



# A CRITICAL REVIEW OF OPIUM AND ITS TOXICITY

**Dr. Rinkesh vishnoi<sup>1</sup>, Prof. Anita Sharma<sup>2</sup>, Vaidya Amol Kadu<sup>3</sup>**

<sup>1</sup>Pg scholar, P.G. Department of Agad Tanta, NIA, Jaipur, 302002

<sup>2</sup>Professor P.G. Department of Agad Tanta, NIA, Jaipur, 302002

<sup>3</sup>Lecturer P.G. Department of Agad Tanta, NIA, Jaipur, 302002

## ABSTRACT

Opium is papaveraceae family herb which is known as poppy is a flowering plant. It is neurotoxic cerebral somniferous poison, somniferous means sleep inducing, referring to sedative property. This poppy is grown as an agricultural crop for the purpose of pharmaceutical to formation of many type of analgesic medicine to treat pain and induce sleep. But many people take long period of opium for the property of aphrodisiac then they will addicted. Opium is a neurotoxic so it is produce many side effects like anxiety, seizures, hallucination, drowsiness, giddiness and many others. The opium poppy, as its name indicate, is the principal source of opium , the dried latex produced by the seed pods.

**KEY WORDS:** Somniferous, neurotoxic, poppy seed, etc.

## INTRODUCTION

Opium is a somniferous poison. Somniferous is also a narcotic poisons. In modern science opium is also categorized in neuro toxic somniferous poison. Opium is also called as poppy, *Affim*, *Aafuk*, *Ahifen* and *Posta*<sup>[1]</sup>. Medically it is use for treating pain and inducing sleep. Its Latin name is *papaver somniferum* and family is papaveraceae. It is an annual plant with white or red flowers growing on a central bulbous pod. Crude opium has a characteristic bitter in test. Latex is obtained by scoring or lacerating the immature seed pods. The latex out and dried to a sticky brown residue. This is scraped off the fruit. Seeds of opium are non-poisonous and are called *Khaskhasor Postdana* which is creamish in color and used in cooking. According to Ayurveda it is categorized in *Upvisha Varga*

## Cultivation

It is cultivated World-wide; mainly it is cultivated in Asia, South Africa, North America and other Eastern countries. In India, it's mainly grown in Madhya Pradesh, Rajasthan and Utter Pradesh.

## Active Principle

The opium has about 25 alkaloids, divided into two groups:

### A. Phenanthrene derivatives (main narcotic constitute)

#### 1. Natural alkaloids

- Morphine (10%): White color powder, bitter test and Alkaline in nature
- Codeine (0.5%)
- Thebaine (0.3%)

2. Semi-synthetic opioids: They are produced by chemical modification of an opiate and include hydromorphone, diacetylmorphine (heroin, brown sugar or smack), oxymorphone and oxycodone.

3. Synthetic opioids: These substances are not derived from an opiate, but binds to an opioid receptor and produce opioid effect clinically. It includes methadone, fentanyl, pentazocine, tramadol and meperide (pethidine).

### B. Benzyl-isoquinolone derivative (no significant CNS effects)

1. Papaverine (1%)
2. Noscapine (6%)<sup>[2]</sup>

## Ayurvedic View

*Rasa – Tikta, Kasay*

*Guna- Laghu, Ruksha, Sukshama, Vyavavi and Vikasi*

*Virya-Usna*

*Vipaka- Katu*

*Prabhava- Madaka*

*Doshakarma- Kaphavata Shamaka and Pitta Prakopaka<sup>[3]</sup>.*

*This herb is Madaka, Vednasthapka, nidrajanana, Sukra Stambhaka, Swashar, Prustvanashka and Akshepar. it is best used Atisara, Kasa, Jwara and Nidra Nasha.*

## Licensing

In most countries including India, it can be cultivated only by license from the government. In India, legal cultivation is carried out only in Madhya Pradesh, Rajasthan and Utter Pradesh. License are given by the Central Bureau of Narcotics (CBN). All the opium product must be sold to the government. If any licensed cultivator illegally sells of opium, he would be awarded rigorous imprisonment of 10-20 years and fine of Rs. 1-2 lakhs (S. 19 NDPSA) 1985).

## Uses

- Best property of morphine is reduce pain and it is special used in diseases of digestive systems.
- Paste of seeds also used to treat ulcer.
- Seed and leaves are anti-cancer used to cure cancer disease.
- Opium is also used in anti- pyretic.
- Opium is specially herb for urinary system as it reduce sugar level in urine.
- Suppositories of this herb used in hemorrhoids and other rectal disorders.
- Opium is also used in various drugs withdrawal like alcohol and blood poisoning because of its *Vyavayi* and *Vikasi* nature.
- Root of opium plant best used to prevent tumor and hard knots in joints of body.
- Seed of opium (*Khaskhas* or *Postdana*) is develop of strengthen of body due to the property of *Balya* and *Vrashya*.
- Aphrodisiac action of opium due to the property of *Vrishya*.
- Opium is used in insomnia due to its hypnotic property.
- Opium is also used in reducing cardiac pain due to its property of cardio boosters.

## Sodhana or Purification

Clean the opium with water and cow's milk, after clening the poiium give seven times *Bhavana* of *Adrak Swarasa* than dry it. Opium gets purified<sup>[4]</sup>.

## Ayurvedic yoga

- *Sameer Gaja Kesri Rasa*
- *Vednatka Rasa*
- *Agasti Sutraj Rasa*
- *Kapoor Rasa*
- *Kaminividrawan Rasa*
- *Nidrodaya Vati*
- *Maha Vataraj Rasa*
- *Ahiphenasava*

- *Dugdha Vati*

## Time of collection

Opium is collected in *Magh* and *Phalgun* month<sup>[5]</sup>.

## Routs of Administration

It can be taken by snorting smoking or chasing (chasing the dragon), intravenously (mainlining) and subcutaneous (skin Popping). It be mixed with cocaine (known as speed balling) and then taken by addicts.

## Metabolism of opium

Most opioids are metabolized in liver by hepatic conjugation to inactive compounds that are excreted readily in the urine. Certain opioids (propoxyphene, fentanyl and buprenorphine) are soluble in lipids and can be stored in the fatty tissue of body<sup>[6]</sup>.

## Absorption, metabolism and Excretion

Morphine is N-demethylated and O-demethylated alone with unchanged drugs are conjugated with glucuronic acid. The unchanged or undigested and unconjugated morphine are excreted by the colon and by the kidneys. A small amount is excreted into the milk. Heroin is reduced to morphine by the liver<sup>[7]</sup>.

## Mechanism of Action

Opioids act by acting on specific opioids receptor. Opioids receptor are MU, DELTA and KAPPA located at spinal and supra-spinal sites in central nerve system. Opioids receptors are part of family of G-protein-coupled receptors and act to open potassium channel and prevent the opening of voltage-gated calcium channels, which reduce neuronal excitability and inhibition and inhibit the release of pain neurotransmitters.

The MU receptor is important and two subtype are recognized. The MU1 receptors are associated with analgesia, euphoria and dependence where MU2 receptors are associated with respiratory depression and inhibition of gut motility.

The KAPPA receptors are responsibility for analgesia at the level of spinal cord. The role of DELTA receptors in human is not clear<sup>[8]</sup>.

## Acute poisoning

The symptoms of opium include the classical triad of respiratory depression, pin point pupil and impairment of sensorium. Peak effects are seen in 10 minutes with IV route, 10-15 minute after nasal insufflation, 30-45 minute with IM, 90 minute after taking orally and 2-4 hours (h) after dermal application.

## Clinical Feature

The Effects Occurs in Three stages

### 1. Stage of excitement

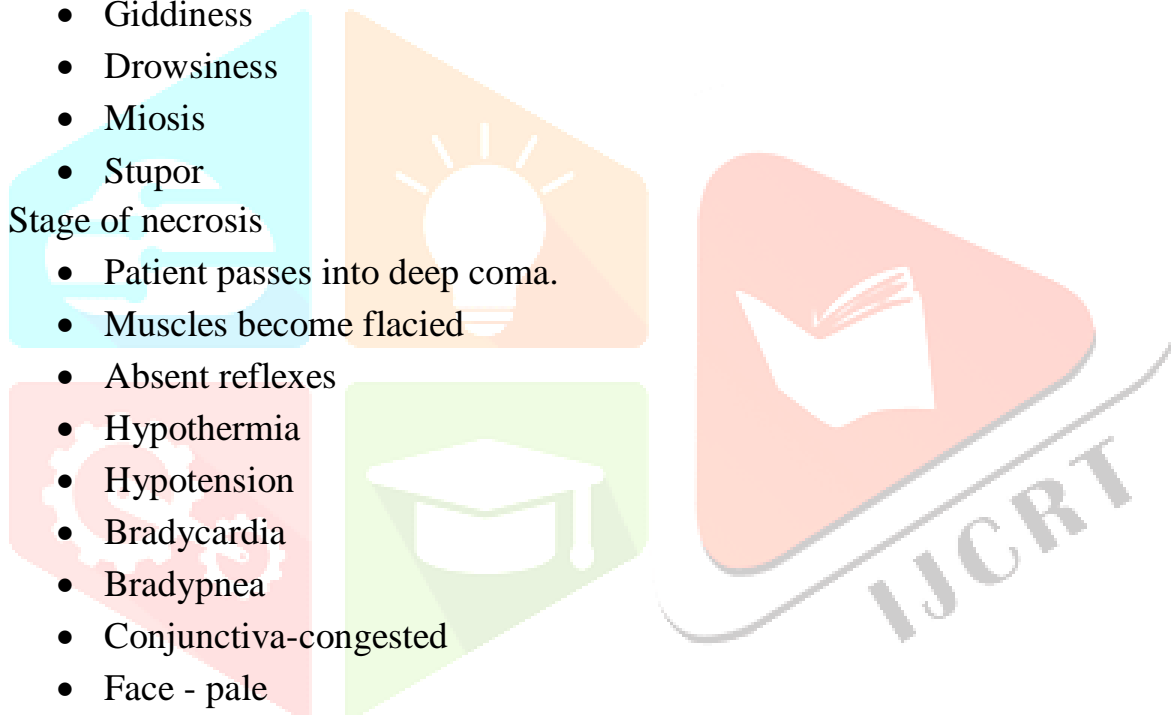
- It is short duration
- The person feel better with increased sense of well-being
- Talkativeness
- Restless or hallucinations
- Flushing of face

### 2. Stage of Stupor

- Headache
- Nausea and vomiting
- Giddiness
- Drowsiness
- Miosis
- Stupor

### 3. Stage of necrosis

- Patient passes into deep coma.
- Muscles become flaccid
- Absent reflexes
- Hypothermia
- Hypotension
- Bradycardia
- Bradypnea
- Conjunctiva-congested
- Face - pale
- Non-cardiogenic edema
- Convulsion
- Respiratory depression
- Death<sup>[9]</sup>



During the terminal stages, ARDS develops and pink froth comes from the mouth (foam cone), pulse is slow, irregular and imperceptible becomes Cheyn-Stokes, and ultimately deep coma and death due to respiratory depression and cardiorespiratory arrest.

## Chronic poisoning

It is seen in addicts after a long period of opium usage. Habit is forming by young people as opium is considered as aphrodisiac and pain reliever. Addicts can tolerate 3-6 gm. of opium per day.

## Clinical feature

- Insomnia
- Emaciated
- Pupil – contracted
- Tongue- dry
- Restlessness and irritability
- Weakness
- Immune system is compromised. Innate immunity and adaptive immunity both are depression.
- Sexual- importance
- Anorexia
- Nausea
- Marked constipation
- CNS- Mania, hallucination, intellectual and moral deterioration, loss of memory and mental fatigue.

## Differential Diagnosis

1. Alcohol intoxication
2. Barbiturate poisoning
3. Carbon monoxide poisoning
4. Carbolic acid poisoning
5. Hysteria
6. Head injury
7. Heat hyperpyrexia
8. Uremia coma
9. Diabetic coma
10. Cerebral hemorrhage
11. Cerebral malaria
12. Meningitis<sup>[10]</sup>.

## Therapeutic Dose

Opium -30-125 mg

Morphine- 10-15 mg

Codeine- 10-60 mg<sup>[11]</sup>

## Fatal Dose

Opium- 2 gm

Morphine-200mg

Codeine-50mg<sup>[12]</sup>

## Fatal Periods

6-12 hours<sup>[13]</sup>

### Management of opium poisoning

- Supportive vitals through respirator and other emergency procedures.
- Decontamination: stomach wash frequently with 1:5000 KMnO<sub>4</sub> leaving some amount of solution in stomach to oxidize the alkaloid that might be secreted in stomach after absorption. Lavage should be carried out even after IV/IM injection of drugs, as it is secreted in the stomach.
- Administration activated charcoal – methods of choice for decontamination following ingestion.
- Enema with 30 gm. of sodium sulfate twice daily.
- Bowel irrigation
- Ventricular tachyarrhythmia can be managed by lidocaine.
- Antidote- narcotic antagonist naloxone in an initial dose of 0.4-2mg IV/IM repeated every 2-3 min up to 10 mg , if no response occurs possibility of an overdose with a benzodiazepine should be considered, and a challenge with IV Flumazenil, 0.2 mg /min up to maximum of 3mg in an hour might be used<sup>[14]</sup>
- Nalmefene has pure opiate antagonist effect and could and could prove superior to naloxone.
- According to Ayurveda *brihatkshudra rasa*, *suthi* and *aadraka* is antidote of opium<sup>[15]</sup>.

## Detection

- Marquis test- It is a simple spot test to presumptive identify opiate and amphetamines. 3ml of concentrated H<sub>2</sub>SO<sub>4</sub> + 3 drops of formalin are added to suspected sample. Purple-red color is observed which gradually change to violet if opiate are present.
- Mandelin test- This test can be used to test for a variety of alkaloids. The reagent consists of ammonium vanadate in concentrated sulphuric acid. The alkaloids produce characteristic color change morphine: blue gray, codeine: olive, heroin: brown and methadone: green to blue<sup>[16]</sup>.

## Post Mortem Findings

### External

- Smell of opium from mouth or nostrils.
- Cyanosis on over all body or blackish
- Froth at the mouth and nostril
- Pupils are constricted or pin point pupils, can be dilated also.
- Allergic reaction to intra venous heroin may be seen.
- Needles prick or tracks are found occasionally, depending on the route of intake.
- Post mortem staining is purple or blackish.

### Internal

- Diffuse cerebral edema.
- All internal organ are congested, trachea contains frothy secretions.
- Blood is dark and fluids.
- Stomach may show presence of opium partial's, smell and soft brownish lumps of opium [17].

### Medico-legal Aspects

- Opium is a poison of choice to commit suicide (ideal suicidal poison), since death is painless.
- Homicidal is rare, because of bitter taste and characteristic smell or odor.
- Morphine is one of favored for euthanasia.
- Accidental opium poison is also common among addict. Drugging of children by opium to keep them quiet and over dose of medicine may result in accidental poisoning.
- Infanticide by breast-feeding an infant by a woman who had smeared her nipple with tincture opium.
- Various nonproprietary formulation, folk remedies, and herb may contain opium, and administration of these results in unintentional poisoning.
- Some-time opium is used for doping racehorses.
- Opium is increase libido hence it is used as an aphrodisiac.
- Some criminal take opium to build courage before committing a crime.
- Opium disappears with purification, so it may not be detected in putrefied bodies [18].
- Cattle poison – rarely
- Increase arsenic levels are found in opium eaters.



## CONCLUSION AND DISCUSSION

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 a powerful analgesic. Opioids are great pain relief, for the short term used where the duration of use is limited by cause of pain, generally healing of wound or repair of injury during surgery, or the death when drugs are used as 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 prescribing 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 prescribing opium needs monitoring, caution and care.

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