

# Case Report

## An Interesting Case of Thyroid Storm

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### Abstract

Thyroid storm is a rare complication of uncontrolled hyperthyroidism which has multisystem involvement and high mortality if untreated. We present a case of thyrotoxicosis progressing to thyroid storm which was precipitated by infection. The clinical presentation was confounded by the presence of underlying mitral regurgitation and atrial fibrillation.

**Key Words:** Hyperthyroidism, Thyrotoxicosis, Thyroid storm

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### Introduction

Thyroid crisis or thyroid storm, also known as accelerated hyperthyroidism is a medical emergency, which requires high index of suspicion and early, prompt and appropriate management in order to minimize mortality. Although the exact incidence is unknown, a Japanese study reported an estimated incidence of thyroid storm in all hospitalized patients in Japan to be 0.20 per 100,000 per year<sup>1</sup>. The overall incidence in hospitalized patients with overt hyperthyroidism is around 1 to 2%<sup>2,3</sup>.

Many criteria have been put forward for the diagnosis of thyroid storm, since it is predominantly a clinical diagnosis, and thyroid function tests may not be much different from those of uncomplicated hyperthyroidism. The presence of multisystem involvement including cardiovascular, gastrointestinal and neurological manifestations makes it challenging for the clinician to diagnose and treat this life threatening condition. When treatment is successful recovery usually occurs in one or two days.

### Case Report

A 44 year old lady presented with complaints of left sided chest pain, breathlessness and palpitations of three years duration, with associated loss of weight. She was known to have hyperthyroidism, for which she had been treated but had discontinued her medications for the past 6 months. She had also been diagnosed to have heart disease but details of treatment were not available.

On examination, she was thinly built, had pallor, glossitis and had a staring look. She also had a diffuse goitre. There was no pedal edema or enlarged lymph nodes. On examination of vital signs, she was found to have tachycardia, with irregularly irregular pulse of varying volume, and an apex pulse deficit of 15. Blood pressure was 100/70mmHg. Systemic examination

revealed an apical impulse which was shifted outward, with a pansystolic murmur of grade 3/6 in the mitral area. She also had a moderate splenomegaly. Neurological examination was normal except for fine tremors. With a clinical diagnosis of hyperthyroidism, with mitral regurgitation and atrial fibrillation, along with anemia and splenomegaly, laboratory investigations were carried out.

Investigations revealed a pancytopenia (Hb 5.8 mg/dl, Total WBC count 1900/cu.mm and platelet count of 62,000/cu.mm). Peripheral smear showed dimorphic anemia, with hypersegmented neutrophils, and thrombocytopenia. Thyroid function tests were suggestive of hyperthyroidism (Free T<sub>4</sub> 4.04ng/dL, TSH<0.01μIU/ mL). Other biochemical tests, including liver function, renal function and serum electrolyte estimations were normal. Serum vitamin B<sub>12</sub> level was done which was markedly decreased (39 ng/mL). ECG showed atrial fibrillation with fast ventricular rate and chest radiograph showed cardiomegaly. ECHO revealed moderate MR, TR, mild PAH, with dilated LA and RA. USG abdomen confirmed splenomegaly.

Therefore, she was diagnosed to have hyperthyroidism, with mitral regurgitation and atrial fibrillation, along with pancytopenia due to Vitamin B<sub>12</sub> deficiency. She was started on Vitamin B<sub>12</sub> supplementation 1000mcg/ day, along with propranolol 20mg twice daily. After a few days, her counts started improving, and hence carbimazole was initiated. However, later she showed a drop in her total WBC count, and carbimazole was subsequently withheld. While in the ward, she developed thrombophlebitis of the left forearm. This was followed by high grade fever, with a temperature of 104.6° F, associated with vomiting, loose stools, altered sensorium and jaundice. An initial diagnosis of infective endocarditis was considered, and patient was started on antibiotics after taking blood cultures. However, patient continued to worsen clinically and

biochemically. In the background of hyperthyroidism, fever with multisystem dysfunction not responding to antibiotics, neurological manifestations, and jaundice, a diagnosis of thyroid storm was considered. Since all other work up for fever was negative, Thyroid storm was a diagnosis of exclusion, based on the clinical features. Under cover of antibiotics she was started on intravenous hydrocortisone, along with Propyl Thiouracil (PTU) at a dose of 200mg 6th hourly. The patient showed remarkable improvement, and her fever subsided, sensorium improved and LFT returned to baseline. The patient was discharged with a final diagnosis of thyrotoxicosis leading to thyroid storm, with mitral regurgitation and atrial fibrillation, and pancytopenia secondary to Vitamin B12 deficiency.

## Discussion

Our patient was a known case of mitral regurgitation with atrial fibrillation, who also had uncontrolled hyperthyroidism. The treatment of hyperthyroidism was complicated by pancytopenia due to Vitamin B12 deficiency, which can be worsened by anti-thyroid medications. Further, the onset of fever with multisystem involvement posed a clinical challenge, as infective endocarditis and sepsis could also manifest in a similar fashion as accelerated hyperthyroidism. With a clinical diagnosis of thyroid storm, we treated the patient with antithyroid drugs, carefully monitoring her blood counts, and also with beta blockers, intravenous steroids and supportive measures such as hydration, antibiotics and antipyretics.

Thyroid storm, also referred to as thyrotoxic crisis, is an acute, life-threatening, hypermetabolic state induced by excessive release of thyroid hormones in individuals with thyrotoxicosis. The presence of hyperthyroidism or thyrotoxicosis is a prerequisite for making a diagnosis of thyroid storm.

Clinical features are fever out of proportion to an apparent infection, sweating, tachycardia out of proportion to the fever, and gastrointestinal symptoms such as nausea, vomiting, diarrhoea and jaundice. As the storm progresses, symptoms of central nervous system dysfunction including increasing agitation and confusion, delirium, coma and rarely seizures. Cardiac manifestations in the form of tachycardia, hypertension, arrhythmias mainly supraventricular and atrial fibrillation, and pulmonary edema or high output cardiac failure are common<sup>4</sup>.

Thyroid crisis is a predominantly clinical diagnosis because the laboratory findings may not be much different than those of patients with uncomplicated hyperthyroidism. Treatment needs to be initiated urgently as the mortality rates of untreated thyroid storm reach 20 to 30%. It includes antithyroid drugs to reduce the hormone production, drugs to block the effect of already circulating excessive thyroid hormones, and finally management of systemic effects as well as control of triggering factors<sup>5</sup>. Thus, it may be treated with lugol's iodine, propyl thiouracil, propranolol and steroids. Additionally antibiotics if infection is present and other supportive measures such as cooling, oxygen, and intravenous fluids can be used.

## Conclusion

Thyroid storm is a life threatening emergency in patients with uncontrolled hyperthyroidism. Early clinical diagnosis, along with prompt initiation of multifaceted treatment will help in reducing mortality.

## References

- 1) Takashi Akamizu et al, Diagnostic Criteria, Clinical Features, and Incidence of Thyroid Storm Based on Nationwide Surveys, *Thyroid*. Jul 2012; 22(7): 661–679.
- 2) Wartofsky L. Thyrotoxic storm. In: Braverman L, editor; Utiger R, editor. *Werner & Ingbar's the Thyroid*. 9th. Williams & Wilkins; Philadelphia, PA: 2005: 651–657.
- 3) Dillmann WH. Thyroid storm. *Curr Ther Endocrinol Metab*. 1997;6:81–85.
- 4) Terry F. Davies, P. Reed Larsen, Thyrotoxicosis. In: Kronenberg HM, Melmed S, Polonsky KS, Larsen PR, editors. *Williams Textbook of Endocrinology*. 11th edition. Philadelphia: WB Saunders Company; 2008
- 5) Joanna Klubo-Gwiezdzinska, Leonard Wartofsky, Thyroid emergencies, *Med Clin N Am* 2012;96: 385–403.