

A Curious Case of Thyrotoxic Crisis and Lower Extremity Weakness

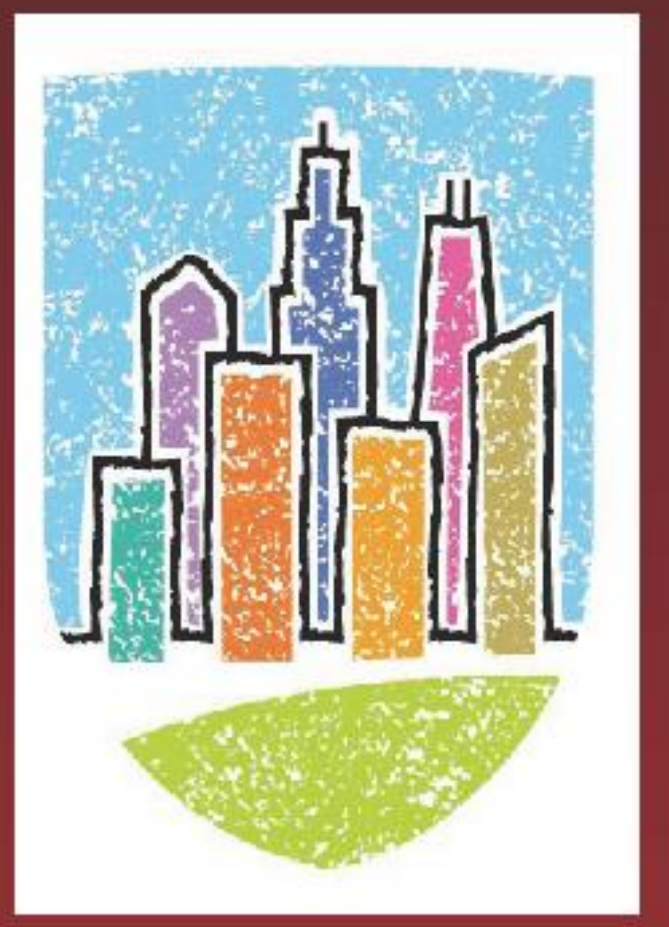
in a 15 year-old Female with Graves' Disease

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Overview and Objective

- We report the case of a female teenager who presented to the Emergency Department with thyrotoxic crisis and lower extremity weakness.
- Objective:**
 - To discuss the course of thyrotoxic crisis
 - To review potential rare neurological manifestations of thyrotoxicosis and their non-thyroid differential

Background

- Thyrotoxic crisis is a rare, emergent complication of pediatric hyperthyroidism.
- Hyperthyroidism occurs in 1 in 5,000 children, especially in the 11 to 15-year age group.
- Graves' disease (GD) is the most common cause of hyperthyroidism in children, accounting for 95% of cases.
- Thyroid myopathy is a rare neurological manifestation of thyrotoxicosis.

History

- 15 year-old African-American female
- CC/HPI:** 5 days of fevers, shortness of breath, dizziness, palpitations, weight loss, abdominal pain, vomiting, and diarrhea.
- PMH:**
 - Graves' disease diagnosed age 14 yo
 - Positive TSI and TRAb antibodies
 - Poor adherence to methimazole (MMI)
 - One prior episode of thyrotoxic crisis complicated by pulm. hypertension
 - Chronic lower extremity weakness of uncertain etiology
 - Asthma, well-controlled
- Medications:**
 - MMI 25 mg daily
 - Albuterol as needed
- Family history:** mother, maternal grandmother, and maternal second cousin with hyperthyroidism.
- Social history:** sophomore in high school, home-schooled due to wheelchair use.

Physical Exam

- Vitals:** T 36.8 C, HR 170 bpm, BP 147/81 mmHg, Wt 60 kg (72nd %ile), Ht 157 cm (20th %ile)
- Eyes:** Mild symmetric exophthalmos bilaterally.
- Neck:** Diffuse nontender goiter, 6 cm transverse diameter bilaterally, with thyroid bruit.
- Cardiac:** Tachycardic, hyperdynamic precordium, 3+ radial pulses.
- GI:** Soft, nondistended, + periumbilical tenderness.
- Neuro:** Muscular deconditioning, fine upper extremity tremor, 3+ patellar reflexes. Normal lower extremity strength, tone, gait.



Figure 1A: Mild symmetric exophthalmos

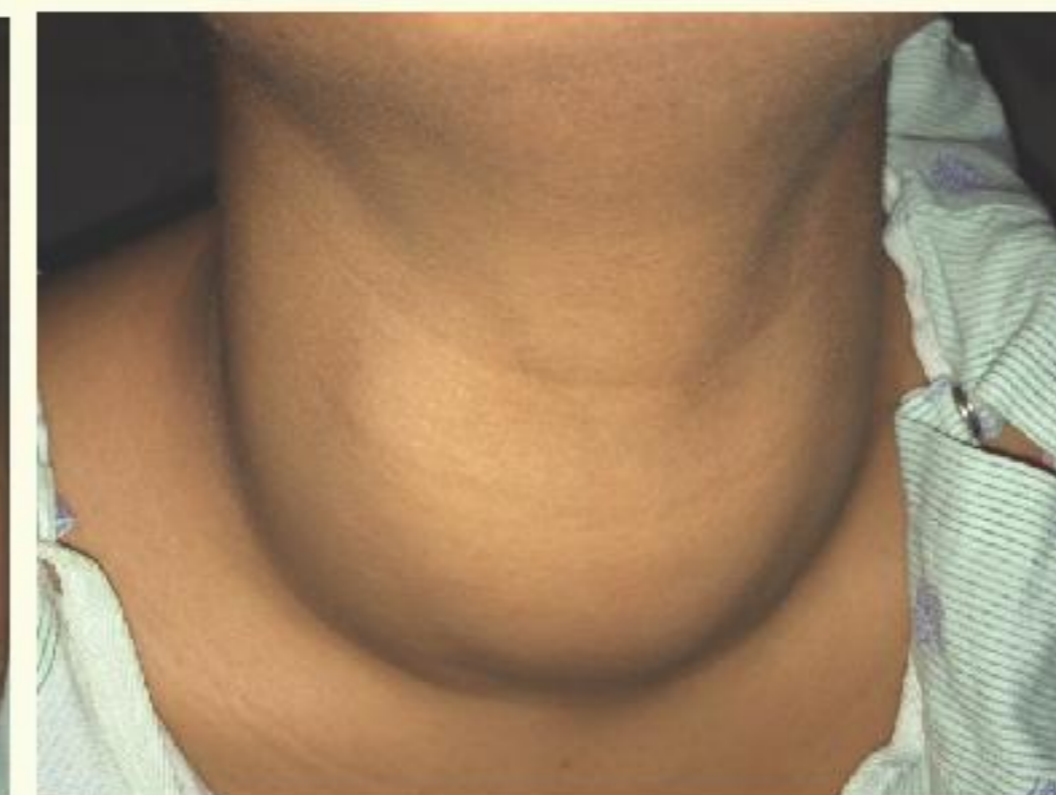


Figure 1B: Diffuse goiter

Initial Laboratory Findings

Laboratory Test	Results	Reference Ranges
TSH (Thyrotropin)	<0.01 mIU/mL	0.5 – 4.8 mIU/mL
T4 (Thyroxine)	20 mcg/dL (257.4 nmol/L)	4.9-13 mcg/dL (63-167.3 nmol/L)
Free T4 (Free Thyroxine)	>7.77 ng/dL (>99.99 pmol/L)	0.93-1.6 ng/dL (11.97-20.59 pmol/L)
T3 (Tri-iodothyronine)	261 ng/dL (4 nmol/L)	80-185 ng/dL (1.23-2.85 nmol/L)
TSH Receptor Antibody (TRAb)	34 IU/L	0.0-1.75 IU/L

Studies

- Electrocardiogram:** Sinus tachycardia with short PR interval, rightward axis, nonspecific T wave abnormality.
- Echocardiogram:** Normal right ventricular function, normal to hyperdynamic bisystolic function, no pericardial effusion.
- Abdominal US:** Normal appendix.
- MRI thoracic and lumbar spine:** No evidence of spinal cord lesions or spinal cord stenosis.

Evaluation/Treatment

- Hyperthyroidism:**
 - Started PTU, SSKI, hydrocortisone, atenolol (cardioselective; due to history of asthma).
 - Clinical symptoms improved in 2 days.
 - After 7 days: off SSKI, switched to MMI, steroid wean started.

Test	Hospital Day #5	Hospital Day #16 (day of discharge)
TSH	<0.01 mIU/mL	
T4	17.1 mcg/dL (220.08 nmol/L)	7.6 mcg/dL (97.81 nmol/L)
FT4	6.63 ng/dL (85.33 pmol/L)	1.54 ng/dL (19.82 pmol/L)
T3	123 ng/dL (1.89 nmol/L)	203 ng/dL (3.13 nmol/L)

- Discharged on MMI 20 mg daily, atenolol 37.5 mg twice daily.
- Thyroidectomy 4 months later:



Figure 2: Excised thyroid

- Lower extremity weakness:**
 - Normal CK and rheumatologic workup.
 - Neurology and Psychiatry evaluation consistent with conversion disorder with weakness rather than thyrotoxic myopathy.
 - Discharged to inpatient rehabilitation facility.

Discussion

- This patient with Graves' disease presented with thyrotoxic crisis due to MMI non-adherence and stress.
- Clinical course complicated by:
 - Prolonged elevated thyroid levels – possibly early escape from Wolff-Chaikoff effect
 - History of asthma requiring cardioselective β -blockade
 - Workup for chronic muscle weakness attributed to conversion disorder

Conclusions

- Few cases of thyrotoxic crisis described in children and adolescents.
- Prompt diagnosis and management may prevent cardiovascular collapse and CNS dysfunction.
- Early escape from Wolff-Chaikoff effect and history of asthma may complicate treatment.
- Muscle weakness in hyperthyroid patients may be due to thyrotoxic myopathy and warrants further evaluation.

No relationships to disclose.

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