Family Medicine
436 Team

SDL- Thyroid Disorders

Color Index	IMPORTANT	NOTES	GOLD	EXTRA

OBJECTIVES

- Understand the causes and diagnosis of different types of thyroid disorders (hypothyroidism, hyperthyroidism and thyroid nodule).
- Identify the principles of thyroid history taking and physical examination.
- Explain the role of family physician in management of hypothyroidism and hyperthyroidism and when to refer
- Understand the approach to patient with thyroid nodule

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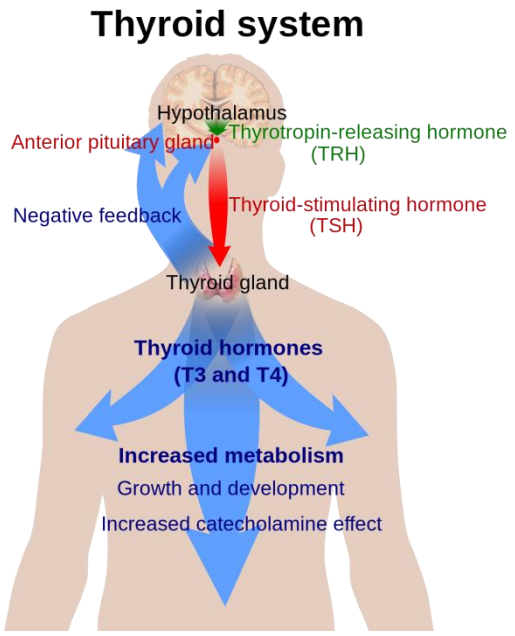
Sources	

Introduction

The Thyroid is a small gland located in the lower-front part of your neck. It's responsible for helping to regulate many of the body's processes, such as metabolism, energy generation, and mood. The thyroid produces two major hormones: triiodothyronine (T3) and thyroxine (T4).



Hypothyroidism

Causes:

Primary:

1. Hashimoto's thyroiditis With goiter.
2. "Idiopathic" thyroid atrophy, presumably end-stage autoimmune thyroiddisease, following either Hashimoto's thyroiditis or Graves' disease.
3. Neonatal hypothyroidism due to placental transmission of TSH-R blocking antibodies.
4. Radioactive iodine therapy for Graves' disease.
5. Subtotal thyroidectomy for Graves' disease or nodular goiter.
6. Excessive iodine intake or low intake (kelp, radiocontrast dyes)
7. Subacute thyroiditis
8. Iodide deficiency
9. Other goitrogens such as lithium, amiodarone, antithyroid drug therapy Inborn errors of thyroid hormone synthesis

Secondary:

- Pituitary adenoma
- pituitary ablative therapy
- pituitary destruction

Tertiary:

- Hypothalamic dysfunction (rare)
- Peripheral resistance of the action of thyroid hormone rare cause, receptors on thyroid are dysfunctional

Clinical presentations and findings:

Signs and Symptoms: Easy fatigability, coldness, weight gain, constipation, menstrual irregularities, and muscle cramps.

Physical Exam: cool rough dry skin, puffy face and hands, hoarse husky voice, and slow reflexes, yellowish skin discoloration.

CVS	Pulmonary function	Gastrointestinal	Renal function
• Bradycardia. • Decreased cardiac output. • Low voltage ECG due to pericardial effusion. • Cardiomegaly. • Pericardial effusion.	• Shallow and slow respiration • Respiratory failure	• Chronic constipation • Ileus	• Impaired GFR • Water intoxication
	Neuromuscular system	**Anemia**	**CNS**
	• Severe muscle cramps. • Paresthesias. • Muscle weakness. • Carpal tunnel syndrome.	• Impaired hemoglobin synthesis. • Iron deficiency • Folate deficiency. • Pernicious anemia, with B12 deficient megaloblastic anemia.	• Chronic fatigue. • Lethargy. • Decreased concentration. • Anovulatory cycles and infertility. • Menorrhagia. • Depression. • Agitation.

Diagnosis:

- **Elevated serum TSH** is the Initial test.
  - ❖(If clinical presentation is of hypothyroidism + elevated TSH, it is primary hypothyroidism. No need for T3, T4. if TSH is normal do T3 T4)
- **Low serum T4**
- **Thyroid antibodies**
- **TRH stimulation test** (not done any more).
  - ❖ In primary hypothyroidism TSH is high, in secondary TSH is low or normal
  - ❖ (If TSH is high and normal T3 T4. subclinical hypothyroidism (mild hypothyroidism). Treat in pregnancy, dyslipidemia, elderly, puberty (for growth). If patient is asymptomatic, monitoring is enough).

Complications:

- **1- Myxedema coma:**
  The end stage of untreated hypothyroidism, it's characterized by Progressive weakness, stupor, hypothermia, hypoventilation, hypoglycemia, hyponatremia, water intoxication, shock, and death.
  - Associate illnesses and precipitating factors: pneumonia, MI, cerebral thrombosis, GI bleeding, ileus, excessive fluid administration, and administration of sedatives and narcotics.
  - Three main issues: CO2 retention and hypoxia, fluid and electrolyte imbalance, and hypothermia.

- **2- Myxedema and heart disease:**
  Patient with hypothyroidism and heart disease is a big problem because giving thyroxin will increase heart rate and may cause IHD. Start treatment gradually

- **3- Hypothyroidism and neuropsychiatric disease**
  because they might not take the treatment as ordered (increase or decrease it)

Treatment:

❖ **Hypothyroidism:**

Levothyroxine (T4) is Very Safe medication, can be used in pregnancy or lactation, in kids elderly. repeat thyroid function test after 6 weeks, if TSH is normal this means the dose is right.

❖ **Myxedema coma**

In pituitary myxedema,

1. glucocorticoid replacement is essential
2. IV levothyroxine: loading 300-400 ug, daily maintenance 50 ug
3. non active rerewarming (Blanket).
   (Active rewarming of the body in contraindicated. Caused vasodilation which causes blood pressure to drop even more.)

Toxic effects of levothyroxine therapy:

1. Osteopenia and osteoporosis, Cardiac symptoms, No allergy has been reported to pure levothyroxine.
2. Symptoms occur when dose is wrong **(high)**

History taking

History of presenting illness:

1. Exposure to ionizing radiation
2. Iodide ingestion:
   - Kelp type of seafood
   - Iodide-containing cough preparation
   - IV Iodide-containing contrast media
   - Lithium carbonate (anti-psychotic)
3. Residence in an area of low dietary iodide

Family history:

1. Thyroid disease
2. Immunologic disorders:
   - Diabetes
   - Rheumatoid disease
   - Pernicious anemia
   - Alopecia
   - Vitiligo
   - Myasthenia gravis
   - MEN 2A

Hyperthyroidism & Thyrotoxicosis

Definitions

- **Thyrotoxicosis**: is the clinical syndrome that results when tissues are exposed to high levels of circulating thyroid hormone
- **Hyperthyroidism**: is the hyperactivity of the thyroid gland

Conditions associated with Thyrotoxicosis:

- Diffuse toxic goiter (Graves' disease)
- Toxic adenoma (Plummer's disease)
- Toxic multinodular goiter
- Subacute thyroiditis
- Hyperthyroid phase of Hashimoto's thyroiditis
- Thyrotoxicosis factitia
- Rare: ovarian struma, metastatic thyroid carcinoma (follicular), hydatiform mole, TSH secreting pituitary tumor, pituitary resistance to T3 and T4

Diffuse Toxic Goiter Graves' disease

- Most common form of thyrotoxicosis
- Females > Males

Features:

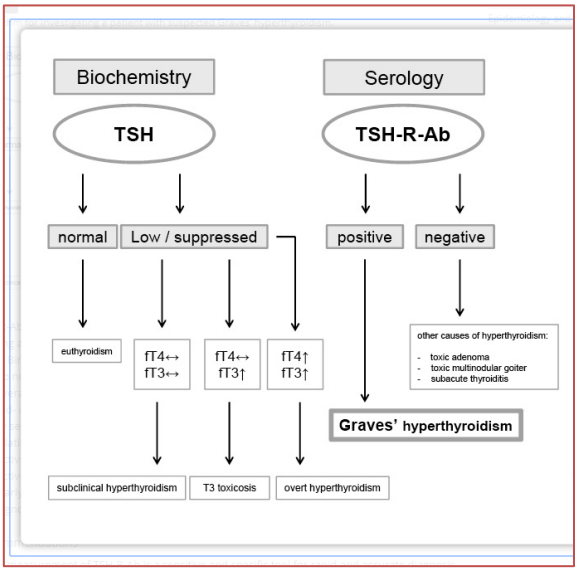
- Thyrotoxicosis
- Goiter
- Orbitopathy (exophthalmos)
- Dermopathy (pretibial myxedema)

Etiology:

- Autoimmune disease of unknown cause. (TSH receptor antibody)
- There is a strong familial predisposition
- Peak incidence in the 20- to 40- year age

Diagnosis:

- TSH-R Ab [stim]
- Free T3
- Atypical presentations:
- Thyrotoxic periodic paralysis more common in Asians
- Thyrocardiac disease
- Familial dysalbuminemic hyperthyroxinemia



Complications:

- **Thyrotoxic crisis (thyroid storm)**
- Predisposing conditions
- Clinical features:
  * Fever / Agitation
  * Altered mental status
  * Atrial fibrillation / Heart failure

Treatment:

Medical

- **Antithyroid drug therapy:**
- **Propylthiouracil** or **methimazole** stop thyroid hormone synthesis. If stopped remission is high. PTU is safe for pregnancy.
  - Spontaneous remission 20-40%
  - Relapse 50-60%
  - Duration of treatment 6 months – years.

Surgical

- **Subtotal thyroidectomy**
- **Preparation for surgery**
- Complications:
  - hypothyroidism/ hypoparathyroidism (hypocalcemia, need to give calcium and vitamin D all life)
  - Recurrent laryngeal nerve injury

Radiation

- Radioactive iodine therapy
- ^{131}I is most commonly used in ~~pregnancy~~, under 15 years, severe eye disease, older patients with multinodular or toxic noduels. (RAI can make exophthalmos worse)

Symptomatic

- **B-blockers:** for symptomatic treatment (palpitations, tremors)
- **SSKI super saturated potassium iodide**: controls thyrotoxicosis

Indication for RAI therapy:

- Women planning a pregnancy in the future (in more than 6 months following RAI administration.
- Individuals with comorbidities increasing surgical risk.
- Patients with contraindications to ATD use or failure to achieve euthyroidism during treatment with ATDs.
- Patients with congestive heart failure
- Multinodular toxic goiter and toxic adenoma

Contrandication for RAI therapy:

- Pregnancy, lactation, coexisting thyroid cancer, or suspicion of thyroid cancer. Women planning a pregnancy within 4–6 months .

Subacute Thyroiditis

- Patients with mild symptomatic subacute thyroiditis should be treated initially with b-adrenergic-blocking drugs and nonsteroidal anti-inflammatory agents (NSAIDs)
- Corticosteroids should be used instead of NSAIDs when patients fail to respond or present initially with moderate to severe pain and/or thyrotoxic symptoms.

Thyroid Nodules

Introduction and Presentation

Thyroid nodules are often noticed by patients as a lump or protrusion in the lower anterior neck. Large nodules can cause compressive symptoms, such as **difficulty swallowing** or a **choking sensation**. Nodules may be single or multiple, hard or soft, and tender or non-tender.

Nodules may also be found by physicians on routine examination.
Clinical examination of the thyroid is difficult in persons with large necks.
Nodules 1 cm or smaller are rarely detected by palpation.

Evaluation:

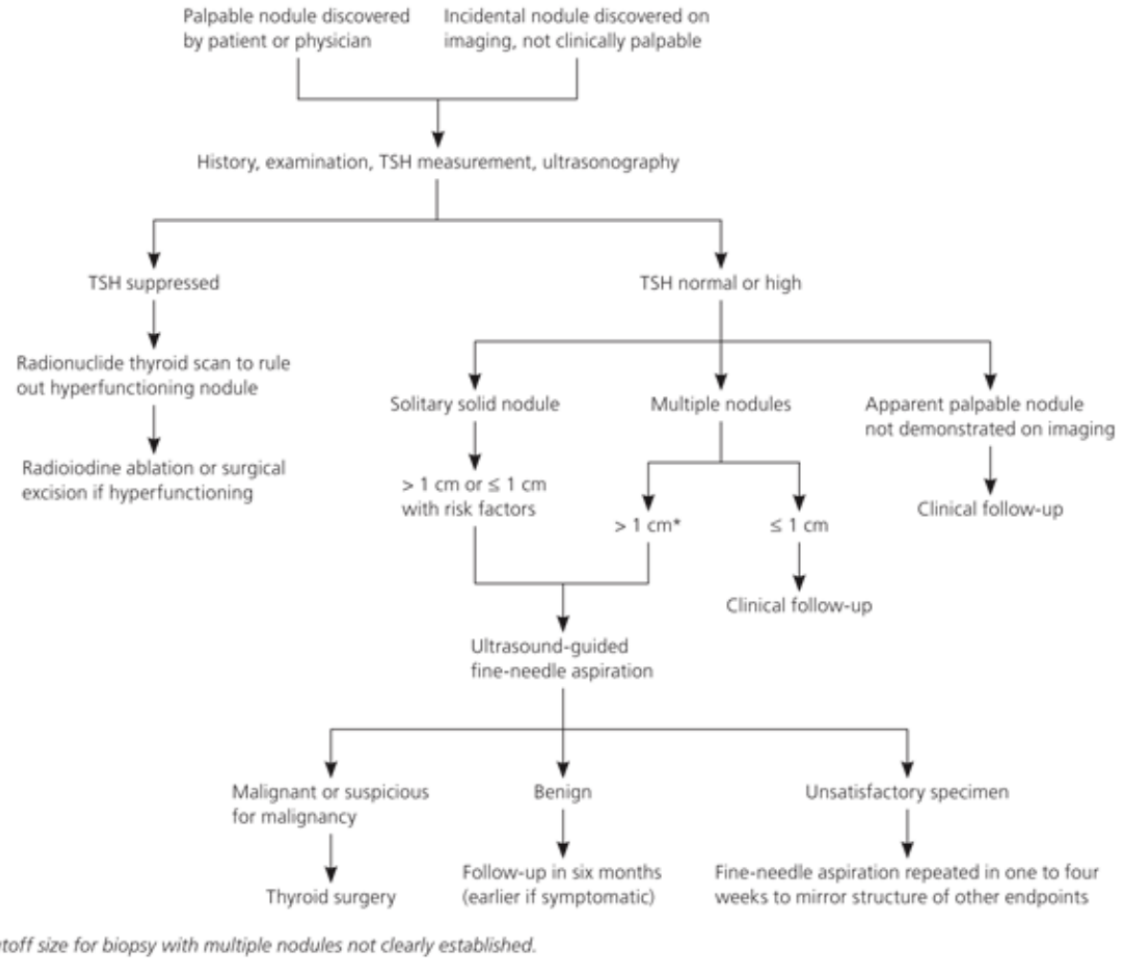
The primary goal when evaluating a thyroid nodule is to determine whether it is malignant. The next figure presents a suggested algorithm for evaluating and treating thyroid nodules.

When to refer the Patient:

❖ **Endocrinology** referral is recommended for all patients with suspected myxedema coma and other indications, such as:

- Age younger than 18 years.
- Cardiac disease. (Atrial fibrillation secondary to hyperthyroidism)
- Coexisting endocrine diseases.
- Myxedema coma suspected.
- Pregnancy.
- Presence of goiter, nodule, or other structural thyroid gland abnormality.
- Unresponsive to therapy.

Diagnosis and Treatment of Thyroid Nodules



*—Cutoff size for biopsy with multiple nodules not clearly established.

Figure 1.

Suggested diagnostic and treatment approach for thyroid nodules. (TSH = thyroid-stimulating hormone.)

Adapted with permission from Weiss RE, Lado-Abeal J. Thyroid nodules: diagnosis and therapy. Curr Opin Oncol. *2002;14(1):50*.

Family Medicine and Thyroid disorders:

- The first step for the patient is to consult a Family Physician, they can thoroughly explore their patients' symptoms to determine if they are attributable to the thyroid, or if the problem lies elsewhere.
- Family physicians talks through all of those conditions and about the patient as a whole, to see what might be causing the issues. If those conversations suggest hyperthyroidism or hypothyroidism, ordering lab test to measure the amount of thyroid-stimulating hormone (TSH) are the preferred method of detecting hypothyroidism and hyperthyroidism.
- In hyperthyroidism a nuclear medicine scan is considered.