

¹Shukla .S.Archana,

¹Associate Professor;Department of AgadaTantra, S.R.C.College of Ayurveda,Chikli.

ABSTRACT

Ayurveda has eight branches. *Agadtantra* is one of the most important branches of Ayurveda which deals with study of all animal, herbal and other poisonous substances, sign, symptoms and management. It deals with the study of poison(*visha*) and it's treating measures .When *visha* is administered , it disturbs all the functions of body , makes them abnormal, which degrades the health of human being resulting death. This review article includes the overall information about the poisonous plant *Ahiphen* it's, Toxicological aspect,Medico-legal aspect and therapeutic uses mentioned in Ayurveda and modern science.

Keywords: *Agadtantra, Visha, Upavisha, Ahiphen, Poison.*

INTRODUCTION: The word “*Gada*” literally means a disease, pain or a poison; therefore *Agad* stands for something which meant for defend of a disease or to combat to toxin.¹Toxicology is one of the branch of medical science which deals with poisons with reference to their sources, properties, toxic symptoms produced by them, the lethal dose, treatment to combat the toxic effects, methods for detections of poisons ².*Agadtantra* is one of the eight branches of Ayurveda, which deals with the study of poison and it's treating measures³ . *Acharya Shusrut* says “*Agadtantra* 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 drugs⁴.The substance which immediately after entering into the body causes the vitiation of the healthy *dhatus* or killing of the healthy person is defined as *Visha*. *Visha* causes sadness to the world ⁵. It creates depression and sorrow in the body and mind.⁶ Poison is a substance which when administrated, inhaled or ingested is capable of acting deleteriously on human body and causes hazardous damage to vital organs .*Sharangadhara* defines that the

Visha is a substance which is *Agnibhutapradhana*, destroyer of life and *yogawahi* i.e. prime synergistic in action.⁷According to modern medical science poison is defined as a substance which after being absorbed in to the living organism or by its chemical action on the tissues, produces an injurious effect on the body. Medico-legal experts, expresses that the real difference between a medicine and a poison is the intent with which it is given. In this article the modern and ayurvedic perspective review of *Upavisha*, *Ahiphen* is described.

CLASSIFICATION OF VISHA: On the basis of origin *Visha* has been classified mainly into two categories namely *Sthavarvisha* i.e. plant and mineral poisons, and *Jangamvisha* i.e. animal poisons where the sites of *Sthavar*⁸ and *jangama visha*⁹ has described ten and sixteen respectively¹⁰. *Sushruta*, while describing the instantaneously fatal poison, described *Sthavara, Jangama and Krittrima vishas* i.e. artificial poison.¹¹ *Charaka* included another type the *garavisha* along with the above three types¹². *Chakrapani* opines that, the combination of two non- poisonous materials is called *gara* and which produced by the combination of two poisonous materials, is called *krittrima* or artificial.¹³ *Vagbhata* described two main types i.e. natural poison which are *Sthavar* and *Jangamvisha* and artificial poison i.e.

*Garavisha*¹⁴. Certain texts also classifies *vishdravyas* in *Mahavisha*¹⁵ and *Upavisha*¹⁶. *Dravya* with high toxic potency are called *Mahavisha* and the *visha* with less potency are called *Upavisha*. *Upavisha* are mostly used in various diseases with many therapeutical preparations. These drugs are either not having all ten *gunas* or they have less potent *gunas*.

In short here we can consider that the *Visha* (poison) is divided in two major groups, *Sthavarvisha* (vegetative and mineral poison) and *Jangamvisha* (animal poison)¹⁷ *Sthavaravisha* is again divided in to *mahavisha* and *upavisha*. The number of *mahavisha* and *upavisha* are nine and eleven respectively. According to *Rasatarangini*, *upavisha* are following;

1. *Vishatindukbeeja (Nuxvomica)*
2. *Ahiphen (Opium)*
3. *Bhanga (Indian Hemp)*
4. *Gunja (Indian Liquorice)*
5. *Arkaksheera (Milk of Calotropis)*
6. *Snuhiksheera (Common milk hedge)*
7. *Langali (Malabar Glory Lily)*
8. *Karveera (Indian oleander)*¹⁸

In this study we will review the literature on *Upavisha*, *Ahiphen* (opium). *Brahattrayi* texts did not mention *Ahiphen*. *Sarangdhaar* quoted it as the example for “*VyavayaGana*”. Texts like *Bhavprakash*, *RasRatnaSamuchya* and *Rasa Tarangini* described *Ahiphen*. *Bhavmishra* mentioned *Ahiphen* in *Haritakyadivarga* while in *RasaTarangini* it is described under *Upavisha*.¹⁹

Main Synonym	<i>Ahiphen, Aphen, Nifen, Ahifenak, Afuk, Afu, Fanifen, Nagafen, Afim, Amal, Afuyan.</i> ²⁰ <i>Ahiphen Kshupa, , Chosa, Khasila, Khasakhas, Khasaphala, Khasabijam, Phaniphena, Saphenaka.</i> ²¹
Useful Parts	Seeds, Seed oil, Unripe capsules, Flowers, Exudate from fruit, Latex
<i>Rasa Panchak</i>	<i>Rasa : Tikta, Kashaya</i> <i>Guna : Laghu, Ruksha, Suksma, Vyavayi, Vikashi</i> <i>Virya : Ushna</i> <i>Vipaka : Katu</i> <i>Prabhav : ,Madak</i>
Action	<i>Balya</i> (Strengthening), <i>Grahi</i> (absorbent), , <i>Vrishya</i> (Aphrodisiac), <i>Nidrajanan</i> (sedative), <i>Swashar</i> (Good for respiratory disorder), pain killer (<i>vedanashamak.</i>)
Therapeutic Indication	<i>Apasmara</i> (Epilepsy), <i>atisaar</i> (Diarrhoea), Sperm problems, <i>Anidra</i> (Insomnia), Pain Reliever.
Therapeutic Uses	1. The seeds pounded with milk & pasted destroy dandruff. 2. The seeds are used as general tonic in form of various recipes.
Therapeutic dose	25 to 125 mg as per the strength of the patient

Therapeutic Formulations	<i>Ahiphenasav, AstakshariGutika, BhrihadgangadharaChurna, DugdhaVati, Harshodyavati, VedanantakaVati, KamesvaraModaka, KarpuraRas, Mahavataraj Rasa, Nidrodaya Rasa.</i>
Adverse Effect	Its overdose causes- drowsiness, sleep, respiratory arrest, depression and even death
Remedial Measure	Stomach wash, emesis, use of antidotes like ghee, tobacco etc, cardiac stimulant like <i>kasturi</i> .
Contraindications	Children, Kidney disease, Depression like mental disorder
Purification	To purify <i>Ahiphen</i> , it is first washed with water and cow's milk and then is triturated 21 times with the juice of <i>Ardrak</i> (Ginger), and then dried and stored ²²

Table I-Table showing Ahiphen Description Given in Ayurvedic texts.

PLANT INTRODUCTION: 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. It is an erect rarely branched, annual herb. Each plant bears 5 to 8 capsules. Flowers are bluish white in colour. Leaves are many, amplexicaule, lobed, dentate or serrate, linear-oblong or ovate –oblong.²³ Crude opium is a dark brown or grey, irregular mass with a characteristic odour and bitter taste.

PLANTATIONS: 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.

ACTIVE PRINCIPLES : 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:

- Phenanthrene group – Morphine, Codeine and Thebaine.
- Benzyl isoquinoline group – Papaverine and Noscapine.

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

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

MODE OF ACTION: 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. The opiates and opioids occupy certain receptors in the brain which in the normal state are occupied by endorphins and enkephalins (associated with pain thresh-

old), 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.

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 –

- 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 sense of well being and increased mental and physical activities are noticed as below:

- Freedom from anxiety.
- Restlessness.
- Hallucination
- Flushing of face
- Increased action of heart
- In children it may present with convolution.

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

- 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:

- Headache
- Heaviness of body
- Fatigue
- Giddiness
- Drowsiness and intense desire to sleep, from where the patient can be aroused but likes to sleep.
- The pupils are contracted and pin point.
- The face and lips are slightly cyanosed
- The pulse and respiration is normal.
- Stage of Coma –

- This is the stage of coma where the person cannot be aroused. There is no response on talking and shaking
- Later on there is no response to deep pain
- The muscles are relaxed and reflexes are lost.
- All secretions are depressed and suspended
- Pupils are contracted, pin point and insensitive to light. They dilate only when asphyxia sets in, which is a terminal feature of poisoning.
- Respiration is slow, deep in character and subsequently labored – Chayne stokes type.
- Pulse is feeble and slow, gradually it becomes irregular and imperceptible.
- Rarely there could be convulsions before death.
 - Unusual Symptoms –
- Vomiting and purging
- Tetanoid convulsions
- Dilated pupils – even in the beginning stages also
- Syncope and heart failure
- Rebound phenomenon may be seen. The patient apparently recovers but suddenly because of increased intestinal absorption goes into stuporous 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 occurs in adults when 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 –

According to Modern –

- Supportive measures –
- Maintenance of patient airway.
- Endotracheal intubation, assisted ventilation.
- Stomach wash (in oral ingestions)

- 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.
- 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 brain-stem which is suppressed by opiates especially heroin.
- Amiphenazole 20 to 40 mg IV can also be given and repeated as required (no more recommended today).
- Supportive measures include vasopressors for hypotension, diuretics and antibiotics for pulmonary edema, etc.
- Convulsions may be treated with benzodiazepines in the usual manner, though this is frequently not necessary if naloxone is available.
- According to Ayurveda –
- The juice extracted from the plant *brhatksudra* 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 death²⁴. (*anupanmanjari* 3/1)
- Also references are available in Ayurveda saying that fresh cow's milk, ghee, *kadunimba*, *makoy*, *kapus*, or tamarind leaf juice, paste of *errand mool*, *akhrot* *gar* (walnut), *turtichurna*, *tejbal* paste and *hingu* are called *afuvinashak*. As per requirement ayurvedic preparations like *jawaharmohrapishti*, *chandrodayakasturi*, can be used.²⁵

DIFFERENTIAL DIAGNOSIS

Opium or morphine poisoning clearly resembles ;

- Intracranial lesions such as cerebrovascular accidents especially pontine haemorrhage.
- Metabolic conditions such as uraemic coma and diabetic coma.

- Alcohol poisoning.
- Carbolic acid poisoning.
- Organophosphorus poisoning and
- Other comatose conditions such as epileptic coma, hysterical coma and barbiturate poisoning, from which it needs to be distinguished.

CHRONIC POISONING

Signs and Symptoms: Tolerance is seen, i.e., on subsequent occasions the dose has to be increased to get the same effect as before:

- Dermal scars resulting from repeated injections
- Constricted pupils
- Anorexia
- Amentia, confusion, hallucinations
- Constipation
- Impotence.

Management:

- The drug intake should not be abruptly stopped but gradually withdrawn in progressively diminishing amounts.
- 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 60 to 40 mg / day and then gradually tapered off.
- 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)
- Anti-spasmodics can take care of abdominal cramps, vomiting, diarrhoea, etc.
- Tranquillisers or bed time sedation can be administered, if necessary.
- Psychiatric counseling is frequently necessary.

POSTMORTEM APPEARANCES

External appearance

- Injection marks, dermal abscesses, scarring, look for injection marks in the antecubital fossae, forearms, back of the hands, neck, groin and ankles.
- Tattooing, (a common feature of the drug subculture)
- Emaciation
- Bluish appearance of finger nails and face
- Presence of white, fine froth around the face and nose
- Petechial haemorrhages in the skin, and other parts.
 - ✓ Internal appearance –
- The stomach may contain dark brown lumps. The walls may or may not be congested.
- Gross pulmonary oedema with froth exuding out of mouth and nostrils, especially in sudden heroin-related death.
- Cerebral edema
- Congestion of liver with enlargement of hepatic lymphnodes. Chemical analysis of lymph nodes may reveal presence of morphine.

MEDICOLEGAL IMPORTANCE

- 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.
- For homicidal purposes opium is rarely used because of bad taste.
- Accidental poisoning is more frequent in children.²⁶

CONCLUSION : *Agadatantra* is one of the incredible branch of *AshtangaAyurveda*. *Upavisha Ahiphen*,described in *Agadatantra* and *Rasashastra* is used as medicine, also for suicidal purposes and for homicidal purposes .In this article *Ahiphen*,is reviewed briefly with its macroscopic characters, medico legal aspects and toxicological effects,fatal period, fatal dose, treatment, postmortem appearance and medico legal aspect . The information available in this

review could be helpful to scholars, manufacturers, forensic experts, and other scientific bodies related to Ayurvedic research. More research is needed to be done on this medicinal plant .

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Corresponding Author: Dr. Archana.S. Shukla,Associate Professor;Department of AgadaTantra, S.R.C.College of Ayurveda,Chikli.dr_archanashuklamishra@yahoo.com

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