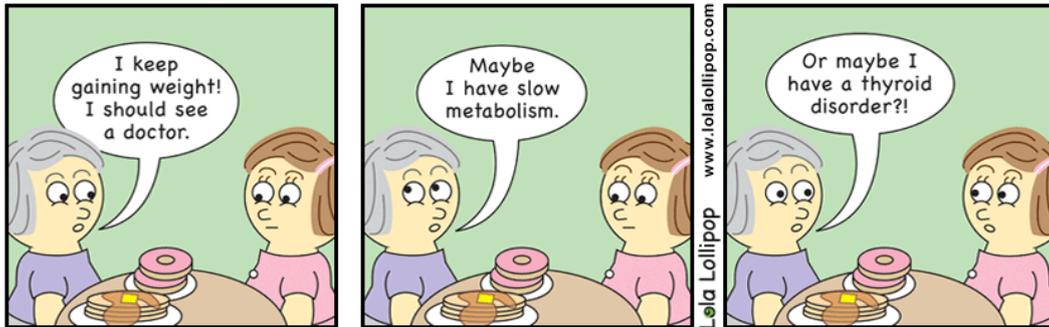


# Thyroid Disorders



## References:

1- DR. Assim Al-Fadda sound lecture

2- 427 handout

3- Step-up medicine

Done By

429 Medicine Team



- **Anatomy of thyroid gland:**

Below thyroid cartilage (not on it)

- **When examining thyroid patient we assess:**

1- Hormone status (hyper – Euo – hypo)

2- Compression symptoms (Dysphagia – Dyspnea – Dysphagia – Snoring)

3- Rule out malignancy (nodules)

- **In thyroid history we ask about:**

- Exposure to ionizing radiation (frequent x-rays)
- Iodine ingestion:
  - In some cough drugs
  - IV iodine contrast
  - **lithium – Amiodarone**
  - Kelp (extract of sea food which's contain a lot of iodide)
- Thyroid disease
- Family history
- Residence In a area of low dietary iodine
- Immunologic disorders:  
Diabetes - Rheumatoid disease - Pernicious anemia - Alopecia –Vitiligo  
-Myasthenia gravis - MEN 2A

- **Physical examination :**

- Observe the neck, especially as the patient swallows
- Examine from the front, rotating the gland slightly with one thumb while palpating the other lobe with the other thumb
- Examine from behind, using three fingers and the same technique
- Determine the size of the thyroid lobes, consistency, presence of nodules

# Hypothyroidism

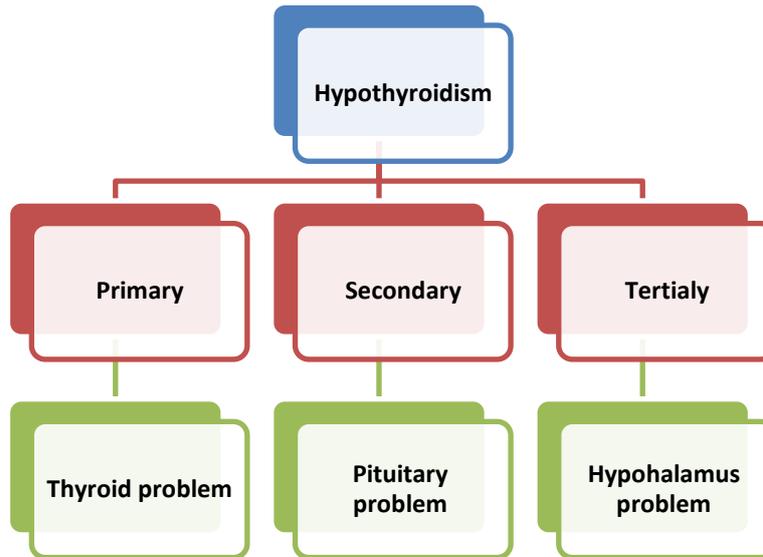
"Low thyroxine level in the blood"

- most common cause of hypothyroidism in order :

1- Hashimoto

2- surgery

3- Radioactive treatment



- Causes of Hypothyroidism:

1- Primary (most common):

1-Hashimotoa (most common):

- Autoimmune antibodies against thyroid gland

2- Radioactive iodine usage

3- Surgery (thyroid removal)

4- Some uncommon causes like:

- Drugs
- Excessive iodine intake (kelp- IV iodine dyes)
- Thyroiditis

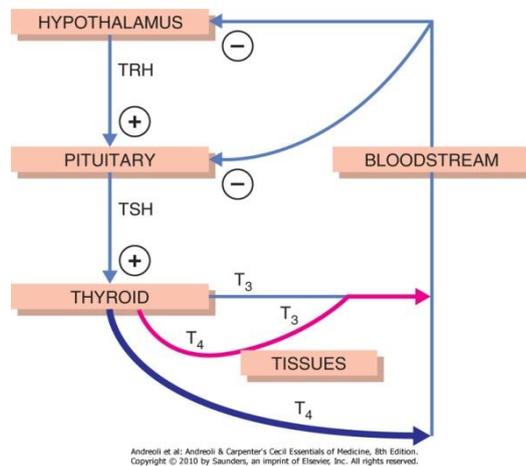
## 2- Secondary:

Ex. Pituitary adenoma or destruction

## 3- Tertiary: Problem in Hypothalamus

Destruction – surgery – radiation

4- **Peripheral resistant to thyroid hormone** in body tissues will give hypothyroidism symptoms



### - Symptoms :

- Fatigue (not all patient will have fatigue)
- Depression
- **Cold** intolerance (getting cold in normal temperature)
- Dry skin
- Weight gain or cannot lose weight
- Increase sleeping hours (in severe cases)
- Constipation
- Infertility (in female)
- Irregular period or menorrhagia (heavy menses)



Typical appearance of patients with moderately severe primary hypothyroidism or myxedema. Note dry skin, sallow complexion, with the absence of scleral pigmentation differentiating the carotenemia from jaundice. Both individuals demonstrate periorbital myxedema. The patient in B illustrates the loss of the lateral aspect of the eyebrow, sometimes termed Queen Anne's sign. That finding is not unusual in the age group that is commonly affected by severe hypothyroidism and should not be considered to be a specific sign of the condition.

### Signs:

- **Cardiac** :Low voltage ECG (due pericardium effusion)- Cardiomegaly - Bradycardia
- **Respiratory** : shallow slow respiration
- **GI** : Illues and constipation
- **Renal** :Low GFR (may develop water intoxication)
- **Anemia** (Can be due to: Chronic disease or altered iron absorption or altered B12 and folate absorption due intestinal anemia)
- **CNS**: Depression-Agitation- confusion- **loss of memory "can be first symptoms in elderly patients"**
- **Neuromuscular disease** (cramps – weakness – parasthesia - fatigue – proximal Myopathy – carpal tunnel syndrome)
- Non-pitting edema

### - Pathogenesis of Myxedema and Edema:

Myxedema: glycosaminoglycans -mostly hyaluronic acid- accumulation under the skin

Edema: increase capillary permeability (edema around eyes "puffy eyes" and pericardium and carpal canal syndrome can be present - also voice changes or hoarseness)

### - Note:

**Myxedema coma** in hypothyroidism

**Peritibial Myxedema** in hyperthyroidism "Graves"

### - Diagnosing primary hypothyroidism:

- High TSH (most sensitive indicator)
- Low T3 T4
- Thyroid antibodies (for autoimmune thyroid disease)

- TRH stimulation test Not used anymore

### - Subclinical Hypothyroidism:

TSH high **but Normal T3 T4** (normal thyroid but need high TSH) not treated only with these indications:

- symptoms of hypothyroidism (Goiter –Psychosis)
- pregnancy
- Autoimmune thyroid disease
- Growing child age or old age
- Significant TSH elevation
- Hypercholesterolemia

### - Complication of hypothyroidism:

**1- Myxedema coma** (The end stage of untreated hypothyroidism):  
Hyponatremia – hypothermia – hypoglycemia – fever -Shock -  
hypoventilation "**coma due low thyroid hormone + infection**"

## 2- Myxedema and heart disease:

(Severe hypotension + ischemic)→ difficult to treat because thyroxine will increase heart contractility→ increase the demand→which's precipitate the attack→ **so treat it gradually**

## 3- Neuropsychiatric disease

### - Treatment :

#### 1- Hypothyroidism:

- Thyroxine: tablets 1.7 ug/kg on empty stomach in the morning
- Gradual dose if he has heart disease
- Assess the patient treatment in a revisit after 5 to 6 weeks (half life of thyroxine one week): if thyroxine level in the revisit is low that means the dose is not enough
  - o A lady came with high TSH and low T3 and T4 after 6 weeks of treatment with thyroxine.. What to ask her about?  
Compliance – **pregnancy** – malabsorption (some drug affect thyroxine absorption "Iron or Ca++ tablets" >> **increase the dose**

#### 2- Myxedema coma treatment: ER case

- Hypothyroidism >> Thyroxine IV 300-500 ug
- Hypoventilation >> intubation
- Hypocortisolemia >> IV Hydrocortisone
- Hypothermia >> blanket "**passive** re-warming"
- Hyponatremia >> mild fluid restriction  
Avoid excessive hydration→ water intoxication
- Treat hypotension
- Treat the precipitation factor
- Levothyroxine has no reported allergy or side effects.. But in excess dose hyperthyroidism symptoms may occur:
  - o Cardiac symptoms
  - o Osteopenia and osteoporosis

# Hyperthyroidism

Thyrotoxicosis	Hyperthyroidism
High thyroid hormone level ( can be due to thyroid or exogenous "drugs" )	Increase thyroid Function

## - Hyperthyroidism due :

- 1- **Graves disease** is the **most common** (Autoimmune)
- 2- Nodules: single toxic adenoma or toxic multinodular goiter (**plummer disease**)
- 3- Thyroiditis

**Note:** Hashimoto Thyroiditis and sub acute Thyroiditis can cause **transient** hyperthyroidism

## - Symptoms of hyperthyroidism:

- Nervousness and insomnia
- Hand tremors
- Sweating and heat intolerance
- Weight loss
- Diarrhea
- Palpitation
- Muscle weakness

## - Graves:

- **IgG antibodies bind to TSH receptor in the Thyroid and stimulates excess synthesis of thyroid hormones**
- Autoimmune disease with strong familial relation
- More in female
- Peak incidence in the 20- to 40- year age group

o Features:

**1- Goiter**

**2- Exophthalmus "Orbitopathy"**

**3- Peritibial Myxedema "Dermopathy"**

**4- Thyrotoxicosis**

5- Puffiness around eyes – edema in conjunctiva "chemosis"

**Note:**

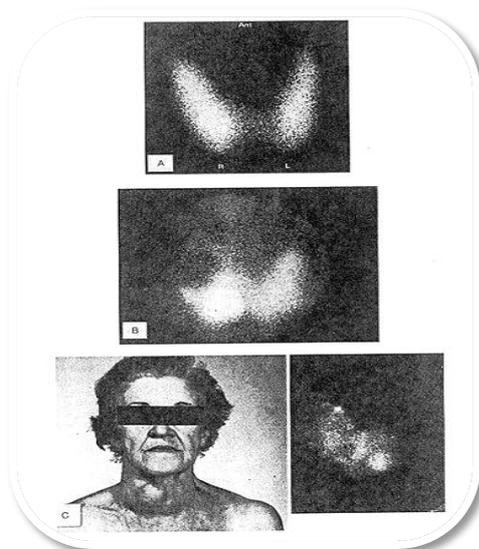
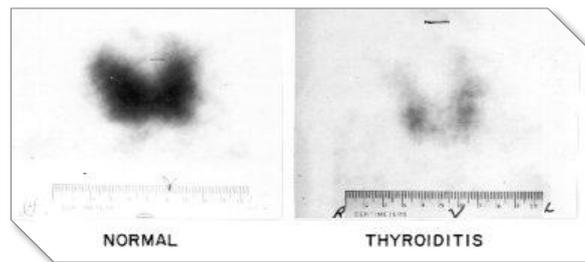
Suppressed TSH high T3 T4 with eye signs and goiter= typical Graves case

- **Diagnosis:**

- Elevated Free T4
- Suppressed TSH
- Eye signs (Graves disease)
  - If (+) → No Further Test.
  - If (-) → Thyroid Scan → Thyrotoxicosis for investigation.

- **Investigations:**

- Scan uptake of iodine:
  - If graves or Toxic multinodular goiter (high uptake)
  - If Thyroiditis (low uptake)
    - Iodine loaded patients and Patients on LT4 therapy will show low uptake



**Thyroid Scans.**

- A. Normal thyroid imaged with 123I.**
- B. Cold nodule in the right lobe imaged by 99mTc.**
- C. Elderly woman with obvious multinodular goiter and the corresponding radioiodine scan on the right.**

## - Complications of Graves :

Thyrotoxic storm: predisposed by infection, Diabetes ketoacidosis and stress

- Clinical features:
  - Fever
  - Atrial fibrillation – Tachycardia
  - Agitation-Confusion-Psychosis
  - GI symptoms (Nausea, Vomiting, Diarrhea)

## - Treatment:

**1- Antithyroid drugs:** First line treatment **methemazole or Propylthiouracil**

- Propylthiouracil: used in pregnancy ( less side effect)

**2- Radioactive iodine:** Iodine 131 mostly used

Best choice but contraindicated in: pregnancy and exophthalmus  
(worsen the case)

### **3-Surgery**

- indication of surgery :
  - failed medication
  - large goiter
  - sever eye disease
- complications of surgery are
  - Recurrent laryngeal nerve injury - hypothyroidism

- **Beta blockers** (for reliving heart symptoms)
- **Super saturated potassium iodine:** given for 2 weeks to decrease thyroid function

## **Note:**

- Patient with thyrotoxicosis symptoms caused by Amiodarone: **don't stop Amiodarone** because it is important drug but start to treat hyperthyroidism
- Thyroiditis : supportive treatment only (no thyroid medication)
- Treatment of :Toxic adenoma : control + surgery
- Toxic multinodular goiter: medication + surgery

**DONE**

