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/HP: 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

- Vitalts: 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 nottender goiter, 6 cm transverse diameter bilaterally, with thyroid bruit.
- Cardio: Tachycardic, hyperdynamic precordium, 3+ radial pulses.
- Gl: Soft, nondistended, + periubilical tenderness.

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.
- **Discharged on MMI 20 mg daily, atenolol 37.5 mg twice daily.**
- Thyroideotomy 4 months later:
  - **Excised thyroid**

Initial Laboratory Findings

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
<th>Reference Ranges</th>
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</thead>
<tbody>
<tr>
<td>TSH (Thyrotropin)</td>
<td>&lt;0.01 mIU/mL</td>
<td>0.5 - 4.8 mIU/mL</td>
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<tr>
<td>T4 (Thyroxine)</td>
<td>20 mcg/dL (25.7 ng/mL)</td>
<td>4.9-13 mcg/dL (63-167.3 ng/mL)</td>
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<tr>
<td>Free T4 (Free Thyroxine)</td>
<td>&gt;7.77 ng/dL (&gt;99.99 pmol/L)</td>
<td>0.93-1.6 ng/dL (11.97-20.59 pmol/L)</td>
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<tr>
<td>T3 (Triiodothyronine)</td>
<td>261 ng/dL (4 mmol/L)</td>
<td>80-185 ng/dL (1.23-2.85 mmol/L)</td>
</tr>
<tr>
<td>TSH Receptor Antibody (TRAb)</td>
<td>34 IU/L</td>
<td>0.0-1.75 IU/L</td>
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</tbody>
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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.

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.

References

- Rose DS. Thyroid storm. UpToDate, 2013.