An Overview of Thyroid Diseases

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What’s the thyroid?

What does the thyroid do?

Thyroid Disease- The “Hidden” Health Problem
  - Hyperthyroidism
  - Hypothyroidism
  - Thyroid Nodules

Who’s at risk?

Diagnosis & treatment
What Are Hormones?

- Chemicals: are secreted by glands and released into the bloodstream
- Regulators of specific body functions
The Endocrine System

- Hypothalamus
- Pituitary Gland
- Parathyroid Glands (located on each side of the trachea and near the thyroid)
- Pancreas
- Thyroid Gland
- Adrenal Glands
- Ovaries
- Testes
What’s the Thyroid?

- A small, butterfly-shaped gland at the base of the Adam’s Apple
- The “engine” that regulates the body’s speed
- If your thyroid is malfunctioning, so are you!
What does the thyroid do?

- Extracts iodine (“the fuel”) from the bloodstream
- Produces two thyroid hormones called:
  - Thyroxine (T4)
  - Triiodothyronine (T3)
- Secretes thyroid hormone into the bloodstream
- Affect every cell, tissue and organ in the human body
The Role of the Pituitary Gland

- Known as the “Master Gland”
- Controls all the glands in the endocrine system
- Acts as the thyroid’s “accelerator”
- Sends messages in the form of thyroid-stimulating hormone (TSH)
- These messages tell the thyroid how much thyroid hormone to produce
- TSH levels rise or fall based on the amount of thyroid hormone being produced
T4 is Low

TSH is High
TSH is Low

T4 is High

TSH is Low
Thyroid Disease - The “Hidden” Health Problem

**Hyperthyroidism**
- Too much thyroid hormone
- Metabolism speeds up

**Hypothyroidism**
- Not enough thyroid hormone
- Metabolism slows down
Hyperthyroidism

- Overproduction of thyroid hormone, causing metabolism acceleration

- Affects roughly 1% of the U.S. population or two million Americans

- Graves’ Disease
  - Most common form of hyperthyroidism
  - Autoimmune disorder
Signs & Symptoms of Hyperthyroidism
Treating Thyroid Disorders

Hyperthyroidism
- Radioiodine Therapy
- Stop thyroid hormone production
  - Anti-thyroid drugs
- Surgery
- Treatment tailored to patient’s needs
Graves Disease: Therapy

- Medical therapy with methimazole
  - Use propylthiouracyl (PTU) only in the 1\textsuperscript{st} trimester of pregnancy
  - PTU has been associated with irreversible hepatocellular necrosis and death
- Radioactive iodine therapy
- Surgery: thyroidectomy
Advantages

- 25-30% of patients achieve remission, esp. small goiter
- Can be use in pregnancy
- Can be use in breast feeding
- Can be use in children

Disadvantages

- Pruritus, rash
- Arthralgia
- Agranulocytosis, neutropenia
- Liver dysfunction
Radioactive iodine therapy

- Definitive therapy
- No association with cancer and birth defects in nonpregnant females (always \(\text{hCG}\))
- Hypothyroidism
- Rarely, radiation thyroiditis (transient)
- ? worsening of ophthalmopathy
- Cannot be use during pregnancy or breast feeding
- Caution in children
Graves Disease: Surgery

- Rapid resolution of hyperthyroid state

Complications:
- Hypothyroidism
- Recurrence
- Bleeding, infection
- Hypoparathyroidism
- Vocal cord paralysis
Hypothyroidism

- Underproduction of thyroid hormone, causing metabolism to slow
- Affects up to 25 million Americans, approximately twelve million remain undiagnosed
- Hashimoto’s Thyroiditis
  - Most common thyroid disease in the U.S.
  - Autoimmune disease
Signs & Symptoms of Hypothyroidism

- Thyroid disease
- Low oxygen in your blood
- Liver or kidney disease
- Nutrient deficiencies

Lethargy
Dry Skin (Coarse & Scaly)
Muscle Aches & Weakness
Constipation

In this patient with advanced pretibial myxedema, these striking skin changes are due to accumulations of mucopolysaccharides ("myxedema"). These changes are reversible with thyroid hormone.
“Hidden” features of Hypothyroidism:

**Cardiovascular:**
- Slow heartbeat
- Elevated Cholesterol

**Aging:**
- Dry, Scaly Skin
- Sparse or Coarse Hair

**Gynecological:**
- Irregular Menstruation
- Infertility

**Ear, Nose & Throat:**
- Hoarse Voice

**Gastrointestinal:**
- Constipation
- Weight Gain

**Psychiatric:**
- Impaired Concentration
- Depression
- Lethargy, Fatigue

**Muscular:**
- Muscle Weakness
- Stiffness

**Blood:**
- Anemia
Remembering the Signs & Symptoms of Hypothyroidism

Sleepiness, Fatigue
Loss of Memory, Trouble Concentrating
Unusually Dry Skin
Goiter
Gradual Personality Change, Depression
Increase in Weight
Sensitivity to Cold
Hair Loss
Diagnosing Hypothyroidism

- Family and personal medical history
  - Hypothyroidism may be Hereditary

- Physical exam
  - MD observes the patient
  - Palpates the thyroid
  - Interviews patient

- Laboratory Tests
  - TSH
  - Free T4
Who’s at Risk?

- **Women over 40**
  - Five to seven times more likely to develop Hashimoto’s Thyroiditis than men
- **Women 20-50**
  - Graves’ Disease
Hypothyroidism

- Daily oral medications replace missing hormone
- Individualized dosage adjustment
- Annual monitoring
Hypothyroidism in Pregnancy

- Levothyroxine requirement increases by 33% in the first trimester of pregnancy
- Ask to be notified when your female patient is pregnant to check TSH and adjust levothyroxine dose
- Subclinical hypothyroidism during pregnancy decreases the child’s IQ by a mean of 10 points
- Check TSH + free T4 q4-8 weeks during pregnancy
How’s *Your* Thyroid?

- Tell your doctor when symptoms arise
- Ask your doctor for a TSH Test and Free T4
  Women over 40, make it part of your medical routine
- Take medication as directed
  - Take Thyroid medication separately from iron, calcium, and multivitamins
- **Do Not** change brand or generic or dose of medication
- If symptoms persist, tell your doctor
When visiting your physician...

- Prepare questions in advance
- Don’t hesitate to ask them
- Observe good health practices: eat properly & exercise
- Bring your medications
Don’t Let Your Thyroid Slow You Down

- Know the signs & symptoms
  - Alert your doctor
  - Ask for a TSH Test and a measure of free T4
- Take medication only as directed
- Don’t skip your medicine —
  - Consistency is key
- Don’t switch brand or dose
- Take the time to take care of yourself!!!
Thyroid Nodule

• A discrete lesion within the thyroid gland that is palpably and/or ultrasonographically distinct from the surrounding thyroid tissue
Types of thyroid nodules

- Adenoma
- Nodular goiter
- Hyperplasia
- Carcinoma
- Benign or malignant cyst
- Inflammatory thyroid disease
  (Subacute and Hashimoto’s thyroiditis)
Thyroid Self Test

Focus on the area of your neck just below the Adam’s apple and immediately above the collarbone. Your thyroid gland is located in this area of your neck.

While focusing on this area in the mirror, tilt your head back.

Now swallow a sip of water.

As you swallow, look at your neck. Check for any bulges or protrusions in this area.

Talk to your doctor immediately, if you see any bulges or protrusions in this area.
Prevalence of thyroid nodules

Age (years)

Prevalence (%)
Factors associated with an increased prevalence of thyroid nodules

- Female sex
- Increasing age
- Exposure to ionizing radiation
- Iodine deficiency
- Family history
“Patient lies prepared for surgery at a thyroid clinic in Minsk, Belarus. About 4,000 people who were children at the time of the disaster have contracted thyroid cancer as a result of the burning reactor's large releases of radioactive iodine 131, which effectively targets the thyroid. Luckily, the isotope has only an eight-day half-life, so it quickly diminished to negligible levels in the environment, limiting the health damage.”

*National Geographic* April 2006
Thyroid nodule: Laboratory Evaluation

- Blood test: TSH to screen for hyper- or hypothyroidism
- Obtain a thyroid ultrasound
- Fine needle aspiration biopsy of thyroid nodule if it meets criteria
  - Small nodules are common and don’t need to be biopsied
Fine-needle aspiration
Fine-needle aspiration
Thyroid Ultrasonography
Ultrasound-Guided FNA (US-FNA)
Which nodule to biopsy

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- Most thyroid nodules are not cancer
- Only 1-5 % of nodules are thyroid cancer
Thyroid Cancer: A few statistics

- Fastest rising incidence among cancers in the US, with new cases increasing at a rate of approx 4% annually.
- Occurs three times more often in women.
- Over 350,000 people in the US are living with a diagnosis of thyroid cancer.
- 58% of thyroid cancer are diagnosed while the cancer is still confined to the primary site (localized stage).
- 35% are diagnosed after the cancer has spread to regional lymph nodes or directly beyond the primary site.
- 5% are diagnosed after the cancer has metastasized to distant organs.
Figure 4. Total number of the main histological subtypes of thyroid cancer diagnosed per year, 1994–2010
Thyroid Cancer

- Estimated new cases in 2017: 56,870
- Percentage of all new cancer cases: 3.4%
- Estimated deaths in 2017: 2,010
- Percentage of all cancer deaths: 0.3%
- Percentage Surviving 5 Years (2007-2013): 98.2%
Few things people should know about thyroid

- Up to 30 million Americans may be affected by thyroid disorders
  - More than half remain undiagnosed

- Thyroid disorders are more common amongst women

- Thyroid disorders tend to run in the family

- TSH testing is the most useful test for thyroid screening
Few things people should know about thyroid

- Regular check-ups are the key

- Changing brands or generics and dosage should be followed by retesting

- Do not change the dose without guidance from your physician

- Thyroid conditions in pregnancy warrant close attention

- Thyroid cancer is one of the fastest growing cancers in America, and one of the most curable
For more information:

visit us on the web at:

www.thyroid.org

www.thyroidawareness.com