



# Metallic 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

# Occupational exposure

## ▶ 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

# Mechanism of action

- ▶ 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

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# 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 effected 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