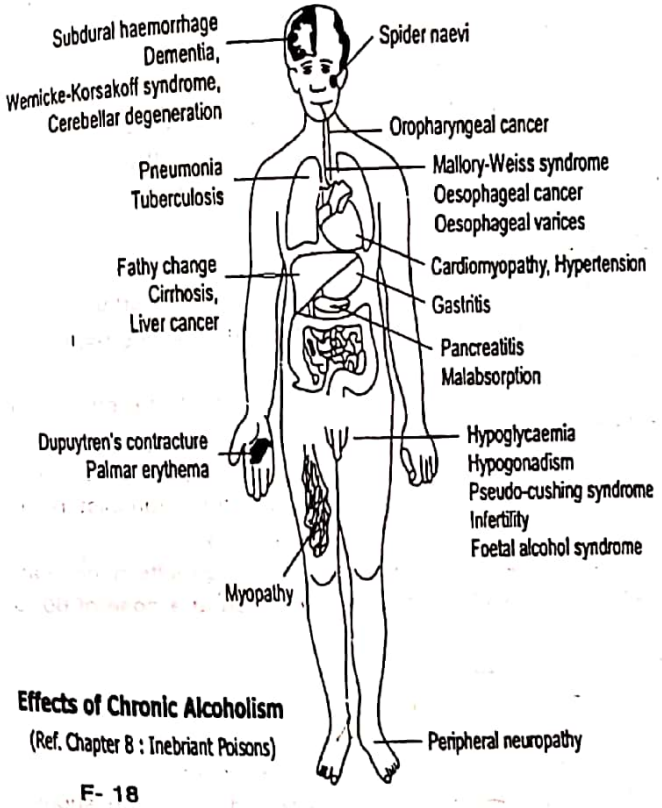
b) Liver - Fatty liver with portal hypertension, heaptitis, cirrhosis, increased Incidence of hepatic carcinoma.

c) Pancreas - Acute or chronic pancreatitis.

d) CVS - Cardiomyopathy, dysrhythemias, hypertension.

e) CNS - Polyneuropathy, cerbellar degeneration, demyelination of corpus callosum, amblyopia, stroke.

f) RS - Aspiration pneumonia, alcohol-induced asthma,



Effects of Chronic Alcoholism

(Ref. Chapter 8 : Inebriant Poisons)

F- 18

g) Endocrine - Hypogonadism and feminisation in males, amenorrhoea, menorrhagia, and infertility in females, pseudo-cushing syndrome.

h) Blood - Anaemia, thrombocytopenia.

i) Skeletal muscle - Myopathy.

j) Neuropsychiatric - Memory disturbances, delusions, delirium tremours, Wernicke's encephalopathy, Korsakoff's psychosis, dementia, alcoholic hallucinosis.

iii) Treatment -

a) Treatment of withdrawal -

Apart from the treatment measures outlined earlier, the following drugs have also been tried with varying degrees of success :

Carbamazepine - It has been shows to be effective in treating alcohol withdrawal, including delirium tremens.

Chloremethiazole - It is one of the most popular drugs used for alcohol withdrawal in abroad and is administered in a rapidly reducing dosage over 6 to 7 days.

Clonidine - Has also shown promising reults in the treatment of withdrwal symptoms. It is given at a dose of 60 to 180mg/hr i.v

b) Aversion therapy -

The main aim in the treatment of alcoholism is gradually wean away the patient from the clutches of ethanol, once the acute manifestations of withdrawal have been taken care of. This process referred to quite loosely as de-addiction, should be undertaken only after admission to a hospital over a period of several days under close medical supervision.

Further intake of alcohol should be reduced by the administration of Tablet Antabuse (Tetra erthylthiuram disulphide).

in the dose of 0.2 to 0.75 gm/day. Antabuse tablet should be used only with the consent of the patient as the condition of the patient deteriorates miserably on taking alcohol after antabuse. Tablet Temposil (Citrated Calcium Carbimide) in the dose of 50 mgm a day can be used for the same purpose.

Well balanced diet.

Multivitamins to make up the deficiency. This has to be continued for longer durations.

c) Supportive psychotherapy -

This is mainly a psychiatric problem because of the multiple causes behind the habit.

iv) Drunkenness -

A person who has taken so much quantity of alcohol that he loses control of his physical and mental activities to such an extent that he is incapable of acting with safety to himself and persons surrounding him. This is the state of drunkenness.

IX) Postmortem Appearance -

1) Acute alcohol poison

A) External findings -

i) The rigor mortis and putrefiction changes do not set in quickly. The body can be preserved for longer time.

ii) Conjuctival congestion is marked.

B) Internal findings -

I. Smell of alcohol may be noticed from the contents of the stomach as the other organs.

II. The walls of stomach are hyperaemic, red contents are brown.

III. The other organs are congested.

iv. Oedema of brain is evident by shortening of space between the two gyri.

2) Chronic alcoholic poisoning

a) Gastric mucosa shows hyperaemia and hypertrophy.

b) Liver and kidneys are congested. Liver shows evidence of fatty infiltration and cirrhotic changes.

c) Heart is dilated and shows evidence of fatty infiltration.

Viscera Preserved for Chemical Analysis -

1) Blood.
2) Lungs.
3) Brain.

X) Medico-Legal Importance -

a) Alcoholism is a state after drinking excess of alcohol in which a person is liable to injure his health, unable to perform adequate social functions or both. Pharmacologically the effects are considered as : Tolerance and physical dependence.

Medicolegal effects are - Road accidents.
Industrial accidents.
Personal relation.
Injury, Murder, etc.

b) Alcohol can be estimated in the blood and urine. It's importance can be explained in cases of sudden death, car accidents. Other industrial accidents where the accused takes drunkenness as a defence.

The estimation in blood is subjected to variations by the oxidations of the tissues. Alcohol in urine is more constant but its importance decreases because of the fact that products like acitone, ether paraldehyde are likely to be determined as alcohol and thus the test loses its significance.

CHAPTER - 12

SNAKE POISON

(सर्पविष)

I) CLASSIFICATION OF THE SNAKES
II) SNAKES REPRODUCTION
III) IDENTIFICATION OF THE SNAKES
IV) FACTORS THAT INFLUENCE IN THE INCREASE IN THE POTENCY OF THE SNAKE POISON
V) FACTORS INFLUENCE IN THE DECREASE IN THE POTENCY OF THE SNAKE POISON
VI) FACTORS INFLUENCING THE SNAKE BITE
VII) TYPES OF THE SNAKE BITE
VIII) DIFFERENCE BETWEEN POISONOUS AND NON-POISON SNAKE BITE
IX) DIFFERENT POISONOUS SNAKE BITE FEATURES
X) SNAKE POISON IMPULSES
XI) REJECTABLE PATIENT XII) TREATMENT

Jaṅgama Viṣa is a part of the Agada tantra which mainly deals with the poisonous animals. Carakācārya described about the types of the poisonous animals.

✓ सर्पाः कीटोन्दुरा लूता वृश्चिका गृहगोधिकाः ।
जलौकामत्स्यमण्डूकाः कणभाः कृकलासकाः ।।
श्वसिंहव्याघ्रगोमायुतरक्षुनकुलादयः ।
दंष्ट्रिणो ये विषं तेषां दंष्ट्रोत्थं जगंम मतम् ।।

(च.चि. २३/९-१०)

The poison of serpents, insects, rats, spiders, scorpions, house lizards, leeches, fishes, frogs, hornets, lizards, dogs, tigers, jackals, hyenas, mongooses and other fanged animals is known as Jāgamma viṣa (poisonous animals). The sites and general features of the animal poison is already described in the previous chapters.

CHAPTER -13
RABIES POISON
(अलर्क विष)

I) CAUSES II) FEATURES III) TREATMENT
IV) SOME OF THE REMEDIES, PREPARATIONS OF MEDICINES AND TREATMENT IN ALARKA VIṢA

About the Alarkaviṣa there is explanation in the Suśrutasaṃhita regarding its signs, symptoms and its treatment etc..

I) Causes of Rabies poison (अलर्कविष निदान)-

Due to the poison in the animals like jackal, dog, wolf, bear, tiger etc. the vāyu gets vitiated by kapha which takes the shelter of sensory channels (sañjñāvaha sōratas) and hampers the consciousness. Due to this drooping of tail, jawbones and shoulders with copious flow of saliva from the mouth. The animals in such a state becomes intensely blind and deaf, run towards each other at random. When such animals bite in rage leads to sensory loss and profuse bleeding with blackish discolouration takes place from the affected part. The features of this bite resembles with vidhavraṇa[1].

II) Features of Rabies Poison (अलर्कविष लक्षण)-

1) Local features

2) General features

3) Incurable features

---

१. श्रवश्रृगालतरक्ष्वृक्षव्याघ्रादीनां यदा अनिलः । श्लेष्मप्रदुष्टो मुष्णाति संज्ञावहाश्रितः।। तदा प्रस्रस्तलाङ्गूलहनुस्कन्धो अतिलालवान् । अत्यर्थबधिरो अन्धश्च सो अन्योन्यमभिधावति।। तेनोन्मत्तेन दष्टस्य दंष्ट्रिणा सविषेण तु । सुप्तता जायते दंशे कृष्णं चातिस्रत्यसृक्।। दिग्धविध्दस्य लिंगेन प्रायशश्चोपलक्षितः । (सु.क. ७/४३-४५)

1) Local features -

These features are described by Vāgbhaṭa in two ways :

A) Poisonous bite features (सविष दंश लक्षण) -

The poisonous bite leads to itching, continuous pain, discolouration, loss of tactile sensation, exudation, fever, giddiness, burning sensation in the abdomen as well as the site becomes discoloured with pain, suppurative, swollen, formation of cystic type of swelling, contractures, tearing of the tissues, formation of blabs (vesicles), appearance of ring like patches (mandala) and swelling like the lotus seed (karnikā) all over the body - these are the symptoms of bites having poison in them[1].

B) Non-Poisonous bite features (निर्विष दंश लक्षण) -

The opposite of above those features are of bites not having poison[1].

2) General features -

Some of the general features in the patient who is bitten by the affected animal causes immediately loss of sensation at the affected site, profuse bleeding with blackish discolouration and later on leads to chest pain, headache, fever, rigidity of the body parts, excessive thirst and fainting[2].

3) Incurable features (असाध्य लक्षण)[3] -

In this stage the affected person imitates the voice and activities of an animal by which he got bitten, slowly person becomes paralysed with respect to his activities which inturn leads to death. If a person bitten by a rabid animal sees its

---

१. कण्डूनिस्तोदवैवर्ण्यसुप्तिक्लेदज्वरभ्रमा । विदाहरागरुक्पाकशोफग्रन्थिविकुञ्चनम्।। दंशावदरणं स्फोटाः कर्णिका मण्डलानि च । सर्वत्र सविषे लिङ्ग विपरीतं तु निर्विषे।। (अ.सं.उ. ४६/१४-१५)

२. दंशस्तेन विदष्टस्य सुप्तः कृष्णं क्षरत्यसृक् । हृच्छिरोरुग्ज्वरस्तम्भतृष्णामूर्च्छोद्भवोऽत्र च ।। (अ.सं.उ. ४३/१२)

३. (सु.क. ७/४६-४७)

(imaginary) image reflected in water or in a mirror, it indicates that he has reached to an unfavourable stage of the disease.

Jalatrāsa - Generally a person gets frightened by water without cause that should be understood he has been afflicted with Jalatrāsa(suffering from hydrophobia), which is a sign of death(ariṣṭha or mṛtyu). If such Jalatrāsa features are seen in unbitten person considered to be unhealthy or if a healthy person gets frightened by water on waking or in sleep should be regarded as fatal symptom[1].

III) Treatment -

1) Prophylaxis methods -

The person in whom the poison (of a rabid dog or jackal etc.) is spontaneously aggravated has no chance of recovery. Hence the poison should be artificially aggravated (and then remedied) before reaching that stage of aggravation. This was one of the important point from the Suśrutakalpasthāna. This indicates that in poisonous condition the prophylactic treatment plays a major role, because as the disease is progressing it is very difficult to treat and becomes incurable[2]. Nowadays it is believed that in the rabies virus prophylaxis methods(like vaccination) are having more importance than the treatment because it is incurable at this stage.

2) Agnikarma[3] -

In the case of rabid animal the seat of the bite should be profusely bleed (by pressing it) so as to let out all the (vitiated) blood. It should then be cauterised with boiling ghee. After this

१. त्रस्यत्यकस्माद्योऽभीक्ष्णंदृष्ट्वा स्पष्ट्वाऽपि वाजलम् ।। जलत्रासं तु विद्यात्तं रिष्टं तदपि कीर्तितम् । अदट्षो वा जलत्रासी न कथञ्चन सिध्यति ।। प्रसुप्तोऽथोत्थितो वाऽपि स्वस्थस्रतो न सिध्यति ।। (सु.क. ७/४७-४८)

२. कुप्येत् स्वयं विषं यस्य न स जीवति मानवः । तस्मात् प्रकोपयेदाशु स्वयं यावत् प्रकुप्यति ।। (सु.क. ७/५८)

३. सु.क. ७/५०

is pasted with the aforesaid agada or the patient should be made to drink a portion of maturated (purāṇaghṛta) ghee.

3) Propitiatory bath (स्नानविधि) :

The patient should be given bath at the crossing of roads or on the bank of a river with pitcherfuls of water containing gems and medicinal drugs and consecrated with the appropriate mantra. The mantra is mentioned below[1].

4) Śōdhanakarma -

After doing proper bath strong purgatives should be administered, since the poison in a patient with an uncleansed organism may sometimes aggravate even after healing of the incidental ulcer[2].

IV) Some of the remedies, preparations of Medicines and treatment in Alarka viṣa -

1) A compound pasted sesamum mixed with its oil treacle and the arkakṣira which eliminates the poison and the poison of rabid dog (alarka) from the system as a gale of wind drives a pack of clouds before it.

2) A quantity of rice, one karṣa in weight of the roots of śaraphuṅka and half karṣa weight of dathūra (roots) should be pasted together with the washings of the rice (taṇḍulōdaka). The paste covered with dathūra leaves and baked (on the fire) in the shape of an apupāka (cake). The prepared cake should be given to a person bitten by a rabid dog for a complete nullification of the poison. But the use of these cakes is attended with certain other troubles at the time of their digestion and these troubles become subdued by a retiring to in a dry but cool chamber away from water. The patient (after subsidence of the troubles) should be bathed the next day

१. अलकाधिपते यक्ष सारमेश्गणाधिप । अलर्कजुष्टमेतन्मे निर्विषं कुरु मा चिरात् ।। (सु.क. ७/६१)

२. सु.क. ७/६२.

and diet of boiled śāli or saṣṭika rice with tepid milk should be prescribed for him. On the third and fifth day the anti-venomous compound should again be administered in half doses to patient for the elimination of the poison[1].

2) The following medicine is very powerful and a poisonous drug. The processing of this medicine altogether takes a period of 82 days. The north wise directed root of the plant kanjiram is taken and cut into two pieces. The cut end of the root is dipped into gingely oil which is kept in a bottle and closed tightly. Then kept for 41 days. By then the oil will be absorbed by the root fully. Again it is kept for 41 days. Now, there will be a little amount of oil oozing from the root, back to the bottle. This is highly potential and poisonous. In sure cases of rabies poison 6 drops of this oil is given orally thrice a day for seven days. The poison will subside. Caution is to be taken for its misuse[2].

3) Karañja, Angota - panchanga of these two trees can be used as pāna, lēpa etc. Swarasa of vyakrapadi (Ipomea pestigridis) should be given - 2 pala in every morning, if continued for 8 days said to relieve alarka viṣa[3].

4) Datura patra 15 gm. triturated with milk should be given early morning. Then the patient should be closed in a room. After sometime the patient will show the symptoms of madness which will be reduced by after noon, when madness reduces completely jaladāra should be done until the patient shivers. After this treatment patient will sleep. When he wakes up, cooked rice with curd should be given to him. If viṣa remains in the body then after this food he shows the alarka viṣa lakṣaṇās again.

१. सु.क. ७/ ५३-५८.

2. Thaaliyola grandham.

3. वषचिकित्स by Vaidya Vachaspathi M Balakrishana Nair.

Next day the whole treatment should be repeated again. Like this alarka viṣa lakṣaṇās will be pacified within 3 days.

RABIES
(Hydrophobia)

I) Definition -

It is an infectious disease characterised by encephalitis with spasm of different muscles, paralysis, fear of water etc. caused by a neurotropic filtrable virus transmitted commonly by the bite or lick of an infected rabied animal commonly a dog.

Apart from this other animals such as bats, skunk, raccoons, cattle, fox, cat may also transmit the disease through open wound.

In these animals the virus from its point of entry gains access to the brain and after multiplication travel along the efferent nerves till it reaches salivary glands, 5-7 days before their death.

II) Incubation period -

Ten days to two years, average 18 - 60 days but it varies with age of the patient and the site of bite. Individuals with head and neck bite or who are young will have a shorter incubation period.

III) Clinical features -

The features develops in several stages:

1) Premonitory or initial stage - This stage lasts for a day or two days. Patient feels pain and discomfort at the site of bite. Patient is irritable even to slight noise and spasm of different muscles particularly muscles of swallowing may result. Temperature is slightly raised. Headache, anorexia, fatigue, diarrhoea, weakness are also present.

2) Stage of irritability or excitement - Gradually the spasm of

different muscles particularly of deglutation may become very prominent and not to speak or drinking, even sight of water may initiate spasm (so the disease is called hydrophobia). Muscles of larynx and other muscle groups of different parts of body may also undergo spasmodic contraction. Blowing on the back of the neck may initiate spasm. Respiration is laboured and the rate is increased. Cyanosis may develop. Large amount of thick saliva comes out through mouth. There is hoarseness of voice. Jerks are brisk and the temperature is raised . This stage lasts for a day or two days. Heart failure is the very common cause of death in such cases.

3) Stage of paralysis - Spasmodic contraction gradually disappears and paralysis of different muscles group sets in. Consciousness is never lost. Death usually takes place very rapidly. This stage lasts for few hours.

IV) Diagnosis -

This is done by isolation of virus and demonstration of Negri body by immunofluorescence test in infected tissue or by antibody titre. Dogs or other animals are killed for demonstration of Negri body in the brain (hippocampus and cerebellum).

V) Prophylaxis -

1) Indications

- Bitten by rabid animal.
- The animal dies during observation and Negri bodies are found.
- Broken skin is solid with the saliva of a rabid animal.
- Dog has disappeared or been killed without diagnosis of rabies established and rabies is known to be present in the area.
- Bite on face or head.

Four vaccines are avalible.

A) Active Immunization -

i) Antirabies vaccine carbolized (semple vaccine)-

- It is a 5% suspension of sheep brain substance containing carbolic acid fixed rabies virus in 5 and 50 ml vials.
- For post dog bite prophylaxis 2-5 ml is injected s.c. in the anterior abdominal wall daily for 14 days.
- All those vaccinated may not be protected and vaccine associated with allergic encephalomyelitis occurs in 1 out of 3000 - 7000 recipients.
- This vaccine, though outdated, is still used in Government hospitals.

ii) Purified chick embryo cell vaccine (PCEV) -

- It consists of Flury-LEP strain of rabies virus grown on chick fibroblasts and inactivated by a - propiolactone; available as 2,5IU in ml amp (RABIPUR).
- For post exposure treatment six i.m. injections of 1 ml each are given on day 0, 3, 7, 14, 30 and 90.
- Primary prophylaxis can be afforded by 3 doses at 1 month intervals and booster after 1 year.
- Complications like neuroparalytic complications are rare, but like local pain, erythema, swelling and lymph nods enlargement can occur.

iii) Human depliod cell vaccine (HDCV) -

- It is lyophilized inactivated rabies virus grown in human diploid cell culture.
- The single dose vial contains 2.5IU (MERIEUX HDC); suspension freshly prepared in 1 ml diluent and injected deep s.c or i.m. in the low infraspinatus fossa or deltoid region.

- For post exposure treatment six I.m. injections of 1 ml each are given on day 0, 3, 7, 14, 30 and 90.
- A single dose after-exposure treatment sufficient in immunized subjects.
- A local reaction - redness and slight induration lasting 1-2 days occurs in 10% cases.
- Fever and arthralgia is reported in 1% of cases.
- HDCV is 100% effective, well tolerated and vaccine associated encephalitis does not occur.

iv) Purified vero cell rabies vaccine (PVRV) -

- This contains inactivated wistar rabies PM / WI38-1-503-3M strain grown on vero continuous cell lines (VERORAB 1ml: VEROVAX-R 0.5 ml).
- Used for 5 dose post exposure as well as 3 dose for pre exposure.

Intradermal regimens for vaccination -

The current i.m. regimen of post exposure antirabies vaccination uses 1 ml of PCEV or HDCV or 0.5 ml of PVRV per dose. An intradermal (i.d.) regimen called Thai regimen which requires 1/5 dose of i.m. regimen has been developed and found to be equally effective and safe. In this regimen 0.1 ml PVRV or 0.2 ml of HDCV / PCEV is injected i.d at sites (over both deltoids) on days 0, 3, 7 and at one site on days 28 and 90 (total 8 injections)

An alternative 8 site regimen (Oxford regimen) is advocated for an earlier antibody response, particularly when Rabies immunoglobulin (RIG) is not available for post exposure treatment. In this regimen 0.1 ml of PCEV or HDCV (but not PVRV) is injected at 8 sites (over both deltoids, suprascapular region, thighs and abdomen) on day 0. On 7th day 4 sites are injected followed by one site injection on - day 28 and 90 (total 14 injections).

These i.d. regimens (specially the Thai regimen) are cheaper than even simple vaccine and are recommended by WHO. They are likely to be approved by Drugs Controller of India also.

B) Passive Immunization -

Administration of RIG (rabies immunoglobulin) 20 IU/kg human RIG or 40 IU/kg heterologous RIG given once, at the beginning of antirabies prophylaxis, to previously unvaccinated by actively producing antibody. RIG can be given upto 7 days after administration of potent tissue culture vaccine. Beyond day 7, RIG is not indicated because an antibody response to vaccination should have occurred. RIG should be infiltered around and into the wound even when the lesion has begun to heal.

Indications -

- Exposure involving animals suspected of being rabid.
- Following unprovoked bites in endemic areas unless the animal is proved negative by laboratory examination.
- Those exposed to a rabid domestic animal or an animal that is unavailable for examination.
- Individuals at high risk groups, including laboratory workers handling the virus.
- Workers in enzootic areas who may be exposed to an unusual risks of infection.
- Travellers to remote areas where enzootic dog rabies is present.

VI) Treatment of wound -

- Scrub with soap (or detergent) and water under a running tap for atleast 5 minutes.
- Remove foreign material.

- Rinse with plain water.
- Irrigate with virucidal agent e.g. 40-70% alcohol, povidone iodine or 0.01% aqueous iodine.
- Explore, debride and irrigate deep wounds and avoid suturing and occlusive dressings
- Consider tetanus risk and treat accordingly.

CHAPTER -14
SCORPION POISONING
(वृश्चिक विष)

I) CLASSIFICATION OF SCORPION
II) POISONOUS FEATURES
III) TREATMENT
IV) SOME OF THE ANTI-POISONOUS THERAPEUTICS FROM THE YŌGARATNĀKARA

These are eight-legged arthropods and have a hollow sting in the last joint of their tail, which communicates by means of a duct with the poisonous glands, which secrete poison on stinging. The venom is a clear, colourless toxalbumen and can be classified as either haemolytic or neurotoxic. Its toxicity is more than that of snakes, but only a small quantity is injected. The morality except in children is negligible. Colour of scorpions varies from light yellow to black.

From the Āyurvēdic references it is described in the kīṭaviṣa. According to its origination it was classified into three types.

I) Classification of Scorpion (वृश्चिक वर्गीकरण)[1]-

1) Mandaviṣa Vṛścika (mild poisoned scorpion) -

Scorpions germinating from cow-dung or from any rotten substances are mandaviṣa. These are sub-classified into twelve types. (12)

2) Madhyamaviṣa Vṛścika (moderate poisoned scorpion)-

Those which germinate from (decayed) wood or (decayed) bricks are madhyamaviṣa. These are subclassified into three types. (3)

१.सु.क. ८/५६-५७

3) Tīkṣṇaviṣa Vṛścika (strong poisoned scorpion) -

Those which originate from the decomposed carase of a snake or from any other poisonous putrid organic matter are tīkṣṇaviṣa. These are subclassified into fifteen types.

II) Poisonous features (विषलक्षण) -

These features can be classified into two types

1) General Poisonous features (सामान्य विषलक्षण)-

The scorpion poison is sharp (tīkṣaṇa) in nature and causes burning sensation like fire in the beginning(local spread), and thereafter it spreads upwards (general spread). At the end, it localises at the site of sting. It produces severe pain, blackish discolouration, pricking and throbing type of pain at site of sting[1].

2) Specific Poisonous features (विशिष्ट विषलक्षण)-

A) Mandaviṣalakṣṇa -

A bite by a scorpion of this species is accompanied by pain (in the site of bite), tremours, stiffness of the body and flow of blackish discoloured blood. In the case of a bite at any of the extremities the pain radiates upwards accompanied by a burning sensation, perspiration, swelling of the bitten part and fever[2].

B) Madhyamaviṣalakṣṇa -

A bite by a scorpion of this species is accompanied by a swelling of the tongue, difficulty in digitation and deep fainting[3].

C) Tīkṣṇaviṣalakṣṇa -

A bite by a scorpion produces poisonous impulses

१. वृश्चिकस्य विषं तीक्ष्णमादौ दहति वह्निवत् - - - - दंशः सद्यो अतिरूक्ष श्वयस्तुद्यते स्फुटतीव च । (अ.हृ.उ. ३७/६)

२. एभिर्दष्टे वेदना वेपथुश्च गात्रस्तम्भः कृष्णरक्तागमश्च ।। शाखादष्टे वेदना चोर्ध्वमेति दाहस्वेदौ दंशशोफो ज्वरश्च ।। (सु.क. ८/६०)

३. जिह्वशोफो भोजनस्यावरोधो मूर्च्छा चोप्रा मध्यवीर्याभिदष्टे ।। (सु.क. ८/६३)

(viṣavēgas) similar to snake poison and gives rise to pustular eruptions along with vertigo, burning sensation, fever and excessive discharge of blackish discoloured blood from the passages due to which the person dies soon[1].

Vāgbhaṭa describes with the features oedema in tongue, rigidity of the body parts, loss of sensory perceptions, perspiration, gets fainting, dryness of mouth, patient becomes anxious and gets severe discomfort due to agonising pain, sloughing off muscles at the site of bite and generally the person dies[2]

Vāgbhaṭa described another variety of scorpion called as 'Uccitiṅga' bites by its mouth which produces very severe pain, stiffness of the penis, horripilations, a feeling as though the body is sprinkled with cold water, because of having the colour like the camel this (scorpion) itself is spoken as Uṣṭradhūmaka and Rātrika since it moves out at night times[3].

III) Treatment -

In all poisons and those located in all parts mostly the cold measures are adopted except in cases of Vṛścika and Uccitiṅga[4].

In the scorpion poison fomentation, massage with ghee and salt, hot sprinklings, intake of ghee with edibles or alone should be used[5].

१. एभिर्दष्टे सर्पवेगप्रवृत्तिर्भ्रान्तिदाहौ ज्वरश्च । खेभ्यः कृष्णं शोणितं याति तीव्रं तस्मात् प्राणस्त्यज्यते शीघ्रमेव ।। (सु.क. ८/६६)

२. तैर्दष्टः शूनरसनः — — -विशीर्यमाण्मांसश्च प्रायशो विजहात्यसून्।। (अ.सं.उ. ४३/३३-३४)

३. उच्चिटिंगस्तु वक्त्रेण दशत्यभ्यधिकव्ययः । साध्यतो वृश्चिकात् सतम्भं शैफसो हृष्टरोमताम । करोतिसेकमंगानां दंशः शीताम्बुनेव च ।। उष्ट्वर्णतया प्रोक्तः एव ह्युष्ट्धूमकः । रात्रिको रात्रिचाराच्च।। (अ.सं.उ. ४३/३६-३७)

४. विषेष्वपि च सर्वेषु सर्वस्थानगतेषु च । अवृश्चिकोच्चिटिंगेषु प्रायः शीतो विधिर्हितः।। (च.चि. २३/१७२)

५. वृश्चिके स्वेदमभ्यंगं घृतेन लवणेन च । सेकांश्चोष्णान् प्रयुञ्जीत भोज्यं पानं च सर्पिषः ।। (च.चि. २३/१७३)

1) Treatment According to Type of Scorpion bite -

A) Strong and Moderate Venomed Scorpion poison -

A bite by a scorpion of the middle-venomed or strong-venomed class should be treated as a case of snake bite to all intents and purposes[1]. And around the site of the bite fomentation should be done followed with the :

i) Pratisāraṇam -

After the fomentation, at the site of the bite should be marked with superficial incisions (scratches) and should be gently rubbed (pratisāraṇa) with powders of haridra, saindhava, trikaṭu and the fruit and flower of śiriṣa[1].

ii) Lēpam -

The tender leaves of surasa pasted with the juice of mātuluṅga and the urine of the cow in a lukewarm state or lukewarm cowdung should be employed in plastering and fomenting the affected part[1].

iii) Pānam -

Portions of ghee mixed with honey, milk with profuse quantity of sugar[1].

B) Mild Scorpion poison -

In case of a bite by a mild-venomed one can be followed as mentioned in the specific treatment principles.

i) Sēcanam (toileting of the wound)-

Should be sprinkled over with the cakrataila or with a

१. उग्रमध्यमविषैर्दष्टं चिकित्सेत् सर्पदष्टवत् । आदंशं स्वेदितं चूर्णैः प्रच्छितं प्रतिसारयेत्।।
रजनीसैन्धवव्योषशिरीषफलपुष्पजैः । मातुलुंगाम्लगोमूत्रपिष्टं च सुरसाग्रजम् ।।
लेप स्वेदे सुखोष्णं च गोमयं हितमिष्यते । पाने क्षौद्रयुतं सर्पिः क्षीरं वा बहुशर्करम।।
(सु.क.८/६७-६९)

tepid talla duly prepared with the drugs of the vidaryādi group[1].

ii) Svēdanam(fomentation) -

The affected locality should be (repeatedly) fomented with the application of poultices in the utkārika form prepared with anti-venomous drugs (śiriṣa etc)[1].

iii) Pānam -

Treacle prepared with the cold water, caturjātaka and sugar or cold milk mixed with sugar should be recommended as drinks[2].

iv) Dhūpanam (fumigation) -

The compound made of the feathers of the tail of a cock or a peacock, saindava, oil and ghee mixed together and burnt is a speedy destroyer of scorpion-poison. As an alternative the fumes of a compound made up of kusumbha flowers, the two kinds of rajani and kōdrava straw should be mixed with the ghee.

IV) Some of the Anti-poisonous Therapeutics from the Yōgaratnākara -

1) Mantravidhi - By chanting this "ओं क्षः फट् स्वाहा" mantra if the water is sprinkled all over the body the scorpion poison can be treated.

आदित्यरथवेगेन विष्णुबाणबलेन च ।
गरुडपक्षनिपान भुम्यां गच्छ महाविष ।।
(यो.उ. विषनिदान)

१. दंशं मन्दविषाणां तु चक्रतैलेन सेचयेत् । विदारीगणसिध्देन सुखेष्णेनाथवा पुनः ।।
कुर्याच्चोत्कारिकास्वेदं विषघ्नैरुपनाहयेत् । गुडोदकं वा सुहिमं चातुर्जातकसंयतम्।।
पानमस्मै प्रदातव्यं क्षीरं वा सगुडं हिमम् । शिखिकुक्कुटबर्हाणि सैन्धवं तैलसर्पिषी।।
(सु.क. ८/७०-७३)

२. धूमो हन्ति प्रयुक्तस्तु शीघ्रं वृश्चिकजं विषम् । कुसुम्भपुष्पं रजनी निशा वा कोद्रवं तृणम् ।। एभिर्धृ तात्तैर्धूपस्तु पायुदेशे प्रयोजितः । नाशयेदाशु कीटोत्थं वृश्चिकस्य च यद्विषम् ।।
(सु.क. ८/७४)

The meaning of the mantra is that the "hē mahāviṣa • (हे महाविष) you should go into the earth in such a way as like the Sūrya's charity speed, like the force of the Lord Viṣṇu's arrow, and like the force of the wings of the eagle bird.

2) Jirakādilēpa - In the paste of jiraka mixing of the ghee, saindhava and honey, and this prepared paste should be applied at the site of bite in the lukewarm state.

3) Ajakṣirādiyōgam - Fruit of the śiriṣa and pippali should be taken equally and mixed in the goat milk and this paste should be applied at the site of the bite.

4) Kārpāsapatrādiyōgam - Leaves of the kārpāsa should be pasted with the ghee and this paste should be applied at the site of the bite or even the vatsānābha viṣa was pasted by mixing with the water and that paste should be applied.

5) Manahśilādi Guṭika- Purified manaḥśila, kūṭha, seeds of karañja, seeds of śirīṣa, seeds of gambhāri all should be taken in equal quantity and prepared as vati. This can be used as a internal medicine and externally as a application at the site of the bite.

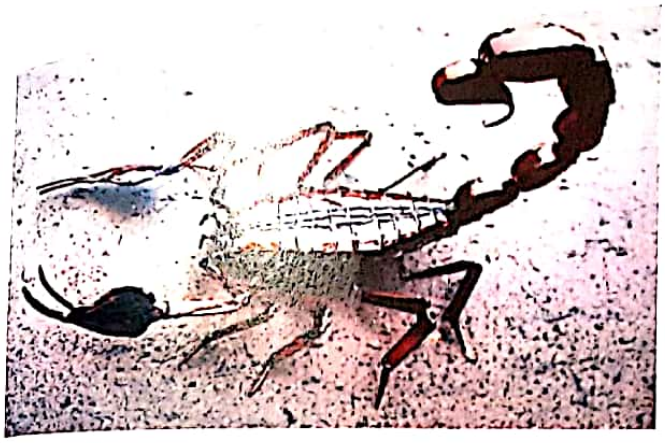
6) Jaipālaprayōga- Seeds of the jaipāla should be pasted by mixing with the water and that lepa should be applied.

7) Ullīpāṣāṇa Lēpa- The paste which is prepared by mixing with the nimbū fruit juice and ullīpāṣāṇā should be applied.

8) Usage of Punarnavayōga- kārpāsa root which is collected on ravivāra (sunday) and śvētapunarnavāmūla should be chewed and it eradicates the scorpion poison.

SCORPIONS

Scorpions belongs to class Arachinda (comprising eight-legged creatures), and are quite commonly encountered in



F 30 - Scorpion

India. Of the nearly 100 Indian species, the commonest are Mesobuthus tamulus (red scorpion), and Palamneus swammerdami (black scorpion). The former is more venomous. These are having sting in the last joint of their tail, which communicates by means of a duct with the poisonous glands, which secrete poison on stinging. The venom is a clear colourless toxalbumen, and can classified as either neurotoxic and haemolytic. Its toxicity is more than that of snakes, but only a small quantity is injected. The mortality, except in children is negligible.

Clinical features -

- Local burning pain, swelling, paraesthesias.
- Sweating, salivation, vomiting, abdominal cramps.
- Mydriasis.
- Hypotension followed by hypertension, bradycardia followed by tachycardia, cardiac arrhythmias, myocarditis.
- Convulsions.
- Pulmonary oedema.
- Oliguria.

Treatment -

- Immobilize the stung limb by application of tourniquet above the bite.
- Local ice application, and incise and use suction, and wash with a weak solution of ammonia, borax etc.
- A local anaesthetic is injected at the site to lessen the pain.
- I.V fuids and oxygen according to need.
- A specific antivenum is available for most species.
- Diazepam for convulsions.
- Metoclopramide for vomiting.
- Atropine is valuable in preventing pulmonary oedema.

CHAPTER -15

SPIDER POISON

(लूताविष)

I) MYTHOLOGICAL ACCOUNT OF THE ORIGIN
II) CLASSIFICATION OF LŪTA
III) SITE OF POISON IN LŪTA
IV) CLINICAL FEATURES
V) TREATMENT
VI) SPECIFIC MANAGEMENT FOR DIFFERENT LŪTĀS

I) Mythological Account of The Origin of Lūta

Once upon a time, it is said king Viśvāmitra went to the hermitage of the holy sage Vaśiṣṭha and somehow provoked the warth of the holy sage. Consequently sweat drops from the forehead of the enraged sage (Vaśiṣṭha) having brilliance like that of the sun. and trickled down on the heap of grass cut, which was collected for the use of the cows and these drops of sweat were transformed into innumerable dreadful and venomous spiders (Lūta) which are found to infest the articles of royal use for the iniquity of that royal sage (Viśvāmitra). They are called Lūtās (Spiders) from the fact of their being germinated from the drops of perspiration of the holy sage Vaśiṣṭha fallen on the cut grass and they are sixteen in number[1].

Ācārya Vāgbhaṭa included this Lūtaviṣa under the Kiṭaviṣa (insects) since it posses the features of insects[2].

II) Classification of Lūta

1) Based On Dōṣaprakōpa[3]

A) Vātika B) Paittika C) Ślēṣmika D) Sannipātika (miśraka)

१. सु.क. ८/८९-९३
२. अ.सं.उ. ४४/४.
३. अ.सं.उ. ४४/६-१०

2) Based On Viṣaprabhāva

A) Acutely and Violently (तीक्ष्ण विषयुक्त) - Death will occur within 7days.

B) Moderate (मध्यम विषयुक्त) - Death will occur within 7 to 10 days.

C) Mild (मन्द विषयुक्त) - Death will occur within 15 days.

3) Based On Prognosis (साध्यासाध्यता)

A) Kṛcchasādhya Lūtā - 8 types.

B) Asādhya Lūtā - 8 types.

III) Site of Poison in Lūta

The site of poison in spiders are eight. 1) Breath (श्वास), 2) Fangs (दंष्ट्र), 3) Fecal matter (पुरीष), 4) Urine (मूत्र), 5) Semen (शुक्र), 6) Saliva (लालास्राव), 7) Nails (नख) and 8) Menstrual fluid (आर्तव)[1].

IV) Clinical Features

1) General Features[2]

General features of the bites of the lūtās (spiders) are, appearance of a round shape with rash the white black, red, yellow or bluish in colour, soft elevated, its centre is either black or blue and resembling like a net at its edges, spreading in nature like visarpa, swollen, with burning sensation and severe pain, fever, undergoes quick ripening (ulceration or suppuration), exudation, sloughing, destruction of muscle tissue, causes the wound if this exudation gets touched to the other healthy parts.

---

१. अ.सं.उ. ४४/८५

२. दंशः सामान्यस्तासां दद्रुमण्डलसन्निभः । सितोऽरुणःपीतःश्यावो वा मृदुरून्नतः ।।
मध्ये कृष्णोऽथवा श्यावः पर्यन्ते जालकावृतः । विसर्पवाञ्छोफयुतस्तप्यते बहुवेदनः ।।
ज्वराशुपाकविक्लेदकोथावदरणान्वितः । क्लेदेन यत्स्पृशत्यंग तत्रापि कुरुते व्रणम् ।।
(अ.सं.उ. ४४/९२-९५)

2) Specific Features

A) According To Dōṣas Vitiation

त्रिदोषाः प्रायशः सर्वा लूताःपित्तकफाधिकाः ।।
(अ.सं.उ. ४४/३२)

Generally the poison of spiders have the properties of all the three dōṣās with predominance of pitta and kapha.

i) Vāyavya Lūta

Kamudā, Alaviṣa, Raktā, Citrā, Santā, Nimēcakā and Kasanā these seven are born from the earth (soil) are Vāyavyā and give rise to diseases of Vāyu[1]. It will show the features of the swelling which is roughness, blue in colour, giving rise to pain in the joints and such other symptoms[2].

ii) Āgnēya Lūta

Kapilā, Agnimukhi, Pītā, Padmā, Mūtrā, Sitā and Asitā these seven are born from sweat and Āgnēya and give rise to diseases of pitta[3]. It will show the features of the burning sensation, thirst, formation of blebs (vesicles) fever and burning sensation all over the body[4].

iii) Saumyalūta

Pāṇḍurā, Raktapādikā, Bhṛṅgā, Piṅgā, Trimaṇḍalā, Pūti and Vīrā these seven are born from eggs (ova) are Saumya and give rise to diseases of Kapha[5]. It will show the features of the hard swelling, white in colour, itching and mild pain[6].

---

१. अ.सं.उ. ४४/८

२. वातिकः परुषः श्यावः पर्वभेदादिरुक्करः ।। (अ.सं.उ. ४४/३०)

३. अ.सं.उ. ४४/६

४. दंशः पित्तात्मको दाहतृट्स्फोटज्वरदाहावान् । (अ.सं.उ. ४४/३०)

५. अ.सं.उ. ४४/७

६. सशोफः कठिनः पाण्डुः कण्डूमान् श्लैष्मिकोत्परुक् । (अ.सं.उ. ४४/३०)

iv) Miśrā Lūta

Kākāṇḍa, Ēṇapadī, Lājā, Vaidēhī, Jālini, Mālāguṇa and Suvarṇā these seven are Miśra (mixed qualities) and known as Upādika also. These spread through out the body quickly, causing fire like burning sensation, this is incurable being a combination of all the three dōṣās the others are curable[1].

B) According To the Site of Poison (स्थानुसार)[2]

i) By Breath (श्वास)

Poisoning by the breath, the person quickly develops swelling associated with fever and burning sensation.

ii) By Teeth

Bitten by the teeth, the site has profound swelling associated with pricking pain and burning sensation.

iii) By Excreta

By the excreta, there is swelling with foul smell, burning sensation, itching, pricking sensation, it ripens quickly and when ripe it is yellowish, which resembles the fruit of pilu.

iv) By Urine

The swelling has red coloured edges and black centre, resembles a whirl, emits foul smell, spreads outwards and has burning sensation.

१. अ.सं.उ. ४४/९-१०

२. श्वासेन दंशः सहसा शूयते ज्वरदावान्। दंष्ट्राकृतस्तूग्रतरो विवर्णः कठिनः स्थिरः।। गम्भीरशोफवस्तोदवेदनादाहसंयुक्तः। दुर्गन्धी शकृता दाहकण्डूविमिचिमान्वितः।। पच्यते चाशु पक्वश्च पाण्डुः पीलुफलोपमः। मूत्रेण रक्तपर्यन्तो मध्ये कृष्णो विशीर्यते।। आवर्तसदृशः शूनः पूतिः सर्पति दह्यते। शुक्रेण ग्रन्थिसंस्थानः कठिनस्तीव्रवेदनः।। अल्पमूलोत्सरूक्कोठो लालया कण्डुरो मृदुः। नखेन चोषपिटकाकण्डूधूमायनान्वितः। किंशुकोदरवर्णस्तु रजसा चञ्चुमालवान्।। (अ.सं.उ. ४४/१६-२०)

v) By Semen

The swelling resembles a tumour, is hard and very painful.

vi) By Saliva

There appears pain, elevated rash which is not deep seated has mild pain, itching and soft to touch.

vii) By Nails

Eruptions develop, which have burning sensation, itching and feeling as though hot smoke is coming out.

viii) By Menstrual blood

Eruptions appear having the colour of Kimmśuka flowers(red) and resembling garland.

C) Features of Spider According to Stagewise -

Vāgbhaṭacārya described different stages according to dayswise. And also mentioned the lesion at the site of bite by spiders does not manifest for half a day (from the time of bite).

i) First day

It appears as though pricked by a needle, with no discolouration over the affected part, there will be slight itching and pain[1].

ii) Second day

The site of bite shows with the features of raised edges, surrounded by eruptions with well change in colour of skin, depressed in the centre, has itching and resembles like a pitika[1].

iii) Third day

The poisonous features are suffering with fever, horripilations, red circular(mandala) patches with the shape of soucer(śarāvika), severe agonising pain and discharge from hair follicles[1].

१. अ.सं.उ. ४४/२३-२७

iv) Fourth day

There is profound swelling producing temperature, dyspnoea and giddiness[1].

v) Fifth day

It gives rise to symptoms of poisoning related/concerned to the dōṣās[1].

vi) Sixth day

The poison invades all the vital organs[1].

vii) Seventh day

The poison destroys the life[2].

D) According to Kṛcchasādhya and Asādhya

i) Kṛcchasādhya Lūta Lakṣaṇa

Trimaṇḍala, Śvēta, Kapilā, Pītikā, Āla, Mūtraviṣa, Raktā, Kasanā are eight. A bite by any of them is attended with an aching pain in the head, pain and itching about the seat of the bite and the symptoms and disorders peculiar to the aggravated vāyu and kapha.

ii) Āsādhya Lūtalakṣṇa

Sauvarṇikā, Lājavarṇā, Jāliṇē, Aṇipadi, Kṛṣṇā, Agnivarṇā, Kākāṇḍā, Mālāgu these eight are considered as Asādhya Lūtās. Their bites are marked by bleeding, fever, a burning sensation, diarrhoea and disorder due to the concentrated action of all the three deranged dōṣās of the body and the bitten part putrefies[3].

१. सूचीव्यधवदाभाति ततोर्सा प्रथमेऽहनि । अव्यक्तवर्णः प्रचल किंचित् कण्डूरूजान्वितः ।।
द्वितीयेऽयुन्नतोन्तेषु पिटकौरिव चाचितः । व्यक्तवर्णो नतो मध्ये कण्डूमान् ग्रन्थिसन्निभः ।।
तृतीये सज्वरो रोहर्षकृद्रक्तमण्डलः । शरावरूपस्तोदाढ्यो रोमकूपेषु सास्रवः ।।
महाश्चतुर्थे श्वयथुस्तापश्वासभ्रमग्रदः ।। विकारान् कुरुते तांस्तान् पंचमे विषकोपजान् ।
षष्टे व्याप्नोति मर्मणि सप्तमे हन्ति जीवितम् ।। विषमित्यतितीक्ष्णानामितरे विभजेदतः ।।
(अ.सं.उ. ४४/२३-२७)

२. सु.क. ८/९५-९६

३. सु.क. ८/९७-९८

V) Treatment

The cases of Lūta bite are the most difficult to diagnose and cure. The diagnosis of such a case puzzles the many ill experienced physician.

In case of doubt or conflicting regarding poisonous or non-poisonous conditions, a physician should employ such remedies which should not cause damage to rasa etc. dhātūs, since the agadas are applicable only in cases of poisoning otherwise in healthy non-poisoned persons would produce all kinds of discomfort. Hence it is incumbent on a physician to have the conclusive evidence of the poisonous nature and its onset, the administration of anti-poisonous drugs. A physician failing to assertion the existence of poison proves more fatal in many cases than the bite itself[1].

The ten fold treatment for the Lūtaviṣa as per the Suśrutācārya

नस्यांजनाभ्यंजपानधूमं तधाऽवपीडं कवलग्रहं च ।
संशोधनं चोभयतः प्रगगढं कर्यात्सिरामोक्षण मेवचात्र ।।
(सु.क. ८/९३४)

1) Snuff (nasya), 2) Medicated collyrium (aṃjana), 3) Unguents (abhyaṅgana), 4) Potions (pāna), 5) Fumigation (dhūma), 6) Administration of nasal drops (avapīḍhana), 7) Gargling (gaṇḍūṣa), 8) Emesis (vamana), 9) Purgation (virēcana) and 10) Blood-letting (sirāvyadhana).

1) Snuffing (नस्य)

Nasal drops prepared from śyayamā, yavaphala, seeds of phaṇijjaka, and śirīṣa macerated with the juice of vārtāka is best to remove the poison. And also it may be useful when there is feeling of heaviness of the head, swelling, salivation,

१. सविषं निर्विषं चैतदित्येवं - - - - - - - - - भिषग्वाव्यापादयेन्नरम् ।।
(सु.क. ८/७६-७८)

lock jaw, etc,[1].

2) Medicated Collyrium (अंजनम्)-

If disorders of vision, swelling and itching in the eyes are present at the time of onset of sleep, then collyrium prepared with the following drugs should be made use of vaca, manōhvā, trikaṭu, triphala, lōdhra, gairika, śaṅka, nīlōtpala, tāmra, muktā, hēma and pravāla[2].

3) Unguents (अभ्यंग)

Medicated ghee prepared with roots of kaṭabhī, tagara, sāmāṅgā, dēvadāru, the two bṛhati, gāṅgēyī, rōcana and candana[3].

4) Potions (पानम)

Sarpākṣī, candana, vakra, mṛgākṣī, gandhnākulī, ēlā, and mahāsugandha made into paste with goats urine and used for external application and internal drink in case of spider bite. There is none other equivalent to this.

5) Fumigation (धूपनम)

No specified drugs.

6) Avapīḍhana Nasaya

The drugs which are described for the nasya can be used.

7) Gargling (गंडूषम)

Can be done with any antipoisonous drugs.

8) Emesis (वमन)

In persons who are strong the aggravated dōṣās and

१. श्यामा यवफला ------ नस्यं विषहरं परम ।। (अ.सं.उ. ४४/६४)
२. नेत्रोपरोधश्वयथुकण्डुनिद्रासमागमे । -------- हेम प्रवालमकम् । (अ.सं.उ. ४४/६६-६७)
३. कटभीमूलतगरसमंगादेवदारुभिः ------ घृतम् ।। (अ.सं.उ. ४४/७८)

poison should be removed by administering the emesis therapy, using kākaṇḍakī, kōśavatī, lōdhra, indrayava and saindava or paṭōla patra, marica, karaghāta and priyaṅgu[1].

9) Purgation (वरेचन)

Purgation can be also done by triphala, trivṛt and saindava[2].

10) Blood-letting (रक्तमोक्षण)

Blood should be taken out from other parts of the body either using a sucking horn or by cutting the vein. After blood letting it is beneficial to pour cold ghee, milk etc. on the body[3].

Ācārya Vāgbhaṭa still explained that immediately after the bite the sting should be removed out from the site with a sharp instrument and the site should be burnt (cauterised) by heated Jāmbavōṣṭaśalāka. Cauterisation should not to be done if pitta symptoms are predominant[4].

All the cases of bites by any insect or by any snake and ulcers incidental to those bites should be carefully treated with measures and remedies laid down in connection with snakebites as long as the stage of inflammation and suppuration would last[5].

VI) Specific Management For Different Lūtās[6]

1) Tri-mandala	Is marked by a flow of black-coloured blood from which it is tran-	In such conditions the compound prepared by the arka

१. (अ.सं.उ. ४४/५१-५२)
२. (अ.सं.उ. ४४/५३)
३. (अ.सं.उ. ४४/३८)
४. अ.सं.उ. ४४/३५
५. सु.क. ८/१३६
६. सु.क. ८/१०१-११५

	stormed into an open ulcer. It is also attended with deafness, impaired or cloudy vision and a burning sensation in the eyes.	root, rajani nakuli, and pṛṣṇaparṇi, should be employed for the nasya, pāna, and vasti.
2. Śvēta	Followed by the eruption of white-coloured pustules attended with itching, burning sensation, epileptic fits, fever, erysipelas and pain and secretion from the bite.	An agada prepared from the candana, rāsna, ēla, hariṇu, nāla vañjula, kuṣṭha, lāmajjaka, cakra and nalandā is efficacious in such cases.
3. Kapila	Is characterised by the eruptions of copper-coloured pustules of an indurated nature accompanied by a sense of heaviness in the head, a burning sensation. vertigo and darkness of vision.	The agada which is prepared by padmaka, kuṣṭha, ēla, karañja, kakubha tvaka, sthira, arkaparṇi, apāmārga, dūrva and brāhmi, is very much useful.
4. Paitika	It is marked by an eruption of hard pustules, vomiting fever, colicky pain, and redness of eyes.	For this the agada is composed by the kuṭaja, uśira, kiṇihi śēlu, kadambha and kakumbha bark is very much useful.

5. Ala-Viṣa	It is marked by the bright red colour at the seat of bite, eruption of pustules like mustard seeds, dryness of the palate and a burning sensation in the body.	In this the agada composed of priyaṅgu, harivira, kuṣṭha, lāmajja, vanajūla, śatapuṣpa and sprouts of pippala and the vāta trees are very much useful.
6. Mūtraviṣa	In this attended with putrefaction, erysipelas, flow of a blackish blood, cough, difficult breathing, vomiting, epileptic fits, fever and burning sensation.	In these conditions manahśila, ela, yaṣṭimadhu, kuṣṭha, candana padmaka, and lāmajjaka is very much useful.
7. Raktā	Its bite is marked by eruptions of yellow-coloured red in the extremities with a burning sensation and slimy secretion.	For this the agada is tōya, candana, uśira, padmaka, and bark of arjuna and amṛtaka, is very much useful.
8. Kāsana	After its bite, flow of the cold blood and with cough and difficult breathing.	The treatment is as like for the rakta.

Treatment for the incurable cases of the spider bites should however be taken in hand by a wise physician with a due consideration of aggravated dōṣās or dōṣās in each case with the exception of making incisions (chēdanakarma).

SPIDER

I) Introduction -

There are at least 50,000 spider species in the arachnid family. Spiders are defined as having eight jointed legs, no wings, no antennae and only two body sections: the thorax and the abdomen. Spiders spend their entire life span capturing and eating other insects (about 2,000 in a year). Even though spiders do a great deal of good for our environment, spiders are greatly feared by most of the population. Most spiders are killed only because they scare people, not because they are actually dangerous to humans.

All spiders have some amount of venom with varying degrees of potency. The fangs of a spider are hollow. The venom is injected through the fangs into the victim (usually an insect). The venom will rapidly paralyze the victim and aid in digestion. Fortunately, most spiders are not dangerous to humans because their fangs are either too short or too fragile to penetrate human skin.

II) Poisonous Ingredient -

The poison of a spider contains protein, amines and polypeptides. Some of these molecules are capable of disrupting the communication between the nervous system and the muscles, which causes paralysis. Other molecules cause death of cells, which leads to necrosis.

III) Symptoms -

1) Body as a whole

- Pain similar to a bee or wasp sting at the site of the bite
- Sense of swelling of lips and throat.

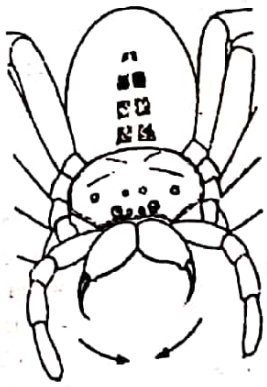
2) Respiratory -

- Difficulty in breathing

F-31 Black widow spider

Black widow Spider

They are found throughout California, especially in the warmer regions such as the Central Valley and Southern California. Only the female spider is dangerous to humans



F-32 Modern spider

Spider - *Neosparassus salacius*

The jaws of a modern spider, Aranaeomorphae.

are used to grab and crunch a prey. Most spiders use poison to kill their victims. At the end of the jaws are two syringe-like structures that are hollow and very sharp. These are used to puncture the body of a victim and to inject the poison. The poison is produced in special glands. These cells grow into small sacs with poison (vesicles) which, migrate to a special bladder where they burst. Around this poison bladder there is a spiral muscle that contracts to eject the poison through the syringes in to the prey.

3) Eyes, ears, nose, and throat

- o Angioedema (eye lid puffiness)
- o Skin temperature over the bite area tends to be warmer than the - surrounding area

4) Skin

- o Redness
- o Rash
- o Itching (usually caused by the penetration of barbed hairs)
- o swelling at the site of the bite

5) Heart and blood vessels

- o Rapid heart rate
- o Low blood pressure

IV) Bite marks

Bite marks from most spiders are usually too small to easily be seen. Frequently the patient will not recall being bitten.

V) Fatal dose -

How lethal is the poison of a spider? This is difficult question to answer. A poison is given a number LD50 to express its toxicity. LD50 stands for quantity of a lethal dose needed to kill 50% of a tested population. The poison of a black widow spider has a LD50 of 0.9 mg per kg mouse. Therefore 0.013 mg poison is enough to kill one mouse. The spider needs 2 mg to kill a frog. So the lethality differs among animals. Such a test has never been performed on humans. Therefore it is difficult to calculate how poisonous a spider is for humans. We know that the black widow can kill people.

The lethality of spider s poison to humans is very exaggerated. However there are spiders that are dangerous to humans. The Latrodectus species (Black widow), the Australian Sydney funnel web spider, *Atrax robustus*, and some wandering spiders from South -America are dangerous. These spiders use a substance that disturbs the nerve system, which can cause heart rhythm disturbances, cramps, shaking, pain and dizziness. A spider sting can be fatal to children and persons with weak constitution.

VI) Treatment -

Place ice (wrapped in a washcloth or other suitable covering) on the site of the sting for 10 minutes and then off for 10 minutes. Repeat this process. If patient has circulatory problems, decrease the time to prevent possible damage to the skin.

VII) Prognosis -

Death in a normally healthy individual is uncommon. Recovery usually takes about a week.

CHAPTER -16
कीटविष

I) ORIGINATION AND CLASSIFICATION OF KĪṬA
II) SHARP INSECT POISONOUS FEATURES
III) MILD INSECT POISONOUS FEATURES

I) Origination & Classification of Kīṭa (Insects)

Various kinds of insects germinate from the s:,men, fecal matter, urine, putrefied bodies, eggs of the serpents, are classified into different categories based on their vātaja, pittaja and kaphaja constituency, but ultimately these insects are composed of the characters of all three dōṣās. Though the insects are of small size but could prove to be fatal. These are ultimately classified according to dōṣa into four types[1],

1) Vātaja Kīṭa
2) Pittaja Kīṭa
3) Kaphaja Kīṭa
4) Sannipātaja Kīṭa

Vātaja Kīṭa are eighteen types and bite by these leads to Vātaja diseases and similarly the Pittaja Kīṭa are of twenty one types, Kaphaja Kīṭa are of thirteen types and Sannipātaja Kīṭa are of twelve types[2].

II) Sharp Insect Poisonous Features (तीक्ष्णविष कीटलक्षण)

The seat of the bite seems as if on fire or being burnt with strong alkali and is characterised by a red, yellow, white or vermillion colour. The other features are fever, breaking

१. सर्पाणां शुक्रविण्मूत्रशयपूत्यण्डसंभवाः ------ कीटत्वेऽपि सुघोराः स्युः सर्व एव चतुर्विधाः ।। (सु.क. ८/३,४)
२. सु.क. ८/५-१८.

and aching pain, horripilations, vomiting, thirst, a burning sensation in the body, loss of consciousness, yawning, shaking of the limbs, difficulty in breathing, hiccough, a burning and a cold sensation, eruption of pustules, swelling (in the affected locality), appearance of nodular glands (grandhi), circular erythematous patches (maṇḍala) on the skin, erysipelas, keloid (kiṭibha) and at the seat of the bite (karṇika) as well as any other symptoms peculiar to the dōṣa aggravated by the poison of each species[1].

III) Mild Insect Poisonous Features (मंदविष कीटलक्षण)

The symptoms which manifest in the case of a bite by such an insect are salivation (praseka), an aversion to food, vomiting, heaviness in the head, a slight sensation of cold and appearance of pustules and urticaria according to the deranged dōṣa aggravated by the species of the biting of insect[2].

IV) Treatment

All anti-poisonous and cleansing (viṣaghna and saṃśōdhana) therapies should be employed in all insect bites. In the sharp insects bite treatment to be employed as like in the snake bite poison[3].

Measure of treatment in case of three types (vātādi types) Insects should be planned according to three dōṣās. In treatment, fomentation, hot pastes and irrigation should be applied except in condition of fainting and the site of bite being vitiated with suppuration and sloughing; besides all kinds of anti-poisonous measures and repeated use cleansing procedures (emetic, purgatives, etc.) should be adopted[4].

१.सु.क. ८/१९-२२.
२.सु.क. ८/२३-२४.
३.अ.सं.उ. ४३/४८
४.क. ८/४२-४३.

1) Makṣika Kīṭaviṣa (Honey Bees)

A) Types

These are six types - 1) kōtārika, 2) kṛṣṇaka, 3) piṅgalika, 4) madhūlika, 5) kāṣāyī, 6) sthālika[1].

B) Poisonous Features

Bite by any of these is accompanied by swelling and a burning sensation. A bite by one of the sthālika or kaṣāyī species, however is marked by the preceding symptoms as well as by the eruption of pustules (pidika), with supervening symptoms in addition there[1].

C) Treatment

The application of the paste which was prepared by the black ant-hill (valmīkam) and the urine of a cow proves curative in cases of bites of pipilika, makṣika and maśaka[2].

The paste which is prepared by taking in equal parts with nagara, gṛhakapōtapurīṣaṃ, bījapūrakarasa, haritāla and saindava, which helps in the makṣikā bite immediately[3].

2) Guhagōdhika (Lizard)

A) Poisonous Features -

Bite by the guhagōdhika leads to burning sensation, oedema, pain and sweating[4].

B) Treatment

Saindhavalavaṇa, marica both should be taken in equal

१. ताभिर्दष्टस्य कण्डुशोफदाहरूजो भवन्ति स्थालिकाकाषायीभ्यामेतदेव श्यावपिडकोत्पत्तिरुपद्रवाश्च ज्वरादयो भवन्ति कषायी स्थालिका च प्राणहरे ।। (सु.क. ८/३५)

२. पिपिलिकाभिर्घष्टानां मक्षिका मशकैस्तथा । गोमूत्रेण युतोलेपः कृष्णवल्मीक मृत्तिका।। (सु.क. ८/५५)

३. नागरं गृहकपोतपुरीषं - - - - - - - - - भृंगजनितं विषमेतत् ।। (यो.र.विषचिकित्सा . ९)

४. विदाहं श्वयथुं तोदं स्वेदं च गुहगोधिका ।। (यो.र.विषनिदान)

parts to that equally neem seed powder should be mixed. And this medicine should be taken with the either honey or ghee, which helps in treating the sthāvara and jaṅgaviṣa also[1].

3) Śatapadi (Centipede)

A) Types

These are divided into eight types 1) paruṣa, 2) kṛṣṇa, 3) citra, 4) kapālika, 5) pītaka, 6) rakta, 7) śvēta and 8) agniprabha.

B) Poisonous Features

A bite by any of these insects is attended with swelling, pain and a burning sensation in the heart. A bite by one of the śvēta and agniprabha species is marked by all the aforesaid symptoms as well as by violent epileptic fits, an intolerable burning sensation and eruptions of white pustules[2].

C) Treatment

An agada composed of kuṅkummaṃ, tagaraṃ, śigru, padmakaṃ and rajajanidvayaṃ are pasted in the water and proves curative in the case of a bite by śatapadi[3].

4) Maṇḍūka Viṣa (Frogs)

A) Types

These are divided into eight different species kṛṣṇa, sāra, kuhakō, haritō, raktō, yavavarṇābhō, bhṛkuṭī, kōṭika.

B) Poisonous Features

Bite by any of these is accompanied by an itching sensation at the seat of the bite and a flow of yellow coloured foam from the mouth. A bite by one of the bhṛkuṭī and kōṭika species gives rise to the aforesaid symptoms as well as burn-

१. (यो.र.विषचिकित्सा . १)

२. तागिर्दष्टे शोफो वेदना दाहश्च हृदये श्वेताग्निप्रभाभ्यामेतदेवः दाहो मूर्च्छा चातिमात्रं श्वेपिडिकात्पत्तिश्च ।। (सु.क. ८/३०)

३. सु.क. ८/४९.

ing sensation, vomiting and a severe attack of epileptic fits in addition there to[1].

C) Treatment

An agada prepared from the mēṣaśṛṅgi, pāṭha, nicula, rōhiṇi, and bāluka is efficacious in all kinds of maṇḍūkaviṣa[2].

5) Pipīlikā Viṣa (Ants)

A) Types

These are six types sthūlaśīrṣā, saṃvāhikā, brāhmaṇikā, aṃgulikā, kapilikā, and citravarṇēti[3].

B) Poisonous Features

Bite by any of these is attended with swelling, burning sensation like fiery touch and inflammation at the site[4].

C) Treatment

The paste prepared with the soil of black ant hill pasted and the urine of a cow proves curative in cases of bites of flies, mosquitoes and ants[5].

6) Maśaka Viṣa (Mosquitoes)

A) Types

These are five types sāmudra, parimaṇḍala, hastimaśaka, kṛṣṇa, pārvatīya[6].

B) Poisonous Features

A bite by these is characterised by severe itching and swelling of the affected part, while the symptoms which mark

१. तैर्दष्टस्य दंशे कण्डूर्भवति पीतफेनागमश्च वक्त्रात्, भृकुटीकोटिकाभ्यामेतदेव दाहश्छर्दिमूर्च्छा चातिमात्रत् ।। (सु.क. ८/३९)
२. (सु.क. ८/५०)
३. (सु.क. ८/३४)
४. ताभिर्दष्टे दंशे श्वयथुरग्निस्पर्शवद्दाहशोफौ भवतः ।। (सु.क. ८/३४)
५. सु.क. ८/५५
६. सु.क. ८/३५

a bite by a pārvatīya one is similar to those of a bite by fatality venomous insects[1].

C) Treatment

The treatment is same as described for the pipīlikā viṣa[2].

7) Kaṇabha Viṣā (Hornet)

A) Types

These are four types trikaṇṭa, kariṇī, hastikakṣa and aparājita[3].

B) Poisonous Features

These are extremely painful in their bites giving rise to swelling, aching in the limbs, heaviness of the body and a black aspect at the seat of the bite[3].

C) Treatment

An agada prepared from the kuṣṭha, cakra, vaca, bilva roots, pāṭha, sauvarcika, gṛhadhūma and dviharidra is efficacious in the case of the trikaṇṭa[4].

8) Gōdhēraka Viṣa

A) Types

These are five types pratisūryaka, piṅgabhasa, bahuvarṇa, nirupama and gōdhēraka[5].

B) Poisonous Feature

The stages and the symptoms of bite by an insect of this group are often identical with a snake bite and are marked

१. तैर्दष्टस्य तीव्रा कण्डूर्दंश शोफश्च पार्वतीयस्तु कीटै प्राणहरैस्तुल्यलक्षणः ।। (सु.क. ८/३६)
२. (सु.क. ८/२७)
३. व्याख्यातास्तीव्रवेदनाः तैर्दष्टस्य श्वयथुरंगमर्दो गुरुता गात्राणां दंशः कृष्णश्च भवति।। (सु.क. ८/२७)
४. (सु.क. ८/४७)
५. (सु.क. ८/२८)

by all its characteristic pain and the appearance of dreadful nodular type of swelling of varied colours and shapes[1].

C) Treatment

The treatment of a case of a bite by pratisūryaka is the same as that of the snake bite[2].

9) Nakha Viṣa

A) Poisonous Features

In this insect bite, there will be burning sensation and supparation[3].

B) Treatment -

Bhṛṅgarāja svarasa is very much useful in this poison[4].

10) Jalauka Viṣa

A) Poisonous Features

If the poisonous leach bite leads to itching sensation, swelling and fever[5].

B) Treatment

Kaṭabha, arjuna, śirīṣa, lākṣa and kṣīravṛkṣatvaka all are taken in equal quantity either prepared into decoction or paste or powder can be used for the jalaika viṣa[6].

Wasps, Honey Bees and Hornets

These secrete a poisonous fluid which in toxic amounts is haemolytic and neurotropic. The bee venom

---

१. तैर्दष्टस्य शोफो दाहरुजौ च भवतः गोधेरकेणैतदेव प्रन्थिप्रादुर्भावो ज्वरश्च ॥ (सु.क. ८/२८)

२. (सु.क. ८/५५)

३. नखवकृष्यतेऽत्यर्थं पिडकादाहा भवन्ति । (सु.क. ८/३७)

४. (सु.क. ८/५५)

५. कण्डूं शोथं ज्वरं कुर्युः सविष जलौकसः ॥ (यो.र)

६. (यो.र)

contains complex poilypeptides.

Clinical features -

Single sting produces local irritation, burning pain and swelling but multiple stings sometimes produce symptoms resembling anaphylactic reaction. These are giddiness, sense of constriction in the chest, urticaria, tachycardia, unconsciousness, lividity of the face, jerky breathing, cold and calmy skin and invoutard passage of urine and faeces, sometimes haemoglobinuria and peripheral neuritis also present. Death may occur from shock. Bee stings can sometime produce severe generalised urticaria.

Treatment -

- The sting should be removed by lifting or scraping it out with the blade of knife or the finger nail.
- After the part should then be rubbed immediately with an antihistamine cream.
- Intravenous calcium gluconate is useful.
- In severe cases injection adrenaline 1 :1000 solution may be given I.M.,
- In a large doses of 1-2 c.c inj.. antihistamines and steroids should also be given.
- The sting is treated with Calamine lotion.
- A 10mg. tablet of iso-prenaline sublingually is equally effective.
- For severe reactions 100 mg. of hydrocortisone in normal saline drips is useful.

Centipedes

- They have segmented bodies with pair legs on each segment and a pair of claws on the first segment through which venom is injected.

- The length is from two to several centimeters.
- The colour may be greenish-black or black.
- They have powerful jaws and produce relatively large volumes of toxin, which may include histamine, serotinin, hydronidase, esterase and protienases.
- They produce paired bites of pinpoint type with spacing of up to 12mm.
- Fatal bites are rare.

Symptoms

- Local swelling, excruciating pain and necrosis, paralysis and contracture of extremities, cardiac irregularities, arthritis and meningism may occur.
- Symptoms subside in 2 to 3 days.

Treatment

- Inj. pethidine can be used to relieve pain.
- A ligature should be tied proximal to the bite and ice should be applied to the area for at least two hours.
- It could be lethal in children.

Ants

- They secrete formic acid by certain glands situated in the tail.
- Ant bite produces pain irritation and swelling at the site of the bite.

CHAPTER -17

FOOD POISONING

The term food poisoning may be used in a general or special sense. When the term is used in its general or wider sense, it includes all illnesses resulting from ingestion of poisonous foods and it is two yypes.

1. Bacterial food poisoning
2. Non-bacterial food poisoning.

I) Bacterial food poisoning

That the poisoning is due to bacterial products only. The bacterial products include bacteria and their toxins. The poisoning resulting therefrom is, by convention, known as **bacterial food poisoning.**

II) Non-bacterial food poisoning

The non-bacterial products include poisons derived from plants and animals, and inorganic chemicals.

Foods containing such products are, by convention, known as **poisonous foods.**

III) Diagnosis

1) Simultaneous attack of many persons at the same time
2) History of ingestion of common food by all sufferers,
3) Similarity of signs and symptoms in a majority of cases.

BACTERIAL FOOD POISONING

This is of three types, viz (1) infection type (2) toxin type, and (3) botulism.

Infection type: This results from ingestion of viable microorganisms that multiply in the gastrointestinal tract and produce a true infection, eg. salmonella group of organisms.

Toxin type: This results from toxins produced by multiplying

organisms that have gained access to the prepared food, eg, enterotoxin produced by the staphylococcus.

Botulism: This results from ingestion of preformed botulinum toxin in the preserved food. The toxin is produced by Clostridium botulinum.

1) Infection type of food poisoning

In this type of food poisoning, the organisms multiply in the gut and cause gastroenteritis. The common organisms responsible for the attack are the Salmonella group of organisms, and occasionally, the Shigella group.

The natural of reservoir of salmonella organisms in certain birds, mammals and reptiles. Food may be contaminated with infected excreta of mice or rats, or infection may be transferred by flies or by carriers employed in the handling of food.

Shigella infection is the result contamination of food or water supplies with the faeces of the individuals who either have the disease or, less often, are asymptomatic carriers of the organism.

Symptoms and signs

Depending on the susceptibility of individuals to salmonella food poisoning, while some participants may remain free from symptoms, others may be severely affected.

A) The incubation period is longer than slaphylococcal food poisoning. A delay of 12 hours or more is usual.

B) The onset is sudden.

C) A chill may be the Initial symptom, followed by headache, nausea and vomiting, severe abdominal cramps, and marked prostration.

Differential diagnosis

Three characteristics that differentiate it from staphylococcal food poisoning are;

A) Muscular weakness

B) Fever, and

C) Persistent, very foul smelling diarrhoea.

Diagnosis

The diagnosis rests on the isolation of the causative organism from the patient and suspected articles of food.

Treatment

A) The stomach should be washed and the bowel emptied by a cathartic if diarrhoea is not present.

B) For infection with the Salmonella group of organisms, the antibiotic of choice is chloramphenicol. Ampicillin or Septran can also be used.

C) For infection with the Shigella group of organisms, sulphaguanidine was used in the past; nowadays. Ampicillin and tetracyclines are used. Cotrimoxazole is as good as Ampicillin and preferred by some.

D) The rest of the treatment is symptomatic.

Postmortem appearances

A) These are those of gastroenteritis and general toxaemia.

B) The mucosa of alimentary tract is inflamed or even ulcerated.

C) Internal organs are congested.

2) Toxin type of food poisoning.

For this type of poisoning to occur

A. The food must be contaminated by a strain of organism that produces enterotoxin

B. It must be suitable for growth of this organism.

C. The infected food must be kept at a temperature suitable for bacterial growth and for a sufficiently long time so that an appreciable quantity of enterotoxin is formed.

D. Most cases are due to some strains of staphylococci which produce a heat stable enterotoxin.

Symptoms and signs

A. symptoms develop rapidly within one to four hours.

B. The first symptom is salivation, followed by acute gastroenteritis, and recovery in about 24 hours.

C. Unlike salmonella food poisoning, this condition is not an infection.

Differential diagnosis

The characteristics that differentiate it from botulism are

A. Symptoms appear rapidly and are mainly gastrointestinal

B. They are of short duration.

C. Recovery is usually prompt and complete.

Treatment

This is largely symptomatic and on the same lines as in salmonella food poisoning.

Postmortem appearances

These are the same as those found in salmonella food poisoning.

3) Botulism

A. The term botulism is derived from botulismus meaning a sausage, since large outbreaks of the disease were first observed following ingestion of improperly cooked sausage.

B. The causative agent is an anaerobic spore forming bacillus, Clostridium botulinum, which produces an exotoxin. It is commonly found in the soil.

C. The toxin is therefore likely to be present in such soil contaminated undercooked or canned foods. The foods that are most often responsible are meat, fish and vegetables.

D. The toxin is destroyed by heat at 80°C for thirty minutes and therefore adequate cooking gives protection against it. The toxin paralyses the muscles by blocking nerve impulses at the myoneural junction. It blocks the action of acetylcholine.

Symptoms and signs

A. The symptoms commence within 12-36 hours.

B. The initial symptom is usually diplopia from ocular muscle palsy, followed by difficulty in swallowing and speech.

C. The picture is thus one of bulbar palsy. Respiratory paralysis with extension to the breathing centre closes the scene.

D. Gastrointestinal symptoms are rare. The temperature is normal or subnormal throughout.

E. The victim is usually conscious to the end. The fatal dose of contaminated food may be less than 5 grams.

F. Death may occur within 24-48 hours or may be delayed for a week. The diagnosis rests on the isolation of the bacillus from food, or patient's vomit, faeces, or viscera.

Treatment

The stomach should be washed out and the bowels emptied by saline purges if necessary. The administration of anti-botulism serum is an urgency. Management of bulbar and respiratory failure is as for poliomyelitis. Mortality is 60 to 70 per cent.

Postmortem appearances

The pathological changes consist of congestion and haemorrhages in all the organs and especially in the central nervous system. Degenerative changes occur in the liver and the kidneys.

NON-BACTERIAL FOOD POISONING

By usual implication, this term excludes conventional food poisoning by bacteria and their toxins and is restricted to poisoning by articles of food due to

(1) Contained toxic principles
(2) Metallic contamination
(3) Food allergy.

1) Containing toxic principles

- The articles of food containing toxic principles are poisonous food grains, infected rye, adulterated oil, and poisonous mushrooms.
- The most common food grain so affected is lathyrus sativus (kesari dal), which gives rise to lathy rism, a spastic paralysis of the lower limbs. The other food grains which may be so affected are lolium temulentum (darnel), stigmata maides (maize), and paspalam scrobiculatum (kodra).
- The manifestations are usually neurological, viz, spastic paraplegia and polyneuritis.
- The contaminated rye (claviceps purpurea) produces convulsive or gangrenous type of ergotism. The mustard oil contaminated with argemone oil (katkar oil) produces dropsy.
- The poisonous mushrooms produce symptoms of irritant poisoning, neurotic poisoning, or both.

2) Metallic contamination

This is probably more common than dangerous. Various metallic poisons formerly occurred in food stuffs as dyes, preservatives or colouring matter. Such severe poisoning is not common nowadays.

3) Food allergy

- This is due to sensitivity to certain articles of diet. usually proteinaceous in nature.
- It is followed by an illness characterised by nausea, vomiting, diarrhoea, fleeting joint pains, and urticaria. oedema of the glottis and asthmatic seizures may follow.
- Many articles of food are implicated, viz, shell fish, eggs, tomatoes, strawberries, mussels, etc. In this, the individual factor plays a very important part.
- The abnormality is not in the food but in the allergic individual. Diagnosis is generally not difficult. Antihistaminics and steroids are of value.

In Āyurvēda a virudhāhara (incompatible food) can be considered under food allergy and it was defined precisely, the substances which cause utklēśa of dōṣās but do not expel them out of the body and also which possesses the contrdictory qualities of the bodily dhatus[1].

---

१. उत्क्लेश्य दोषान्न हरेद् द्रव्यं यत्तत्समासतः ।
विरुध्दं तद्धि धातूनां प्रत्यनीकतया स्थितम् ॥
(अ.सं.सू. ९/३७)

There are eighteen types of food incompatibilities described in caraka samhitaa. They are[1]:

1. **Dēśavirudhda** (Place incompatibility) E.g. Hot and sharp in arid place. Cold and unctuous in marshy place.

2. **Kālavirudhda** (Time incompatibility) E.g. Cold and dry in cold season. Spicy and hot in summer.

3. **Agnivirudhda** (Digestion incompatibility) E.g. In take of heavy food when the power of digestion is mild (mandāgni), intake of light food when the power of digestion is high (tīkṣaṇa), similarly intake of food at variance with irregular and normal power of digestion come under this.

4. **Mātṛāvirudhda** (Dose incompatibility) E.g. Honey and Ghee in equal quantities.

5. **Sātmyavirudhda** (Habit incompatibility) E.g. Very spicy food to a person who is not habituated to it.

6. **Dōṣavirudhda** (Humor incompatibility) Which aggravates any of the humors.

7. **Saṃskāravirudhda** (Process incompatibility) Incompatible due to improper cooking process. E.g. Pigeon fried in mustard oil.

8. **Vīryavirudhda** (Potency incompatibility) Combining of substances of opposing potencies.

9. **Kōṣṭavirudhda** (Gut incompatibility) Not suitable for the type of kōṣṭa. E.g. Strong purgatives in mṛdukōṣṭa and light laxative in kṛrakōṣṭa.

10. **Avasthāvirudhda** (Condition incompatibility) Not

१. यच्चापि देशकालाग्निमात्रासात्म्यानिलादिभिः ।
संस्कारतोवीर्यतश्च कोष्ठावस्थाक्रमैरपि ।।
परिहारोपचाराभ्यां पाकात् संयोगतोऽपि च ।
विरूध्दं तच्च न हितं ह्रत्संपद्विधिभिश्च यत् ।।
(च.सु. २६/८४)

suitable to the condition of the consumer. E.g. kaphavardhaka āhara to a excessive sleeping person.

11. **Kramavirudhda** (Order incompatibility) A person under natural urges should clear it and have food. E.g. Dining with the urge or taking the food without appetite is incompatible.

12. **Parihāravirudhda** (Proscriptions incompatibility) To expose to unfavorable conditions after food. E.g. To expose to heat after eating pork.

13 **Upacāravirudhda** (Prescription incompatibility) Use of things those are to be avoided before or after food. E.g To expose to cold after consuming Ghee.

14. **Pākavirudhda** (Cooking incompatibility) Improperly cooked. E.g.Use of bad fuel for cook or overcooked and uncooked food.

15. **Saṃyōgavirudhda** (Combination incompatibility) E.g. Milk with with acidic fruits.

16. **Hṛdayavirudhda** (Mental incompatibility) Objectable to mind E.g. Meat for a strict vegetarian.

17. **Sampad-virudhda** (Maturity incompatibility) Immature or over mature substances which do not have desirable qualities.

18. **Vidhivirudhda** (Regulation incompatibility) Against the rules of consuming food. E.g. Eating without privacy.

IV) Prevention of Food Poisoning

1. Buying groceries

- Buy meat and seafood items only from hygienic outlets.
- Do not buy items whose expiry date has elapsed.
- Do not buy items containing undercooked or raw animal-derived ingredients.
- Buy only pasteurized milk or cheese.

- Do not buy eggs which are cracked or leaking.

2. Storage

- Take groceries directly home and store immediately in the refrigerator.
- Always store raw meat, poultry, or seafood in plastic bags, so that drippings do not contaminate other items in the refrigerator.
- Purchased hot foods should be eaten immediately, or kept hot (> 60°C), or refrigerated.
- Do not store eggs in the egg-section of the door (provided in most refrigerators), since adequate cooling does not occur. Place them inside cartons and store them in the main section of the refrigerator.

3. Temperature requirements

- Never leave cut vegetables or meat in the open. Store them in the refrigerator or cook them.
- Ensure that the temperature in the main section of the refrigerator is always below 4° C, and that of the freezer is below -18°C.
- Cook all meat and seafood thoroughly before eating. Never consume undercooked oysters, clams, mussels, sushi, or snails.
- Cook eggs thoroughly until both the yolk and white are firm. Never eat runny yolk.
- Reheat food or heat partially cooked foods all the way through to at least 74° C.
- If any food item looks or smells suspicious, discard it.

4. Hygiene

- Wash hands, utensils, counters, and cutting surfaces with water and soap between preparation of different foods (especially in the case of raw meat, poultry, fish, or eggs).

- Use plastic or glass cutting boards for slicing vegetables or meat. Wooden boards are extremely difficult to clean adequately.
- Wash fresh fruits and vegetables under running water.

5. Dining out

- Avoid consuming uncooked animal-derived dishes (sushi, raw ysters, Hollan-daise sauce, eggnog, mayonnaise, etc).
- Do not eat undercooked meat or poultry.
- Do not consume egg preparations with runny yolk.

6. Foreign travel

- Drink only boiled or bottled water.
- Do not eat raw vegetables and salads.
- Do not buy food items from roadside vendors.

The following regulations mentioned in Ayurvedic dietetics are very useful to avoid food hazards.

1. Eat warm food. (In many diseased conditions cold food and drinks are advised. Such advises are according to the condition of the patient and are exceptions to the general rule.]
2. Eat moist food
3. Eat appropriate quantity
4. Eat only after the former food has digested.
5. Eat food substances which are not of opposing verya.
6. Eat in a pleasant place.
7. Eat with all fond equipment.
8. Eat with the loved.
9. Do not eat very fast.
10. Do not eat very slowly
11. Do not talk while eating
12. Do not laugh while eating
13. Be attentive in eating.

14. Consider your necessities and limitations, health condition etc.
15. Eat at the appropriate time, when hungry, preferably after bath.
16. Clean the hands face mouth before eating.

CHAPTER -18
POISONING INDIA

I) *Epidemiology*

Poisoning both accidental and intentional are a significant contributor to mortality and morbidity throughout the world. According to WHO, three million acute poisoning cases with 2,20,000 deaths occur annually. Of these 90% of fatal poisoning occur in **developing countries** particularly among agricultural workers.

The exact incidence of poisoning in India is uncertain due to lack of data at central level as most cases are not reported, and as mortality data are a poor indicator of incidence of poisoning. It has been estimated that about 5 to 6 persons per lakh of population die due to poisoning every year.There are more than four thousand species of medicinal plants growing as herbs, shrubs, and trees in India, many of which are poisonous when administered in large doses.

The toxic principles belong to alkaloids, glycosides, toxalbumins, resins, cannabinoides and polypeptides. Suicidal and homicidal cases of poisoning are common in India, as poisons can be easily obtained and many poisonous plants grow wild, e.g. datura, oleanders, aconite, nux vomica, etc. Many Indians consider the taking of life by bloodshed a greater crime than poisoning, strangling etc.

Accidental poisoning occurs from the use of philters or love potions, and quack remedies containing poisonous drugs, and snake bites. A love philter is a drug which is supposed to increase the love between the giver and taker. All aphrodisiacs such as cantharides, arsenic, alcohol, opium, cocaine and cannabis, are supposed to act as love philters.

In India, the common poisons are

- Insecticides and pesticides, such as organophosphates, chlorinated hydrocarbons, aluminium phosphide, carbamates and pyrethroids.
- Other poisons are corrosives, sedatives, alcohol, datura, oleanders, calotropis, croton and cleaning agents.
- In children kerosene, pesticides, drugs and household chemicals are commonly involved.

The commonest cause of poisoning in India and other developing countries is

- Pesticides, the reasons being agriculture based economics,
- Poverty and easy availability of highly toxic pesticides.
- Occupational poisoning due to pesticides are also common indeveloping countries,
- Due to unsafe practices,
- Illiteracy,
- Ignorance and
- Lack of protective clothing.

Among the adults, females predominate in all age groups, with an evident preponderance in the second and third decades of life. Acute poisoning in children is almost entirely accidental, while in adults is mainly suicidal

II) Poison Information Centres

National Poisons Information Centre has been established in AIIMS, New Delhi. It uses a computer software on poisons (INTOX) compiled by WHO. National Institute of Occupational Health at Ahmedabad has also a centre. These centres provide toxicity assessment and treatment recommendations over the telephone throughout the day for all kinds of poisons.

III) Prevention

(1) Education is a major component of any poison prevention programme.
(2) All drugs and toxic substances should be kept in locked cabinets.
(3) All household poisons must be kept separate from food.
(4) All products should be kept in their original containers.
(5) The label should be read before using the drug.
(6) No drug should be given or taken in the dark.
(7) All drugs whether expired or otherwise should be disposed in a safe manner.
(8) Drugs in child-proof packages only should be purchased.
(9) Children should be taught not to eat plants or berries.
(10) Wherever cooking gas is used, adequate ventilation should be provided.
(11) In persons showing suicidal tendencies, special care should be taken.
(12) In chemical factories air- pollution should be prevented.
(13) The workers in all factories should be properly educated, and safety equipment provided.

Indian statutes on drugs/poisons

Several legal Acts have been passed regulating and controlling the manufacture, sale, distribution, and possession of drugs and poisons. The principal Acts include the following:

1. The Poisons Act (1919)

This Act was amended in 1958 and repealed in 1960. It deals with the import of poisonous substances into India, license issuance for possession of certain specified poisons, and restrictions in the sale of such substances (mostly chemicals) as poisons, over which control is to be exercised.

2. *Drugs and Cosmetics Act (1940)*

This Act was amended in **1964.** It deals with the import, manufacture, distribution, and sale of all kinds of drugs. As per the Act, every patented or proprietary medicinal preparation should display on the label of the container, either the exact formula or a list of the ingredients.

3. *The Drugs and Cosmetics Rules (1945)*

This is an offshoot of the **Drugs and Cosmetics Act of *1940,*** and is concerned mainly with the standard and quality of drugs, apart from exercising control over the manufacture, sale, and distribution, of drugs and cosmetics. All types of drugs used in therapeutics have been included; allopathic, homoeopathic, ayurvedic, unani, and siddha. All drugs and cosmetics are required to be labelled and packed appropriately.

The Drugs and Cosmetics Rules have classified drugs into various Schedules as follows:

Schedule C - Biological products, sera, vaccines, etc.

Schedule E - List of poisonous substances under ayurvedic, siddha, and unani systems.

Schedule G - Hormonal preparations, antihistamines, anti-cancer drugs.

Schedule H - Barbiturates, amphetamines, reserpine, ergot, and some sulphonamides.

Schedule J - Drugs claimed to prevent or cure ailments such as appendicitis, blindness, cancer, cataract, epilepsy, hydrocoele, etc., which must not be advertised or imported.

Schedule L - List of prescription drugs (which includes drugs from Schedule H also)

4. *The Pharmacy Act (1948)*

The objective of this Act is to allow only registered pharmacists to compound, prepare, mix, or dispense any medicine on the prescription of a registered medical practitioner. Under this Act, the **Pharmacy Council of India** has been constituted which regulates the study of pharmacy throughout the country. Individual states have **State Pharmacy Councils** for registration of pharmacists.

5. *The Drugs Control Act (1950)*

This Act regulates the supply and distribution of drugs, and also guides the manufacturer or dealer in fixing the maximum price for every drug.

6. *The Drugs and Magic Remedies (Objectionable Advertisement) Act (1954)*

The objective of this Act is to ensure that ethical standards are maintained when drugs are advertised by the manufacturers. Advertisements which offend decency or morality can be banned under this Act. Also, those which claim magical powers for certain drugs, e.g., enhancement of potency, cure for incurable diseases, etc. Magical remedies include the use of talismans or charms such a mantras , kavachas , etc.

7. *The Narcotic Drugs and Psychotropic Substances Act(1985)*

The Narcotic Drugs and Psychotropic Substances Act (NDPS Act) was enacted in India and subsequently amended in **1988,** to implement the provisions of the Convention on

Psychotropic Substances (1971), and the Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988), both held in Vienna. This Act repeals and renders obsolete three previous Acts - **the Opium Act (1857), the Opium Act (1878)** and the **Dangerous Drugs Act (1930).**

CHAPTER - 12

SNAKE POISON

(सर्पविष)

I) CLASSIFICATION OF THE SNAKES
II) SNAKES REPRODUCTION
III) IDENTIFICATION OF THE SNAKES
IV) FACTORS THAT INFLUENCE IN THE INCREASE IN THE POTENCY OF THE SNAKE POISON
V) FACTORS INFLUENCE IN THE DECREASE IN THE POTENCY OF THE SNAKE POISON
VI) FACTORS INFLUENCING THE SNAKE BITE
VII) TYPES OF THE SNAKE BITE
VIII) DIFFERENCE BETWEEN POISONOUS AND NON-POISON SNAKE BITE
IX) DIFFERENT POISONOUS SNAKE BITE FEATURES
X) SNAKE POISON IMPULSES
XI) REJECTABLE PATIENT
XII) TREATMENT

Jangama Viṣa is a part of the Agada tantra which mainly deals with the poisonous animals. Carakācārya described about the types of the poisonous animals.

सर्पाः कीटोन्दुरा लूता वृश्चिका गृहगोधिकाः ।
जलौकामत्स्यमण्डूकाः कणभाः कृकलासकाः ।।
श्वसिंहव्याघ्रगोमायुतरक्षुनकुलादयः ।
दंष्ट्रिणो ये विषं तेषां दंष्ट्रोत्थं जगंम मतम् ।।

(च.चि. २३/९-१०)

The poison of serpents, insects, rats, spiders, scorpions, house lizards, leeches, fishes, frogs, hornets, lizards, dogs, tigers, jackals, hyenas, mongooses and other fanged animals is known as Jāgamma viṣa (poisonous animals). The sites and general features of the animal poison is already described in the previous chapters.

SNAKES

There are more than 2000 species of snakes in the world and about 216 species in India, of which 52 are poisonous. It is estimated that annually about 2 lakhs people (2 million, as per some other source) are bitten, of whom around 16,000 die. Since the majority of snakes are non-venomous.

I) Classification of The Snakes -

दिव्यभौमविभागेन द्विविधाः पन्नगाः स्मृता : । (अ.सं.उ. ४१/२)

In the basic classification of the snakes are two types - 1) Divya -divine (mythical) and 2) Bhauma - terrestrial (living on the earth).

1) Divya -divine (mythical) snakes -

They are Vāsuki, Takṣaka, Ananta, Sagara, Sāgarālaya, Nanda and Upananda. These are radiant just like fire and it is said that they always roar, cause rain, shine by themself and makes to shine, always supports and sustains the world, when becomes angry convert the world to ashes by their sight and breath ; our salutations to them, as there is no treatment for their wrath (which is definitely fatal).

Snakes have a characteristically elongated body, a proportionately short tail and no limbs. There is an opening in the rear part of the body known as vent. This is a common orifice for the intestinal as well as genitourinary systems. The part behind the opening is called the tail, which is round in land snakes and flat in sea snakes.

The body is covered by scales which are imbricate in primitive snakes and form a distinctive mark in the highly evolved ones. On the head there are two eyes, two nostrils but no external ear. The eye is covered by a transparent scale, has a round or vertical pupil but no eyelid with the result that it normally appears to be open all the time.(conti....)

...ma sarpa (terrestrial snakes) -

अशीतिरत्येव सर्पाणां भिद्यते पंचधा तु सा ।।
दर्वीकरा मण्डलिनो राजिमन्तस्तथैव च ।
निर्विषा वैकरंजाश्च - - ।।

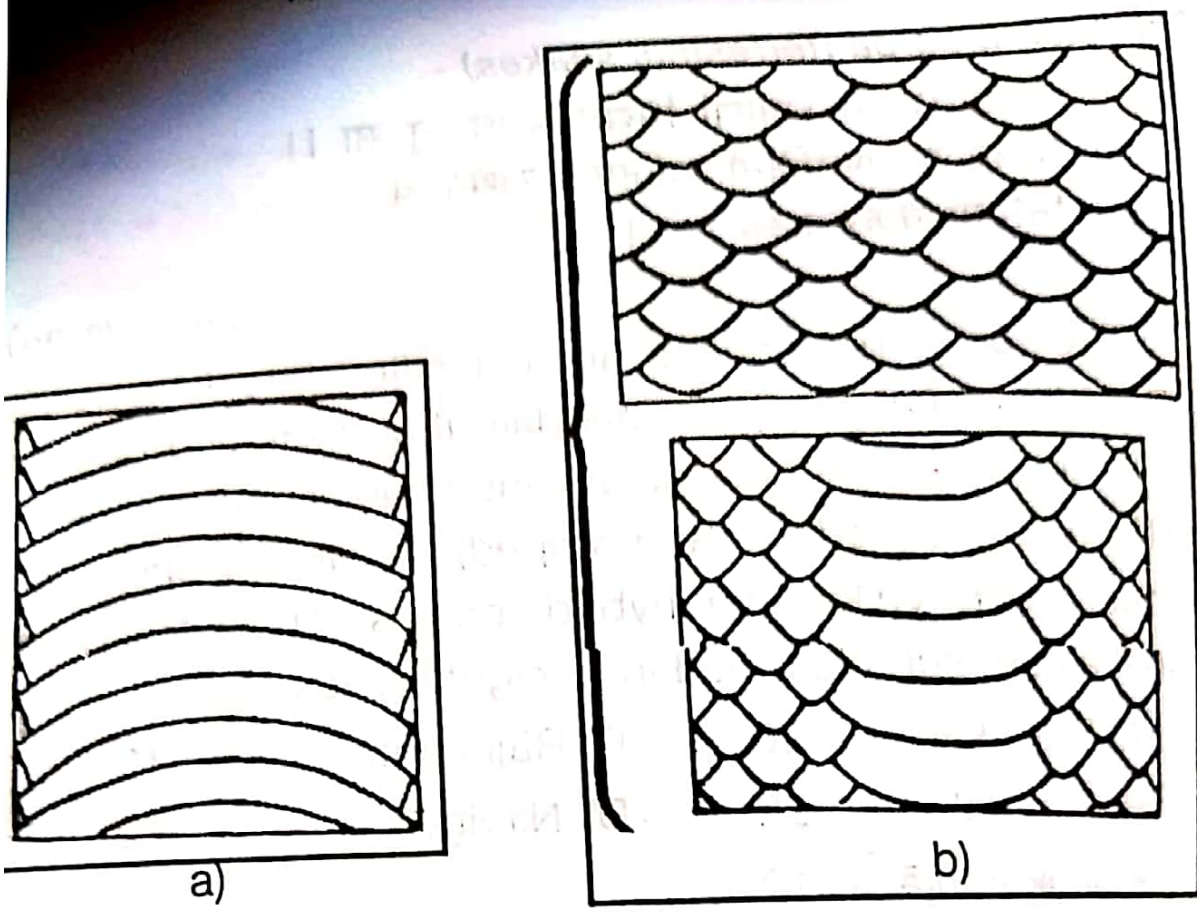
(सु.क. ४/९-१०)

The terrestrial snakes are classified into five types. A) Darvīkara (hooded), B) Maṇḍali (hoodless and painted with circular patches or rings of varied colours on their skin), C) Rājimanta (hoodless and striped), D) Nirviṣa (non-poisonous) and E) Vaikarañjā (hybrid species). These five types of snakes are sub classified in to eighty types.

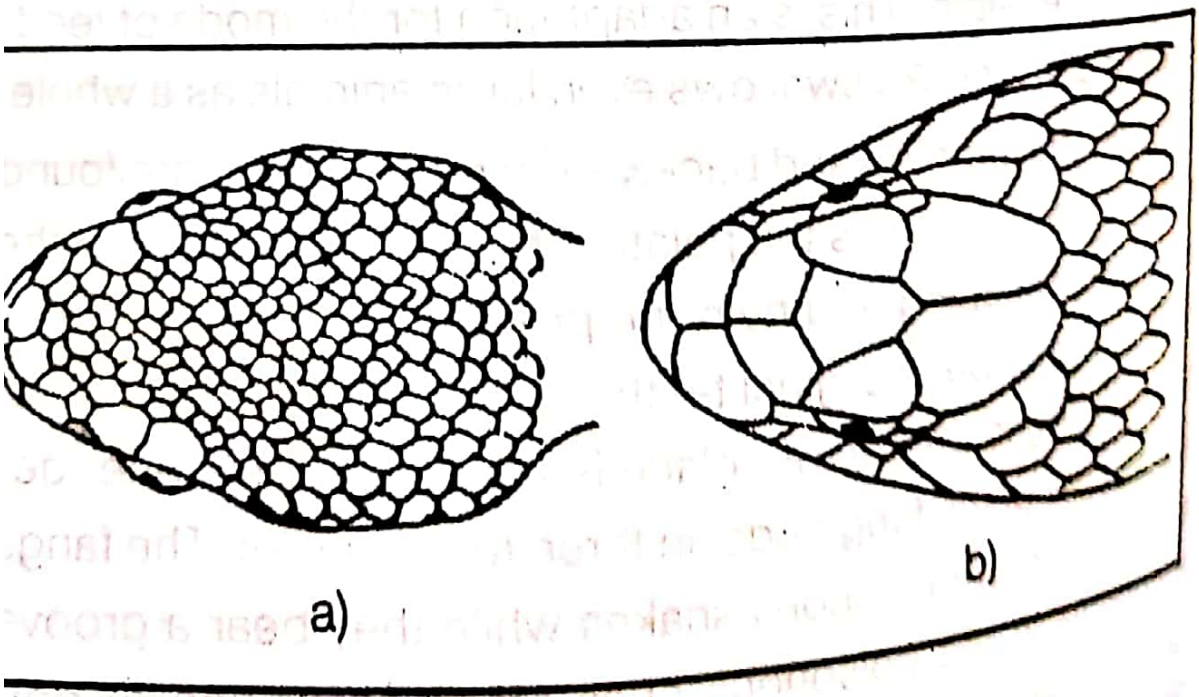
A) Darvīkara	- 26	C) Rājimanta	- 10
B) Maṇḍali	- 22	D) Nirviṣa	- 12
E) Vaikarañjā	- 10		

(conti...) The lower jaw consists of two bones in front joined by elastic ligament. It is not properly articulated with the upper jaw with the result that the mouth of the snake is widely distensible. This is an adaptation for the mode of feeding because a snake swallows even large animals as a whole.

The thin pointed and backward directed, teeth are found on both jaws as well as the palate. The recured teeth hold the prey from escaping and help the propulsion of food into the mouth. The upper marginal teeth are modified to form fangs. When a fang is broken, its place is taken by a new one, developed out of the fang buds, in three to six weeks. The fangs are solid in non-poisonous snakes while they bear a groove or channel in the poisonous ones for transmission of poison. They are connected to the poison gland by means of a duct. The parotid salivary gland is modified in poisonous snakes to act as a venom gland. It is situated below and behind the eye, one on each side, and secretes toxic saliva, known as venom.(conti...)



F19- Belly scales for a) poisonous &
b) Non-poisonous snakes



F20- Head scales for a) Poisonous
b) Non-poisonous or poisonous

From the modern aspect the snakes are mainly classified into two types

1) Poisonous snakes
2) Non-poisonous snakes

(cont...) **THE BASIC CLASSIFICATION OF SNAKES**

Divya- devine snakes

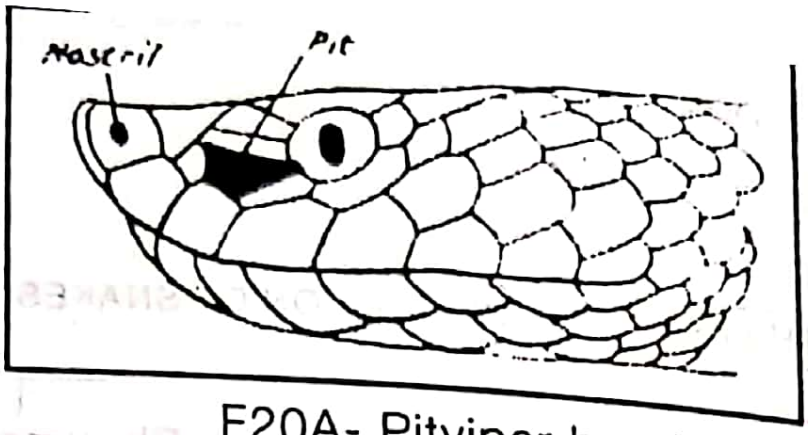
Vāsuki like these are can not be seen by the normal persons and these are mythical snakes.

Bhauma snakes

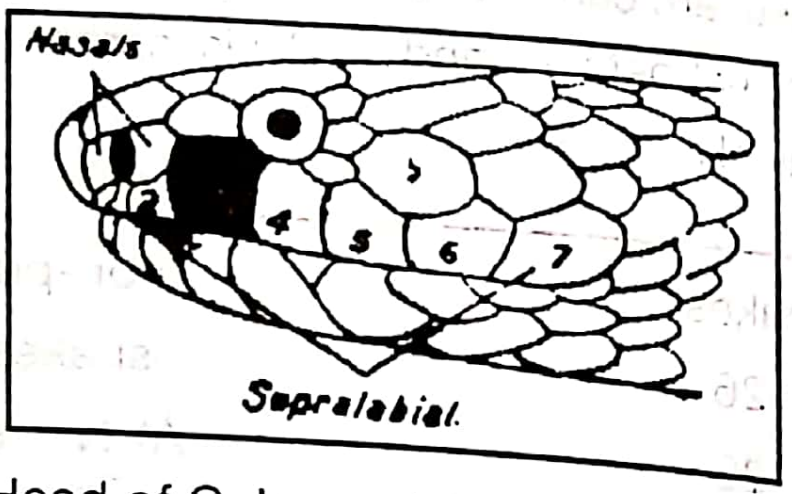
- Saviṣasarpa (poisonous snakes)
  - A) Darvīkara -26
  - B) Maṇḍali -22
  - C) Rājimanta -10
  - D) Vaikarañjā -10
- Nirviṣasarpa (non-poisonous snakes)
  - A) Nirviṣa -12

DIFFERENCE BETWEEN POISONOUS & NON-POISONOUS SNAKES

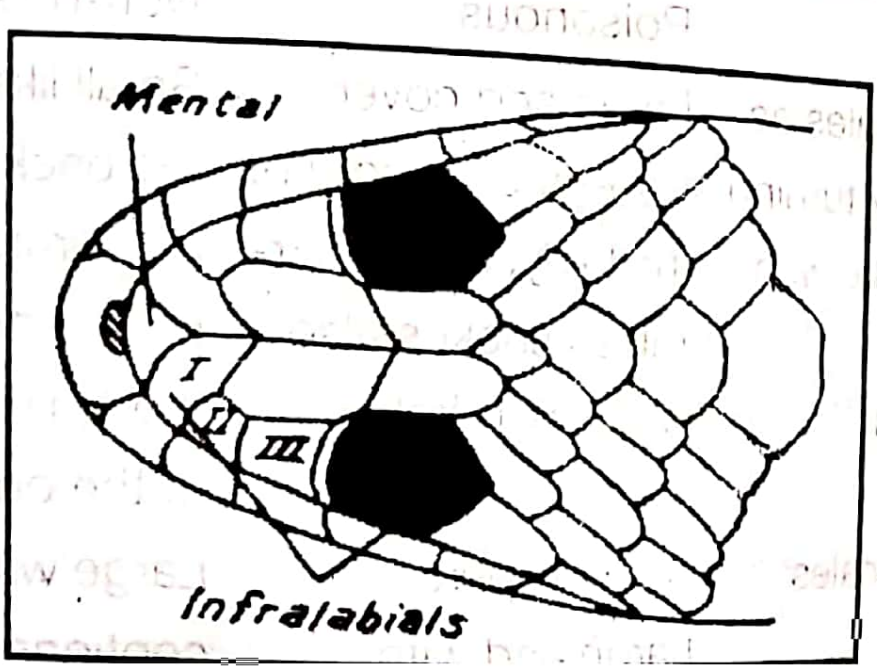
	Poisonous	Non-poisonous
1) Belly scales as seen by turning the snake with belly upwards[F19].	Large and cover the entire breadth of the belly. Some harmless snakes also have such belly scales.	Small like those on the back or moderately large, But do not cover the entire breadth of the belly.
2) Head scales[F20]	Small (vipers)	Large with the exceptions as out
	Large and with	
	a) Conspicuous pit between the eye and nostril (pit vipers)[F20A]	lined under the poisonous snakes, viz, pit vipers, cobra, king cobra, coral and kraits.
	b) Third labial touches (cont...)	



F20A- Pitviper head



F20B- Head of Cobra or King cobra or Coral snake



1) Poisonous snakes -

All venomous snakes may be divided into five families :

A) Crotalidae - Rattlesnakes, pigmy rattle snakes, copperheads, cottonmouths, pit viper and the massasugas.

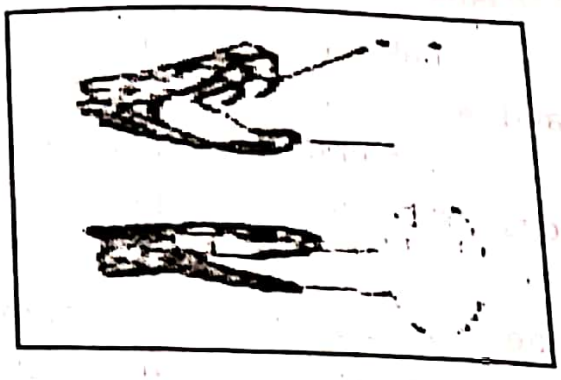
B) Viperidae - Russel's viper, gabbon viper, saw scaled viper, puff adder.

C) Elapidae - Consists mainly of cobra, krait, coral snakes and mamba(contains neurotoxic venom).

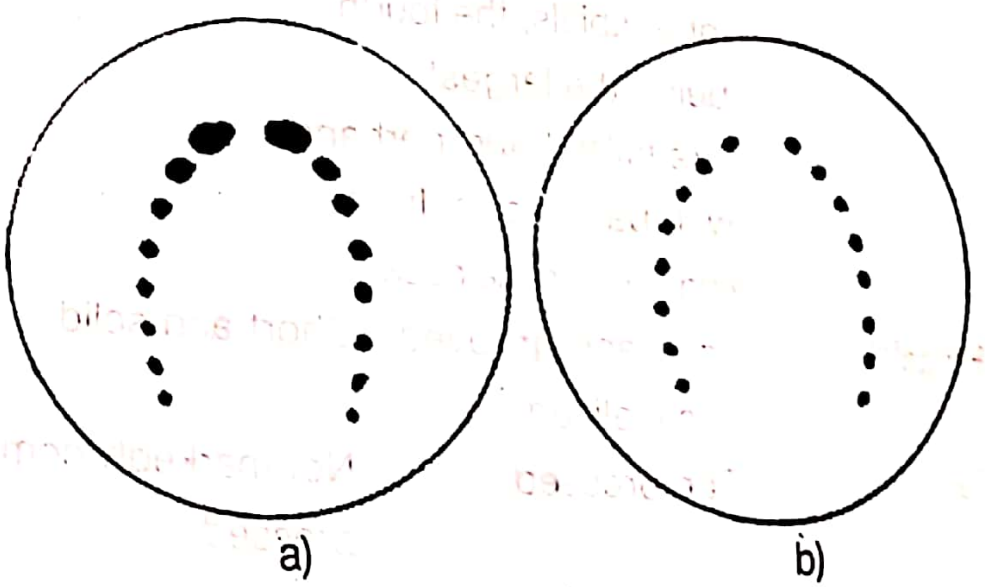
D) Hydrophidae - Consists of sea snakes (contains myotoxic venom).

(cont..)	the eye and nasal shields (cobra, king cobra or coral[F20B]) c) Central row of scales on back enlarged and under-surface of the mouth with only four infra-labials, the fourth being the largest (kraits)[F20C], and perhaps with bands or half rings across the back.	
3) Fangs[F21]	Long and grooved or canalised	Short and solid.
4) Tail	Compressed	Not markedly compressed.
5) Habits	Generally nocturnal	Not so.
6) Bite marks[F22]	Two fang marks with or without small marks of other teeth.	A number of small teeth marks in a row. (cont...)

Scanned with CamScanner

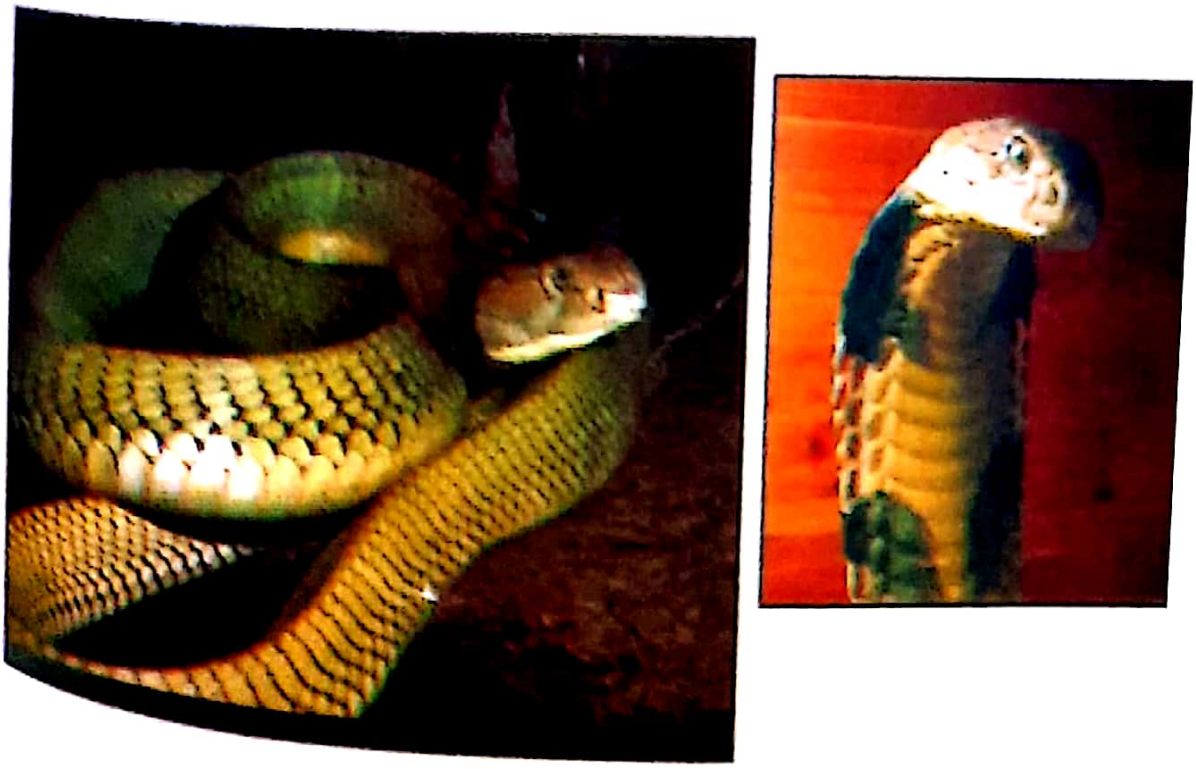


F21- Fangs of Poisonous and non-poisonous snake



F22- Bite marks a) Poisonous snake
b) Non-poisonous snake

F23- Common cobra



F24- King cobra

E) Colubridae - Boom slangs, bird snake of the African continent.

(cont....) On the basis of the Āyurvēdic classification of the snakes can be interpretated with the modern classification of the snakes in the following way :

1) Darvikara (making the hood) -

These snakes expand their neck on either side and thus produce the hood, when they are enraged and at the time of striking its prey etc. The two varieties of hooded snakes are common cobra and king cobra.

A) The Common cobra (Naja-naja)[F23] -

Grows to a length of 5 - 6 feet, usually brown in colour, the neck and back speckled with small golden spots. On the hood there is a predominant mark resembling single or double spectacle or scissors, eyes have no lids and the pupils are circular. It moves very fast and in zigzag manner with the help of its belly (snakes have no legs).

B) The King cobra (Naja-bungarus)[F24] -

Is usually very black in colour grows to a length of 12 - 15 feet, it can produce the hood but there will be no marks on it. Both of these hooded snakes lay eggs.

2) Maṇḍali (having patches on the back) -

These snakes have big patches, round or irregular in shape, arranged horizontally. Among such snakes viper are common.

Vipers -

Two kinds of vipers are mostly found within India, i) Pit viper[F25] - It has a pit or depression on either side of the head between the eye and nostril. ii) Pitless viper head of vipers are broad, neck narrow and short tail. Pupils of eyes are vertical these cannot make the hood. There are two varieties of pitless vipers. (conti....)

F25 - Pitviper

F26- Russels viper

F27- Saw scale viper

II) Snakes Reproduction (जन्म कर्म) -

Generally the female snake is fertile (fit to conceive) during the month jyēṣṭha (may); during the month āṣāḍha (july) it mates with the male snake (and conceives) and during the

---

(conti....) a) Russels viper[m]-grows to a length of 4 - 5 feet, head triangular, flat and has a V shaped mark. Body white with dark circular or semi-circular patches in three rows. It makes a loud hissing sound during the attack. b) Sawscaled viper[m] - is a small snake of 1/2 to 3 feet, brown or grey, back covered with rough scales, head triangular with white mark like an arrow on the head.

3) Rājimanta (with stripes) -

Two kinds of snakes with stripes on their back common in India are viz- a) *Common krait*[m] (Bungarus Caeruleus), grows to a length of 3 - 5 feet has shining grey colour, with single or double, white or brown stripes on the back extending from side to side. b) *Banded krait*[m] (Bungarus Fasciatus) grows to a length of 5 - 6 feet. It is black in colour, has cross stripes alternating with deep yellow and black bands and so beautiful to look at.

4) Vaikarañja (cross bred/hybrid)-

Are the other kinds of small snakes, tree snakes, coral snakes, water snakes.

Python (python molurus)-

.Is the biggest and heaviest snake grows to about 25 feet in length and 300 lbs in weight. Brown in colour with dark grey edged rhomboid shaped patches on the back. It is very lethargic (slow moving) becomes active at the site of the prey. It hurls itself on it, coils round, strangulates it and then swallows it. (According classics [Su.Ka. 4/38] it can be compared with **Ajagara** which destroys the body and life by swallowing and not by poisoning).

F28 - Common krait

F29 - Banded krait

month of kārtika (november) it lays two hundred and forty eggs'.

From the eggs which resemble karketana maṇi in colour come out as male snakes, from the eggs which have long red lines, when hatched come out as female snakes and from those eggs resembling flowers of śirīṣa in colour come out eunuchs snakes (napuṃsaka).

On the seventh day after their birth, four fangs (poison teeth) develop and from the fourteenth day onwards poison appears in these fangs. Among the four fangs, the one which is present on the left side of the lower jaw is black, the one above it (on the left side of the upper jaw) is yellow, the fangs on the right side in the lower jaw is red, the one above it on the right side in the upper jaw is blue; on these fangs one, two, three and four drops (bindu) of poison is present respectively. Here the word 'bindu' means the size of a mudga (green gram). This is generally the quantity in hooded snakes only and not in others.

Apart from these four fangs, there are fortyfour numbers of teeths in snakes, which are not poisonous.

III) Identification of The Snakes -

The identification of different snakes can be done as per the classical references on the following basis :

1) Physical Appearance-

A) Darvīkara -

Those having hooded and fast moving having marks resembling of a wheel or a plough, an umbrella or a cross (Svasthika) or goad (Amkusa) on their body should be known as Darvīkara sarpa.

B) Mandali -

Those having large body variegated with various types

circular marks, slow-moving and lustrous like fire and the sun should be known as Mandali sarpa.

C) Rājimanta -

The snake which are glossy and whose bodies look colourful as if painted with various colours horizontal, perpendicular and lateral stripes are known as the Rājimanta sarpa.

2) Sex Differences Of Snakes (लिंग लक्षण)[1]-

The eyes, the tongue, the mouth and the head of a male serpent are large, while those of female snakes are small. Those which partake of both these features, mild-poison and angerless should be considered as hermaphrodite (Napumsaka).

3) Features of Castes (जाति लक्षण)-

This classification it is very difficult to explain in scientific way , but the features can be described for each type as follows from the classical references.

A) Brāhmaṇasarpa[2]-

Brāhmaṇa snakes are angry, bluish brown or whitish-red in red colour, mouth is red, eyes are brown, roam about in cleaner places, possess marks such as that of the yajñōpavīta (sacrificial thread) etc. characteristic of brāhmaṇans on their hood and emit smell like the flowers of bilva, hima (candana), uśīra, padma, guggulu etc.These snakes bite from the front and it aggravates the tridōṣās.

B) Kṣatriyasarpa[3] -

Kṣatriya snakes are proud, brave, with red eyes, get angry soon, possess colour like those of ripe fruit of jāmbū, kharjūra, drākṣa and broken aṃjana lump, marks on the hood resem-

१. सु.क. ४/३५
२. अ.सं.उ. ४१/२३-२४
३. अ.सं.उ. ४१/२५-२६

bling half-moon, śrīvatsa gem, conch wheel or plough, emit smell like that of jāti, campaka, punnāga patra and jōṅgaka. These snakes bites from the right side of the person and it aggravates the vātadōṣa.

C) Vaiśyasarpa[1]-

Vaiśya snakes posses colour like a piegon, vajra (diamond) and gomedaka (beryl), body covered either with dots or patches of the colour of smoke, pāṭala flower or red, emit smell like that of goat, kuṣṭha, sheep's milk and ghee and it bites from the left side and it aggravates the pitta dōṣa.

D) Śūdrasarpa[2]-

Śūdra snakes are similar in colour to wheat, buffalo, elephant or slush, have dots or lines on the body, dry (rough) and emit smell of surā (beer) or blood, and it bites the person from the back and it aggravates the kapha dōṣa.

IV) Factors influencing in the increase in the Potency of the Snake poison -

1) Age and Season (आयु, ऋतु का प्रभाव)[3] -

Darvīkara snakes have more poison during its youth (taruṇāvastha) and **rainy season**, *maṇḍali* snakes during its **middle age** (madhyamāvastha) and **winter**; **rājīmanta** snake during its **old age** (vṛdhdāvastha) and **summer season** and where as the *vyantarā* (cross breed/hybrid snakes) during the **intervening periods** (ṛutusandhi) of seasons.

2) Sex (लिंग का प्रभाव)[4] -

The male snakes are powerful during day, similarly female snakes are during night, eunuchs are during evening

---

१. अ.सं.उ. ४१/२७.

२. अ.सं.उ. ४१/२८.

३. अ.सं.उ. ४१/७.

४. अ.सं.उ. ४१/२२.

timings and bite during those periods repetitively, some times the females bite always (anytime).

Snakes which dwell in places such as burial ground, sacred tree, anthill, sacrificial site, temple, meeting place of four roads, reservoir of water, old garden, hollows in trees, trees yielding milky sap, neem tree, near water falls and caves of mountains, which bear marks (on their hood) such as wheel, diamond, mace, spear and trident, which have a jata (tuft of hair, crown), whose mouth and eyes are red-these possess intense of poison. These have no rule regarding time no order of sequences in the appearances of stages of poisoning. Even by the strength (power) of mantra and tantra (remedial hymns and magical methods) it does not get cured completely. Only those few who adopt upahāra (charity), namaskāra (worship), japa (meditation) and śānti (propitiatory rites) survive when bitten by these and that too with ugly appearance or distortion of the body[1].

V) Factors influencing in the decrease in the Potency of the Snake poison -

Snakes drenched in water, debilitated by copulation, which are frightened, vanquished by the mongoose, tormented by cold breeze, sunlight, disease, hunger, thirst and fatigue, soon after coming from a different region, soon after shedding off its peel, which wander in forests full of kuśa grass, auṣadhi (medicinal plants) and kaṇṭaka (thorny vegetation) and cultivated regions (powerful divine and medicinal places) possess little quantity of poison or decrease in the potency of the poison[2].

VI) Factors influencing the - Snake bite -

Snake bite (man and other animals) for the purpose of

१. अ.सं.उ. ४१/७२-७५.
२. अ.सं.उ. ४१/७०-७१.

food, by fear, being touched by the feet, accumulation of more poison (in their body), anger, committing of sinful acts (by man etc.), by hatred and instigation by gods, sages and yama (Lord of death). The effect of poison is more predominant in each succeeding one[1].

VII) Types of the Snake bite (सर्पदंश के भेद)-

There are differences in the classification between Suśruta and Vāgbhaṭa and can be understood as follows :

Suśruta described the three types -

1) Sarpita, 2) Radita, 3) Nirviṣa and Sarpāṅgābhihata is also included separately.

Vāgbhaṭa described the five types -

1) Tuṇḍāhata, 2) Vyālīḍha, 3) Vyālupta, 4) Daṣṭaka and 5) Daṃṣṭrānipīḍita.

1) Tuṇḍāhata -

न तु दंष्ट्राकृतं दंशं तत्तुण्डाहतमादिशेत् ।।

(अ.स.उ. ४१/३७)

Where the place of bite is only wet by the saliva (of the snake) but no mark of teeth are seen then it should be known as tuṇḍāhata (hit/assault by the mouth).

2) Vyālīḍhā -

एकं दंष्टापदं द्वे वा व्यालीढाख्यमशोणितम् ।

(अ.सं.उ. ४१/३७)

Mark of one to two teeth (bite) seen but there is no bleeding then it should be known as vyālīḍha.

3) Vyālupta -

दंष्टापदे सरक्ते व्दे व्यालुप्तं त्रीणि तानि तु ।।

(अ.सं.उ. ४१/३७)

Scanned with CamScanner

Mark of two teeth seen along with bleeding is known as vyālupta.

4) Daṣṭaka -

मांसच्छेदादविच्छिन्नरक्तवाहीनि दष्टकम् ।

(अ.सं.उ. ४१/३८)

Three such marks of teeth seen accompanied with tearing of muscle only but not the blood vessels is known as daṃṣṭaka.

5) Daṣṭanipīḍita -

दंष्टापदानि चत्वारि तद्वदष्टनिपीडितम् ।।

(अ.सं.उ. ४१/३८)

Four teeth marks are seen with others (tearing of muscle and blood vessel) is known as Daṣṭanipīḍita.

Among these the first two are not having poison and last two are incurable.

VIII) Difference between the Poisonous and Non-poisonous Snake bite - (सविष & निर्विष सर्पदंश भेद)

Bites (of snake) having poison are accompanied with painful swelling, pricking, knotty, itching and severe burning sensation. Those without poison have opposite features[1].

---

१. दंशस्तु सविषः सर्वः सशोफो वेदनान्वितः । तुद्यते ग्रथितः किंचित् कण्डूमान् दह्ये भृशम् ।। निर्विषो विपरीतोस्मात् - (अ.सं.उ. ४१/४३)

*From the Suśruta's view the snake bites are three + one (sarpita, radita and nirviṣa + sarpāṅgābhihata). The bite in which one, two or more marks (punctures) of fangs of considerable depth are found on the affected part attended with a slight bleeding as well as those which are extremely slender and owe their origin to the turning aside and lowering of its mouth (head) immediately after the bite are attended with swelling and the characteristic changes (in the system

(cont...)

IX) Different Poisonous Snake bite Features -

1) Features Of The Darvīkara Snake bite (दर्वीकरसर्प दंश लक्षण)-

The site of bite of snake is seen elevated like tortoise back, dry, with small (thin) marks of teeth, associated with abnormal symptoms such as blue colour of the face, nails, urine, eye, faces and skin, fever with rigors, pain in the joints, loss of sleep, more yawning, rigidity of the neck, distention of the veins, catching pain of the bones of the back and waist, loss of speech, heaviness of the head, anorexia, cough, dyspnoea, stiffness of the lower jaw, pain and twisting movement inside the abdomen, dryness and obstruction of the rectum, irrelevant speech, loss of movements; loss of consciousness just like a dead man, appearance of forth and saliva at the mouth, hiccup, rum-

---

(conti....) of the victim) should be known as the **sarpita**. These features looks to be similar to the **daṃṣṭranipīḍita, daṣṭaka** which were described by the Ācārya Vāgbaṭa.

A bite made by the fangs of a snake and the affected part being attended with reddish, bluish, whitish or yellowish lines or stripes is called the **radita** bite which is characterised by the presence of a very small quantity of venom in the punctured wound. These features looks to be similar to the **vyālupta**, which was described by the Ācārya Vāgbaṭa.

A **nirviṣa** (non venomous) bite is marked by the presence of one or more fang marks, and absence of swelling and the presence of slightly vitiated blood at the spot and is not attended with any change in the normal condition of the person bitten. This can be compared with the **tuṇḍāhata, vyālīḍa** which were described by the Ācārya Vāgbaṭa.

Scanned with CamScanner

bling sound in the throat, dry belchings often and other symptoms of vāta (aggravation)[1].

2) Features of The Maṇḍali Snake bite (मण्डलिसर्प दंश लक्षण)-

Bite by this snake has great heat locally, site is dry, appears yellowish red in colour, muscle becomes thick with visarpa (herpes) like ulcer accompanied with burning sensation, heat, moistness (exudation) putrefaction and falls off. Associated abnormalities such as yellowishness of the face, teeth etc., thirst, fatigue, giddiness, burning sensation, fainting, fever, bitter taste in the mouth, seeing all things as yellow, bleeding from above channels (nose, ears, mouth) and from below (urethra, vagina, rectum) desire for cold, feeling of smoke coming up from the stomach, toxicity, accumulation and flow of fluids from the entire body and other disease/symptoms of pitta aggravation[2].

3) Features of Rājīmanta Snake bite (राजीमंतसर्प दंश लक्षण) -

Bite by this snake the site becomes unctuous, firm, slimy, swollen, blood which is thick, cold, pale in colour. As-

---

१. तत्र दंश फणावताम् । कूर्मप्रष्ठोन्नतो रूक्षः सूक्ष्मदंष्टापदान्वितः ।। विकाराः श्यावता वक्त्रनखमूत्राक्षिविट्त्वचाम् । शीतज्वरः सन्धिरूजा निद्रानाशो विजृम्भिका ।। मन्यास्तंभः सिराध्मानं पृष्ठकचस्थिवाग्ग्रहाः । शिरोगुरुत्वमरूचिः कासश्वासौ हनुग्रहः ।। शूलमुद्वेष्टनं कोष्ठे शोषरोधौ मलाश्रयौ । सन्दिग्धवाक्त्वं नैश्चेष्टचं मृतस्येव विसंज्ञता ।। फेनलालोद्गमौ हिध्मा कण्ठे घुरुघुरायणम् । शुष्कोद्गारो मुहुस्ते ते वातजाश्चापरे गदाः ।।
(अ.सं.उ. ४१/४४-४७)

२. दंशो मण्डलिनां सोष्मा सशोषः पीतलोहितः । पृथुर्विसर्पदाहोषाक्लेदकोथैर्विशीर्यते।। विकारा वक्त्रदन्तादिपीतता तृट्श्रमो भ्रमः । दाहो मूर्च्छा ज्वरस्तिक्तवक्त्रत्वं पीतदर्शनम्।। रक्तागमनमूर्ध्वाधःशीतेच्छा धूमको मदः । आशुसर्वांगविसृतिर्गदास्ते तै च पित्तजाः ।।
(अ.सं.उ. ४१/४९-५१)

sociated abnormalities such as headache, anorexia, vomiting, rumbling sound in the throat and difficulty in expiration, sleep, cough, white colour of the nails etc., rigidity and feeling of heaviness of the body, discharge from the nose, eyes and mouth, horripilations, loss of consciousness, dyspnoea and such other symptoms of kapha origin[1].

4) Features of Male Snake bite-

Bitten by a male snake, the person gazes upwards, keeps his right leg briskly over the upper part of the body like a brave man and symptoms are weak during nights[2].

5) Features of Female Snake bite-

The symptoms are opposite to the features of the male snake bite and person will have feeble voice diarrhoea, shivering fear and fever.

6) Features of Eunuch Snake bite -

Bitten by an eunuch snake, the person has a sideward gaze, greatly fearful and desire for copulation.

7) Features of Other Snake bite -

Bite by an aged snake (vṛddhasarpa) makes the person talks too much, with mild grade of pain for longer period. Bite by a young snake (bālasarpa) causes appearance of symptoms with sever grade of pain in a short term period. Male offspring (kumārasarpa- not having mating with a female) produces redness in the right eye of the person, while bite by femal offspring (kumāryāsarpa -snake not having mating with a male) causes redness in the left eye. Biten by a preg-

---

१. दंशो राजीमतां स्निग्धः स्थिरपिच्छिलशोफकृत् । सान्द्रास्रःशिशिरः पाण्डुस्ताद्विकाराः शिरोव्यथा ।। अरूचिश्छार्दिरालस्यं हृल्लासो मधुरास्यता । कण्ठे घुरूघुरः पाको कण्डूरक्ष्णोर्हिमो ज्वरः ।। कृच्छ्रादुच्छ्वसनं निद्रा कासः श्वेतनखादिता। स्तब्धो गुरूत्वं चांगानां नासिकाक्षिमुखस्रुतिः । रोमहर्षस्तमश्वासो रागाश्चान्ये कफोद्भवाः।। (अ.सं.उ. ४१/५२-५५)

nant snake (garbhiṇyasarpa) leads to black colouration and with the squint eyes, more yawning, anger, suffers from adenoids(upajihva) oedema of the lips, whitish discolouration of the face, heaviness of the abdomen and headache. Biten by a snake which has just delivered(sutasarpa) voids urine mixed with blood causes agonising pain in abdomen and uterus along with severe pricking type of pain[1].

X) Snake Poison Impulses (सर्पविष वेग) -

Impulses for the three types of poisonous snake bites are slightly different and are given below.

1) Darvīkara Viṣavēgās (Cobra Type) -

The following are the seven vegas for Darvī type of bites:

In **First Impulse** (prathamavēga) Rakta (blood) gets vitiated, becomes blackish and thereby produce darkish complexion of the body. The person feels as though ants are running all over his body[2].

In **Second Impulse** (dvitīyavēga) māṃsadhātu (muscular tissue) gets vitiated. Swelling occurs on the bitten site[2].

In **Third Impulse** (tṛtīyavēga) mēdōdhātu (adipose tissue) gets vitiated. Heaviness of the head, loss of vision, moistness at the site of bite[2].

In **Fourth Impulse** (caturthavēga) the poison enters into kōṣṭha and vitiates the kaphadōṣa there and produces symptoms such as excessive salivation, vomiting, joints pains and lethargy[2].

---

१. व्यन्तरे मिश्रलिंगत्वं - दष्टः पुंसोर्ध्वमीक्षते । प्रक्षिपेद्दक्षिणं पादं पूर्वकाययमुद्यतः ।।
धीरोल्पवेगः शर्वर्याविपरीतस्तु योषिता । हीनस्वरोतिसारार्तः कम्प्ते त्रस्यते ज्वरी।।
नपुंसकेन तिर्यग्दृगधीरः प्रियमैथुनः । बहुपादी च वृध्देन चिरान्मन्दाश्च वेदनाः ।।
बालेन शीघ्रं तीक्ष्णाश्च - कुमारेणाक्षिण दक्षिणे । रोगी कुमार्या वामे तु - गर्भिण्या
कृष्णजिह्वदृक् ।। जृम्भा क्रोधोपजिह्वार्तः स शूनोष्ठः सिताननः । गुरूदरः
शिरोरोगी सूतादष्टस्तु मेहति । शोणितं कृच्छ्रशूलार्तः सूचीभिरिव भिद्यते ।।
(अ.सं.उ. ४१/५४-५९)

२. सु.क. ४/३९.

Scanned with CamScanner

In **Fifth Impulse** (pañcamavēga) the poison enters into asthidhātu (osseous tissue) and vitiates the prāṇavāyu and also agni. This causes joints pains, hiccups and burning sensation.

In **Sixth Impulse** (ṣaṣṭavēga) the poison enters into majjādhātu (bone marrow) and also vitiates the grahaṇi (pittadarākala) causes severe pain in the chest, heaviness in the chest, delirium and also at times diarrhoea[1].

In **Seventh Impulse** (saptamavēga) the poison enters into śukradhātu (generative tissue) thereby extremely aggravates the vyānavāta, dislodges the kapha even from the minutest capillaries, producing secretions of lump-like phlegm from the mouth, a breaking pain in the waist and the back, impaired functions of the mind and the body, excessive salivation, perspiration and suppression of breath[1].

2) Maṇḍalisarpa Viṣavēgās (Viper Type)-

The following are the seven vegas for Maṇḍali type of bites :

In **First Impulse** (prathamavēga) Rakta (blood) gets vitiated and causes severe burning sensation and yellowish discoloration all over the body[1].

In **Second Impulse** (dvitīyavēga) māṃsadhātu (muscular tissue) gets vitiated and causes extreme yellowish discoloration all over the body and there is severe burning sensation and swelling at the site of bite[1].

In **Third Impulse** (tṛtīyavēga) mēdōdhātu (adipose tissue) gets vitiated and causes numbness of the eyes, thirst, slimy exudation from the wound (site) and perspiration[1].

In **Fourth Impulse** (caturthavēga) the poison enters into kōṣṭha and produce severe fever[1].

१.सु.क. ४/३९.

In **Fifth Impulse** (pañcamavēga) the poison enters into asthidhātu (osseous tissue) and thereby causing severe burning sensation all over the body[1].

In **Sixth Impulse** (ṣaṣṭavēga) **and Seventh Impulse** (saptamavēga) these stages are identical with those of the foregoing (darvikaraviṣa)[1].

3) Rājimāna Viṣavēgās (Krait Type)-

The following are the seven vegas for Rājimāna type of bites :

In **First Impulse** (prathamavēga) Rakta (blood) gets vitiated and causes pale yellow producing the appearance of goose- skin of the victim who looks white[1].

In **Second Impulse** (dvitīyavēga) māṃsadhātu (muscular tissue) gets vitiated and giving rise to an extreme paleness of complexion, prostration and swelling of the head[1].

In **Third Impulse** (tṛtīyavēga) mēdōdhātu (adipose tissue) gets vitiated. There by causing to haziness of the eyes, deposit of filthy matter on the teeth, perspiration and secretions from the nostrils and the eyes[1].

In **Fourth Impulse** (caturthavēga) the poison enters into kōṣṭha and causes lock-jaw, severe heaviness of the head[1].

In **Fifth Impulse** (pañcamavēga) the poison enters into asthidhātu (osseous tissue) and vitiates the vāta dōṣa thereby loss of speech and brings on śītajvara[1].

In **Sixth Impulse** (ṣaṣṭavēga) **and in Seventh Impulse** (saptamavēga) these stages are identical features of darvikaraviṣa[1].

Significance About the Vegas -

The signs and symptoms expressed in each vega (stage) denotes the spread of the poison from one tissue to the other

१. सु.क. ४/३९.

and is also therapeutically significant because the management depends on the stage at which the poison has spread in the body. When the poison has affected deeper tissues such as majja and sukra, it turns to be asādhya (incurable). It is mandatory for a viṣavaidya to have a thorough knowledge of seven vegas or stages to bring about effective therapy.

MODERN ASPECT OF SNAKE POISON

The classification of the snakes was already discussed in the beginning of the chapter and the severity of the signs and symptoms of the snake poison depends on the following factors :

1) The nature, location, depth and number of bites: 98% of the snake bites occur over the extremities.
2) The length of the time snake holds on.
3) The extent of anger or fear that motivates the snake.
4) The amount of venom injected.
5) The species of the snake.
6) The condition of its fangs and venom glands.
7) The age and size of the victim.
8) The victim's sensitivity to the venom.
9) The pathogens in the snake and,
10) The first aid and medical care.

A) Signs and Symptoms of Cobra Snake poison-

Local symptoms start within 6 to 8 minutes. A small reddish wheel develops at the site of the bite. The bitten area is tender with slight radiating burning pain. Swelling may be minimal or even absent. The patient feels sleepy, slightly intoxicated, weakness of legs and reluctant to stand or move. Nausea and vomiting are sometimes the early symptoms. Weakness of the muscles increases and develops into paralysis of the lower limbs. The head falls forward. The eyelids also hang down. After half to one hour, there is excessive

Scanned with CamScanner

salivation and even vomiting. This is followed by paralysis and swelling of the tongue and larynx, due to which there is difficulty in speech and swallowing. There may be extraocular muscle weakness, ptosis, and strabismus. After about 2 hours the paralysis is complete. Respiration becomes slower and the heart rate increases. Though the patient is conscious, he is not able to speak. Coma sets in and finally the respiration stop with or without convulsions and the heart stops. In cases of recovery the skin and cellular tissues surrounding the bite mark undergo necrosis.

B) Signs and Symptoms of Krait Snake poison-

Symptoms resemble those of cobra bite, but there is no swelling or burning pain at the site of the bite, and the convulsions are milder, while the feeling of drowsiness and intoxication is more intense. Albumin appears in urine.

C) Russell`s Viper and Eachis Carinate-

More than 50% of the victim have minimal or no poisoning, as little or no venom is injected. About 25% will develop serious generalised poisoning, but death is rare. When venom is injected, the spot develops a severe pain within 8 minutes. The area around the bite is red and painful. The onset of swelling starts within 15 minutes and there is often blood stained discharge from the wound. When the amount of venom injected is less, pain and swelling restricted to below the elbow or knee, and some nausea disappear within one to two days. In moderate poisoning, there is marked feeling of intense pain, vomiting, giddiness, sweating, abdominal pain, dilatation of pupils, getting insensitive to light and in about one to two hours there is marked collapse and often complete loss of consciousness. Skin temperature is raised, tingling and numbness over the tongue and mouth or scalp and parasthetia around the wound occrue. These symptoms

Scanned with CamScanner

usually clear up spontaneously within next few hours. There is local extravasation of blood, and swelling spreads as far as the trunk, in one to two days, without further generalised symptoms. Though the limb looks swollen and red, it is usually not tender. The local swelling and discolouration and sometimes few blisters heal without necrosis within one to four weeks. In severe cases the main feature is the persisting shock. Blood may show heamoconcentration early, then decrease in R.B.C and platelets, and urine contains blood sugar and protein. Bleeding and clotting time are usually prolonged. Haemorrhagic syndrome with blood stained sputum haemorrahages from the gums, rectum, the site of bite etc. occur due to the increased coagulation time. Intravascular haemolysis may lead to haemoglobinuria and renal failure. Petechial haemorrhages are common. In systemic poisoning, the blood becomes defibrinated and therefore will not clot. Increasing respiratory depression, blurring of vision, headache, dizziness and weakness often occur towards the end there is an extensive suppuration and sloughing, followed by malignant oedema of the bitten area. Paralysis does not occur. Death is usually due to shock and heamorrhage. In the case of echis, death may not occur but the secondary symptoms continue for days and haemorrhages are severe and the wound shows mild necrosis.

D) Sea Snakes-

Bites cause little or no local reaction. After half to one hour, the patient develops pain, stiffness and weakness of the skeletal muscles. Sea snake bites result in marked polymyositis with a limb-girdle distribution. Muscle enzymes and plasma potassium levels are increased and myo-globinuria with renal failure may occur. Marked weakness of muscles

Scanned with CamScanner

Fatal Dose :-

Cobra - 12mg, Russell's viper - 15mg, echis - 8mg, krait-6mg, of dried venom. The average yield in one bite in terms of dry weight of lyophilised venom is cobra - 200mg, Russell's viper -150mg, Krait - 20mg and echis - 5mg.

Fatal Period :-

Cobra - 1/2 to 6hrs

Viper - one to two days.

Snake Venom :-

The poisonous snakes contain the snake venom which is clear and viscid. Even when the snake venom is dried the toxicity is retained. The following are the constituents of snake venom :

1) Proteolytic enzymes - cause digestion of tissue proteins and peptides and produce marked tissue changes and destruction. They may contribute to hypersensitive action of snake venom, through the damage to muscular endothelium, with the escape of blood from the vessels and the possibility liberation of histamine.

2) Phosphatidases - causes haemolysis and most of the effects on the heart and circulation. Haemolysis by venom is accelerated by lecithin. Phospholipases, A, B, C, and D are catalysts involved in the hydrolysis of lipids Cholinesterase catalyses the hydrolysis of acetylcholine to choline, and acetic acid.

3) Neurotoxins - produce various action on the nervous tissue and produce a curare-like effect and paralysis.

4) Hyaluronidase - helps in spreading the venom and ophioxidase in autolysis and petrification.

5) Lecithinase - attacks the lipid layers of the endothelial cell lining, produce lysolecithin and helps in the increase

Scanned with CamScanner

of fragility and permeability for breakage of cell. Proteases lead to dissolution of blood vessels and spill over of erythrocytes and serum into tissue.

The colubrine venom is mainly neurotoxic and has a primary toxicity for the respiratory and cardiac centres. It can produce marked cardiac or vascular changes or have a direct effect on the blood. The viperine venom is mainly haemolytic and causes intravascular haemolysis and depression of the coagulation mechanism. It can also produce changes in the nervous system or in vascular dynamics. As a rule one of the modes of action far exceeds the other. The sea snake venom is myotoxic.

XI) Rejectable patient (त्याज्यरोगि) -

Before giving the treatment knowing about the curability and incurability is very important . Especially in the poisonous conditions it is very needful, because the patient may go into the complications which may lead near to death. In such situations the physician should reject the patient for the treatment. These incurable features were explained by the Acārya Vāgbhaṭa very clearly as follows :

The person bitten (by snakes) who has white coloured face and eyes, hairs falling off, loss of movement of the tongue, faints again and again and cold expiration does not survive.

He who develops hiccup, dyspnoea, vomiting and cough all these simultaneously and also pain in the heart, does not survive[1].

Vomiting of forth, unconsciousness, blue colour of the feets, hands and face pinched nose, distortion of body parts, diarrhoea, looseness of joints are the symptoms manifesting just before death in persons who have consumed poison by mouth, by snakes or injured by poisoned arrow[1].

XII) Treatment (चिकित्सा) -

The treatment by the physician to the poisonous patient just as saving a house on fire, protecting the life reaching the throat, by all efforts and mitigating the poison[1].

In the snake poisoning cases emergency treatment is required as the poison remains for a period of one hundred mātra only at the site of the bite and then spreads throughout the body vitiating the blood and other tissues. Within this period itself, incising the site of the bite and other treatments should be done quickly so that the poison does not grow in the body[2].

Acārya Vagbhaṭa still explain that the person who is bitten by the snake should immediately bite the same snake or a lump of stone or mud tearing it with his teeth violently[3].

1) General Treatment (सामान्य चिकित्सा) -

A) Ariṣṭhābandhana - discussed in the treatment of the poison[4].

B) Daṃśanirharaṇa (removing the fangs) - The teeth (fangs of the snake) which are not on vital spots should be pulled out by squeezing the area of bite, symptoms of toxicity of poison will not develop (if the fangs are removed) just as a sprout (is lost) when the seed is destroyed. Removing

---

१. अतो अन्यथा तु त्वरया प्रदौप्तागारवभ्दिषक् ।। रक्षन् कण्ठगतान् प्राणार्न विषमाशु शमं नयेत् ।। (अ.हृ.उ. ३६/३७)

२. मात्राशतं विषं स्थित्वा दंशे दष्टस्य देहिनः । देहं प्रक्रमते धातुन् रूधिरादीन् प्रदूषयत् ।। एतस्मिन्नन्तरे कर्म दंशस्योत्कर्तनादिकम् । कुर्याच्छीघ्रं यथा देहे विषवल्ली न राहिति ।। (अ.हृ.उ. ३६/ ३८-३९)

३. दष्टमात्रो देशेदाशु तमेव पवनाशिनम् । लोष्टं महीं वा दशनैश्छत्वा वानु ससम्भ्रमम।। (अ.सं.उ. ४२/४)

४. अ.सं.उ. ४२/५-७

the teeth (fangs) which are on vital spots leads to death and on the joints to distortions of the body[1].

C) Agnikarma - discussed in the treatment of the poison[2].

D) Ācuṣaṇa (sucking) - discussed in the treatment of the poison[3].

E) Sirāvyadhana (veinesection) - discussed in the treatment of the poison[4].

F) Hṛdayāvaraṇa (protecting the heart) - discussed in the treatment of the poison[5].

G) Vamana (emesis) - discussed in the treatment of the poison[6].

2) Specific Treatment (विशिष्टचिकित्सा)-

Special treatment should be adopted after carefully considering the nature of the snake, the dōṣa (aggravation), sthāna (place of the bite) and the site of the bite on the body, vega (stage of the poisoning)[7].

A) Treatment of bite of hooded snakes (दर्वीकरसर्प विष चिकित्सा) -

Root of sinduvāra macerated in its own juice, added with honey and consumed is the recipe for poison of hooded snakes. Root of siduvāraka and śvēta girikarṇikā made into paste (with water) and consumed, pākala (kuṣṭha) and honey

१. निष्पीड्य चोध्दरेद्दंशमर्मसन्धिगतं तथा । न जायते विषवेगो बीजनाशादिवांकुरः।
मर्मगे प्राप्नुयान्मृत्युं सन्धिस्थे विकलांगताम् ।। (अ.सं.उ. ४२/८)

२. अ.सं.उ. ४२/९

३. अ.सं.उ. ४२/१०

४. अ.सं.उ. ४२/१२-१४

५. अ.सं.उ. ४२/१९-२२

६. अ.सं.उ. ४२/२४,२५

७. भुजंगदोषप्रकृतिस्थानवेगविशेषतः । सुसूक्ष्मं सम्यगालोच्य विशिष्टां चाचरेत्क्रियाम्।।
(अ.सं.उ. ४२/२५)

made use of as nasal drops are for the person bitten by hooded snake[1].

If bitten by a kṛṣṇa sarpa (black snake) the blood should be removed from the site and paste of carati and nakuli or of powerful root poison should be applied[1].

Ghee added with honey, mañjiṣṭha and gṛhadhūma (kitchen soot) should be drunk[1].

Agada (antipoisonous recipe) prepared with taṇḍulīyaka, kāśmarya, kiṇihi, girikarṇika, mātuluṅga, sitā and sēlu used for drinking, nasal medication and collyrium is beneficial in powerful poison of hooded snakes and also snakes with stripes[1].

B) Treatment of bite of Snakes with patches (मंडलिसर्प विषचिकित्सा) -

Equal parts of sugandhā, mṛdvika, śvētākhyayā, and gajakarṇki, half part each of leaves of saurasā, kapitha, bilva and dāḍima made into a paste mixed with honey and used which is especially suitable for poison of snake with patches[2].

C) Treatment of bite of Snakes with stripes (राजीमन्तसर्प विषचिकित्सा)-

Kaṭukā, ativiṣa, kuṣṭha, gṛhadhūma, harēnukā, vyōṣa and tagara made into paste and consumed mixed with honey, destroys the poison of snakes with stripes.

In case of bite by kāṇḍacitra snake (a variety of striped snake) the bitten part should be buried in the ground for two yāma (6 hours), then pulled up the site (of bite) incised (allowed to bleed) and covered with the mud adhering to the root of a corn plant, the patient made to drink ghee boiled with powder of vāra. After this gets digested and he had

१. अ.सं.उ. ४२/२६-३०

२. अ.सं.उ. ४२/३१

purgations, he should partake cooked barely along with processed soup'.

D) Treatment of bite of crossbreed snakes (व्यन्तरसर्पविष चिकित्सा)-

Karavīra, arkakusuma, root of lāṅgalikā, kaṇā, pāṭhā and marica are made into paste with sour gruel and used. This is known as sārvakārmika agada is best for poisoning of vyantara (cross breed) snakes[2].

3) Treatment According to Impulses (वेगानुसार चिकित्सा)-

Vega	Sarpa DARVĪKARA	Sarpa MAṆḌALĪ	Sarpa RĀJIMĀNA
1st[3]	Raktamōkṣaṇa by sirāvyadhana	Raktamōkṣaṇa	Raktamōkṣaṇa with Alābu
2nd[3]	Madhu, Ghṛta Agadapāna	Madhu, Ghṛta Agadapāna and Yavāgusēvana	Ghṛta Agadapāna Vamana and Agadapāna as described for the Darvīkarasarpa.
3rd[3]	Viṣanāśaka Nasya, Aṃjana	Śōdhana by the Virēcana after Yavāgūpāna	Same as in the Darvīkarasarpa.
4th[3]	Vamana, after the vamana, Yavāgupāna is advised which was described in the context of the Sthāvaraviṣa Cikitsaā (ie. in the Su. Ka. second chapter).	Same as in the Darvīkarasarpa	Same as in the Darvīkarasarpa.
5th[3]	Śītalaupacāra	Same as in the	Tīkṣṇa Aṃjana.

१. अ.सं.उ. ४२/३६-३८
२. अ.सं.उ. ४२/३९
३. सु.क. ५/२०-२९

Scanned with CamScanner

	(cooling procedure) and giving the virēcanayavāgu.	Darvīkarasarpa.	
6th[1]	Same as in the fifth vega.	Kākōlyādi Madu-ragana or agadapāna .	Nasya.
7th[1]	Tīkṣaṇa Aṃjana, Nasya, making the Kākapada shape incision on the scalp and applying the blood mixed flush over the incision.	Agadapāna and Avapīḍana Nasya.	Avapīḍadana nasyam.

4) Treatment of poison in each tissue (धातुगत विषचिकित्सा)[2]-

Blood and flesh (rakta, māṃsa) of gōdhā (inguana lizard) made into powder after drying, this powder was mixed with the juice of kapittha and consumed is beneficial when poison is present in rasadhātu.

Bark of root śēlu, young shoots of badara, udumbara and kaṭabhī, mixed with the juice of kapittha is beneficial when poison is in rakta (blood); The paste of roots of khadira, ariṣṭa, kuṭaja made with water and then mixed with honey when it is present in the māṃsa (flush).The paste of the two balā, madhuka, madana and nata and added with honey is beneficial when it is present in all the tissues (dhātus).

5) Treatment for the Śaṅkāviṣa and Sarpāṅgābhihata-

In this context Ācārya Caraka explained about śaṅka viṣa and Suśruta explained about sarpāṅgabhhita[3], while

---

१. सु.क. ५/२०-२९

२. अ.सं.उ. ४२/४५-४७

३. सु.क. ५/१९

Scanned with CamScanner

Vāgbaṭa has explained both types[1].

दुरन्धकारो विध्दस्य केनचिव्दिषशंकया ।
विषोव्देगाज्ज्वरछर्दिर्मूर्च्छा दाहोऽपि वा भवेत् ।।
ग्लनिर्मोहोऽतिसारच्श्राप्येतच्छशंकविष
(च.चि.२३/२२१, २२२)

When a person is bitten by something (non-poisonous animal) in pitch of darkness, the fear of suspicious (śaṅka) of being bitten by a poisonous animal causes manifestation of symptoms of pseudo-poison in the form of fever, vomiting, fainting, burning sensation, prostration, unconciousness and diarrhoea. This condition is called as śaṅka-viṣa.

भीरो सर्पांगसंस्पर्शद् भयेन कुपितोनिलः ।
कदाचित् कुरुते शोफं सर्पांगभिहतं तु तत् ।।
(अ.सं.उ. ४१/४१)

In persons who are afraid when get touched by some part of the snake accidentally, due to this vāta getting aggravated by fear produces swelling at site of touch this is known as sarpāṅgābhihata.

सिता वैगन्धिको द्राक्षा पयस्या मधुकं मधु ।
पानं समन्त्रपूताम्बुप्रोक्षणं सान्त्वहर्षणम् ।
सर्पांगाभिहते युञ्जयात्तथा शंकाविषर्दि ते ।।
(अ.सं.उ. ४२/९९)

Sitā, Vaigandhikā, Drākṣā, Payasyā, Madhuka and Madhu should be consumed as a drink, water sanctified by holy hymns should be sprinkled on the person, he should be consoled with courageous words and pleasant things; this is the treatment for Sarpāṅgābhihata as well as Śaṅkāviṣa.

6)Treatment of the Snake poison from the Modern aspect-

Every year in India about 15,000 to 30,000 persons die from snake bite. It is therefore very important to understand

१. अ.सं.उ. ४१/४१-४२

the principles of treatment in proper prospective. While there is no general agreement or standard procedure for treatment, the following account represents the commonly accepted and current mode of therapy. The main principles of treatment include :

A) Allaying anxiety and fright.
B) Prevention of the spread of venom.
C) Hospital measures
D) Use of the antivenin and other antitoxic therapy.
E) General measures.

A) Allaying anxiety and fright -

As deaths have been reported from shock due to fright even from bites by non-poisonous snakes, it is desirable to reassure the patient by pointing out that :

- All snakes are not poisonous
- Even poisonous snakes are not fully charged with poison and
- Even a snake fully charged with poison cannot always inject a lethal dose.

B) Prevention spread of the Poison (First aid measures) -

- Keep the patient warm and rest.
- Non-sedating, non-salicylate analgesic paracetamol is best.
- Immediately apply a broad firm bandage (tourniquet) around the limb and on the bitten area. As much of the limb should be bandaged as is possible. It should be tight enough to occlude the superficial venous and lymphatic return, but not the arterial or deep venous flow. In bites on the trunk, head or neck, apply firm pressure over the bitten area. Alternatively a ligature can be applied above the site of bite, if the bite is on extremity, which should be loosened for 90 sec-

Scanned with CamScanner

onds in every 10 minutes.

- Immobilise the limb as movement can accelerate the spread of venom.

- Make a cross incision 1 cm. long and 0.5 cm deep over each fang mark. Drainage of blood and lymph from the cuts should be done by mechanical suction, by using a glass or metal cup with a rubber suction bulb attached to it. Suction should be continued for atleast one hour following the bite, or until antivenin is administered. This may result in the removal of up to 20% of subcutaneously injected venom.(Incision and suction not advised in recent days) .

- The wound should not be cauterised as it actually seals the poison within the tissues.

- Clean the wound with sterile saline water and cover with sterile dressing.

C) Hospital measures -

- Observe every case of alleged snake-bite for atleast 24 hours before discharging.

- The following must be monitered -

- Pulse rate, respiratory rate, blood pressure, WBC count, every hour.
- Blood urea, creatinine.
- Urine output.
- Vomiting, diarrhoea, abnormal bleeds should be observed.
- Extent of local swelling and necrosis.
- ECG, blood gas analysis.

D) Use of Antivenom -

i) Indications -

- Do not administer antisnake venom serum as a rou-

Scanned with CamScanner

one measure. It is associated with serious risk allergic reactions. It should be given only when features of envenomation are present -

- Incoagulable blood.
- Spontaneous systemic bleeding.
- Hypotension.
- Neurotoxic or myotoxic features.
- Depressed consciousness.
- Expanding local swelling.
- Tender regional lymph nodes.

ii) Nature -

In India, only polyvalent antivenin is avilable, which is effective against the following snakes :

- Common cobra
- Common krait
- Russell's viper
- Saw-scaled viper

iii) Mode of Administration -

- It is available in the form of the powder and it is dissolved in distilled water before being injected.

- It is useful when given within 4 hrs of bite. It is of less value if delayed for 8hrs, and it is of doubtful value after 24hrs.

- The serum produces severe serum sickness and even acute anaphylaxis in sensitive persons. To test the sensitivity 0.05 to 0.1ml of 1:10 dilution of serum injected intradermally. In positive reactions a wheel 1cm in diameter surrounded by an erythema of about the same width develops in 5 to 20 minutes. For desensitisation 0.1, 0.2 and 0.5 cc of a 1: 100 dilution of antiserum is injected subcutaneously at 15 minute intervals. Subsequently a 1:10 dilution is given in the same manner, followed by undiluted antiserum. If no severe reac-

tion occurs, the usual dose is given intravenously.

In non-allergic individuals, antiserum is always administered intravenously.

- If the antisnake venom is not available 40ml of antivenin is given i.v. and repeated as required. It is effective for cobra and Russell's viper bites. In case of viper bite inject antisnake venom at the site of bite to prevent the sloughing and gangrene.

iv) Procedure -

Dissolve the antivenin in distilled water or normal saline and administer the appropriate dose as an infusion in 500ml of saline at 15 to 20 drops per minute. The rate can be progressively increased so that the infusion is completed in 1 to 2 hours.

v) Dose -

- Saw-scaled viper - 1 to 2 ampules
- Sea sanke - 3 to 4 ampules
- Russell s viper - 8 to 10 ampules
- Common cobra and Krait - 5 to 20 ampules.

Adverse reactions : Anaphylaxis. Always keep adrenaline loaded and ready.

D) General Measures -

i) Inject tetanus antitoxin or a booster dose of tetanus toxoid.

ii) A broad spectrum antibiotics should be given if there is severe tissue involvement.

iii) In viper poisons sedatives may be given to relieve pain and nervousness.

iv) In case of collapse general stimulants are of value.

v) Antihistamines i.v. and cortisone help in relieving the symptoms.

vi) In severe poisoning infusion of normal saline or transfusion of blood or plasma are very useful.

vii) Renal dialysis may be necessary. Peritoneal dialysis is better.

viii) Surgical debridement of the blebs, bloody vesicles and superficial necrosis may be necessary.

XI) Medico-legal Importance -

Snake poisoning is usually accidental, rarely homicidal or suicidal.

XII) Post-Mortem Appearance -

Occasionally the marks of the bite may be indistinct. In case of Cobra bite there will be two lacerated marks 1/2 inch deep and in case of viper bite 1 inch deep mark with, oedema, discoloration cellulitis and oozing of blood at the site of puncture. There may be clots in the veins.

SOME GENERAL PRINCIPLES IN TREATING THE SNAKE POISONING

I) Do's -

1) Wash the bitten site with water or with own urine.

2) Apply tourniquet 2 - 3 inches above the bite mark.

3) Suck out the blood from the bite mark. So the poison can be removed to a certain level.

4) Absolute rest to be given as it reduces the rate of spreading of poison.

5) Reassurance of patient to avoid excitement or fear.

6) Should not allowed to sleep.

7) Agnikarma can be performed within 1 1/2 minute of snake bite, except in case of mandali as mandali will elevate pitta. After 90 seconds agnikarma mostly useless, because visha stays only upto 90 seconds at the bite. Visha gets neu-

trallsed at the temperature of 100 degree centigrade.

8) Hagl as food can be advised.

III) Dont's -

1) Cauterisation should not be done in viper.

2) Avoid alcohol for internal or external use.

3) In case of krait bite patient should not be allowed to sleep.

4) Hot, chilly, sour, salt, oil, fruits, tubers, meat, fish etc. and coitus should be avoided. If any wound is present rice should be avoided.

III) Some of the Laghu oikitsās -

1) Karna mula should be mixed with asyambu (saliva) and should be applied on the site of bite[1].

2) As a hṛdayāvaraṇa and jīvarakṣa, the kaṭṭucanaka, as divya auṣada for poison, (viṣa vaidhyas used to dry this and store). If it is not available, a little amount of mīraca powder or honey mixed with ghee (cow) can be given[1].

3) Nīli mūla (Indolgofera tintora) should be pasted, mixed with milk should be used for internal use as well as external application[1].

4) Purified Tankana (Borax) should be used as a single drug for both sthāvara and jāgamma viṣa[1].

5) Karañja bīja, nīli mula, nimba tvaka should be triturated in pure water or with its own kaṣāya and made into gutika (pills) form, dried and stored. This gutika can be given with suitable anupāna[1].

6) Pada mūla 15 - 30 gms should be triturated and mixed with śudhdajala (water) and can be given for drinking[1].

7) Pañcāṅga of Uttama Kanya (Doemia extensa), tritu-

rated and mixed with milk should be taken internally. This has to be applied externally acts on the site of bite[1].

8) One who takes one lentil grain (masūra) with two leaves of nimba in the month of (vaiśāka) when the sun is mēṣa rāsi, does not suffer from poisoning for a year[1].

9) Likewise the root of white punarnavā taken with rice-water in puṣya constellation alleviates the chances of snake-poisoning for a year[1].

10) Gṛhadhūma, haridra, dāruharidrā root taṇḍuliyaka - these together mixed with curd and ghee should be taken even in severe snake-bite[2].

11) Nata(tagara) and kuṣṭa two palas, ghee and honey four palas-all are mixed together and given to drink. It is beneficial even in severe snake-bite[3].

12) If poison is located in throat, pulp of kapittha mixed with sugar and honey should be taken and in that of stomach tagara powder 40gms mixed with sugar and honey is useful[4].

13) Taṇḍuliyaka Mula (Aristalochia Indica) paste can be used for drinking[5].

14) Ghee, honey, pippali, butter, śuṇṭhi, marica these powders mixed with the saindavalavaṇa. It can be given to the patient internally and it is useful even the snake bitten by angrily[5].

IV) Lēpās (external applications) -

Arka, pāribadra, śigṛ, śnuhi, karakṣara pallavās (tender

---

1. Viṣa Cikitsā by Vaidya Vachaspati M Balakrishnan Nair.
२. चक्रदत्त ५६/३-५.
३. चक्रदत्त ५६/९
४. चक्रदत्त ५६/१४
५. योगरत्नाकर उत्तरार्ध विषाधिकार - २

leaves), should be made into paste and applied on site of bite and surrounding areas intermittently.

Śuṭhi, kalāṣka, marjara, vandini (Acalypha indica) Uttamakanaya patra, Dhatura patra(Datura metal), Arka (Calotropis gigantia) patra, tintika (Tamariduc indicus) patra, Spotya (Physalis minima), all are taken in equal quantity, pasted and applied. This pacifies viṣa and śōpha.

V) Nasya -

1) Śīgṛ, kāravēllaka, nirguḍi, drōṇapuṣpi - the swarasa of these can be used for nasya.

2) Laśūna and hiṅgu taken in equal quantity, crushed with naramūtra and squeezed to obtain rasa. This rasa is a good nasya yoga.

3) Bakula Bīja and marīca triturated with nimbu svarasa can be used.

Although many auṣadhis are mentioned for nasya, drōṇapuṣpi is the one which a physician can trust upon. In all types of poisonable snake bite, for nasya as well as aschctana it is highly applicable. Especially this is beneficial in darvīkaradaṃśa when the patient becomes blind or when he is unconscious.

VI) Anjana -

Marica and bakula bila majja triturated with nimba swarasa and can be applied in as aṃjana. This pacifiies the viṣa.

VII) Dhupanīya Yōgās

Hasthiviṣa, mayurapiccha, kukkuṭapcci, svaramūla, suṣkagōmayatuṣa can be used for dhupana. Dhupana is benificial for spasms and all other consequent symptoms due to poison. In dhupana the treatment as follows first the patient is allowed to laydown on a cot provided with many holes then he is covered with a thick blanket and dhupana is kept under the cot.

VIII) Blowing Therapy[1] -

In viṣa cases, blowing therapy is very effective. For this, the physician needs, three attenders all the three helpers should chew the drugs given by the physician and they can spit this saliva but without loosing the medicine. The patient should be seated in the chair and two helpers should sit on either side of the patient and one behind. The air should be blown from their mouth to the respective ears. And the attender behind the patient should blow to the moordha. This has to be done simultaneously. The physician who is sitting infront of the patient should count numbers 1 - 2 - 3 i.e. with pause. As he counts, the helpers on the both sides of the patient and one behind should blow the medicated dhuma from their mouth to respective ears and the mūrdhā simultaniously. This process should be continued for 150 times. If any one among the helpers wish to spit, all the three has to stop the process simultaniously and they can again start the process together and complete the round.

Blowing therapy when viṣa is in Bāhyadhātus[1] Viśva, yavasa, marica, iśvaramūla, these drugs, when chewed and used according to the blowing therapy, pacifies the viṣa in tvaka and māmasadhātus .

Blowing therapy when viṣa is in Antaradhātus[1] kāraskarabīja, visva, isvarīmūla this should be made into small pieces then covered tābūlapatra and chewed and blowing is done in accordance with blowing therapy. This pacifies the viṣa which had entered antaradhātūs. In those situations where viṣa had entered the asthidhātu and if the patient becomes blind being experienced grīvādaurbalya and in such conditions the head was put straight and the blowing was performed as per therapy course 150 times. Then the patient

1. Viṣa Cikitsā by Vaidya Vachaspati M Balakrishnan Nair.

was relieved from the complications and could do his routine works as usually.

Śigrmūla can be used as a medication in the same therapy for urdhvagata raktapitta and raktamaṇḍali viṣa.

IX) Some of The Agadās[1]

1) Mṛtasañjīvini Guṭika

Pārada, vatsanābha, hiṅgu, vaca, ṭaṅkaṇa, haritāla, manahśila, trikaṭu, dēvatālibīja, sirīṣabīja, bakulabīja, laśuna, taken in equal quantity, made into fine powder, triturated with arkakṣīra into a fine paste, made in to tablet, dried and preserved.

Method of preparation

First haritāla,is made into powder with the help of khlvayantra. Then pārada is poured into it again triturated till it mixes properly without any trace of free rasa. And manahśila should be added to it and again triturated. Then other prescribed drugs should be made into powder and triturated along with it. Finally arkakṣīra should be added and triturated.

2) Bṛhat Jīvarakṣa Guṭika

Vaṅga, pārada taken 110gms (22 nishka) each, higúla 10gms (2 nishka), haritāla, manahśila, 5gms each (1 nishka), ṭaṅkaṇa, alum, sulphur 25gms, each (5nishkas), hiṅgu, saindava, vaca, trikaṭu, tuttha, bakulabīja, śvētaguñjabīja, 30gms (6nishkas) each, iśvarīmūla, śarivamūla, first faeces of calf (kattu chanaka) 40gms (8nishkas) each should be taken as ingredients.

Method of Preparation

Vaṅga should be melted and rasa is added to it. After

---

1. Viṣa Cikitsā by Vaidya Vachaspati M Balakrishnan Nair.

svāṅgaśitala, it should be taken in khalvayantra and powdered. Then powdered sulphur is added to this mixture and triturated till it becomes black. Then powdered haritāla and manahśila are added to it and triturated, till it becomes fine black coloured. Then other drugs are made into powder, added to it and triturated. Finally, arkakṣira is added to it, triturated to fine paste and made into guṭika form which is dried and preserved.

The pārada, gandhaka, vastanābha etc. viṣa drugs, mentioned in these yōgās should not be purified (śōdhana should not be done) while using.

Mṛtasaṃjivini and Jivarakṣaguṭika are given only for cases having serious poison.

When one guṭika is given and if the patient vomits then that viṣa case is considered to be serious. In this case, after vomiting one more tablet is given again keeping an interval of one nazhika i.e., one ghatika (1hr = 2 1/2 ghatika) . If it is vomited again, another tablet is given after one nazhika. If the patient has vomited all the 3 tablets, then the case is confirmed to be asādhya (non-curable).

When viṣa reaches the mēdhō dhātu, the patient vomits. So when the physician is confirmed that the poison is potent, then he should give the guṭika before it reaches the mēdhō dhātu. So that the patient will not vomit and guṭika acts in his body (from experience). In this crucial stage 3 tablets should be given keeping an interval of one hour. If all these 3 tablets activate in the body, then the viṣa pacifies and the patient survives. Other treatment should also be continued, till the complications are totally vanished.

3. Bilvādiguṭika

Bilvādiguṭika is beneficial for all types of viṣās. For more potent poisons, bilvādiguṭika should also be given along with

other drugs. Especially to pacify cobra poison bilvādiguṭika is highly effective. This guṭika can be used as pāna, nasya, aṃana and lēpana.

Method of Preparation

The auṣadha yōga starting with ' bilvasya mūlam surasya puṣpam . .. . ' should be made into fine powder. These cūrṇās should be taken in equal quantity, mixed and triturated for a day with goats urine. Next day morning, it is again triturated for 1 yama (3hrs) and then dried. Next day morning also i.e. 3rd days goats urine is added the triturated for a yama and dried. This procedure should be continued for 9days after triturating with goats urine for 3hrs, it is made into pills. If this gaṭika is triturated and dried in the above said manner for 101 days then, by this drug alone we can cure any highly potent viṣa, even kālakūṭa.

4) Agastayar Kujhambu

A famous auṣadha yōga in Siddha medicine is Agastayar Mējhaku (kujhambu). This mahauṣadha has the capacity to passify many diseases. For many types of viṣa rōgās, this Agastayar Kujhambu is beneficial. This auṣadha cures the disease by sōdhana.

There are many yōgās for this Agastayar Kujhambu with slight differences. There is no marked differences in the effect of these yōga. One yōga is given below.

Pārada, vatsanābha, mana:śila, haritāla, saindhava, hiṅgu, kaṭukirōhiṇi, ṭaṅkaṇa, kṛṣṇjīraka and pippali all these taken in 5gms each. Jayapāla Bīja (shell removed purified) 50gms.

Method of Preparation

Haritāla powdered, kept in khalva and triturated with pārada. When it is mixed comp letly add manahśila powdered and triturate again. Now all other drugs except jayapāla is pow-

dered and triturated with the first mixture. Then jayapāla is added to this mixture that is one bīja of jayapāla is added, and triturated then the second bīja and like wise. After all the jayapāla bījās finished then again the mixture is trituraed porperly. Then a little gōghṛta is added to make the mixture into wax consistency.

This auṣadha can be taken in, in guñjapramāṇ with nāgavalli svarasa. When this guṭika is given, virēcana occurs for 6-8 times. If viṣa has more kpha kōpa, it can cause vamana also. Highly potent poisons can be passified by this guṭika. Likewise, garaviṣa can also be passified. If given in dhānyaka pramāṇa with gōkṣīra for 9 days continously in morning, virēcana occurs for three times a day. pāṇḍurōga caused by dūṣiviṣa, gara and also pāḍurōga with its own cause can be cured.