



# Hypothyroidism

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# Outline:



1. The epidemiology of hypothyroidism.
2. The etiology of hypothyroidism.
3. Signs and symptoms.
4. Hashimoto's thyroiditis.
5. Diagnosis of hypothyroidism.
6. Management of hypothyroidism.

# Epidemiology



- Women are affected approximately 6 times more than men.
- **Most common causes of hypothyroidism:**
  - A. In developing countries:** iodine deficiency.
  - B. In developed countries:** Hashimoto's thyroiditis

# Etiology:



1. Primary hypothyroidism (termed myxedema when it is severe)
2. Secondary (central )hypothyroidism:

# Primary hypothyroidism

## *A. Insufficient functioning thyroid tissue*

1. Congenital absence of thyroid tissue
2. Autoimmune destruction of thyroid tissue
  - **Autoimmune thyroiditis also called (Hashimoto's thyroiditis)**
3. Surgical removal of thyroid tissue
4. Radioablation of thyroid tissue by radioactive iodine or external beam radiation
5. Infiltrative destruction of thyroid tissue
  - Hemochromatosis
  - Scleroderma
  - Amyloidosis

## *A. Impaired thyroid hormone synthesis*

1. Iodine deficiency.
2. Congenital enzymatic defects that disrupt thyroid hormone synthesis.
3. Drug-mediated inhibition of thyroid hormone production and release.
  - **Thionamides**
  - **Amiodarone**
  - **Lithium**

# SECONDARY HYPOTHYROIDISM



- **Insufficient secretion of TRH or TSH**

**1. Hypothalamic disorders:**

**2. Hypopituitarism**

**3. Thyroid hormone resistance syndrome**

# Signs and Symptoms



Weight gain (Despite poor appetite)

Cold intolerance

Fatigue, somnolence

Dry skin

Dry, course hair

Menorrhagia

Hypercholesterolemia

Hyponatraemia

Anemia (usually normocytic normochromic)

# Signs and symptoms of Hypothyroidism



*Psychological*  
- Poor memory and concentration

- Poor hearing

*Pharynx*  
- Hoarseness

*Heart*  
- Slow pulse rate  
- Pericardial effusion

*Muscular*  
- Delayed reflex relaxation

*Extremities*  
- Coldness  
- Carpal tunnel syndrome

*General*  
- Fatigue  
- Feeling cold  
- Weight gain with poor appetite

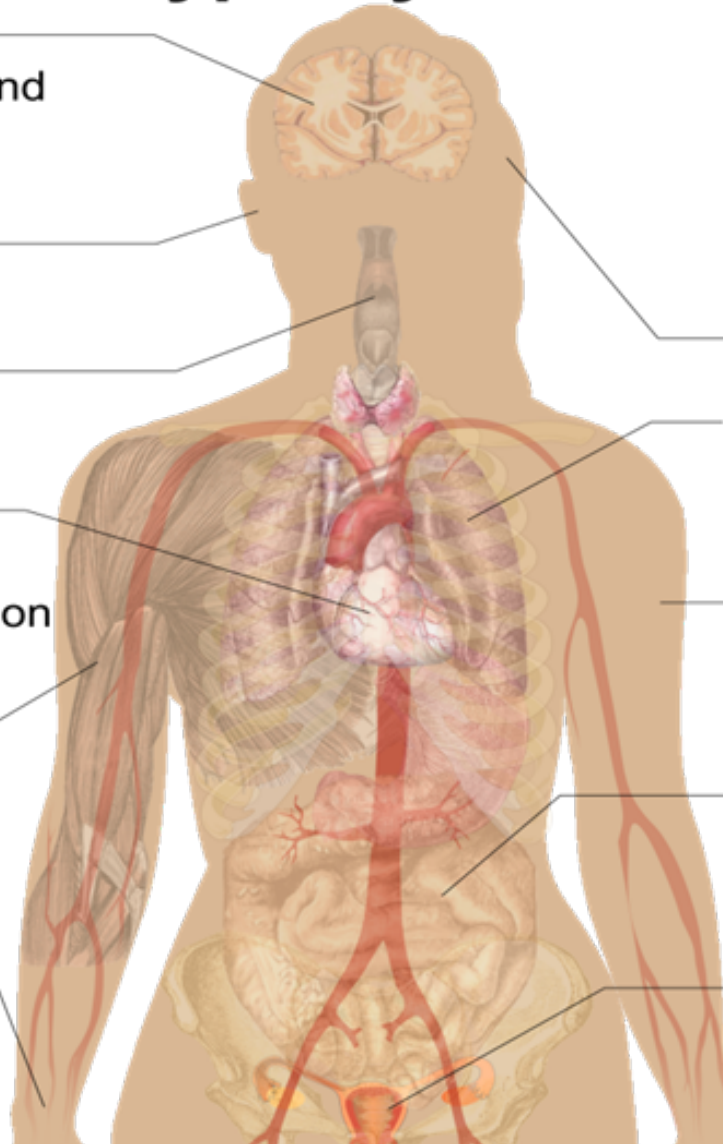
- Hair loss

*Lungs*  
- Shortness of breath  
- Pleural effusion

*Skin*  
- Paresthesia  
- Myxedema

*Intestines*  
- Constipation  
- Ascites

*Reproductive system*  
- Menorrhagia









Pic 3: <http://www.hypothyroidismrevolution.com/hypothyroid-symptoms-in-women/>

# Key points:



- *Most cases of hypothyroidism are not clinically obvious, however, and a high index of suspicion needs to be maintained so that the diagnosis is not overlooked in individuals complaining of non-specific symptoms.*
- *During development deficiency can cause **cretinism** which is irreversible mental retardation.*
- **Symptoms in children:**
  - Delayed linear growth despite weight gain.

# Diagnosis of hypothyroidism:



- Testing to determine **the underlying cause** of primary hypothyroidism is usually **unnecessary**. The condition can almost always be ascertained from the patient's history; if not, **autoimmune thyroiditis** is usually the cause.

## A. Thyroid function tests:

	T4	TSH	TRH
Primary hypothyroidism	↓	↑	↑
Pituitary hypothyroidism	↓	↓	↑
Hypothalamic hypothyroidism	↓	↓	↓



## A. Overt hypothyroidism: is characterized by:

- An **elevated** TSH level, **usually greater than 20 mIU/L**
- A free T<sub>4</sub> level **below** the lower limit of the reference range.

## A. Subclinical hypothyroidism( In this state the patient is asymptomatic with abnormal thyroid function tests) is characterized by:

- The TSH level is only **MODESLY** elevated
- The free T<sub>4</sub> level remains in the **low-normal to normal range (Usually at the low end of reference range).**



- ***B .Serology(antithyroid antibodies):***
  - When confirmation of autoimmune thyroiditis is required (e.g., to convince a patient that the condition is permanent), serum **antithyroid antibodies** may be assessed.



## ***Autoimmune thyroiditis (Hashimoto's thyroiditis):***

- **Most common cause of hypothyroidism in developed countries**
- More common in females
- **Definition:** A condition in which altered T-cell-mediated immunity causes destruction of thyroid tissue and impaired gland function.
- The condition is characterized by a lymphocytic infiltrate and fibrosis.
- Also called: **Chronic Lymphocytic Thyroiditis**
- Circulating **anti-thyroid antibodies** directed against **thyroid peroxidase (anti-TPO) and thyroglobulin (anti-Tg)** are markers of the disease, Patients with autoimmune thyroiditis may have other endocrine and non-endocrine autoimmune disorders.



- **Symptoms:**

- Patients might initially present with hyperthyroid symptoms (Thyrotoxicosis- Hashitoxicosis)
- Hypothyroid symptoms
- Goiter ±

- **Diagnosis:**

- Diagnosis is **clinical** (History and physical examination)+**TSH and T3,T4** and the findings include:
  - **High TSH**
  - **Low T4,T3**
  - **Positive Anti-TPO**
- However, 10% of patients with histologically documented autoimmune thyroiditis have **NO** circulating antithyroid antibodies.

- **Treatment:**

- levothyroxine



# Treatment (levothyroxine)



- **DRUG INFORMATION:**

- The optimal dose of thyroxine for replacement therapy is related to lean body weight, with most adults requiring a daily dose of **1.6 µg/kg.**
- The dose of levothyroxine should be adjusted to maintain serum TSH within the reference range.
- The target TSH level for most individuals should be **the lower half of the reference range (i.e., 1.0 to 2.0 mIU/L).**

# *Myxedema Coma: MEDICAL EMERGENCY!*



- Severe hypothyroidism , a life- threatening condition **characterized by:**
  - 1) Hypothermia(may be as low as 25°C)
  - 2) Bradycardia
  - 3) Hypotension
  - 4) Decreased level of consciousness
  - 5) Multisystem organ failure.
  - 6) Respiratory depression with CO<sub>2</sub> retention
  - 7) Seizures
- **Precipitating factors include:** illness, infection, trauma, drugs that suppress the CNS, and exposure to cold.
- **Treatment:** triiodothyronine IV, treating the underlying cause and supportive treatment.

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