

Irritant poisons

Classification of irritant poisons

➤ Inorganic poisons

❖ Metallic

- Arsenic
- Mercury
- Lead
- Copper

❖ *Non metallic*

–Phosphorus

–Chlorine

–Bromine

–Iodine

➤ Organic poisons

❖ Vegetable

- Ricinus Communis
- Croton Tiglium
- Abrus Precatorius
- Capsicum
- Ergot

➤ **Animals**

- Snakes
- scorpion
- spiders

➤ **Mechanical poisons**

- Powder glass
- diamond dust

Metallic poison

ARSENIC

Compounds of arsenic

- Three oxidation state
 - Metallic form
 - Inorganic
 - Organic
 - Gas (Arsine gas)
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- **Trivalent form is more toxic**
 - **Inorganic form is more toxic than organ**

Arsenic trioxide

Restricted to rat poison

Wood preservative

Organic Arsenic compounds

Arsenocholine

Arsenobutaine

- Sulphides of arsenic
Arsenic trisulphide
Arsenic disulphide
- Copper compounds of arsenic
Copper arsenite
Copper acetoarsenite

Arsenate of lead, sodium, potassium

Arsine gas

Sources of arsenic exposure

- Environmental

.Industrial

.Household

Medicine

Arsenic trioxide use to treat acute promyelocytic anemia

Chinese/Indian herbal medicine

Historically

Solution,tablets,paste,and injectable form

Fowlers solution

Syphilis, parasitic blood disease ,trichomonas vaginalis

Eczema ,stomatitis and gingivitis

MECHANISM OF TOXICITY

- Arsenic is protoplasmic poison
- It combines with sulfhydryl groups, particularly those within enzymes.
- cause inactivation of various enzymes system.
- Including glycolysis, pyruvate dehydrogenase and Krebs cycle.
- Decreased production of adenosine triphosphate.
- uncoupling of oxidative phosphorylation

- Particular target vascular endothelium

- Tolerance
- Absorption
- Distribution
- Elimination

Acute poisoning

- Cardiac arrhythmias
- ST-segment and T-wave abnormalities
- Hypoxic convulsions
- Renal damage result in uremia

Delayed action of acute poisoning

- Alopecia
- Cirrhosis of liver
- Peripheral neuropathy

Poisoning by organic arsenical compound

- Nitritoid crises

Chronic exposure

➤ Four stages

- Stage of nutritional and gastrointestinal disturbances
- Catarrhal changes
- Skin rashes
- Nervous disturbances
 - Arsenical neuritis

Chronic exposure

- Low doses caused milk and roses appearance (due to vasodilatation of facial capillaries)
- Weight loss
 - Bone marrow suppression
 - Liver, kidney and heart damage
 - Pancytopenia

- Skin malignancies
 - Intraepidermal
 - Basal cell
 - Squamous cell
- Black foot disease

Differential diagnosis

- Neurological
 - Diabetes, Guillain-Barre syndrome
- Endocrinopathy
 - Hypothyroidism, hyperthyroidism, Addison's disease
- Hematologic
 - Hemolytic anemia, iron-deficiency anemia
- Gastrointestinal
 - Gastroenteritis, hepatitis

.Toxins

thallium, mercury

- Dermatologic
 - Dermatitis, malignancies
- Cardiovascular
 - Myocardial ischemia, peripheral vascular disease
- Infections

Laboratory examination

➤ Pancytopenia (especially neutropenia)



- Basophilic stippling

- Megaloblastic anemia

➤ Blood arsenic levels

- **Urine arsenic level**
- **Hair and finger nail arsenic levels**
- **Abdominal radiograph**
- **ECG**
- **Rinesch test**

Management Acute arsenic toxicity

Supportive care

- **Decontamination**
- Gastric lavage (large orogastric tube)
- Whole bowel irrigation

- **Skin exposure**
- Wash with soap and water

- **Chelation therapy**
- **Indication for therapy**
 - Severely symptomatic
 - Symptomatic patients with Urine arsenic level more than 50 μ g/L
 - Asymptomatic patients with urine arsenic level more than 200 μ g/L

❖ Chelation therapy

- **BAL/Dimercaprol**
- 3-5mg/IM every 4-6 hours for 5 days

- **DMSA**(2,3-DimercatoSuccinic acid ,succimer)
- 25mg/kg/dose orally every 6 hours for 5 days
- 12 hourly for 14 days

- **D-penicillamine**
- 10mg/kg/dose every 8 hours for 5 days (use only if BAL and DMSA are unavailable)

- Fatal dose
- Fatal period

AUTOPSY FINDINGS

- Acute poisoning

- **External**

- **Internal**

Autopsy findings

Chronic

- External
- Internal
- Microscopy
- Samples

Medico legal aspects