Thyroxine / Liothyronine (Triiodothyronine)

Acute thyroxine (T4) overdose rarely produces significant clinical toxicity. Liothyronine (T3) is associated with more severe clinical features.

Toxicity / Risk Assessment

- *Clinical toxicity is unlikely to occur unless > than 10 mg of thyroxine has been ingested (100 mcg/kg in children)*
- *Patients with co-existing CVS or renal disease, and the elderly are more likely to develop clinically significant toxicity*
- *Severe toxicity has not been described following accidental paediatric ingestions*

Clinical features

Thyroxine and liothyronine produce similar features of clinical toxicity: *tachycardia, tremor, hypertension, fever, agitation, diarrhoea and vomiting, confusion, hallucinations, diaphoresis, delirium, muscle cramps / weakness*

- Clinical effects appear 24-48 hours post ingestion of **thyroxine** (T4) and peak at 1-3 weeks
- Clinical effects appear within 6 hours post ingestion of **liothyronine (T3)**
- Rarely, massive thyroxine OD may lead to delayed coma

Management.

Management is primarily supportive

Decontamination: Offer activated charcoal orally (adult 50 g, child 1 g/kg) within 2 hours of ingestion in all cases of deliberate self-poisoning OR:

Adults: > 10 mg of thyroxine / > 2.5 mg of liothyronine

Children: Thyroxine > 100 mcg/kg or >10 mg. Liothyronine > 20 mcg/kg (5 mcg/kg if pre-existing hypothyroidism)

Investigations: Thyroid function tests are not useful in asymptomatic patients

Supportive care: (it is recommended that local endocrinology services are also consulted)

- A minority of patients who develop clinical toxicity require treatment with a beta-blocker or calcium channel antagonist:
  - Propranolol: 10-40 mg QID orally (paediatric dose - 0.2-0.5 mg/kg)
  - Diltiazem: 60-180 mg TDS orally (paediatric dose - 1-3 mg/kg)
  - Treatment should be continued for a week and then reviewed

Extracorporeal elimination techniques: these are not effective in increasing elimination of thyroxine

Disposition:

- Adult patients who have taken an isolated thyroxine overdose of less than 10 mg do not normally require hospital admission and can undergo immediate mental health assessment as indicated
- Patients discharged home are advised to seek medical review if they develop symptoms of toxicity
- Patients who remain asymptomatic for a period of 6 hours following liothyronine overdose can be discharged pending mental health assessment