Arsenic (As) – Acute Exposure

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

Toxicity / Risk Assessment

Acute arsenic poisoning in the developed world setting is rare

Organic arsenic compounds are less toxic than inorganic forms

Inorganic Arsenic Compounds:

Arsenic trioxide (As_2O_3) – highly toxic

- Chemotherapeutic drugs, used in ceramic and semiconductor industries. Previously used as pesticide.
- Ingestion leads to severe watery diarrhoea, vomiting, GI haemorrhage, hypersalivation, prolonged QT, arrhythmias, CVS collapse, metabolic acidosis, seizures, encephalopathy, haemolysis, pancytopaenia

Arsenates (include sodium, lead, copper) – highly toxic

- Mining, wood preservatives, pesticides, ground water contamination (Bangladesh, India, China, US)
- Ingestion leads to similar features to arsenic trioxide, but may be less severe with onset of clinical features over hours to days, anaemia, leucopenia

Arsine gas (AsH_3) – highly toxic

- Semi-conductor manufacturing, smelting, metal refining
- Inhalation leads to cough, dyspnoea, pulmonary oedema, haemolysis, vomiting, headache, seizures, renal injury

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

- Aggressive fluid replacement/resuscitation and targeted chelation therapy are the mainstay of Rx
- Optimize Ca^{2+}, K^{+}, Mg^{2+} 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 a 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

Investigations:

- Serum arsenic concentrations are unlikely to be available rapidly enough to guide initial acute Rx
- Arsenic is rapidly cleared from the blood. A blood arsenic concentration of > 50 ug/L measured in a sample taken within a few hours of ingestion suggests significant exposure
- In suspected acute exposure, a raised spot urine arsenic concentration may help confirm exposure
- Ingestion of fish, seafood, seaweed or rice in the 48 hours prior to sampling will increase arsenic concentrations