

Levothyroxine Overdose

In the body, concentrations of thyroid hormones are regulated by the hypothalamic-pituitary-thyroid axis. The hypothalamus secretes thyroid-releasing hormone (TRH), which stimulates the release of thyroid-stimulating hormone (TSH) from the pituitary gland. When mature TSH reaches the thyroid gland, it stimulates thyroid hormone production and release. The main thyroid hormone is thyroxine (T4), which is converted to the active form, triiodothyronine (T3).

Levothyroxine (Synthroid®, T4) is the most common thyroid hormone used clinically to treat hypothyroidism and myxedema coma. Most unintentional exposures to levothyroxine are relatively benign due to the large doses required for toxicity; however, a case of thyrotoxicosis in a child who ingested 6 mg of Levothyroxine was recently reported (*Pediatrics*.2010;126:e470-e473). According to Maryland Poison Center guidelines, an ingestion of greater than 2 mg of levothyroxine in pediatric patients warrants medical evaluation. Symptoms can develop 6 hours to 11 days after ingestion and can include fever, tachycardia, tremors, irritability, lethargy and diarrhea. Adults who intentionally ingest very large doses may also develop severe agitation, dysrhythmias, weakness, coma, myocardial infarction and rhabdomyolysis. Follow up is necessary for 1 to 2 weeks after ingestion because of the possibility of a delay in the onset of symptoms while the T4 is converted to T3. The serum concentrations of T4 and T3 can be checked at baseline after large ingestions, and repeated based on the patient's symptoms; however, they may not always correlate with clinical effects.

Activated charcoal is advised for large, recent ingestions of levothyroxine. Beta-blockers are given to treat the symptoms of catecholamine excess. Iodate sodium has been used to block the conversion of T4 to T3 but is currently unavailable in the U.S. Acetaminophen is the drug of choice for hyperthermia. Aspirin should be avoided as there is a risk of increasing T3 and T4 release from thyroxine-binding globulin. Agitation can be controlled with benzodiazepines. Propylthiouracil (PTU) and methimazole, which are used for the treatment of non-drug related hyperthyroidism, should not be used in a levothyroxine overdose.

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DID YOU KNOW THAT... federal appropriations for poison centers will be cut by 25%?

We alerted our readers last month to a possible 93% decrease in federal funding of poison centers. The 2011 fiscal year continuing resolution recently agreed upon by House and Senate leaders calls for a 25% reduction in funding for the U.S. poison control system. Although not as severe as originally proposed, it remains to be seen if and how poison centers will be able to overcome this deficit, coming on top of other budget cuts at the state level. Several poison centers have already closed or have been on the verge of closing in recent years. Read more on the possible impact of federal funding cuts to poison centers on the American Association of Poison Control Centers website, www.aapcc.org.

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