What You Need to Know About Thyroid Disease

Presented by
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Disclosure: Dr. Paauw has no significant financial interest in any of the products or manufacturers mentioned.
Symptoms of Hypothyroidism

- Fatigue
- Constipation
- Slight weight gain
- Dry skin
- Cold intolerance
- Muscle aches
- Hoarseness

These are pretty much seen in most patients we see in primary care 😞
Physical Findings

- Periorbital edema
- Diastolic hypertension
- Bradycardia
- Edema
- Goiter
- Delayed relaxation phase on DTR
- Large tongue
- Carpal tunnel syndrome
A Few Unexpected Presentations

- Sleep Apnea
- Inability to get off ventilator
- Pericardial effusion
Lab abnormalities

- Hyperlipidemia
- Hyponatremia
- Increased CK, AST
Thyroid: Endocrine Feedback

- Free T4 and T3 levels determine TSH secretion in the normal state in an elegant feedback loop.
- When disease is present, abnormalities are seen in TSH, T4 and T3.
A 36 yo woman comes to clinic for evaluation of fatigue. She has not been sleeping well and is too tired to get out of the bed in the morning. She has no other symptoms. Physical exam is normal. Labs: TSH 7 (NL 0.4-4.5), free T4 1.2 (NL) HCT 39. What would you recommend?

A) Start levothyroxine 50 mcg daily
B) Start levothyroxine 100mcg a day
C) Recheck TSH in 3 months
D) Check antithyroid antibodies
Subclinical Hypothyroidism

- 1/3 to ½ progress to overt hypothyroidism
- Initial TSH level is important, risk of progression greater if TSH>10
- Presence of thyroid antibodies increases chance of progression
Does Treating Subclinical Hypothyroidism Change Symptoms?

- To assess the effects of thyroid hormone replacement for subclinical hypothyroidism.
- All studies had to be randomized controlled trials comparing thyroid hormone replacement with placebo or no treatment in adults with subclinical hypothyroidism. Minimum duration of follow-up was one month.
- Levothyroxine replacement did not improve survival, improve quality of life or improve symptoms.
- Cochrane Database Syst Rev. 2007
Who Should Receive Treatment?

- Treat if TSH >10
- Strongly consider treatment in non elderly patients with positive thyroid peroxidase antibodies
- Treat pregnant woman, and women attempting to get pregnant.
You are going through your labs from yesterday and find that the TSH result on your overweight (80 kg) 22 yo woman with a goiter that you saw yesterday is 44. What will you advise her?

A) To return to clinic and have a free T4 drawn
B) Start Levothyroxine 25 mcg a day for 4 weeks
C) Start Levothyroxine 50 mcg a day for 4 weeks
D) Start levothyroxine 125 mcg a day
The Starting Dose of Levothyroxine in Primary Hypothyroidism Treatment

- Prospective, randomized, double blind trial full starting dose of L thyroxine vs 25 mcg starting dose increasing every 4 weeks, in newly Dx patients without cardiac sx
- 50 patients randomized. Euthyroidism reached in 13 patients in the full dose group at 4 weeks vs 1 in the low dose, 19 vs 3 at 8 weeks and 19 vs 9 at 12 weeks
- No symptoms from replacement in either group
- Arch Int Med 2005; 165: 1714-1720
Your 130 patient arrives to discuss her hypothyroidism. 3 months ago she had a TSH of 6.5. This is increased from 4 last year. You counseled her on avoiding taking calcium or iron with her L Thyroxine. She has been taking her L Thyroxine 1st thing in the morning with no other meds. She had a repeat TSH yesterday and it is 6.8. What do you recommend?

A) Increase her L Thyroxine from 100 mcg to 112 mcg a day
B) Increase her L Thyroxine from 100 mcg to 125 mcg a day
C) Have her take her L Thyroxine at bedtime
D) Work her up for Celiac disease
E) Work her up for adrenal insufficiency
The Effects of Evening vs Morning Thyroxine Ingestion

- Patients were studied on two occasions, on a stable regimen of morning thyroxine administration, and two months after switching to night time thyroxine dosing.
- 12 women on thyroxine replacement for hypothyroidism who were not on any interfering meds were studied.
- 24 hour average TSH values were 5.1 when the women were on morning administration vs 1.2 when on evening administration \( (p<.01) \)
A 48 yo woman presents for followup. She has a hx of hypothyroidism and has been on L thyroxine for 15 years. She had a TSH checked last week and it was 12. Her last test one year ago was 4. Medical problems include depression, hypertension, GERD and hyperlipidemia. Meds: L thyroxine, Citalopram, Simvastatin, Omeprazole, MVI, and Lisinopril.

What is the most likely cause of the increased TSH?

A) Omeprazole
B) Simvastatin
C) MVI
D) Citalopram
E) Lisinopril
Effect of Gastric PH on Thyroid Absorption

- Dose of thyroxine evaluated in 248 patients receiving thyroxine with multinodular goiter
- 53 patients had H Pylori gastritis and 60 had atrophic gastritis. 135 had no gastritis and served as control group. Ten patients received Omeprazole for GERD
- Daily requirement for thyrovine was 22-34% higher for patients with H Pylori infection or atrophic gastritis. In the omeprazole treated patients thyroxine dose needed to be increased by 37%
- NEJM 2006;354: 1787-95.
What Should You Do With A Patient On Thyroxine With A Rising TSH?

- Assess compliance
- Taking FeSo4?
- Taking CaCo3?
- Taking sucralfate/cholestyramine?
- Taking PPI or H2 blocker
- Could they have achlorhydria?
- Could the patient have sprue?
A 45 yo man has elevated cholesterol on screening (TC 258 LDL 190 HDL 42). He is started on Simvastatin 20 mg a day. 1 month later he presents with myalgias that have been severe. What would you do?

A) Stop simvastatin
B) Stop simvastatin and start pravastatin
C) Check CK
D) Check CK, TSH, stop simvastatin
E) Check CK stop simvastatin and start pravastatin
Hypothyroidism and Statin Myopathy

- Hypothyroidism can severely raise cholesterol levels, even in the absence of other sx of hypothyroidism
- Statin use in patients with untreated hypothyroidism is dangerous. Increased risk of rhabdomyolysis and statin induced myalgias
- The dyslipidemia with hypothyroidism may not respond well to treatment, leading to increased statin doses and increased risk

- Canadian Family Physician 2007;53:428-431
45 yo F with soft goiter, palpitations and heat intolerance

TSH <0.05, FT4 3.5, TT3 340
(NI: TSH 0.5-5.0; FT4 0.8-1.8; TT3 80-220)

- RAIU 80%
- TSI +, TPO +

Most Likely Diagnosis?
A) Toxic Multinodular goiter
B) Grave’s disease
C) Surreptitious thyroid hormone
D) “Hashitoxicosis”
E) Thyroiditis
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Symptoms of Hyperthyroidism

- Heat intolerance
- Weight loss (non elderly)
- Tremor
- Anxiety
- Hyperdefecation
- Dyspnea
- Increased sweating
- Muscle weakness (especially proximal)
- Amenorrhea
- Polyuria
Signs of Hyperthyroidism

- Lid lag
- Tremor
- Tachycardia
- Goiter
- Proximal muscle weakness
- Hypereflexia
- Gynecomastia (men)
- Onycholysis
- Hair thinning
Abnormal Labs in Hyperthyroidism

- Increased calcium
- Elevated alkaline phosphatase
- Low total and HDL cholesterol
- Impaired glucose tolerance
Interesting Presentations of Hyperthyroidism

- High output CHF
- Osteoporosis
- New atrial fibrillation
- Thyrotoxic periodic paralysis
Hyperthyroidism: Causes

- Grave’s Disease
- Toxic Multinodular Goiter
- Toxic Adenoma
- Thyroiditis (e.g. Post-partum, granulomatous, lymphocytic, radiation or Hashimoto’s disease in early stage)
- Ectopic/Exogenous hormone
- Medications
Radioactive Iodine Uptake

Normal Range: 10-30% at 6 hours

80% uptake in Grave’s disease
Radioactive Iodine Uptake

“Toxic” Adenoma

Thyroiditis
Graves Ophthalmopathy
30 yo F, clinically hyperthyroid with a small, firm symmetric goiter

- TSH < 0.05, FT4 1.9, TT3 290
  (NL: TSH 0.5-5.0; FT4 0.8-1.8; TT3 80-220)
- TPO ab ++++, TSI -

A) Toxic Multinodular goiter
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Hashimoto’s Thyroiditis

- Lymphocytic infiltration of the thyroid and the presence of high serum concentrations of antibodies to thyroid peroxidase and thyroglobulin.
- May or may not be hypothyroid
- Much more common in women (ratio 7:1) associated with Type 1 DM and other autoimmune diseases
70 yo man from Zaire with CHF/A fib who presents with fatigue and weight gain. Meds: Lisinopril, amiodarone, furosemide, carvedilol. Exam: thyroid twice normal size.

- TSH 40, FT4 0.6, TT3 40
  (NI: TSH 0.5-5.0; FT4 0.8-1.8; TT3 80-220)
- TPO-weak +

Diagnosis:

a) Endemic goiter
b) Idiopathic Hypothyroidism
c) Hashimoto’s thyroiditis
d) Secondary hypothyroidism
e) Amiodarone induced hypothyroidism
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Drug Induced Hypothyroidism

- Amiodarone
- Lithium
A 84 yo woman presents with some lower extremity edema. Other medical problems include depression and CRI. A “Lab Rodeo” is done and the only abnormality is a TSH of .15 (NL .4-4.5) with a normal free T4 and a normal T3. What do you recommend?

A) Repeat TSH in 3-6 months
B) DXA and Thyroid RIU
C) Start B Blocker
D) Treatment of hyperthyroidism
Subclinical Hyperthyroidism

- Definition: low TSH with normal Ft4 and T3
- Most common cause is over replacement with thyroid hormone
- Progression to overt hyperthyroidism 6% first year, and rare after that (about .5%)
- It is much more common to progress in patients with Grave’s disease or nodular goiter
- Much rarer in elderly patients, especially if TSH is .1-.4, progression <1%/ year
- If TSH is<.1 likelihood of progression is much higher
Subclinical Hyperthyroidism

- Increased risk of atrial fibrillation
- Low bone density
Subclinical Hyperthyroidism

- Elderly patients with TSH <.1 should be treated
- For patients with TSH .1-.4, observation with repeat testing is reasonable. Assessment of cause can help with decision, if a radionuclide scan shows increased areas of uptake, then treatment is appropriate.
Apathetic Hyperthyroidism

- Older patients more likely than younger patients with hyperthyroidism to have weight loss, shortness of breath and atrial fibrillation
- Less likely to have heat intolerance, tremor, and nervousness
- May have decreased appetite instead of increased appetite
A 40 yo woman with sarcoid is seen for weakness. She has polyuria and a Na of 156. She has had amenorrhea for the past 4 months. MRI shows hypothalamic and posterior pituitary mass. LH and FSH are <1, FT4 .7 (NL .8-1.6), TSH 7.6. What is the cause of the patients hypothyroidism?

A) Iodine deficiency  
B) Sarcoid infiltration of pituitary  
C) Autoimmune thyroiditis  
D) Thyroid cancer
Thyroid Function Tests

- **TSH** is the best screening test for thyroid disease
- If **abnormal** (or suspicion thyroid disease is high, esp. pituitary disease), next tests should be:
  - **Free T4** (Physiologically active hormone, insight into circulating levels without concerns about TBG)
  - **Total T3** (rules out isolated T3 elevation, insight into TBG states, free T3 assays are often inaccurate)
- If **hyperthyroidism** is present would consider:
  - Radioactive Iodine Update (RAIU)
  - $\alpha$-thyroid peroxidase (TPO)
  - $\alpha$-thyroid receptor antibody (TSI)
A 85 yo woman is involved in a MVC injuring her neck. She has a CT scan looking at her C spine, which is fine. You are called by the radiologist because CT shows a 1cm X 1 cm L lobe thyroid nodule. What will you do?

A) Thyroid ultrasound
B) Order ultrasound guided needle bx of thyroid nodule
C) Thyroid RIU
D) Repeat CT scan in 6 months
E) Nothing
A 43 yo man comes to clinic for annual evaluation. He reports that until he was 24 he lived in the Ukraine, 100 miles from Chernobyl. On thyroid exam he has a 1.5 cm R thyroid nodule. What do you recommend?

A) RIU  
B) Neck CT  
C) Neck MRI  
D) Ultrasound guided biopsy