



To: Physicians, Nurses, and Other Health Care Providers in the Federated States of Micronesia  
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Subject: Lithium toxicity  
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- Lithium (Li) is used to treat bipolar disease and other psychiatric disorders. In both acute overdose and chronic toxicity, neurologic effects are the main concern.
- Li is a monovalent cation similar to sodium or potassium.
- Mechanism of action is not fully understood but it is believed to increase serotonin activity in the brain.
- Patients on Li should have serum levels monitored to maintain in therapeutic range (0.6-1.2 mmol./L).
- In overdose, Li absorption from the GI tract and distribution into the CNS are typically delayed. Serum levels often rise after acute overdose, and should be closely followed until declining.
- Li levels do not correlate well with toxicity. In acute overdose GI symptoms predominate early with delayed neuro effects. In chronic toxicity patients have significant neuro effects at lower serum levels.
  - Neuro effects include tremors, ataxia, hyperreflexia, muscle rigidity, delirium, and seizures.
  - EKG may show QTc prolongation, T wave flattening or inversion, and bradycardia.
- Li is cleared by the kidneys. Patients may develop chronic toxicity if kidney function declines due to dehydration or other causes while Li dosing remains unchanged.
- Chronic toxicity may be due to drug interactions with thiazide diuretics, ACEIs, NSAIDs, and others.
- In acute overdose activated charcoal is not effective. Whole bowel irrigation (WBI) with polyethylene glycol/electrolyte solution, 1.5-2 L/h by nasogastric tube, should be considered if seen within 6 hours of ingestion. WBI is usually continued for 5-6 hours, or until rectal effluent is clear.

- Kidney function should be monitored and the patient given IV normal saline to optimize urine output.
- Li can be removed by hemodialysis, but this is usually reserved for patients with significant neuro effects and serum levels > 2.5 mmol/L in chronic toxicity, or > 3.5 after acute overdose.
- The mainstay of treatment is supportive care with IV hydration, monitoring of Li levels and kidney function, and benzodiazepines as needed for tremors, agitation, or seizures.
- Patients with chronic Li toxicity may remain symptomatic for days to weeks after Li levels have declined. Li should not be resumed in patients with symptoms of toxicity even if serum level is therapeutic or below.

Reference: Waring WS. Management of lithium toxicity. *Toxicol Rev* 2006; 25: 221.

**Our trained staff of nurse specialists in poison information and physician toxicologists is available 24 hours a day to answer your questions. In the Federated States of Micronesia, health care professionals and the public can reach the Poison Center by calling 288, wait for an automated operator, then 888-222-4516.**