BENIGN DISEASE OF THYROID GLAND

BY

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THYROGLOSSAL CYST

- Midline neck swelling
- Arising in thyroGLOSSAL tract remenant
- Wall of the cyst rich in lymphatics
- Painless cystic swelling, move up and down on swallowing and on protrusion of the tongue
- Complication: infection and fistula formation
- Treatment: surgical excision by Sistrunck operation
Thyroid Hormone Control
Where to look for Thyroid?

Front View
- Thyroid cartilage (Adam's apple)
- Thyroid gland
- Trachea (windpipe)

Side View
- Thyroid cartilage (Adam's apple)
- Esophagus
- Parathyroid glands
- Trachea (windpipe)
Clinical Anatomy of Thyroid

- Notch Atop Thyroid Cartilage
- Circo-Thyroid Membrane
- Lobes of Thyroid Gland
- Thyroid Cartilage
- Carotid Arteries
GOITRE

THYROID ENLARGEMENT REGARDLESS ITS NATURE
GOITRE

- Swelling in the lower part of the front of the neck which is anatomical of the thyroid gland, having the shape of the thyroid gland (butterfly) and this swelling moves up and down with deglutition
CLASSIFICATION

1- INFLAMMATORY GOITRE (acute – subacute - chronic)
2- TOXIC GOITRE
3- NEOPLASTIC
4- AUTOIMMUNE GOITRE (Hashimoto)
5- SIMPLE GOITRE (physiological-colloid – nodular)
SIMPLE GOITRE

- No manifestation suggestive of thyrotoxicosis, malignancy and inflammation

- Etiology

- Due to stimulation of the thyroid gland by increased level of circulating TSH secondary to low levels of circulating thyroid hormones secondary to either iodine deficiency or defective synthesis of thyroid hormones
C P of Simple goitre

- Swelling irregular surface soft? Nodular surface
- Disfigurement
- Painless
- Complication
  - Tracheal obstruction
  - Sconday thyrotoxicosis
  - Malignancy
  - Cyst formation
  - Haemorrhage into a nodule
  - Retrosternal extension
Treatment of simple goiter

prevention: Iodized table salt

Diffuse hyperplastic goiter is reversible by L-thyroxine

Simple nodular irreversible

Indication of surgery
Compression manifestation
Cosmetic reason
THYROIDITIS

- ACUTE AND SUBACUTE: involved by bacterial infection
- Short duration
- Pain may be fever with or without chills
- warmth and tenderness over the gland
Hashimoto Thyroiditis

Due to presence of antibodies against thyroid antigen, the gland is lobulated.

- Course: early hyperthyroidism which is followed by hypothyroidism.
Riedel Thyroiditis

Rare collagen disease due to extensive fibrosis

The gland is irregularly enlarged

Hard, fixed to skin, trachea, and sternomastoid
Clinical Exam of Thyroid
Clinical Exam of Thyroid
Clinical Exam of Thyroid
Thyromegaly

Thyroid Cartilage
(Adam’s Apple)

Enlarged Left Lobe Thyroid
Hyperthyroidism

- A hyper metabolic biochemical state
- It is a multi system disease with
- Elevated levels of FT$_4$ or FT$_3$ or both

What is thyrotoxicosis?
What is hyperthyroidism?
What are the various causes?
How to differentiate the causes?
What is the appropriate treatment?
Causes of Hyperthyroidism

1. Graves Disease – Diffuse Toxic Goiter
2. Plummer’s Disease – Toxic MNG
3. Toxic phase of Sub Acute Thyroiditis - SAT
4. Toxic Single Adenoma – STA
5. Pituitary Tumours – excess TSH
6. Molar pregnancy & Choriocarcinoma (↑↑ βHCG)
7. Metastatic thyroid cancers (functioning)
8. Struma Ovarii (Dermoid and Ovarian tumours)
9. Thyrotoxicosis Factitia ; INF, Amiodarone, SSRIs
Graves Disease

- The most common cause of thyrotoxicosis (50-60%).
- Organ specific auto-immune disease
- The most important autoantibody is
  - Thyroid Stimulating Immunoglobulin (TSI) or TSA
  - TSI acts as proxy to TSH and stimulates $T_4$ and $T_3$
Toxic Multinodular Goiter (TMG)

- TMG is the next most common hyperthyroidism - 20%
- More common in elderly individuals – long standing goiter
- Lumpy bumpy thyroid gland
- Milder manifestations (apathetic hyperthyroidism)
- Mild elevation of FT$_4$ and FT$_3$
- Progresses slowly over time
- Clinically multiple firm nodules (called Plummer’s disease)
- Scintigraphy shows - hot and normal areas
Toxic Multinodular Goiter (TMG)
Sub Acute Thyroiditis (SAT)

- SAT is the next most common hyperthyroidism – 15%
- $T_4$ and $T_3$ are extremely elevated in this condition
- Immune destruction of thyroid due to viral infection
- Destructive release of preformed thyroid hormone
- Thyroid gland is **painful and tender** on palpation
- Nuclear Scintigraphy scan - no RIU in the gland
- Treatment is NSAIDs and Corticosteroids
Toxic Single Adenoma (TSA)

- TSA is a single hyper functioning follicular thyroid adenoma.
- Benign monoclonal tumor that usually is larger than 2.5 cm.
- It is the cause in 5% of patients who are thyrotoxic.
- Nuclear Scintigraphy scan shows only a single hot nodule.
- TSH is suppressed by excess of thyroxines.
- So the rest of the thyroid gland is suppressed.
Age and Sex

Age

- Graves disease: 20 to 40
- Toxic MNG: > 50 yrs
- Toxic Single Adenoma: 35 to 50
- Sub Acute Thyroiditis: Any age

Sex M : F ratio

- Graves Disease: 1: 5 to 1:10
- Toxic MNG: 1: 2 to 1: 4
Nucleotide Scintigraphy

A. Normal

B. Graves' disease

C. Toxic mng

D. Toxic adenoma
Clinical Features

1. Those that occur with any type of thyrotoxicosis
2. Those that are specific to Graves disease
3. Non specific changes of hyper metabolism
Common Symptoms

1. Nervousness
2. Anxiety
3. Increased perspiration
4. Heat intolerance
5. Tremor
6. Hyperactivity
7. Palpitations
8. Weight loss despite increased appetite
9. Reduction in menstrual flow or oligo-menorrhea
Common Signs

1. Hyperactivity, Hyper kinesis
2. Sinus tachycardia or atrial arrhythmia, AF, CHF
3. Systolic hypertension, wide pulse pressure
4. Warm, moist, soft and smooth skin - warm handshake
5. Excessive sweating, palmar erythema, Onycholysis
6. Lid lag and stare (sympathetic over activity)
7. Fine tremor of out stretched hands – format's sign
8. Large muscle weakness, Diarrhea, Gynecomastia
Specific to Graves Disease

1. Diffuse *painless* and firm enlargement of thyroid gland
2. Thyroid bruit is audible with the bell of stethoscope
3. Ophthalmopathy – Eye manifestations – 50% of cases
   - Sand in eyes, periorbital edema, conjunctival edema (chemosis), poor lid closure, extraocular muscle dysfunction, diplopia, pain on eye movements and proptosis.
4. Dermoacropathy – Skin/limb manifestations – 20% of cases
   - Deposition of glycosamino glycans in the dermis of the lower leg – non pitting edema, associated with erythema and thickening of the skin, without pain or pruritus - called (pre tibial myxedema)
Clinical Presentations
MNG and Graves

Huge Toxic MNG

Diffuse Graves Thyroid
Higher grades of Goiter

Toxic MNG

(Diffuse) Graves
Grade IV Toxic MNG

Huge Toxic MNG

Huge Toxic MNG
Thyroid Ophthalmopathy

Proptosis

Lid lag
Ophthalmopathy in Graves

Periorbital edema and chemosis
Ophthalmopathy in Graves

Occular muscle palsy  exophthalmos
Severe Exophthalmia
Thyroid Dermopathy

Pink and skin coloured papules, plaques on the shin
Thyroid Acropathy

Clubbing and
Osteoarthropathy
Onycholysis
Non specific changes

1. Hyperglycemia, Glycosuria
2. Osteoporosis and hypercalcemia
3. ↓ LDL and Total Cholesterols
4. Atrial fibrillation, LVH, ↑ LV EF
5. Hyper dynamic circulatory state
6. High output heart failure
Diagnosis

1. Typical clinical presentation
2. Markedly suppressed TSH (<0.05 µIU/mL)
3. Elevated $FT_4$ and $FT_3$ (Markedly in Graves)
4. Thyroid antibodies – by Elisa –
5. ECG to demonstrate cardiac manifestations
6. Nuclear Scintigraphy to differentiate the causes
Treatment Options

1. Symptom relief medications
2. Anti Thyroid Drugs – ATD
   - Methimazole, Carbimazole
   - Propylthiouracil (PTU)
4. Thyroidectomy – Subtotal or Total
5. NSAIDs and Corticosteroids – for SAT
Symptom Relief

1. Rehydration is the first step
2. β – blockers to decrease the sympathetic excess
   - Propranolol, Atenelol, Metoprolol
3. Treatment of CHF, Arrhythmias
4. Calcium supplementation
5. SSKI or Lugol solution for ↓ vascularity of the gland
# Anti Thyroid Drugs (ATD)

<table>
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<tr>
<th>Imp. considerations</th>
<th>Methimazole</th>
<th>Propylthiouracil</th>
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<tr>
<td>Efficacy</td>
<td>Very potent</td>
<td>Potent</td>
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<tr>
<td>Duration of action</td>
<td>Long acting BID/OD</td>
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<td>In pregnancy</td>
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<td>Safely can be given</td>
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<td>Mechanism of action</td>
<td>Iodination, Coupling</td>
<td>Iodination, Coupling</td>
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<tr>
<td>Conversion of $T_4$ to $T_3$</td>
<td>No action</td>
<td>Inhibits conversion</td>
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<td>Adverse reactions</td>
<td>Rashes, Neutropenia</td>
<td>Rashes, ↑Neutropenia</td>
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<tr>
<td>Dosage</td>
<td>20 to 40 mg/ OD PO</td>
<td>100 to 150mg qid PO</td>
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How long to give ATD?

- Reduction of thyroid hormones takes 2-8 weeks
- Check TSH and FT$_4$ every 4 to 6 weeks
- In Graves, many go into remission after 12-18 months
- In such pts ATD may be discontinued and followed up
- Treatment is not life long. Graves **seldom needs** surgery
- MNG and Toxic Adenoma will not get cured by ATD.
- For them ATD is not the best. Treat with RAI.
Radio Active Iodine (RAI Rx.)

- In women who are not pregnant
- In cases of Toxic MNG and TSA
- Graves disease not remitting with ATD
- RAI Rx is the best treatment of hyperthyroidism in adults
- The effect is less rapid than ATD or Thyroidectomy
- It is effective, safe, and does not require hospitalization.
- Given orally as a single dose in a capsule or liquid form.
- Very few adverse effects as no other tissue absorbs RAI
Radio Active Iodine (RAI Rx.)

- $^{123}$I is used for Nuclear Scintigraphy (Dx.)
- $^{131}$I is given for RAI Rx. (6 to 8 milliCuries)
- Goal is to make the patient hypothyroid
- No effects such as Thyroid Ca or other malignancies
- Never given for children and pregnant/ lactating women
- Not recommended with patients of severe Ophthalmopathy
Surgical Treatment

- Subtotal Thyroidectomy, Total Thyroidectomy
- Hemi Thyroidectomy with contra-lateral subtotal
- ATD and RAI Rx are very efficacious and easy – so
- Surgical treatment is reserved for MNG with
  1. Severe hyperthyroidism in children
  2. Pregnant women who can’t tolerate ATD
  3. Large goiters with severe Ophthalmopathy
  4. Large MNGs with pressure symptoms
  5. Who require quick normalization of thyroid function
Preoperative Preparation

- ATD to reduce hyper function before surgery
- βeta blockers to titrate pulse rate to 80/min
- SSKI 1 to 2 drops bid for 14 days
- This will reduce thyroid blood flow
- And there by reduce per operative bleeding
- Recurrent laryngeal nerve damage
- Hypo parathyroidism are complications
Let us start applying