

Hyperkeratosis is the most observed clinical feature of chronic arsenic toxicity. Organic arsenic within seafood poses a low risk of toxicity.

Toxicity/Risk Assessment

Non-occupational chronic arsenic poisoning in areas without contaminated ground water is rare.

The most common source of exposure resulting in a raised blood or urine arsenic concentration is seafood. The most common form of arsenic in seafood is arsenobetaine (organic form) which has low toxicity

Sources of organic arsenic: seafood, seaweed, rice

Sources of inorganic arsenic: contaminated ground water, smelting & semiconductor industries, agriculture, pesticides, herbicides, fungicides, complimentary / ayurvedic medicines, sanding or burning of arsenic treated wood

Clinical features:

Hyperkeratosis – palms and plantar surfaces (most common feature of chronic toxicity)

Hyperpigmentation – dark spots on trunk, neck, limbs

Mee’s lines – transverse white nail bands

Sensory and motor neuropathies – may be painful

Other – confusion, depression, chronic GI symptoms

Increased risk of bladder, lung, and skin cancer

When to measure arsenic concentrations?

- Arsenic poisoning is rare. Please consider clinical toxicology discussion *prior* to measuring As concentrations.
- Measurement of arsenic concentrations in patients with a high seafood intake is not indicated. Organic arsenic in the form of arsenobetaine found in seafood does not pose a significant risk of toxicity.
- In patients with clinical features of chronic arsenic toxicity and occupational exposure, or other sources identified as part of a thorough history it is reasonable to measure biological As concentrations.

Measuring arsenic concentration

- Urine (24-hour collection preferred over spot) is the biological fluid of choice for arsenic quantification.
- EXCLUDE all seafood, seaweed, rice from diet for five days prior to urine collection

Interpreting urine arsenic concentration

Total urine As > 17 nmol/mmol creatinine (11 ug/g), AND seafood, rice, seaweed restriction for 5 days prior?

NO -> result not consistent with significant recent arsenic exposure

YES -> send urine for full arsenic speciation analysis and discuss with a clinical toxicologist

Management of confirmed cases of chronic arsenic toxicity

- Remove the patient from the source of arsenic exposure
- Please discuss the role of chelation therapy with a clinical toxicologist
- Chelation therapy removes free arsenic from plasma, but has less effect on established tissue stores
- Evidence for the efficacy of chelation therapy in chronic arsenic toxicity is limited
- Chelation challenge diagnostic or therapeutic tests have no role in the management of arsenic exposure
- Patients with confirmed arsenic toxicity should undergo regular surveillance for skin cancer (yearly), bladder cancer (yearly urinalysis), and lung and liver cancer