

Acute ingestion of inorganic arsenic salts produces severe GI symptoms that may progress to hypovolaemic shock, arrhythmias, and multi-organ failure

Toxicity / Risk Assessment

- Inhalation: arsine gas is highly toxic
- Ingestion: Inorganic arsenic such as trivalent arsenic (arsenite) and pentavalent arsenic (arsenate) are highly toxic
- Consumption of organic arsenic contained in seafood may lead to raised arsenic concentrations, but rarely causes toxicity
- Chronic poisoning may arise from long-term exposure to environmental arsenic (e.g., contaminated well water)

Clinical features:

Acute: severe watery diarrhoea, vomiting, GI haemorrhage, hypersalivation, prolonged QT, arrhythmias, cardiovascular collapse, metabolic acidosis, seizures, encephalopathy

Chronic: abdo pain, diarrhoea, ascending motor neuropathy, peripheral neuropathy (glove-stocking distribution), cutaneous lesions, bone marrow/renal/liver failure, risk of carcinoma (skin, bladder)

Sources:

- Natural aquifers, contaminated ground water
- By-product of smelting and semiconductor industries
- Agricultural pesticides, herbicides, fungicides
- Complimentary ayurvedic medicine (kelp)

Investigations:

- Serum arsenic concentrations are unlikely to be available rapidly enough to guide acute Rx
 - In suspected acute exposure, a raised spot urine arsenic concentration may help confirm exposure
 - >1000 micrograms of arsenic in a 24-hour urinary arsenic collection confirms acute poisoning
- Plain films of chest / abdomen may identify arsenic containing radio-opaque objects
- Chronic arsenic poisoning is diagnosed using a 24-hour urinary arsenic collection (>50 microg/L OR 100 microg/g creatinine OR 100 microg total arsenic) in conjunction with clinical findings
 - Arsenic speciation can be helpful (organic vs inorganic forms)
 - Chronic exposure: basophilic stippling of RBC, ↑creatinine, ↑transaminase, ↑bilirubin, ↓haptoglobin

Management (*discuss all acute exposure with a clinical toxicologist*)

- Aggressive fluid replacement/resuscitation and targeted chelation therapy are the mainstay of Rx
- Optimize Ca²⁺, K⁺, Mg²⁺ concentrations. Manage QT prolongation / TdP as per separate guideline
- Ensure a good urine output (arsenic and arsenic-chelator complexes are excreted in the urine)

Decontamination:

- Remove clothing (place in plastic bag), decontaminate by washing with soap and water
- The use of GI decontamination including WBI should be discussed with clinical toxicologist

Chelation therapy:

- Discuss all cases with a clinical toxicologist. Oral DMSA or parenteral chelation Rx may be indicated in acute toxicity or in cases with chronic exposure and ↑ 24-hour urinary arsenic concentration