Thyroid

“The Highs the Lows and Those that Grow”

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Disclosures

- Nothing to disclose

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Overview

Thyroid Disorders

- Hypothyroidism
- Hyperthyroidism
- Thyroiditis
- Goiter & Thyroid nodules
- Thyroid Cancer

Hypothyroidism

Subclinical Hypothyroidism
- Elevated TSH but normal thyroid hormones (T4)
- Generally no symptoms but sometimes hypothyroid symptoms present
- Associated with hypercholesterolemia
- Associated with CHF
- Associated with an increased risk of CHD events and CHD mortality in those with higher TSH levels, particularly in those with a TSH concentration of ≥10 mIU/L, or greater

Hypothyroidism
- Elevated TSH and low thyroid hormone (T4)

Hypothyroid Symptoms

- Fatigue and weakness
- Dry skin
- Cold Intolerance
- Hair loss
- Difficulty concentrating
- Poor memory
- Constipation
- Weight gain
- Hoarse voice
- Menorrhagia
- Paresthesias
- Impaired healing
- Water retention

Hypothyroidism Signs
- Dry skin, cool extremities
- Puffy face, hands and feet
- Delayed tendon reflex relaxation
- Carpal tunnel syndrome
- Bradycardia
- Diffuse alopecia
- Scalp
- Eyebrows
- Effusions
- Altered Mental Status
- Hypothermia
- Myxedema

Causes of Hypothyroidism
- Autoimmune hypothyroidism (Hashimoto’s)
- Iatrogenic (I$_{131}$ treatment, thyroidectomy, external irradiation of the neck)
- Aging
- Drugs: iodine excess, lithium, antithyroid drugs, amiodarone
- Iodine deficiency
- Infiltrative disorders of the thyroid: amyloidosis, sarcoidosis

Evaluation of Hypothyroidism
- TSH ↑, free T4 ↓
  - HIGH TSH indicates hypothyroidism (TSH > 4.0)
  - 0.35 – 4.0 normal
- Ultrasound of thyroid – not helpful
- Thyroid scintigraphy – not indicated (do not order)
- Anti thyroid antibodies – anti-TPO
- CBC: Normochromic or macrocytic anemia
- EKG: Bradycardia with small QRS complexes

When To Treat Subclinical Hypothyroidism
- Symptomatic
- Asymptomatic
  - If TSH is > 10
  - Hyperlipidemia
  - Obesity
  - On multiple medications (statins)
  - Planning pregnancy
  - Multiple cardiac risk factors

Treatment of Hypothyroidism
- No serious side effects using therapeutic doses
  - Hair loss, dyspepsia, dry skin, brain fog?
- Typical full replacement doses are 1.6 mcg/kg
  - 50-150 mcg for most people
  - Dose adjustments for weight changes, estrogen use, pregnancy, menopause
- Monitor TSH, adjust q 6 weeks until stable then q 6-12 months
  - Start slowly in elderly or if underlying CAD
  - Goal TSH 1.2
- Advise patient to take thyroid hormone in the morning, empty stomach, 1 hour before eating. Take only with water. Keep coffee 1 hour away from thyroid hormone. Keep calcium, MVI, iron 4 hours away from thyroid hormone

Hypothyroidism Treatment Pitfalls
- Avoid taking with food or coffee, wait 60 minutes before eating
- Taking too close to vitamins
- High dose required
  - Consider H. Pylori, atrophic gastritis, celiac
  - Gastric bypass
- Verify compliance before dose adjustment
**Hyperthyroidism**

**Subclinical Hyperthyroidism**
- Low TSH, normal Free T4
  - Usually asymptomatic
  - Can have mild hyperthyroid symptoms
  - Associated with increased risks of total, CHD mortality, increased risk of AF, with highest risks of CHD mortality and AF when TSH level is lower than 0.10 mIU/L

**Hyperthyroidism**
- Low TSH and high Free T4

**Antibody Stimulated (Graves)**

**Subacute Thyroiditis** (acute inflammation)
- Viral or antibody mediated

**Toxic Nodule** (multiple toxic nodules)

**Other Causes**
- HCG mediated (pregnancy)
- Struma Ovarii
- Factitious

**Hyperthyroidism Symptoms**
- Irritability
- Anxiety
- Heat intolerance and sweating
- Palpitations
- Fatigue and weakness
- Weight loss with increase of appetite
- Diarrhea
- Oligomenorrhea or Amenorrhea
- Hair loss

**Hyperthyroidism Signs**
- Tachycardia (AF)
- Tremor
- Goiter
- Warm moist skin
- Proximal muscle weakness
- Lid retraction or lid lag
- Gynecomastia
- Thyroiditis - tender thyroid gland
- Graves – proptosis, scleral edema, scleral injection, periorbital edema

**Diagnosis of Hyperthyroidism**
- TSH ↓, free T4 ↑
- Thyroid auto antibodies
  - TPO (thyroperoxidase)
  - TSI (thyroid stimulating immunoglobulin)
- Nuclear thyroid scintigraphy ($I^{131}$)

**Treatment of Hyperthyroidism**
- RAI (radioactive iodine 131)
  - Permanently hypothyroid 3-6 months post RAI
- Thyroidectomy
  - Risk of recurrent laryngeal nerve and parathyroid injury
- Thionamides
  - PTU
  - Methimazole
  - Side effects: agranulocytosis, liver failure, liver inflammation, rash, itching, bleeding
When To Treat Subclinical Hyperthyroidism

- If symptomatic
- If TSH < 0.01
- Elderly if TSH < 0.1
- Underlying cardiovascular disease
- Multiple cardiac risk factors

Thyroiditis

- Acute: due to suppurative infection of the thyroid
- Subacute: also termed de Quervains thyroiditis/granulomatous thyroiditis – mostly viral origin
- Silent thyroiditis: no pain, related to post partum and antibody mediated
- Chronic lymphocytic thyroiditis: autoimmune (Hashimoto’s) – hypothyroidism
- Radiation induced
- Medication induced: INF, Amiodarone

Clinical Course of Subacute Thyroiditis

Hyperthyroid phase: lasts 1-3 months
Hypothyroid phase: lasts 9-12 months
Euthyroid phase: in 12-18 months

Management of Thyroiditis

- Hashimoto’s (chronic lymphocytic thyroiditis)
  - Treat with thyroid hormone if hypothyroid
- Silent
  - Monitor, treat with thyroid hormone if hypothyroid
- Subacute
  - Monitor
  - NSAID
  - Glucocorticoids
  - Thyroid hormone if hypothyroid

Goiter

- Enlarged thyroid gland
- Iodine deficiency
- Autoimmune mediated
- Due to multiple nodules
- Common in pregnancy
- Medication related
  - Lithium
- Management:
  - Nothing to do if asymptomatic
  - For large goiter may check for airway compression
  - Treat with thyroid hormone if hypothyroid
  - Check esophagram if dysphagia present

Thyroid Nodules

- Very common
  - Incidence is high
  - About same as decade of life
  - 60% of sixty year olds will have a thyroid nodule
- Usually found incidentally on neck or chest imaging or physical exam
- <5% are malignant
- Toxic nodules are rarely malignant
- Ultrasound is best imaging for thyroid nodule
- Nuclear medicine scan not indicated unless patient is hyperthyroid
Thyroid Nodules

- Biopsy if greater than 1-1.5 cm in size
- Monitor if smaller than 1 cm with ultrasound
  - 1 year initially
  - 2-3 years if stable
- Concerning characteristics
  - Microcalcifications
  - Hypoechoic or irregular border
  - Hypervascularity
  - Large size, taller than wide shape
  - FDG PET positive

Surgical Management

- Suspicious lesions on FNA
  - Repeat FNA with molecular marker testing (genetic screen)
- Hemithyroidectomy
  - For large symptomatic nodules
- Total thyroidectomy
  - For large symptomatic goiter or multinodular goiter
  - Risk of recurrent laryngeal nerve injury
  - Risk of hypoparathyroidism
  - Require lifelong thyroid hormone

Thyroid Cancer

- Papillary (most common)
- Follicular
- Hurthle Cell
- Medullary (parafollicular c cells)
- Anaplastic

Thyroid Cancer Management

- Surgery (total thyroidectomy, lymph node dissection)
- Radioactive Iodine 131
- Thyroid hormone suppression
  - Low TSH prevents thyroid cancer growth
- Monitoring
  - Thyroglobulin
  - TSH
  - Imaging (ultrasound, nuclear medicine scan, PET)

Conclusion

- Hypothyroidism, symptoms and signs and management
- Hyperthyroidism, symptoms and signs and management
- Thyroiditis, types and clinical course
- Goiter-Thyroid nodules
- Thyroid Cancer, types and management