

Lead Toxicity Characteristics and Presentation

Lead toxicity inhibits the synthesis of heme. It often occurs from exposure to contaminated food and water, old plumbing, or paint with lead. Clinical features may include GI distress, encephalopathy, neuropathy, sideroblastic anemia, and gingival lead lines.



PLAY PICMONIC

Pathophysiology

Decreased Heme Synthesis

[Down-arrow He-man](#)

Lead causes a decrease in heme synthesis by inhibiting Delta-aminolevulinic acid (delta-ALA) dehydratase, ferrochelatase, and the coproporphyrinogen oxidase pathway. Delta-aminolevulinic acid (delta-ALA) dehydratase is the most affected pathway, which increases Delta ALA.

Epidemiology

Contaminated Food and Water

[Contaminated Food and Water with Toxic-glow](#)

Lead can contaminate drinking water via leaded pipes and/or lead-glazed or lead-soldered containers. Drinking water that contains lead cannot be identified by smell, taste, or appearance. A water sampling test can detect the presence of lead.

Old Plumbing

[Lead Pipe](#)

Old plumbing that contains lead is found in older cities and homes built before 1986.

Paint

[Paint-brush](#)

Peeling paint or dust released through a renovation of a house built before 1978 can expose people to lead. Children have a high risk of developing this toxicity by ingestion or inhalation of lead particles. A playmate or sibling with a history of lead poisoning can help diagnose this illness in a child.

Clinical Features

GI Distress

[GI-guy with Flare-gun](#)

Lead colic, also known as plumbism or painter's colic, is a common abdominal manifestation of lead toxicity. It is characterized by very strong pain radiating from the umbilicus, moving to the lumbar regions, the thighs, and the groin. Patients can also experience vomiting and constipation.

Encephalopathy

Altered Brain

Encephalopathy can occur in patients with a lead level of more than 80-100 micrograms/dL. Lead can pass the blood-brain barrier and damage the cerebrovascular endothelium. This destruction causes increased capillary leak and edema, resulting in altered mental status, ataxia, or seizures.

Neuropathy

Wavy Nerve-guy

Lead toxicity can cause neuropathy, which is commonly characterized by weakness of the wrist and finger extensors. Wrist foot drop may be seen in the patient. In the later stages, it can spread to other muscles.

Sideroblastic Anemia

Cinder-block Anemone

The impaired heme synthesis in lead toxicity causes sideroblastic anemia. It is characterized by basophilic stippling, which presents with cytoplasmic granules of RNA precipitates.

Gingival Lead Lines

Gums-blue pigment

A blue pigment can be seen in the patient's gums. This is also known as a gum-tooth line. This occurs due to the reaction of lead with dental plaque. Lead lines can also occur as a radiographic feature on long bones.