



A Critical Analysis of Ahiphena as Upavisha through its Neurotoxicity

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Ahiphen (opium) also called as Poppy Plant that grows everywhere in India. In ancient times, it was thought to be like foam coming from the mouth of the snake. It contains Codeine, Papaverine and Morphine. All these chemicals, particularly morphine, depress the cortex, respiratory and cough center of medulla. In Ayurveda Ahiphen comes under the Upvisha. In these articles I am going to deal with the mechanism of action, stages of opium poisoning, differential diagnosis and treatment of Ahiphen poisoning related to nervous system. It mainly affects the neurotoxic cerebral sominiferous. This drug is also found to be used in different dosage forms, both for internal administration and external application. This paper is an attempt to review the different yoga's containing Ahiphena highlighting its therapeutic utility. There are four varieties of Ahiphena (Papaver somniferum) as white, black, yellow and colored.

Keywords: Ahiphen, Upvisha, neurotoxic cerebral sominiferous, papaverine, codeine, morphine

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Introduction

Papaver somniferum, commonly known as the opium or breadseed poppy. It is a species of flowering plant in the family *Papaveraceae*. It is a species of plant from which both poppy seeds and opium are derived. Its native range was east of the Mediterranean Sea, but now is obscured by ancient introductions and cultivation, being naturalized across much of Europe and Asia. This poppy is grown as an agricultural crop on a large scale, for one of three primary purposes. The first is to produce seeds that are eaten by humans, commonly known as poppy seeds. The second is to produce opium for use mainly by the pharmaceutical industry. The third is to produce other alkaloids, mainly thebaine and oripavine, that are processed by pharmaceutical companies into drugs such as hydrocodone and oxycodone.

What is Ahiphen in Ayurveda?

Basonym of drug:

Ahe Phen Garalmiva Tikshngunatwata. Vachaspatya
Ahe Phen Sarpasya Phena Garalmiva Atyugratwata.
 (Ra. Ni)

Ahiphen is a drug which comes under the *Upavisha*. Its latex is very strong just like the venom of cobra.

Synonyms of Ahiphen

Ksira (Latex) are all synonyms related to the latex of *Ahiphen*.

- *Phaniphen* - Latex is strong as the venom of snake.
- *Nagaphen* - *Ksira* (Latex) is as strong as a snake venom.
- *Aakupha* - A source of opium.
- *Khasaphaksira* - Injury done to fruit yields latex.

Classification according to Ayurveda

Papaver somniferum Linn

Kula: Ahiphena Kula

There are four varieties of flowers mentioned in *Nighantu*:

1) White 2) Yellow 3) Black 4) Chitrika

Taxonomical classification

Kingdom - Plantae

Class - Dicotyledons

Subclass - Polypetalous

Series - Thalami florum

Order - Ranales

Family - *Papaveraceae*

Genus - *Papaver*

Species - *Somnifera*

Habitat

In India it is cultivated in Uttar Pradesh, Rajasthan, Madhya Pradesh and Bihar.

Varieties

A] Based on color of flower

1. *Sweta* - White flower
2. *Pita* - Yellow flower
3. *Krsna* - Black flower
4. *Citra* - Multicolored

B] Based on mode of action

1. *Jarana* - Digested food
2. *Marana* - Fatal
3. *Dharana* - Maintains health
4. *Sarana* - Evacuates wastes

C] On the Basis of The Regimen

1. *Papaver glabrum* Bios - cultivated in Turkey, Egypt and Iran.
2. *Papaver album* DC - Cultivated in India and Yugoslavia.
3. *Papaver nigrum* DC - Cultivated in southern Europe.
4. *Papaver setigerum* - Wild in Southern Europe.

Morphology

Habit: An annual herb with latex.

Root: Tap root branched

Stem: Erect, herbaceous, green, cylindrical, hairy with latex

Leaf: simple, alternate, sessile, sheathing base, exstipulate, lobed, unicostate, reticulately, veined.

Inflorescence: solitary, terminal cymose

Flower: pedicellate, actinomorphic, bisexual, complete, hypogynous, large, showy, red or white colored

Fruit: Small, white or black

Part Used

- 1) Raw opium - It is the dried latex obtained by the incision from the unripen fruit capsules of *Papaver somniferum*.

- 2) Poppy seeds - seeds are collected from poppy seeds.
- 3) Poppy straw - Dried opium poppies are referred to as poppy straw.

Phytoconstituents of Ahiphena

Alkaloids of Opium are derived and are divided into two groups:

Phenanthrene group

Benzyl isoquinidine group

1. Phenanthrene series

- Morphine 5-21%
- Codeine 0.3% to 4%
- Thebaine 0.3 %

2. Benzyl is a quinone group

- Papaverine
- Nascapine
- Narcinine

Opium also contains Meconine or pianine, organic acids like Neopine, Poryphyrine and Meconidine.

Active Principle

- The morphine is the main ingredient
- Other ingredients which are present in less quantity

A) Natural derivatives- codeine, papaverine, narcotine

B) Semi synthetic derivatives heroine (brown sugar)

C) Synthetic derivatives - Pethidhh

Properties of Ahiphena

Ahiphena	Properties
Rasa	Tikta, Kashaya
Guna	Laghu, Ruksha, Sukshma, Vyavayi
Virya	Ushna
Vipaka	Katu
Doshkarma	Kaphavatahar
Karma	Madyakar, Grahi, Stambhakar,
Indications	Atisara, Kasa, Darunaka, Jvara, Nidranasha

Action on Dosha Dhatu Mala[1]

Dosha Karma: Niryas is Kalpana because of its *Ushna Virya*.

Dhatu Karma: Niryas is Dhatuososaka, Phalatwak is Dhatushosaka and Bija is Dhaturvardhaka.

Karma on Mala: Niryas is Stambhaka and Swedjanaka, Phalatwak is Grahi.

Karma of parts of Ahiphena:

Niryas (latex) - Grahi, Madaka, Ruchira, Agnivardhak

Phalatwak (Fruit Bark) - Grahi, Mohakar, Ruchya, Agnivardhaka

Bija (seed) - Balya, Vrusya

Pharmacological Actions:

Analgesic, hypnotic, sedative, Narcotic, Respiratory depressant, depresses cough reflex, Emetic (but in large doses suppress vomiting centers)

Pharmacodynamics of Ahiphena

Mainly opium acts on the nervous system, but it has other actions mainly it acts on opioid receptors and produce various effects like constipation, Respiratory depression, nausea, vomiting etc.

Some reports also show an opioid driven impairment hypothalamic function that can result in a loss of libido, impotency, and infertility. Many patients reported that stress relief even in presence of sedation, hypoventilation, cough inhibition, prolonged apnea, myosis & respiratory obstruction.

Effect on cardiovascular system: There are many cases which are going to report that it causes peripheral vasodilation due to decrease in blood pressure directly affecting the blood vessels. It also indirectly affects and causes flushing of face, neck, thorax, impaired sympathetic reflex, and postural hypotension.

Effect on gastrointestinal tract and Urinary system: it causes increase in smooth muscle tone, delayed gastric emptying and urinary retention.

Mechanism of Action:

Morphin depresses the cortex and the respiratory and cough centers in medulla but stimulates vagus and vomiting centers. Opium produces its effects by activating specific G protein-coupled receptors in the brain, spinal cord, and peripheral nervous system. There are three major classes of opioid receptors being δ -opioid, κ -opioid and μ -opioid.

Opium will generate an agonist activity which will later open the potassium channels and prevent the opening of voltage-gated calcium channels. This activity causes a reduction in neuronal excitability and inhibits the release of pain neurotransmitters. The addictive character of opium is related to the binding to the μ -opioid receptors,

Which will activate dopaminergic neurons in the ventral tegmental area of the midbrain and thus enhance the dopamine release in the nucleus accumbens. This mechanism involves the reward activity of the mesolimbic dopaminergic pathway.

Receptors involved in various actions:

1. Delta Type of Opioid Receptor:

Kind - protein
Action - agonist

General action - G-protein coupled receptor that functions as a receptor for endogenous enkephalins and for a subset of other opioids. Ligand binding causes a conformation to change that trigger signaling via guanine nucleotide-binding proteins (G proteins) and modulates the activity of down-stream effectors, such as adenylate cyclase. Signaling leads to the inhibition of adenylate cyclase activity. Inhibits neurotransmitter release by reducing calcium ion currents and increasing potassium ion conductance. Plays a role in the perception of pain and in opiate-mediated analgesia. Plays a role in developing analgesic tolerance to morphine.

Specific functions: G protein-coupled enkephalin receptor activity.

Gene name - OPRD 1

2. Kappa Type of Opioid Receptor

Kind - Protein
Actions - Agonist

G-protein coupled opioid receptors that function as a receptor for endogenous alpha-neoendorphins and dynorphins but have low affinity for beta-endorphins. Also functions as a receptor for various synthetic opioids and for the psychoactive diterpene salvinorin A. Ligand binding causes a conformation to change that trigger signaling via guanine nucleotide-binding proteins (G proteins) and modulates the activity of down-stream effectors, such as adenylate cyclase. Signaling leads to the inhibition of adenylate cyclase activity. Inhibits neurotransmitter release by reducing calcium ion currents and increasing potassium ion conductance. Plays a role in the perception of pain. Plays a role in mediating reduced physical activity upon treatment with function G-protein coupled opioid receptor that functions as a receptor for endogenous alpha-neoendorphins and dynorphins but has low affinity for beta-endorphins.

Also functions as receptor for various synthetic opioids & for psychoactive diterpene salvinorin A. Ligand binding causes conformation to change that trigger signaling via guanine nucleotide-binding proteins (G proteins) & modulates activity of down-stream effectors, such as adenylate cyclase. Signaling leads to inhibition of adenylate cyclase activity. Inhibits neurotransmitter release by reducing calcium ion currents & increasing potassium ion conductance. Plays role in perception of pain. Plays role in mediating reduced physical activity upon treat. with synthetic opioids. It regulates arousal & regulation of autonomic & neuroendocrine function.

Specific function: dynomorphine receptor activity.

Gene name - OPRK1

3. Mu- type opioid receptor

Kind - protein
Action - Agonist

Dosage of *Ahiphena*:

- 1) 200mg as morphine
- 2) 10ml of opium tincture
- 3) Heroin - 50mg
- 4) 2gm as opium
- 5) Codine - 500mg
- 6) Pethidine - 1gm

Fatal Dose:

Crude opium - 1-2 g
Tincture opium - 3 to 4 ml
Morphine - 60 – 180 ml
Codeine - 400 mg
Heroin - 20 – 30 mg
Fatal Period: 6 to 12 hours

Signs and symptoms:

1) Acute poisoning:

It includes external as well as internal poisoning.

A) External Poisoning: In sensitive people redness of skin, blisters & itching may be caused due to opium.

B) Internal Poisoning: Opium contains Morphine in large doses so the poisoning due to opium is due to Morphine only. If opium is taken by oral route. The symptoms appear in ½ to 1 hours & if it is injected then the symptoms appear within 3 to 4 minutes because when it is taken by oral route the toxicity is reduced due to metabolism in liver.

Three Stages can be seen in opium poisoning which are as follows:

1. Stage of Excitement or Euphoria.
2. Stage of Stupor.
3. Stage of Narcosis.

1. Stage of Excitement or Euphoria: Feeling of well-being with certain pleasure. mental excitement (short duration), breath may have smell of Opium, convulsion in children is usual. Freedom from anxiety, Restlessness, Hallucinations, flushing of face, Increased action of heart, in children it may present with convulsions.

2. Stage of Stupor: Depressive action starts, Giddiness, Headache, Nausea, Vomiting, Functional loss of senses, Strong will to sleep. The pupils are constricted; face & lips are cyanosed. At this stage, the pulse & respiration rate is almost normal.

3. Stage of Narcosis: It is also called the stage of Coma. No response to talking and shaking later, no response to deep pain. low blood pressure, feeble pulse and slow. All secretions except that of skin are going to be depressed. Deep sleep which patient cannot be aroused.

The muscles become flaccid & relaxed & all reflexes are abolished. The face is pale & congested conjunctivae. The pupils are contracted to a pinpoint size & they do not react to light. The odor of opium may be present in breath, frothing through mouth can be observed, pulse become slow.

Treatment of Poisoning

According to the modern aspect:

There are four methods to treat the poisoning which is going to affect the nervous system.

General treatment of poisoning:

1. Immediate resuscitative measure
2. Removal of unabsorbed poison
3. Use of antidotes
4. Elimination of absorbed poison by excretion
5. Treatment of general signs and symptoms.

1) Immediate Resuscitative Measure:

It includes following - ABCD

- A - Airway
- B - Breathing
- C - Circulation
- D - Correction of CNS Depression

A] Airways:

Opening and cleaning of the airway to remove secretion, vomitus or any foreign body that has been found as obstacles is to be done. Establish a patent airway by positioning, suctioning or endotracheal tube intubation.

B] Breathing:

After clearance of air way if arterial blood gas levels can't be maintained provide supplemental oxygen, if necessary, with a bag and mask device or ventilator.

C] Circulation:

IV fluid administration may be lifesaving.

D] Correction of CNS depression:

Drugs should be administered appropriately for the correction of CNS depression

Drugs used may include:

Dextrose-50%: 50-100ml IV.

Thiamine: 100mg IM or IV.

Naloxone: 0.45-2 mg IV.

Consider flumazenil: 0.2-0.51 ng IV.

2) Removal of Unabsorbed Poison:

Depending upon the route of entry the following methods are explained:

Ingested poison: There are two ways are followed to remove the ingested poison

- A. Gastric lavage
- B. Emesis (Vomiting)

Vomiting:

Vomiting is comparatively of greater value in avoiding the absorption of poison. Vomiting can be induced only if the medullary center of the patient is still responsive. that is, in conscious patients.

Methods to Induce Vomiting

- A. Tickling the fauces
- B. Intake of household emetics

Example

- 1 teaspoon mustard powder, 2 tablespoon common salt with 200 ml of water.
- Give baked Asafoetida, mixed in milk.

Gastric Lavage (Stomach Wash):

It is useful anytime within 3 hours after ingestion of a poison.

Instrument:

The instrument used to do the gastric lavage is stomach tube (Ewald's or Boas tube). The stomach tube is made up of ordinary soft non collapsible rubber tube of one diameter & 1.5 m length with a filter funnel attached to at one end. It is marked at a level of 50cm from the lower end which is rounded with lateral opening. At midpart of tube there is a suction bulb (used to pump out the stomach contents). A wooden mouth gag is provided, one end of which is pointed, so that it can be forcefully inserted by the side of the mouth in non-cooperative patient.

Procedure:

- Patients should be placed in Trendelenburg position or in his left lateral decubitus position or semi prone with hips higher than his head & face downwards and mouth lower than larynx.
- Artificial dentures are removed & mouth gag is placed in between the teeth of two jaws (to avoid teeth bite).
- Care should be taken in unconscious patients who are likely to regurgitate the stomach contents which may aspirate into respiratory tract resulting in death from asphyxia.
- The round end of tube is lubricated with olive oil, glycerin or liquid paraffin and passed into the stomach by depressing tongue and slowly passing it downwards through the pharynx and esophagus through the stomach till 50 cm mark is reached (without force).
- Naloxone HCI is a pure antagonist of Morphine, so it is given 0.4 to 0.8 mg IV. IM Sublingually every 10-15 min until the following signs appear. Dilation of Pupils. Regular & Normal respiration Patient regains consciousness. Inj. Nalmefene, Tab. Naltrexone may also be used as antidote.

Symptomatic Treatment:

1. IV DNS should be given in shock.
2. In 25% coramine 5-10 ml IV may be given as a respiratory stimulant drug.
3. If a patient lands in a deep coma, artificial respiration should be carried out continuously & oxygen gives by inhalation.
4. To avoid infection of respiratory tract, antibiotics should be given.

Treatment of Chronic Poisoning of Opium:

1. Psychiatric counseling should be done.
2. Gradual withdrawal of Morphine.
3. Beta blockers should be used to relieve anxiety & craving.

Ayurvedic treatment:

1. If patients are conscious, give powder to induce emesis.
2. Give baked Asafoetida, mixed in milk.
3. Give *Tankan Laahi* with clarified butter.
4. Juice of Ginger should be given
5. The decoction, *Erand* seed or *Amalakai* decoction should be given.
6. The antidotes of opium according to *Ayurveda* are the following: Cotton seeds, cows clarified butter, Neem etc.
7. To empower heart & to protect heart from toxic effect give remedy of gold like *Suvarn Sootshekhar*.

Ahiphena is contraindicated in:

- *Bala* - Young
- *Vrddhi* - Aged
- *Madhumeha* - Diabetic
- *Visucika* - patients suffering from *Visucika* with cold limbs
- *Slaimika Kasa* - cough because of *Kapha Dosha*.
- *Vrkka Sotha* - Inflammation of kidney.

Discussion

As we know that there are various side effects of *Ahiphen* that can be mainly cured by the modern treatment like gastric lavage and other methods. This poison is going to mainly effect on the CNS system mainly medulla oblongata and pons that causes decrease in heart rate and other symptoms like vomiting.

In *Ayurveda*, There is no any specific treatment which directly cure the poison effect there is only *Upashaya* is present in ayurveda that deals mainly on sign and symptoms to pacify it for temporary duration.

Conclusion

The opium herb is *Kapha Vata Hara*, *Tikta*, *Kashaya*, *Vyavayi*, *Vikashi*, *Vednasthapka* (pain reducing), *Madkari*, *Balya*, *Vrishya* (aphrodisiac),

Sukra Sthambhka, Swashar, Grahi (absorbent) and *Nidrajanan*. It is effectively used in *Atisara, Kasa, Jvara* and *Nidra Nasha*. Opium. is powerful analgesic, opioids are great pain relief, for the sort of term used where the duration of used is limited. by cause of pain, generally healing of wound or repair of injury during the surgery or the death when drugs are used demulcent (palliative) setting. Many products in the market for children and adults were sold for pain and cough relief, they all contained opium. Opium is also very strong pain killers, but we must know that they have big drawbacks to addiction.

Commonly seen side effects with opium use (short term) are nausea, constipation, and many other congestive impairments. Ayurveda doctors prescribed opium substances must know that tolerance towards opium means that over time the patient needs. higher doses to achieve the same level of pain relief and therefore prescribe opium need monitoring, caution, and care. As per the concept of Ayurveda, "even a strong poison can be converted to an excellent medicine if processed and administrated properly. On the other hand, even the most useful medicine may become a poison if handled incorrectly.

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