

# DISEASES OF THE THYROID GLAND

The glands disease are more common in female in most cases

## Types of thyroid gland diseases :

### 1- HYPERTHYROIDISM

- it is : Over activity of the thyroid gland.
- Women : men ratio (8:1).
- activity of gland :
  - a)- 5- 10 times increase in secretion.
  - b)- 2-3 times increase in size.

### CAUSES

**1- Graves' disease** : وشرح في الاميونولوجي بالتفصيل

- an autoimmune disorder.
- mechanism of disease : increased circulating level of thyroid- stimulating immunoglobulins ( TSI) ( which are Antibodies affect the TSH receptors on the thyroid gland and increase the thyroid hormone secretion
  - Graves' disease cause 95% of hyperthyroidisms cases .
  - 4 – 8 times more common in women than men.

**2- Thyroid gland tumor:**

- 95% is benign.
- it associated with history of head and neck irradiation and family history.

**3- Exogenous T3 and T4 :** ( some patients who suffere from Hypothyrodism are treated by taking exogenous T3 and T4 ) so if they take overdose it may cause hyperthyroidism

( rarely cause)

#### 4- Excess TSH secretion:

- diseases of the hypothalamus ( TRH).
- diseases of the pituitary ( TSH).

So in general :

The hyperthyroidism is main parts ( according to the cause )

- 1- Primary ( the problem is in the thyroid gland itself ) → **increase in T3 , T4 and decrease in TSH due to negative feed back**
- 2- Secondary ( the problem is outside the thyroid : ex. Pituitary diseases – hypothalamus diseases ) → **increase in all T3 , T4 and TSH**

## DIAGNOSIS

Sign and symptoms **مهمه جدا** :

1- Goiter **تضخم** in 95%.

2- skin:

- smooth, warm and moist.
- heat intolerance, night sweating → **due to increase oxygen consumption**

3- musculo skeletal:

- Muscle atrophy.

4- Neurological:

- tremor.
- enhanced reflexes.
- irritability.

5- Cardiovascular:

- increase heart rate → **due to up regulation of B1 receptors**
- increase stroke volume.
- arrhythmias.
- hypertension.

## 6- G.I tract:

- weight loss, **With food intake → due to increase metabolic rate .**
- diarrhea.

## 7- Renal function:

- increase glomerular filtration rate.

## 8- Exophthalmos:

- anxious staring expression.
- protrusion of eye balls.

## 9- Others:

- menstrual cycle disturbance.



## INVESTIGATIONS ( by measure :

1- Serum T3, T4 measurement.

2- Serum TSH

Finding according to type of cause : مهمة جدا جدا

a- In primary hyperthyroidism:

high T3, T4 and low TSH .

b- In secondary hyperthyroidism:

high T3, T4 and high TSH.

## TREATMENT

### 1- Medical therapy:

e.g. propylthiouracil → inhibit thyroid peroxidase enzyme

- usually for 12-18 months course.

- with 3-4 monthly monitoring.

### 2- Surgery:

- Subtotal thyroidectomy.

- Indication for surgery:

a)- Relapse after medical treatment.

b)- Drug intolerance.

c)- Cosmetic.

d)- Suspected malignancy.

### 3) radioactive iodine ( I<sup>131</sup> )

# HYPOTHYROIDISM

Under activity of the thyroid gland

more in woman ( 30- 60 years).

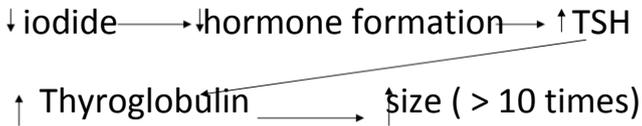
## CAUSES

1- inherited abnormalities of thyroid hormone synthesis :

- peroxidase defect. انظر المحاضره السابقه -
- Iodide trapping defect. انظر المحاضره السابقه
- thyroglobulin defect. انظر المحاضره السابقه

2- Endemic Colloid Goiter هذه حاله تحدث بسبب نقص اليود في الطعام وسميت انديمك لانها كانت مستوطنه في الناس الساكنين في المناطق الجبلية:

- this was cause before table salt.



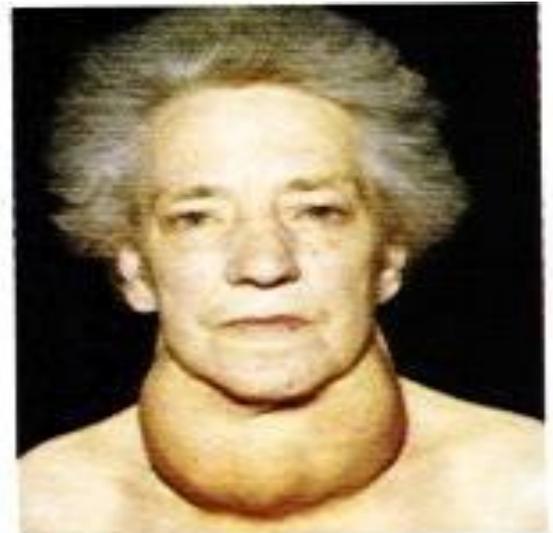
3- Idiopathic Nontoxic Colloid Goiter:

- I intake is normal.
- thyroiditis? التهاب يحدث بسبب غير معروف ولكن الاكثر ترجيحا هو المناعه الذاتيه

ترجيحا هو المناعه الذاتيه

inflammation → ↑ cell damage → ↓ hormone secretion

↑ TSH → ↑ of activity of normal cells → ↑ size



- 4- Gland destruction (surgery).
- 5- Pituitary diseases or tumor.
- 6- Hypothalamus diseases or tumor.

## DIAGNOSIS

### 1- skin :

- dry skin.
- cold intolerance.

### 2- Musculo skeletal:

- ↑ muscle bulk.
- ↓ in skeletal growth.
- muscle sluggishness

### 3- Neurological:

- slow movement.
- impaired memory.
- decrease mental capacity.

### 4- Cardiovascular:

- heart rate
- ↓ stroke volume.

### 5- G.I tract:

- constipation
- increase weight → **without increase in food intake**

### 6- Renal function:

- decrease glomerular filtration rate.



## 7- Myxoedema:

An edematous appearance through out body → due to increase filtration of fluid out of capillaries and edema due to accumulation of osmotically active mucopolysaccharides in intestinal fluid .( just understand why there is edema !! )

## 8- others:

- loss of libido.
- menstrual cycle disturbance.

## INVESTIGATIONS

1- Serum T3,T4 are low.

- TSH is elevated in primary → which cause enlargement of the gland ( goiter )

- TSH is low in secondary hypothyroidism.

## TREATMENT

- L- thyroxine ( T4 )

- Starting dose is 25-50 µg.

- Increase to 200 µg.

- At 2-4 weeks period.

The first response seen is the weight loss.



**Table 9-9** Pathophysiology of Thyroid Hormones

	Hyperthyroidism	Hypothyroidism
<b>Symptoms</b>	<p>Increased basal metabolic rate</p> <p>Weight loss</p> <p>Negative nitrogen balance</p> <p>Increased heat production</p> <p>Sweating</p> <p>Increased cardiac output</p> <p>Dyspnea (shortness of breath)</p> <p>Tremor, muscle weakness</p> <p>Exophthalmos</p> <p>Goiter</p>	<p>Decreased basal metabolic rate</p> <p>Weight gain</p> <p>Positive nitrogen balance</p> <p>Decreased heat production</p> <p>Cold sensitivity</p> <p>Decreased cardiac output</p> <p>Hypoventilation</p> <p>Lethargy, mental slowness</p> <p>Drooping eyelids</p> <p>Myxedema</p> <p>Growth retardation</p> <p>Mental retardation (perinatal)</p> <p>Goiter</p>
<b>Causes</b>	<p>Graves' disease (increased thyroid-stimulating immunoglobulins)</p> <p>Thyroid neoplasm</p> <p>Excess TSH secretion</p> <p>Exogenous T<sub>3</sub> or T<sub>4</sub> (factitious)</p>	<p>Thyroiditis (autoimmune or Hashimoto's thyroiditis)</p> <p>Surgery for hyperthyroidism</p> <p>I<sup>-</sup> deficiency</p> <p>Congenital (cretinism)</p> <p>Decreased TRH or TSH</p>
<b>TSH Levels</b>	<p>Decreased (feedback inhibition of T<sub>3</sub> on the anterior lobe)</p> <p>Increased (if defect is in anterior pituitary)</p>	<p>Increased (by negative feedback if primary defect is in thyroid gland)</p> <p>Decreased (if defect is in hypothalamus or anterior pituitary)</p>
<b>Treatment</b>	<p>Propylthiouracil (inhibits peroxidase enzyme and thyroid hormone synthesis)</p> <p>Thyroidectomy</p> <p><sup>131</sup>I<sup>-</sup> (destroys thyroid)</p> <p>β-Adrenergic blocking agents (adjunct therapy)</p>	<p>Thyroid hormone replacement therapy</p>

## CRETINISM

Extreme hypothyroidism during infancy and child hood (failure of growth).

### CAUSES

- 1- Congenital lack of thyroid gland (congenital cretinism).
- 2- Genetic deficiency leading to failure to produce hormone.
- 3- Iodine lack in the diet (endemic cretinism).

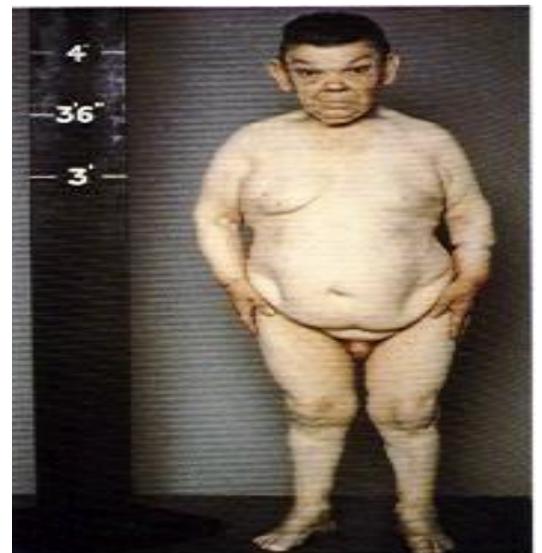
### SYMPTOMS

- 1- Infant is normal at birth but abnormality appears within weeks → cuz he has some T3 and T4 from his mother
- 2- Protruding tongue.
- 3- Dwarf with short limbs.
- 4- Mental retardation.
- 5- Often umbilical hernia.
- 6- teeth.



### TREATMENT

Changes are irreversible unless treatment is given early.



تعديل وتنسيق :

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