Abstract

Opium, *Papaver somniferum*, till today, is the best known source for relieving pain. Then also cases of opium intoxication are one among the frequently seen casualties. This is just because of dose, duration & intention with which it is taken or given. The plant *Ahiphena* (Opium Poppy) contains active principles like Morphine which is basically responsible for causing acute as well as chronic toxicity i.e. Addiction. The detailed information of opium, its contents, dose, cultivation, toxicity, addiction, management will help us to treat such a patient. Also we will become aware of medico legal issues related to opium intoxication. For social purpose we have to do counseling of such addicts and we can do this only after studying total review on Opium.

Key words: Opium, Morphine, *Ahiphena*, Toxicity.
INTRODUCTION

Aphu or the poppy plant has been widely referenced in movies and literature but likely the most famous instance of this is the use of the poppy plants in The Wonderful Wizard of Oz in which the wicked witch used them to put Dorothy & her friends to sleep before they reached the Emerald City. It wasn’t until the late 17th century when the Chinese realized that regular use of opium could and in fact would result in addiction. Even then, millions of people used opium regularly and did not worry much about the negative consequences that would result if addiction set in. Here we will study all about opium toxicity, treatment, addiction and withdrawal. Also medico legal aspects of drug plays very important role mostly for social purpose.

Opium (Papaver Somniferum)

Vernacular Names
A) Sanskrit - Aaphuk, Ahipha, Nāgphena
B) Marathi - Aphi
C) Hindi - Afim
D) English - Opium, Poppy plant

Classification
A) According to Ayurveda –
• Sthavara(Plant origin)
• Upavisha

B) According to Toxicology –
• Neurotic
• Cerebral Somniferous

General Description –
It is a perennial shrub of height 1 to 1.5 m. It is called as poppy.

Stem – It is branchless & smooth.
Leaves – Rectangular, alternate with irregular edges.
Flowers – Large, white, purple or reddish black in color.
Fruit – The fruit is called Doda vernacular. There are 5 to 8 fruits in each plant. The fruit is like small pomegranate fruit with stalk. It breaks by itself. The covering of fruit is called as Poshta in vernacular.
Seeds – It is called as Poshta Dana or Khaskhas. There are harmless as it does not contain the toxic of opium morphine.

In the evening incisions are taken on unripen fruit & the white juice which exudes is collected in the next morning. So opium is an unripen fruit juice’ of Ahiphenaplast.

In 1909, the International Opium Commission was formed to help regulate the shipping, sale and use of opium due to the dangers that were now widely known pertaining to the regular use of the drug. At this time, opium was first being purified into morphine and heroin which were both highly potent and very powerful analgesic drugs that proved to be very much more dangerous than the raw opium itself. By the 20th century, opium was prohibited from many countries and there was great regulations to help keep opium and opiates such as the many prescription painkillers that use opium as a base out of the hands of the wrong users.

Today’s opium production is mostly dominated by Afghanistan and is far less than it was many years ago. Unfortunately, despite the regulations and the procedures in place to keep opium and other opium derivatives out of the wrong hands, millions of people are still physiologically dependent on opium or similar drugs and need help.

Properties according to Ayurveda literatures:

Rasa – Tikta, Kashay; Vipaka: Katu; Veerya: Ushna; Prabhava: Swapjanan (Somoniferous), Vedanasthapan (Analgesic)

Active Principle – Morphine:
The other toxic contains which are in less quantity are –
a) Natural derivatives – Codeine, Papaverine, Narcotine
b) Semi synthetic derivatives – Heroin (brown sugar)
c) Synthetic derivatives – Pethidine.
Mode of action –
Its action is mostly due to morphine and to some extent due to codeine and narcotine. It reacts with the receptor respiratory centre and causes respiratory depression, rather it depresses all the centres except acculomotor-nucleus, vomiting centre and sweating. It is absorbed on ingestion, by injection, or when applied over abraded surface or open wounds, through rectum, vagina or when smoked as cigarettes. Opiates having chemical similarity with natural substances known as endorphines, activates the receptor sites.[viii]

<table>
<thead>
<tr>
<th>Fatal dose</th>
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<tr>
<td>200 mg as Morphine.</td>
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<tr>
<td>2 gm as Opium.</td>
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<tr>
<td>10 ml of tincture of opium.</td>
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<tr>
<td>Codeine – 500 mg</td>
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<tr>
<td>Heroin – 50 mg.</td>
<td></td>
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<tr>
<td>Pethidine – 1 gm.</td>
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<tr>
<td>Fatal Period</td>
<td>6 to 12 hours</td>
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Factors which will modify the fatal dose of opium:

a) Age – Children are more susceptible.
b) Habit
c) Diseases
   1. Tolerate well – In diseases associated with severe pain, any type of convulsive seizures including tetanus.
   2. Reverse will be the situation – In liver disease, kidney diseases, Myxedema and Addison’s disease.
d) Quality of drug.
e) Idiosyncrasy.[ix]

TOXIC SYMPTOMS

Acute poisoning [x]
a) External poisoning – In sensitive people redness of skin, blisters & itching may cause due to opium.
b) Internal poisoning – Opium contains Morphine in large doses so the poisoning due to Morphine only. If opium is taken by oral route, the symptoms appear in ½ to 1 hour & if it is injected ten 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:
   This is a transient phase & if opium is taken in large doses may be absent. In the beginning patient feels increased sense of wellbeing (Euphoria). Due to increased mental activity, feels freedom from anxiety, flushing face, talkativeness, laughing, hallucinations, restlessness, increased heart rate. In children, convulsions may occur at this stage.

2) Stage of Stupor:
   The symptoms are incapacity for exertion, headache, nausea, vomiting, and vertigo, functional loss of senses, strong will to sleep. The subject lies motionless with eyes closed as if in a sound sleep. At first he can be aroused, but soon passes into stupor and later in coma. The pupils are contracted, face & lips are cyanosed & an itching all over the body. At this stage, pulse & respiration rate is almost normal.

3) Stage of Narcosis:
   The patient passes into deep coma from which he 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. Pupils can dilate during the agonal asphyxial phase caused by respiratory depression & that ultimately lead to paralysis but at this stage pupils do not react to light. Blood pressure falls. All the secretions of body are suspended except sweat. The skin is cold & often covered with perspiration. The temperature is subnormal. The pulse is weak with low volume in beginning but in the later stage of coma, it becomes slow & full. Respiration is also slow & stertorous. The respiration is regular but may be reduced to 3-4 times per minute. The odor of opium may be present in breath. Frothing through mouth can be observed. In case of fatal termination, lividity of the surface increases. Pulse becomes slow, irregular & imperceptible. The respiration becomes Cheignestrokes in type. Finally, death occurs in deep coma from asphyxia.

Symptoms of Chronic poisoning

The addiction of opium is called as Morphinism or Morphinomania. The habit is acquired by young people as it is believed to be an aphrodisiac & as it produces a sense of euphoria. Habit of taking opium in various forms is prevalent in India as follows – [xi]

i) Kasoomba – a decoction of opium used in special festive occasions.
ii) Madak, chandu or opium dross – smoked.
iii) Infusion of poppy capsules.
iv) Bhujri – green ripe capsules fried in butter or ghee.
v) Halwa – juice extracted from green capsule.

Tolerance develops due to prolonged and continuous use of opium and there develops psychological dependence but not any physical dependence. The mechanism of tolerance is not known, though it is presumed...
that it remains bound in the cellular level. Addict can tolerate 3 to 6 gms/day. The features include dry skin with tattooing from multiple previous needle pricks (mainliners develop scar formation with pigmentation in cubital fossa – rail road tracks), venous thrombosis, ulceration, scars of abscess, contracted pupils, pigmentation around cheeks, dry furrowed tongue, anorexia, indigestion, at times nausea, vomiting, constipation, weakness, emaciation, sweating, tremor (periodic withdrawal manifestation), restlessness, irritaTable disturbed sleep with terrifying dreams, withdrawal from family, friends and social activities, suffers from mood swings (periods of alternate euphoria and depression) melancholia, to procure the drug the addict may adopt any means committing any crime, may suffer from hallucination. These may develop impotency in male due to decrease in the level of luteinizing hormone and subsequent reduction of testosterone and frigidity in female.

**Effects of withdrawal of opium**
Withdrawal symptoms, withdrawal reaction or cold turkey are almost reverse of the acute signs and symptoms of the drug characterized by nausea, diarrhea, lacrimation, rhinorrhea, profuse sweating, cough, muscle twitching, goose bumps (piloerection), rise of body temperature, BP, rate of respiration. The symptoms reach its peak by 36 to 72 hours of abstinence and usually disappear by 5 to 8 days.

**Chemical test for detection of opium:**
Marquis test – Suspected opiate solution is taken in a test tube, to it added a drop of mixture containing 3 cc of conc. Sulphuric acid and 3 drops of formalin. Color changes from purple red to violet and finally to blue will be diagnostic.

<table>
<thead>
<tr>
<th>Acute alcoholic poisoning.</th>
<th>Carbon monoxide (Co) poisoning.</th>
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<tr>
<td>Barbiturate poisoning.</td>
<td>Heat Hyperpyrexia.</td>
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<tr>
<td>Diabetic coma.</td>
<td>Brain trauma.</td>
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<tr>
<td>Uremic coma.</td>
<td>Meningitis.</td>
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<td>Epileptic coma.</td>
<td>Encephalitis.</td>
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<tr>
<td>Hysterical coma.</td>
<td>Cerebral Malaria.</td>
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<tr>
<td>Carabolic acid poisoning.</td>
<td>Apoplexy, cerebral hemorrhage especially pontine hemorrhage.</td>
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<tr>
<td>Organo phosphorus poisoning.</td>
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**TREATMENT OF POISONING**

**According to Ayurveda**
1) If patient is conscious give powder to induce emesis.
2) Give baked asaphoetida, mixed in milk.
3) Give Borax (Tankan Lahi) with clarified butter.
4) Juice of ginger should be given.
5) The decoction of cotton seed, Eranda Seed or Amalkidecotton should be given.
6) The antidotes for opium according to Ayurveda are follows:
   i. Cotton seed,
   ii. Cow’s clarified butter,
   iii. Neem, tea etc.
7) To empower heart & to protect heart from toxic effect give remedies of gold like HemgarbhaMatra, SuvarnSutshekar, etc.
8) In comatose patient, the Katphaladi snuff should be used. Give the collyrium of chandrodayavarti or ArdhaniNateshwar, Makardhvja or Kasturi should be used by taking incision on vertex (Kakpadacheda).

**According to Modern Science**

Treatment for Acute poisoning –
1) The emetics usually fail due to the depression of vomiting center.
2) Gastric lavage – Fins give gastric lavage with warm water & preserve this first lavage water for chemical analysis. Then use KMnO4 in 1:5000 concentrations for gastric lavage.
To preserve this lavage, contain is of no use because opium is oxidized by KMnO4 & forms a harmless product & opium cannot be detected in chemical analysis. The stomach wash is continued until the brownish color of the stomach wash contain is changed to original pinkish color of KMnO4. In opium poisoning, stomach wash is useful even if the route of opium poisoning is parental as morphine is secreted in stomach. In the in availability of KMnO4 use boiled tea, tannic acid or combination of fine powder of activated charcoal & water.
3) Use of purgatives - Give enema or use purgative drugs like MgSO4 15-30 gm by oral route so that entire gastrointestinal tract is kept clean that restricts the reabsorption of opium through GIT.
4) Inj. Naloxone HCl is a pure antagonist of morphine so it is given 0.4 to 0.8 mg IV I.M. sublingually every 10-15 min until following signs appear:
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(i) Dilatation of pupils;
(ii) Regular & Normal respiration;
(iii) Patient regains consciousness. If necessary antidote can be given through endotracheal intubation.

5) Inj. Nalmefene&Tab.Naltrexone is also used as antidote.
6) Although Atropine is antidote it is not recommended for it can cause death by paralysis of sensory & motor nerves.
7) Nalorphine&Levallarphan is a specific antidote for opium but not recommended for their respiratory depressant & hallucinatory properties.
8) General Treatment -
   a) After patient is seen in early stage, he should be made to walk about in the open air that helps excretion of opium, but if poison has been absorbed & is acting upon cells of the cortex it may do more harm than help by further exhausting the patient.
   b) Keep the patient warm.
   c) Hot tea or coffee should be given orally or by rectal route.
9) Symptomatic Treatment:
   a) IV DNS should be given in shock.
   b) In 25% caramine 5-10 ml IV may be given as a respiratory stimulant drug.
   c) Stimulant drugs like Methyl amphetamine HCl 10-20 mg may be given.
   d) If patient lands in deep coma, artificial respiration should be carried out continuously & oxygen given by inhalation.
   e) To avoid infection of respiratory tract, antibiotic should be given.

Treatment of chronic poisoning of opium:
1) Psychiatric counselling should be done.
2) Gradual withdrawal of morphine.
3) Beta blocker should be used to relieve anxiety & craving
4) Antispasmodics should be used for abdominal colic; vomiting & diarrhoea.

Post-Mortem appearance:
A) External –
Smell of opium is noticed. Face is deeply cyanosed & blackish discoloration is seen on face. Signs of asphyxiation are observed. The veins of neck are edematous. Postmortem Staining is well marked & cyanotic. Froth is seen at mouth & nostrils. In patient of addiction many needle prick marks can be seen.

B) Internal –
The stomach may contain small lumps of opium. On opening the chest, the smell of opium is noticed, but it disappears if putrefaction has set in. Opium disappears rapidly from the cadaver. Trachea, bronchi, lungs, brain & organs of abdomen are congested.

Medico legal Importance
1) Suicidal – From 12th century, opium is supposed to be an ideal poison for suicide, as it causes painless death in comatose stage. But according to Opium Act 1957 & 1878 & NDPS Act 1985 to keep opium is a crime. So its use is restricted.
2) Homicidal – It is used for infanticide especially infant of unmarried woman.
3) Accidental – Opium is used by worker women to keep their child in deep sleep while going to their duty. In such cases, accidental poisoning may cause with increased dose. In following cases accidental poisoning may cause:
   a) Therapeutic overdose of medicine containing opium;
   b) Overdose of opium medicine used for treatment of sexual incompetancy;
   c) Overdose in opium addicts.
4) To induce courage – Sometimes opium is used to steady the nerves for doing some bold act like murder requiring special courage. In ancient time the warriors used opium before March.
5) Doping – Sometimes it is used for doping race horses. It is rarely used as a cattle poison.
7) Aphrodisiac (Vajikar) – Opium is used to increase sexual potency but with long term consumption it develops impotence & sterility.

DISCUSSION

Toxicology deals with the knowledge ,the sources, characters, properties of the poison, the signs & symptoms caused by their administration, fatal doses, fatal period and management of cases of poisoning. As poison is a substance which when administered, inhaled or ingested is capable of acting deleteriously on the
human body, almost anything is poison. 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. Same in the case of Opium. It is used as a painkiller. Also opium toxicity occurs depending on its dose & other criteria mentioned earlier in the text. We have to manage the toxicity following Ayurveda as well as modern guidelines. Most of the times opium, morphine, Heroin these words come in picture when addiction is there. Treatment is must along with counseling in such addicts. Most likely, opium was the first narcotic substance discovered at the dawn of mankind. Contemporary drug abuse predominantly poses a social and clinical problem and encompasses among other aspects emergency procedures in cases of intoxication and treatment of addictions. On the other hand, this is also a problem of the judicial system, which implements the rule of apt punishment in criminal cases (rapes, robberies, drivers, production and trade in narcotic substances) and of the necessity of monitoring drug-associates deaths). In all drug-associated cases, investigative capabilities have increased with the introduction of extremely sensitive and specific analytical methods (GC-MS, LC/MS, HPLC/DAD) allowing for detection and identification of multi-component mixtures of xenobiotics found at low concentration levels in complex biological matrices. Isolated deaths resulting from morphine poisoning, mostly involving individuals employed in the health care sector, constituted the subject of medico-legal expert opinions starting at the beginning of the 20th century, but only the eighties did bring the need for multidirectional toxicological examinations of opiates and their metabolites in diversified biological and non-biological materials. Keeping this purpose in mind detail study of the drug poisoning, addiction. Management, medico legal aspect play major role & develop awareness about it.

CONCLUSION

Opium derived from drug Aristophana though previously mostly used for analgesic purpose, it may produce toxicity affecting human’s life. Opium is a narcotic and for those who become addicted to narcotics, the outcome is a difficult one. Gradual withdrawal & other necessary treatment may save lives. Awareness of its medico legal aspects is must from social point of view.

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CORRESPONDING AUTHOR

Dr. THORAT VIDHYASHREE JAGANNATH
Assistant Professor, Dept. of Agadatantra & Vyavaharayurveda, Dr. D.Y. Patil Ayurved College & Hospital, Nerul, Navi Mumbai, Maharashtra
E-mail: drvidyathorat@yahoo.com

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