

Thyroid dysfunction



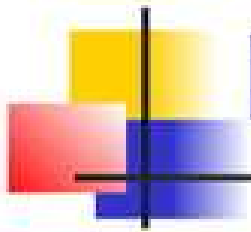
Basics

- Located in anterior neck, moves with deglutition
- Produces-
 - Triiodothyronine- T3- more potent
 - Thyroxine- T4- converted to T3 peripherally
 - Calcitonin- moves Ca into bones
- Control- TSH from anterior pituitary- negative feedback loop, mainly T3
- Only small free unbound fraction of T3/T4 is active
- Production of T3/T4 blunted by somatostatin, steroids, estrogen/testosterone, high blood iodide
- Function- regulation of growth & metabolism



Thyroid function tests

- TSH-
 - Negative feedback loop with FT3
 - Primary or secondary thyroid dysfunction
- Free T4- in hypothyroidism
- Free T3- in hyperthyroidism
- Autoantibodies-
 - Hashimoto- anti-thyroglobulin/thyroperoxidase Ab
 - Graves- anti-TSH receptor Ab, anti-microsomal/thyroglobulin Ab
- Thyroid scan- radioiodine or 99mTechnitium scan
- Ultrasound of thyroid
- Guided FNAC/biopsy



Diseases of Thyroid

- Hypothyroidism
- Hyperthyroidism
- Thyroiditis
- Endemic goiter
- Thyroid nodules & multinodular goiter
- Thyroid cancers



Hypothyroidism

■ Causes-

- Hashimoto's thyroiditis- TSH high
- Iatrogenic- Sx, RT, I-131, amiodarone, IFN/IL-2, lithium
- Pituitary dysfunction- TSH low

■ Consequences-

- Weight gain, fatigue, myalgias, depression
- Cold intolerance, constipation, menorrhagia, hoarseness
- Bradycardia, diastolic HT
- Pallor, dry coarse skin, thin nails/hair, alopecia
- Puffy face, edema, goitre, delayed DTR, galactorrhea

■ Complications- increased CAD/CHF, myxedema crisis



Management

- Ix-

- TSH, FT4, autoantibodies
- Raised LDL, TG, SGPT, CPK, prolactin
- Hyponatremia, hypoglycemia, anemia

- Rx-

- Levothyroxine-
 - taken in morning, with water
 - start with 25-75 $\mu\text{g}/\text{day}$, lower in elderly or with CAD
 - titrate every 4 weeks, to TSH- 0.4-2 mU/L
 - increased dose required in pregnancy
- Myxedema crisis- levothyroxine IV, steroids, Abx



Hyperthyroidism

■ Causes-

- Graves' disease, functional nodules- adenoma/MNG
- Viral thyroiditis, Jodbasedow disease- iodine-induced
- Struma ovarii, choriocarcinoma
- Amiodarone, Pituitary tumor- TSH high

■ Consequences-

- Restlessness, cramps, heat intolerance, diarrhea, weight loss
- Stare & lid lag, proptosis, diplopia, moist skin, pretibial edema
- Resting tremor, hyperreflexia, proximal myopathy
- Tachycardia, arrhythmias- A-fib., wide pulse pressure
- ± Goiter, with bruit



Management

- Ix-

- FT4 high, TSH- low-thyroid/high-pituitary
- Graves' disease- TSH-receptor Ab
- US thyroid- for adenoma/MNG ± guided FNAC

- Rx-

- Propranolol- for symptomatic relief
- Iodinated contrast agents- for temporary relief
- Thioureas- Methimazole or Propylthiouracil
- I-131- destroys overactive thyroid tissue
- Surgery- young, pregnant, ?malignant



Subclinical hyperthyroidism

- Euthyroid, with low TSH & normal FT4
 - 1 of 7 develops clinical hyperthyroidism in ~2 years
 - No Rx, but regular FU required




Thyroiditis

- Hashimoto-
 - Autoimmune- anti-TPO/TG Abs +nt, chronic lymphocytic
 - Causes hypothyroidism, Rx-levothyroxine
- Graves'-
 - Autoimmune- anti-TSH-R Abs
 - Causes hyperthyroidism, Rx- I-131/Sx
- Subacute- de Quervain/granulomatous
 - Acute, painful; raised ESR, hyper→hypo-thyroidism
- Suppurative-
 - Bacterial infection- acute/chronic; Rx- underlying infection
- Riedel-
 - Invasive, fibrous; hypo-thyroidism/parathyroidism
 - Rx- tamoxifen ± steroids-for pain/compression




Endemic goiter

- Common in areas of iodine deficiency
- Mostly cosmetic & obstructive symptoms
- May become multinodular with hypothyroidism or hyperthyroidism
- TFT- mostly normal
- Rx-
 - Levothyroxine if TSH normal, with target TSH <0.1 mU/L
 - Surgery for cosmesis/compression
- Prevention- iodine supplementation- increases prevalence of autoimmune thyroid disease- Hashimoto/Graves'



Thyroid nodules

- Solitary or multiple
- Majority benign
- Majority euthyroid
- Ix-
 - FT4, TSH, US + guided FNAC
- Rx-
 - Hyperthyroidism- propranolol, thiourea, I-131/Sx
 - Hypothyroidism- levothyroxine
 - Suspicious/malignant- surgery



Thyroid cancer

- Incidence increases with age
- Types-
 - Papillary- most common, multifocal, involves LN
 - Follicular- common, most absorb iodine, distant 2°
 - Medullary- rare, 2/3rd familial, early local LN mets
 - Anaplastic- rare, most aggressive
- Size of nodule correlates with malignant potential- >2 cm. increased risk



Management

- Ix-

- FT4, TSH- mostly normal
- Tumor markers- thyroglobulin-P/F, calcitonin-M
- US + guided FNAC/biopsy
- CT scan neck- to assess local extension
- MRI/PET scan- distant metastasis

- Rx-

- Surgery- near-total thyroidectomy
- Levothyroxine- to suppress TSH <0.05 mU/L
- I-131- for papillary/follicular cancers, XRT- for anaplastic cancer