

# STRYCHNOS NUX VOMICA

## KUCHILA

Powerful alkaloids Strychnine and brucine ( 1& ½ %)

Seeds also contain glucoside loganine

Fruit hard, rough, glossy orange, 4-5 cm wide, jelly like white or pale yellow pulp. It has 3-5 seeds

Strychnine occurs as colourless, odourless, rhombic prisms, having an intensely bitter taste

The bark contains only brucine

Fruit pulp --- low strychnine content

Strychnine = 20 X brucine

- Seeds are flat, circular discs or slightly convex on one side, concave on other side
- 2.5 cm in diameter, 6mm in thickness
- Ash grey or light brown in colour
- Seeds are very hard, tough, difficult to pulverise

- USES
- In Chinese herbal medicine, the seeds of strychnine are eaten to alleviate external pains.
- Different types of tumors as well as allay paralysis such as Bell's palsy or facial paralysis.
- Useful herbal medicine
- Ingredient of homeopathic medication and is particularly recommended for digestive problems, feeling for cold as well as tetchiness.
- As a respiratory stimulant
- As a rodenticide
- For killing stray dogs, even wild animals

## **ABSORPTION AND EXCRETION**

All mm

Much is taken by liver, muscle to be either released again into blood stream or to be destroyed

This release produces convulsions on the 2<sup>nd</sup> or 3<sup>rd</sup> Day

80% is oxidised mainly in the liver

Excreted slowly by the kidneys and traces in the bile, milk, saliva

- **ACTION**
- Competitively blocks ventral horn motor neuron postganglionic receptor sites in the spinal cord and prevent the effect of **GLYCINE**
- Widespread inhibition in the spinal cord results in **“release” excitation**
- Action in anterior horn cells
- It stimulates the cerebral cortex

## **SIGNS AND SYMPTOMS**

If swallowed ??????

When crushed seeds are taken symptoms delayed for 1 hr

If alkaloid taken symptoms appear immediately ( in 5-15 min)

Bitter taste, sense of uneasiness and restlessness and feeling of suffocation and fear, and difficulty in swallowing occurs

Convulsions are preceded by

- 1) Increased acuity of perception
- 2) Increased rigidity of muscles
- 3) Muscular twitching

Convulsions are produced due to direct action on the reflex centres of the spinal cord, and affect all the muscles at a time

First clonic then tonic

During convulsions face is cyanosed and has anxious look, eyes are staring, eyeballs prominent, pupils dilated

Risus sardonicus

Mouth covered with froth, frequently blood stained

Convulsion most marked in anti gravity muscles producing OPISTHOTONUS

- **OPISTHOTONUS:** In supine position the body is supported by heels and head
- Legs are abducted and extended, and the arms are flexed over the chest or rigidly extended and the hands are tightly clenched
- Bow like form
- **EMPROSTHOTONUS:** spasm of the abdominal muscles may bend the body forwards or to the side ( **PLEUROSTHOTONUS** )
- Consciousness is not lost and the mind remains clear till death
- The suffering of the spasm is severe and the patient is conscious of impending danger of death



- Duration of convulsion-  $\frac{1}{2}$  to 2 min
- In between the convulsion the Ms are completely relaxed and the patient looks well though somewhat exhausted and the breathing is resumed
- Cyanosis lessens, cold perspirations covers the skin, dilated pupils may contract
- After 5-15 min, or on slightest impulse, e.g. a sudden noise, a current of air, or gently touching the patient, another convulsion occurs
- In severe cases ????

- The patient cannot breathe because the diaphragm and the thoracic Ms are fully contracted
- Hypoxia causes medullary paralysis and death
- In non fatal cases interval b/w convulsions become longer and the spasm less, until these entirely stop within 12 to 24 hrs, and recovery takes place in a day or two

- **FATAL DOSE :** 50-100MG, OR ONE CRUSHED SEED
- **FATAL PERIOD:** 1-2 HRS

	<b>TRAIT</b>	<b>STRYCHNINE</b>	<b>TETANUS</b>
<b>1</b>	<b>HISTORY</b>	<b>NO INJURY</b>	<b>INJURY</b>
<b>2</b>	<b>ONSET</b>	<b>SUDDEN</b>	<b>GRADUAL</b>
<b>3</b>	<b>CONVULSIONS</b>	<b>ALL MUSCLES AT ONE TIME</b>	<b>ALL MUSCLES NOT AT ONE TIME</b>
<b>4</b>	<b>LOWER JAW</b>	<b>DOES NOT START IN, NOR ESPECIALLY AFFECT THE JAW</b>	<b>USUALLY START IN, SPECIALLY AFFECT THE JAW</b>
<b>5</b>	<b>MUSCULAR COORDINATION</b>	<b>B/W FITS MUSCLES ARE COMPLETELY RELAXED</b>	<b>B/W FITS MUSCLES ARE SLIGHTLY RIGID</b>
<b>6</b>	<b>FATAL PERIOD</b>	<b>1-2 HRS</b>	<b>&gt;24 HRS</b>
<b>7</b>	<b>CHEMICAL ANALYSIS</b>	<b>STRYCHNINE FOUND</b>	<b>NO POISON FOUND</b>

## TREATMENT

- 1) Control of convulsions
  - a) Pt to be kept in a dark room, free from noise and disturbance.
  - b) Diazepam 0.1 to 0.5 mg/kg i.v slowly and then phenobarbital i.v
  - c) consider GA or Ms relaxants if above inadequate
- 2) Short acting barbiturates are antidotes, 0.3 to 0.6 gm i.v
- 3) Wash stomach with warm water and dilute sol. of  $\text{KMnO}_4$  , and then AC ( Tannic acid if no AC)
- 4) Acidify urine
- 5) General symptomatic t/t

## PM Appearances

Not characteristic but those of asphyxia

Rigor appears early but is not necessarily prolonged

Seeds or their fragments in the stomach

Extravasated blood in the muscles

Haemorrhages are sometimes found in the peritoneal coat of the stomach

## MLI

Homicide sometimes, in the form of alkaloid or as powdered nux vomica seeds in crushed form in spite of bitter taste

suicide rare

Accidental poisoning during overdose of medicinal preparation, or children eating the seeds.

Aphrodisiac sometimes

Cattle poison or arrow poison

# **PERIPHERAL NERVE POISONS**

**CURARE**



Found in various sp of strychnos

Active principle : **CURARINE**

Action is entirely peripheral and at MN jn. And blocks the postsynaptic nicotinic ach receptors in the Ms, thus causing flaccid paralysis of the skeletal Ms

Not poisonous when swallowed??? But absorbed thru wounds or abrasions

S/S: Gradual paralysis of the limb → Respi Ms → Death from asphyxia

Headache, vertigo, mydriasis, blurred vision and hypotension due to liberated histamine

- Mental faculties are clear till death
- **FATAL DOSE : 60 MG**
- **FATAL PERIOD: 1-2 HRS**
- t/t: Atropine 0.6 to 1.2 mg followed by neostigmine 5 to 100 mg i.v

Physostigmine 3 ml of 1: 200 sol. i.v is useful

Artificial respiration should be started

### **PM Appearances**

Not characteristic but those of asphyxia

Cattle poison or arrow poison

## CARDIAC POISONS

- NICOTIANA TOBACUM
- DIGITALIS PURPUREA
- NERIU ODORUM
- CERBERA THEVETIA
- CERBERA ODALLUM
- QUININE
- ACONITE

# NICOTIANA TOBACUM

- Tobacco, tambaku
- All parts poisonous except ripe seeds

- Dried leaves contain 1-8% nicotine
- Can be smoked, stuffed or chewed
- Active principle nicotine, anabasin

narnicotine

Nicotine is colourless, volatile, bitter, hygroscopic liquid alkaloid

## USES

Agricultural and horticultural work, for fumigating and spraying, as insecticides, as worm powder etc.

## **ABSORPTION AND EXCRETION**

- each cigarette contains about 15-20 mg of nicotine of which 1-2 mg is absorbed by smoking
- Each cigar contains 15-40 mg nicotine
- Rapidly absorbed from all mm , lungs and skin.
- 80 to 90% is metabolised in the liver but some in kidney and lungs
- Excreted by the kidneys

## ACTION

- On autonomic ganglia which are first ????
- -----  
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- Also acts on somatic NM junction

## ACUTE POISONING

- G.I.T: Burning acid sensation, N/V/AP, hypersalivation
- C.V.S: Increased HR, BP,RR ( early)  
Decreased HR, BP,RR ( early)  
Arrhythmias may occur
- C.N.S: Miosis, confusion, headache, sweating, ataxia, agitation, restlessness, lethargy, convulsion, coma, death( due to Respi failure)



## **CHRONIC POISONING**

- Cough, wheezing, dyspnoea, anorexia, V/D/Anemia, fatigue, tremors, impaired memory, blindness, amblyopia, extrasystoles

## WITHDRAWAL SYMPTOMS

- Intense urge to smoke, anxiety
- Impaired conc and memory
- Depression or hostility, Ms cramps
- Sleep disturbances, increased appetite and wt. gain, diaphoresis
- **FATAL DOSE :** 50-100MG of nicotine
- or 15-30 gm of crude tobacco
- **FATAL PERIOD:** 5-15 MIN

## TREATMENT

- 1) Wash stomach with warm water containing AC, tannin and dilute sol. of  $\text{KMnO}_4$
- 2) A purge and colonic wash out
- 3) Mecamylamine ( Inversine) is a specific antidote given orally
- 4) Protect airway
- 5) In mild to moderate poisoning Atropine 1-2 mg i.m and hexamethonium chloride 25-50 mg s.c to counteract the peripheral autonomic disturbances
- 5) General symptomatic t/t

## **PM Appearances**

Not characteristic but those of asphyxia

Brownish froth at mouth and nostrils

Haemorrhagic congestion of G.I.T

Pulmonary oedema

## MLI

- Accidental poisoning due to ingestion, excessive smoking and application of leaves or juice to wound or skin.
- Homicide and suicide rare
- Malingering

## **DIGITALIS PURPUREA**

- Common name : Foxglove
- Entire plant toxic, containing over 30 cardiac and steroidal glycosides
- Roots, leaves, seeds contain digoxin, digitoxin, digitalin, digitonin

## **SIGNS AND SYMPTOMS**

- G.I.T: A/N/V/Diarrhea
- C.V.S: Arrhythmias, extrasystole, VT, Fibrillation, AF, Fibrillation, SA block, AV block
- C.N.S: Miosis, confusion, headache, fatigue, sweating, ataxia, agitation, restlessness, lethargy, confusion, delirium, hallucinations, coma, death( due to Cardiovascular collapse)
- Endocrine: Gynaecomastia

**FATAL DOSE :** 15-30 mg of digitalin or 4 mg of digitoxin or 10 mg of digoxin

- Leaf: 2 gm

**FATAL PERIOD:** 1-24 hrs



## TREATMENT

- 1) Wash stomach with warm water tannic and dilute sol. of  $\text{KMnO}_4$
- 2) A purge and colonic wash out
- 3) AC repeated doses
- 4) DIGOXIN SPECIFIC Ab FRAGMENTS ( Fab )** 1 vial i.v in 30 min, which contains 38 mg Fab fragments total 10-20 vials
- 5) Treat VT
- 6) EDTA may help to lower Ca
- 7) Potassium salts to reduce extrasystoles
- 8) General symptomatic t/t

## PM Appearances

Not characteristic

Slight inflammation of the gastric mucosa

MLI

Poisoning is accidental due to therapeutic overdose

## **NERIUM ODORUM**

- White oleander, kaner
- Wild plant, all parts of plant poisonous, flowers are white, pink, dark red, or rareely pale yellow
- Small, 2.5-5 cm wide, born in terminal clusters
- Contains cardiac glycoside oleandroside ( oleandrin) and nerioside ( nerin)
- Both these resemble digitalis in action
- Other glycosides are folinerin and rosanerin
- Nectar yields poisonous honey

## **SIGNS & SYMPTOMS**

- Contact dermatitis
- G.I.T: Difficulty in swallowing and articulation  
AP/Profuse frothy salivaton/ V /Diarrhea
- C.V.S: Pulse is first slow then rapid and weak, BP falls, Fibrillation, SA block, AV block
- C.N.S: Pupils dilated, headache, muscular twitching, tetanic spasm, lock jaw, drowsiness, coma, respiratory paralysis and death( usually due to Cardiac collapse)

**FATAL DOSE :** 15-20 gm of root

Leaf: 5-15 leaves

**FATAL PERIOD:** 20-36 hrs

### **TREATMENT**

1. GL
2. Sodium molar lactate transfusion with glucose and one mg atropine, 2 ml adrenaline and 2mg noradrenaline
3. Symptomatic

### **PM Appearances**

Not characteristic , congestion of the organs seen.

It can be detected long after death

## MLI

The roots, leaves or fruit are often used as a paste or decoction for suicidal purposes

Homicide rare

Abortifacient – locally or taken internally

Root taken internally for treating venereal disease, cancers or ulcers.

Decoction applied externally to reduce swelling

Cattle poison.

Smoke of plant poisonous

## CERBERA THEVETIA

- Yellow oleander, pila kaner
- All parts of plant poisonous
- Flowers are large, bell shaped and yellow 5-7 cm long, 5 cm wide, 5 lobes, spirally twisted and spreading
- Each fruit is globular, contains single nut which contains 5 pale yellow seeds
- Seeds contain 4% cardiac glycoside
  1. Thevetin (  $1/8^{\text{th}}$  of ouabaine and similar to digitalis)
  2. Thevetoxin
  3. Nerifolin ( > potent than thevetin)
  4. Peruvoside, ruvoside, cerebrin

## **SIGNS & SYMPTOMS**

- Contact dermatitis/ inflammation
- Feeling of heat in the mouth/Dryness of throat/ V /Diarrhea/ Headache, tingling sensation. Pulse is rapid weak and irregular, and low BP, Pupils dilated, muscular twitching, Loss of muscle power, heart block, collapse, and death( usually due to peripheral circulatory failure)



**FATAL DOSE :** 8-10 seeds; 15-20 gm of root

Leaf: 5-10 leaves

**FATAL PERIOD:** 2-3 hrs

### **TREATMENT**

1. GL
2. Sodium molar lactate transfusion with glucose and one mg atropine, 2 ml adrenaline and 2mg noradrenaline
3. Symptomatic

### **PM Appearances**

Not characteristic , congestion of the organs seen.

Seeds/ fragments can be detected long after death

## MLI

The roots and seeds are often used as a paste or decoction for suicidal or homicidal purposes

Abortifacient – locally or taken internally

Accidental poisoning due to children eating the seeds.

Cattle poison.

## CERBERA ODALLUM (Pilikirbir)

Leaves are dark green, fleshy and lanceolate, 20-30 cm long and 4-6 cm broad

Flowers are white like those of jasmine

Active principles: Cerberin, cerebroside, odollin, odolotoxin, thevetin and cerapain.

Fatal dose: Kernel of one fruit.

Fatal period: 1 or 2 days or more.

Treatment:

(1) Stomach wash

(2) Atropine 0.5 mg i.v and repeated every 15 to 30 min to keep heart rate above 50 per minute

(3) Correct hyperkalemia.

- Signs and symptoms:  
Initial symptoms within one hr are gastro-intestinal.  
Cardiac toxicity within 3 hours of ingestion.
- There is bitter taste, nausea, severe retching, V /AP /D, general weakness, blurring of vision, sinus bradycardia, SA block, AF, irregular respiration, collapse and death from heart failure.  
Chief bio-chemical changes are Hyperkalemia, and depression of transaminase activity

- **QUININE**

It is a strong protoplasmic poison with anaesthetic and sclerosing action. It stimulates and then depresses central nervous system.

Signs and symptoms:

Headache, giddiness, ringing in the ears, partial deafness, disorders of vision, pupils are fixed and dilated. Mental confusion, pain in the abdomen, nausea and vomiting, confusion of thought, muscular weakness, itching, erythematous or urticarial rash on the skin, methaemoglobinemia, tachycardia, hypotension, cyanosis, delirium and coma.

Fatal dose: 8 to 10 gm.

Fatal period: Few minutes to 2 days.

Treatment:

- (1) Gastric lavage
- (2) i.v. fluids to promote diuresis
- (3) Bilateral stellate ganglion blocks causes return of vision.
- (4) Symptomatic.