

Hyperthyroidism

Symptoms

1. General: anxiety, emotional lability, urinary frequency, diarrhea, DOE, tremor, heat intolerance, weakness, weight loss, perspiration, hyperactive.
 2. Women: oligomenorrhea or amenorrhea
 3. Men: gynecomastia and erectile dysfunction
 4. Elderly: high risk for atrial fibrillation
- subclinical hyperthyroidism is associated with a threefold increase in the risk of atrial fibrillation in elderly and is responsible for 3 percent of all cases of new onset atrial fibrillation

Signs

1. Skin/Hair: warm, moist, thin hair
 2. Eyes: stare and lid lag in all etiologies
exophthalmos, periorbital, conjunctival edema (only Graves' disease)
 3. Thyroid: enlarged, palpable nodule(s) when over 1cm
 4. CV: tachycardia, systolic hypertension/wide pulse pressure, hyperdynamic
 5. Neuro: tremor, muscle weakness, hyperreflexia
- *thyrotoxic crisis/storm--usually has precipitating event, in untreated patients
high fever, tachy, hypotensive, delirium, vomiting/diarrhea, coma

Etiology

1. Graves' disease
the most common cause, autoimmune
thyrotropin receptor antibodies aka thyroid stimulating immunoglobulins
cause stimulation of thyroid gland growth and increase hormone synthesis
predominantly in the 3rd and 4th decades, women > men (?7:1)
can get Hashimoto's and Graves' at the same time
?remission- decreased gland size, normalization of labs, Ab levels go down
2. Toxic multinodular goiter (second to Graves')
focal or diffuse hyperplasia of thyroid follicular cells independent of TSH regulation
(focal = toxic adenoma)
3. Thyroiditis
subacute- inflammation with transient hyperthyroidism, involves release of preformed hormone from colloid space
de Quervain's- viral/post viral syndrome with fever, tender goiter
subacute lymphocytic- painless, most often assoc with postpartum
4. Extrathyroidal
drugs: amiodarone, synthroid OD, prolonged Li use
tumors: TSH-producing pituitary adenomas, large bony metastases from follicular thyroid cancer, hydatidiform mole, choriocarcinoma, ovarian, testicular germ cell tumors
palpation: parathyroid surgery
5. Other
T3 thyrotoxicosis- typically rise in T3 is greater than rise in T4
precedes increase in T4 initially or during a recurrence, iodine deficient
T4 thyrotoxicosis- large iodine exposure favors T4 synthesis
inhibition of peripheral conversion of T4 to T3
Thyroid carcinoma

Diagnostics

TSH (Thyrotropin) produced in anterior pituitary, suppressed (except in TSH prod tumor, occ T3 thyrotoxicosis)

T4 (Thyroxine) 70% bound to TBG, 20% bound to TTR, 10% bound to albumin, 0.03% circulates free

T3 (Triiodothyronine) almost all is bound to TBG, 0.3% circulates free

rT3 is a metabolite of T4, demonstrates tissue utilization of T4, rarely measured

T4Uptake (see diagram, aka Thyroid hormone binding ratio THBR) measures the amount of TBG or binding sites available

FTI (free thyroxine index) calculated estimate of T4 circulating freely based on the Total T4 level and the T4U

TPO (Thyroid Peroxidase Antibody) usually in Hashimoto's but can be in Graves' pt

TSH receptor antibody activate cAMP, act as agonists

TBII (thyrotropin binding inhibitor immunoglobulin) can be found in Graves' pt and predict future hypothyroidism after therapy

TRH stimulation test - don't worry about it

Radioiodine uptake:

High- indicates new synthesis of hormones

Low- either inflammation/destruction of tissue with preformed hormones being released or nonthyroidal source

Treatment

1. Symptomatic relief: Beta blocker, NSAID for inflammation/pain
Iodate (block T4 to T3 conversion and therefore lessen tissue effects)

2. Thionamide:

Block hormone synthesis

may produce remission in Graves' patients

are a bridge to definitive therapy in multinodular goiters

Propylthiouracil (PTU)

Pro: can be used during pregnancy

Con: must be dose three times a day, radioactive iodine protective

Methimazole (Tapazole)

Pro: take once a day, better tolerated and acts faster than PTU

Con: cannot use in pregnancy

Side effects include rash (most common), hepatitis, leukopenia, agranulocytosis

*not useful if the thyroid is not producing new hormone (ie thyroiditis)

3. Radioactive Iodine:

-Usually reserved for adults who have recurrent hyperthyroidism, difficult to control on oral meds or those who have very large goiters

-may cause longterm hypothyroidism and worsen eye findings in Graves'

-need to be isolated afterward for 1 wk

-need to stop antithyroid meds at least 1 week prior to treatment

-Failure rate of 10% on first treatment

4. Surgery:

subtotal thyroidectomy for very large or obstructing goiter

