

## Signs and symptoms of thyrotoxicosis

Organ system	Symptoms	Signs
Neuropsychiatric/Neuromuscular	Emotional lability	Muscle wasting
	Anxiety	Hyperreflexia
	Confusion	Fine tremor
	Coma	Periodic paralysis
Gastrointestinal	Hyperdefecation	
	Diarrhea	
Reproductive	Oligomenorrhea	Gynecomastia
	Decreased libido	Spider angiomas
Thyroid gland	Neck fullness	Diffuse enlargement
	Tenderness	Bruit
Cardiorespiratory	Palpitations	Atrial fibrillation
	Dyspnea	Sinus tachycardia
	Chest pain	Hyperdynamic precordium
		Congestive heart failure
Dermatologic	Hair loss	Pretibial myxedema
		Warm, moist skin
		Palmar erythema
Ophthalmologic	Diplopia	Exophthalmos
	Eye irritation	Ophthalmoplegia
		Conjunctival injection

### Underlying aetiology

- The most common underlying cause of thyrotoxicosis in cases of thyroid storm is Graves' disease. Graves' disease is mediated by the thyrotropin receptor antibodies that stimulate excess and uncontrolled thyroidal synthesis and secretion of thyroid hormones (thyroxine [T4] or triiodothyronine [T3]).
- thyroid storm can also occur with a solitary toxic adenoma or toxic multinodular goiter.
- Rare causes of thyrotoxicosis leading to thyroid storm include hypersecretory thyroid carcinoma, thyrotropin-secreting pituitary adenoma, struma ovarii/teratoma, and human chorionic gonadotropin-secreting hydatidiform mole.
- Other causes include interferon alpha and interleukin-2-induced thyrotoxicosis during treatment for other diseases, such as viral hepatitis and HIV infection

### Precipitating events

- a precipitating event usually ignites the transition from thyrotoxicosis to thyroid storm. Thyroid storm can be precipitated by systemic insults such as surgery, trauma, myocardial infarction, pulmonary thromboembolism, diabetic ketoacidosis, parturition, or severe infection.
- Thyroid storm has also been reported to be precipitated by the discontinuation of antithyroid drugs, excessive ingestion or intravenous administration of iodine (eg, radiocontrast dyes, amiodarone), radioiodine therapy, and even pseudoephedrine and salicylate use.

- In thyroid storm, the pattern of elevated free T4 and free T3 with a depressed thyrotropin (less than 0.05 mU/mL) are comparable to the levels seen in thyrotoxicosis.

- Other possible laboratory findings associated with thyrotoxicosis include hyperglycemia, hypercalcemia, elevated alkaline phosphatase, leukocytosis, and elevated liver enzymes.
- The hyperglycemia tends to occur because of a catecholamine-induced inhibition of insulin release, and increased glycogenolysis. Mild hypercalcemia and elevated alkaline phosphatase can occur because of hemoconcentration and enhanced thyroid hormone-stimulated bone resorption

- Radiologic imaging is not required to make the diagnosis of thyrotoxicosis or thyroid storm. Although not always indicated for diagnosis, given the urgency and clinical context, nuclear medicine imaging with radioactive iodine uptake and scanning would reveal a greatly increased uptake of radioiodine as early as 1 or 2 hours after administration of the isotope, indicating rapid intraglandular turnover of iodine.

- It is frequently helpful, and generally easier in the setting of an intensive care unit, to obtain a thyroid sonogram with Doppler flow to assess thyroid gland size, vascularity, and the presence of nodules that may require further attention. Typically, a thyroid gland secreting excessive hormones would be enlarged and have enhanced Doppler flow. On the other hand, in the setting of subacute, postpartum, or silent thyroiditis, or exogenous causes of hyperthyroidism, the thyroid gland would be expected to be small, with decreased Doppler flow.

- Electrocardiogram manifestations of thyrotoxicosis most commonly include sinus tachycardia and atrial fibrillation. Sinus tachycardia occurs in approximately 40% of cases, whereas atrial fibrillation occurs in 10% to 20% of patients who have thyrotoxicosis, with a tendency to occur more commonly in patients older than 60, who are more likely to have underlying structural heart disease.

### clinical features of thyrotoxicosis

### aetiology

### Investigation

## clinical features of thyroid storm [created by Paul Young 02/12/07]

### general

- In the spectrum of endocrine emergencies, thyroid storm ranks as one of the most critical illnesses. Recognition and appropriate management of life-threatening thyrotoxicosis is vital to prevent the high morbidity and mortality that may accompany this disorder.
- The incidence of thyroid storm has been noted to be less than 10% of patients hospitalized for thyrotoxicosis; however, the mortality rate due to thyroid storm ranges from 20 to 30%.

### definitions

- hyperthyroidism refers to disorders that result from overproduction of hormone from the thyroid gland, thyrotoxicosis refers to any cause of excessive thyroid hormone concentration. Thyroid storm represents the extreme manifestation of thyrotoxicosis.
- The point at which thyrotoxicosis transforms to thyroid storm is controversial. However, clinically, it is prudent to assume that someone with severe thyrotoxicosis has impending thyroid storm, and to treat them aggressively, rather than focus on specific definitions.

### Diagnostic criteria for thyroid storm

Diagnostic parameters	Scoring points
<b>Thermoregulatory dysfunction</b>	
<i>Temperature</i>	
99–99.9	5
100–100.9	10
101–101.9	15
102–102.9	20
103–103.9	25
≥ 104.0	30
<b>Central nervous system effects</b>	
Absent	0
Mild (agitation)	10
Moderate (delirium, psychosis, extreme lethargy)	20
Severe (seizures, coma)	30
<b>Gastrointestinal-hepatic dysfunction</b>	
Absent	0
Moderate (diarrhea, nausea/vomiting, abdominal pain)	10
Severe (unexplained jaundice)	20
<b>Cardiovascular dysfunction</b>	
<i>Tachycardia</i> (beats/minute)	
90–109	5
110–119	10
120–129	15
≥ 140	25
<i>Congestive heart failure</i>	
Absent	0
Mild (pedal edema)	5
Moderate (bibasilar rales)	10
Severe (pulmonary edema)	15
<i>Atrial fibrillation</i>	
Absent	0
Present	10
<b>Precipitating event</b>	
Absent	0
Present	10

**Scoring system: A score of 45 or greater is highly suggestive of thyroid storm; a score of 25–44 is suggestive of impending storm, and a score below 25 is unlikely to represent thyroid storm.**