Arsenic

Rosenstock:

- A ‘normal’ urinary arsenic concentration is less than 100 µg / liter.
- A ‘normal’ hair & nails arsenic concentration is less than 1 µg / liter.
- CLINICAL EFFECTS:
  - **Acute**:
    - Early stage:
      - Nausea, vomiting, abdominal cramps,
      - **Myocardial toxicity** (broadening of the QRS complex, flattening of T-waves, ST segment depression),
      - CNS toxicity (encephalopathy),
      - Death (circulatory collapse due to fluid and electrolyte loss).
    - Late stage (after 1-3 week):
      - Painful peripheral neuropathy (delayed ascending neuropathy) → is initially sensory with a stocking-glove distribution, but can progress to include sensory and motor deficits (DDx with Guillain–Barré syndrome),
      - Reversible **bone marrow suppression** → leucopenia and granulocytopenia, anemia, ↑ eosinophil count, megaloblastic
      - Cutaneous → nothing to slight erythema to exfoliative erythroderma,
      - **Mees lines**,
      - Mild to moderate ↑ of liver enzymes can occur.
  - **Chronic**:
    - Cutaneous effects → follicular and eczematous dermatitis, Mees lines, hyperpigmentation or melanosis, arsenical keratoses on the palms and soles.
    - Peripheral nerves → axonopathy
    - Peripheral vascular → Raynaud’s phenomenon, acrocyanosis, frank gangrene, so-called **blackfoot disease**.
    - Hypertension, cerebrovascular disease, MI
    - M egaloblastic bone marrow suppression
    - Liver enlargement, ↑ serum liver enzymes, cirrhosis
    - CNS → impaired cognition, personality changes.
    - Lung cancer, skin cancer (BCC, SCC, Bowen’s disease)

- Biologic monitoring of urine is useful → collect a **24-hour urine specimen**
- Chelation for acute intoxication with dimercaprol (British Anti-lewisite, or BAL), D-penicillamine, or dimercaptosuccinic acid (DMSA).
Ladou:

- CHRONIC EFFECTS → Skin and lung cancer, hepatic angiosarcoma
- Most of the reports of both acute and chronic toxicity of arsenic are attributable to arsenic trioxide, a trivalent form.
- Total urine arsenic levels are useful in confirming recent exposure.
- The majority of the absorbed trivalent arsenic is metabolized to dimethyarsinic acid (DMA) and monomethylarsonic acid (MMA) and excreted in the urine with a half-life of 10 hours.
- Organic arsenic compounds are excreted unchanged in the urine.
- The measurement of DMA and MMA eliminate confusion with dietary sources of organic arsenic compounds.
- Hair and nail arsenic levels may be useful in detecting systemic absorption of arsenic.
- Biologic monitoring of arsenic in urine will complement industrial hygiene efforts to control exposure.
- Dimercaprol is not effective in arsine poisoning.