Metalllic poison

MERCURY
Forms of mercury

- Elemental mercury
  - Quick silver

- Inorganic mercury salts
  - Mercurous
  - Mercuric

- Organic mercury compounds
  - Short chain mercury (methyl mercury)
  - Long chain mercury compounds
Elemental mercury
- Amalgam makers, Barometer maker, Ceramic workers
- Dentists, Electroplaters, Jewelers, Thermometer makers, Paint makers and Mercury refiners

Inorganic
- Dye makers, Explosive makers, Tannery workers, Disinfectant

Organic
- Drug makers, Bactericide makers, Farmers, Fungicide makers, seed handlers, Histology technicians
Nonoccupational exposure

- **Medicinal**
  - Antiseptic, calomel teething powders, dental amalgam, diuretics
  - Laxatives, preservatives

- **Food**
  - Fish, grains, seeds (treated)

- **Others**
  Button batteries, light bulbs
Mercury ions produce toxic effects by protein precipitation, enzyme inhibition, and generalized corrosive action.

- Binds to sulfhydryl groups as well as to phosphoryl, carboxyl, amide, and amine functional groups.
Clinical presentation

- Acute inhalation of elemental mercury
- Acute ingestion of mercuric salts
- Sub acute or chronic inorganic mercury intoxication
- Acrodynia (pinks disease)
- Methyl mercury intoxication
Acute toxicity (elemental mercury)

- Primary target organs (in case of inhalation are):
  - Lungs, peripheral and central nervous system

- Initial effects

- Pulmonary effects

- Ingestion
  - Retain in appendix
  - Systemic mercury poisoning

- Injection
  - Abscess, embolization, granuloma formation
**Chronic exposure**

- **Inhalation**
  - Classical triad of **Gingivostomatitis, Tremor, Neuropsychiatric illness**

- **Tremors**
  - Resting and intentional (MAD HATTER SHAKE)

- **Erethism**
  - Neuropsychiatric symptoms, memory dysfunction, shyness, loss of self confidence

- **Ophthalmic**
  - Brown light reflex from anterior capsule of the lens
  - Vascular changes at the corneoscleral junction
Acrodynia (pink disease)

- Chronic mercury exposure that occurs in infants and children
- General symptoms
  - Excessive sweating, tachycardia, irritability, anorexia, photophobia
  - Insomnia, tremors, paresthesias, decreased tendon reflex and weakness

Skin
  - Painful pinkish red discoloration of the extremities
  - Rash may be urticarial, vesicular and hemorrhagic
  - Hyperkeratotic induration of palms soles and face
Acute ingestion (inorganic mercury salts)

- Target organs are **GIT and kidney, nervous system**
- Grayish discoloration of mucous membrane
- Metallic taste
- Hematemesis
- Hematochezia
- Hemorrhagic gastroenteritis
- Fluid loss
- Acute tubular necrosis
Chronic intoxication (organic mercury)

- **Target organs**
  - Central nervous system, liver and congenital abnormalities

- **DELAYED NEUROTOXICITY**
  - Paresthesia involving lips, nose, and distal extremities
  - Headaches, fatigues, ataxia, dysarthria, visual field
  - Constriction and blindness
  - Severely affected patients lay in mute rigid position
  - Primitive reflexive movements
Chronic intoxication (organic mercury)

- Dysarthria, ataxia and constricted vision
- GI SYMPTOMS
- TREMORS
- RESPIRATORY DISTRESS
- DERMATITIS
Diagnostic test

- **Acute**
  - Blood, urine level
  - Abdominal radiography
  - Endoscopy

- **Chronic**
  - Hair analysis
  - Electromyography and nerve conduction studies
Treatment

- Decontamination
- Inhalation
- Ingestion
- Injection

- **Chelation**
  - *Succimer* is drug of choice in elemental and organic mercury
    - 10mg/kg three times daily for five days
  - *BAL (Dimercaprol)*
    - First choice in inorganic mercury
      - 3-5 mg/kg every 4 hours for first 24 hours
      - Then every 12 hours for second 24 hours, then once a day for 3 days
Postmortem findings

- **Acute**
  - Appearance of corrosive poison if the poison taken in concentrated form
  - The tongue is white and sodden
  - Diffuse grayish white escharotic appearance
  - Mucous membrane of alimentary tract is inflamed and corroded
  - Difficult to remove the organs without rupture
  - Selective action on caecum and large intestine
    - Inflammation, ulceration, gangrene
    - Liver and heart show fatty degeneration
Chronic

- Changes in large intestine due to re-excretion
- Tubular nephritis
- Fatty degeneration of the liver and cardiac muscles
Post mortem findings

- **Chronic elemental mercury**
  - Pleural effusion, pulmonary granuloma, bronchiectasis

- **Acute inorganic mercury**
  - Severe hemorrhagic necrosis of GIT

- **Chronic organic mercury**
  - cortical and cerebellar atrophy
  - Corpus collasum hypoplasia
  - Demyelination of pyramidal tract
In addition to routine viscera
- Bones, teeth, hairs and nails should also be preserved for chemical analysis