Internal Medicine Clerkship
Case Discussions

Hypothyroidism and Hyperthyroidism
Student Guide

Objectives:

1. Identify characteristics and relevant review of systems that determine the status of hyperthyroidism including weight loss, palpitations, and heat intolerance.
2. Assess past medical history for risk factors and associated conditions including atrial fibrillation and osteoporosis.
3. Identify key physical exam findings that may suggest an underlying etiology including exophthalmos and thyroid nodules.
4. Identify and interpret key laboratory and imaging tests and list indications, benefits, test characteristics, risks, and costs of testing:
    a. Determine degree of hyperthyroidism including TSH, free T4, and T3.
    b. Determine underlying etiology (including use of radioactive iodine uptake scan).
5. Describe a rational and evidence-based approach to treating a patient with hyperthyroidism:
    a. List appropriate initial treatments based on underlying etiology including radioiodine ablation, thiourea drugs, and surgery.
    b. State how to control symptoms with medications including beta-blockers and thiourea drugs.
6. Describe possible complications of hyperthyroidism including ocular and cardiac complications.
7. Identify characteristics and relevant review of systems that determine that status of hypothyroidism including constipation, cold intolerance, and menstrual irregularities.
8. Assess past medical history for risk factors and predisposing conditions including autoimmune disease, infiltrative diseases, and neck irradiation.
9. Assess for familial risk factors for predisposition to thyroid disease.
10. Identify key physical exam findings that may suggest an underlying etiology including thyroid enlargement.
11. Identify and interpret key laboratory and imaging tests and list indications, benefits, test characteristics, risks, and costs of testing:
    a. Determine degree of hypothyroidism including TSH and free T4.
    b. Determine an underlying etiology including thyroid peroxidase (TPO) antibodies.
    c. Distinguish a patient with true hypothyroidism from an euthyroid patient with acute illness and abnormal thyroid tests.
12. Describe a rational and evidence-based approach to treating a patient with hypothyroidism:
    a. Treat all hypothyroid patients with levothyroxine (T4).
    b. State patient characteristics and comorbidities that factor into levothyroxine dose including age and coronary artery disease.
    c. Identify TSH monitoring frequency including at levothyroxine initiation and during maintenance.
13. Describe appropriate screening for hypothyroidism including identifying patients at risk for hypothyroidism (including patients with enlarged thyroid glands, autoimmune disease, and head and neck irradiation) and describe screening frequency for patients at risk.

Clinical Case 1:

43yo presents to clinic with complaint of hair loss. She notes that she has been very aggressive recently in trying to lose weight and has been able to drop 20lbs in the last three months. She is happy with her progress. She notes despite the weight loss, she has maintained a very healthy diet. She has noticed some diarrhea but attributes this to her dietary changes. She also reports her periods have been somewhat irregular, but she again attributes this to her rapid weight loss. She has also noticed some recent palpitations that seem to come out of the blue and last for a few seconds at a time.

Physical Exam:

Vitals:	108/62, HR 88, and BMI 24
Gen:	Normal body habitus, diffuse thinning of hair on scalp
HEENT:	PERRLA, no conjunctival pallor noted
Neck:	Thyroid is diffusely enlarged and firm but without discrete nodules
Resp:	Clear to auscultation bilaterally
CV:	Borderline tachycardic, regular, no murmurs
Abd:	NABS, soft, NTND
Ext:	No peripheral edema
Neuro:	CN II-XII intact, 5/5 motor strength throughout, light touch intact, patellar reflexes are 3+, slight hand tremor bilaterally

Questions:

1. Differentiate thyrotoxicosis and hyperthyroidism. What are major causes of each of these conditions?

2. What is the pathogenesis of Grave's disease?

3. What are common symptoms of hyperthyroidism, and what physical exam findings should you asses for?

4. If you were concerned this patient may have hyperthyroidism, how would you evaluate her?

Patient has her laboratory tests completed, and the results are noted below:
TSH: 0.01, Free T4 6.2
Chem: within normal limits
CBC: Hgb 10.9, MCV 78, RDW 15.9, otherwise normal

Updated 4/12/24 MRE

Questions:

5. How would you counsel the patient regarding these tests? Are there any further tests you would do and if so, how would they assist in your diagnosis? In particular, does she need a radioactive iodine uptake scan?

6. How would treat the patient at this time? When would you follow-up with her?

7. How would you counsel regarding her future clinical course? What other potential complications of hyperthyroidism would you counsel her about?

Clinical Case 2

29yo presents to clinic with complaint of fatigue and weight gain over the last six months. She reports no change in her diet, stress levels, sleep patterns, and she has been able to maintain an exercise routine despite her fatigue. She has also noticed some increased hair loss over this time, which is especially worrisome to her. Her mother has a history of hypothyroidism, and she is wondering if she is developing this as well.

Physical Exam:

Vitals:	BP 127/90, HR 62, and BMI 26.
Gen:	Slightly overweight, diffuse thinning of her hair
HEENT:	PERRLA, no conjunctival pallor
Neck:	Thyroid is slightly enlarged with an irregular contour and is non-tender
Resp:	Clear to auscultation bilaterally
CV:	Borderline tachycardic, regular, no murmurs
Abd:	NABS, soft, NTND
Ext:	No peripheral edema
Neuro:	CN II-XII intact, 5/5 motor strength throughout, light touch intact, patellar reflexes are 2+ bilaterally

Questions:

1. What are the common causes of hypothyroidism?

2. What is the pathogenesis of Hashimoto's thyroiditis?

3. What are common symptoms of hypothyroidism, and what physical exam findings should you asses for?

4. If you were concerned this patient may have hypothyroidism, how would you evaluate her?

Patient has her laboratory tests completed, and the results are noted below:
TSH: 6.4, Free T4: 0.8
TPO Ab: >300

Questions:

5. How would you counsel the patient regarding these tests? Are there any further tests you would do and if so, how would they assist in your diagnosis?

6. How would treat the patient at this time? Would your management change if she were older or had heart disease? When would you follow-up with her?

7. What is sick euthyroid syndrome, and how would you differentiate this from true hypothyroidism?

8. Describe the complication of myxedema coma and how you would treat this.

References:

Harrison's Principles of Internal Medicine, 21e. Chapter 384: Hyperthyroidism and Other Causes of Thyrotoxicosis
https://accessmedicine-mhmedical-com.archer.luc.edu/content.aspx?bookid=3095&sectionid=265439975

Harrison's Manual of Medicine, 20e. Chapter 173: Thyroid Gland Disorders
https://accessmedicine-mhmedical-com.archer.luc.edu/content.aspx?bookid=2738&sectionid=227559667

Symptom to Diagnosis: An Evidence-Based Guide, 4e. Chapter 32-12: Hyperthyroidism
https://accessmedicine-mhmedical-com.archer.luc.edu/content.aspx?bookid=2715&sectionid=249062426

Harrison's Principles of Internal Medicine, 21e. Chapter 383: Hypothyroidism
https://accessmedicine-mhmedical-com.archer.luc.edu/content.aspx?bookid=3095&sectionid=263546550

Symptom to Diagnosis: An Evidence-Based Guide, 4e. Chapter 18-4: Hypothyroidism
https://accessmedicine-mhmedical-com.archer.luc.edu/content.aspx?bookid=2715&sectionid=249060151

Updated 4/12/24 MRE