



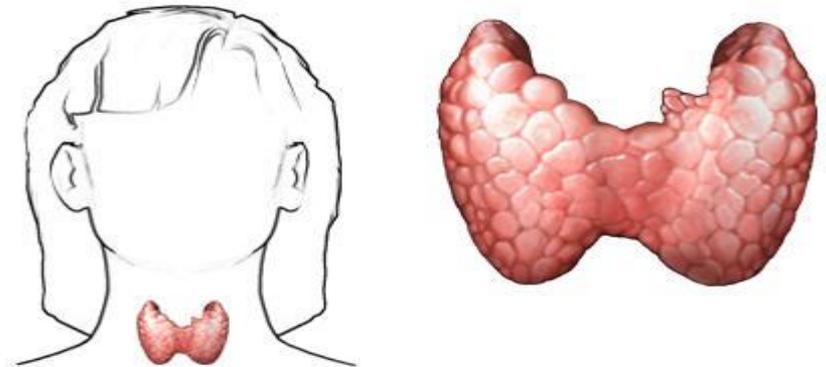
Semester 4

Cases discussion on thyroid disorders



Hyperthyroidism

- Definition .
- A condition characterized by excessive production of thyroid hormones (T3 and T4) by the thyroid gland .
- Common causes include Graves disease, toxic multinodular goiter and toxic adenoma.



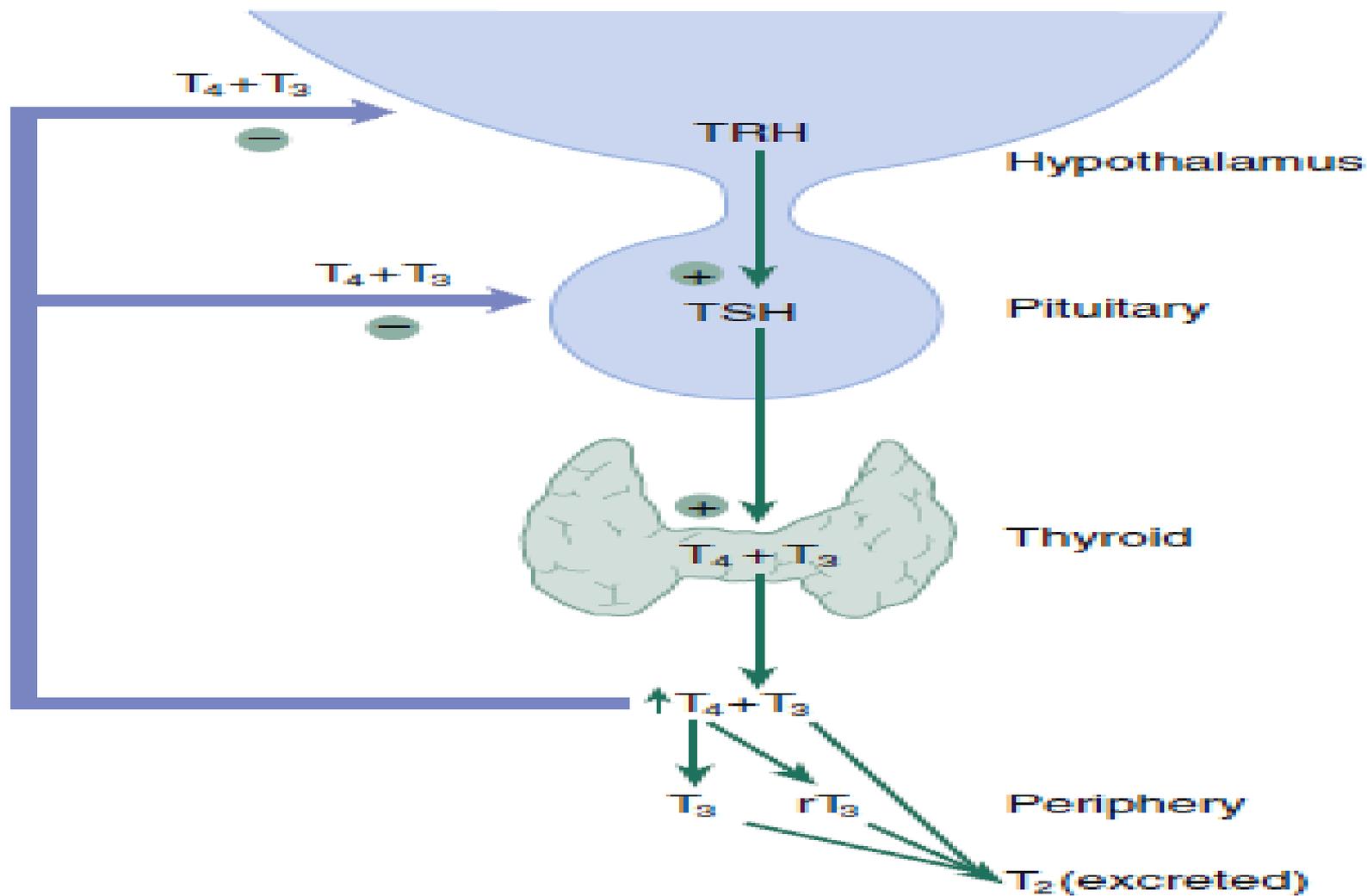


Fig. 44.1 Control of thyroid hormone secretion.
 TRH, thyrotrophin-releasing hormone; TSH, thyroid-stimulating hormone

Diagnosis

- 1- Clinical manifestations of hyperthyroidism.
- 2- Laboratory tests . TSH, free T3 and free T4 levels.
- 3- Imaging studies. Thyroid US and thyroid scan.

How should hyperthyroidism be treated?

- The three main treatment options are
- **Antithyroid drugs** include carbimazole, methimazole (MMI) and propylthiouracil (PTU).
- **Radioiodine (131I) ablation**
- **Surgery (thyroidectomy)**

(MMI is almost always the preferred agent. Because of concerns about severe hepatotoxicity, PTU is recommended only in (1) the first trimester of pregnancy (2) thyroid storm therapy, because of the ability of PTU to block T4-to-T3 conversion; and (3) patients with minor reactions to MMI who refuse 131I therapy or surgery.)

- Unless contraindicated, most patients should receive **beta-blockers** for heart rate control and symptomatic relief.

- The choice will largely be determined by the age of the patient, the cause of the thyrotoxicosis, the severity of the condition, comorbidity and patient preference

Hypothyroidism

- **Definition**

Hypothyroidism is a condition that results from inadequate production or action of thyroid hormone, most commonly as a result of **primary hypothyroidism** which is the failure of the thyroid gland itself.

Hypothyroidism can be overt, with a frank decrease in serum thyroxine (T4) levels and a compensatory increase in thyroid-stimulating hormone (TSH) levels. It is also commonly seen in subclinical hypothyroidism in which the TSH is mildly elevated, but T4 levels are normal.

The most common causes of hypothyroidism.

the two most common causes are chronic lymphocytic thyroiditis (Hashimoto's disease), an autoimmune form of thyroid destruction, and radioiodine-induced hypothyroidism after treatment of Graves' disease.

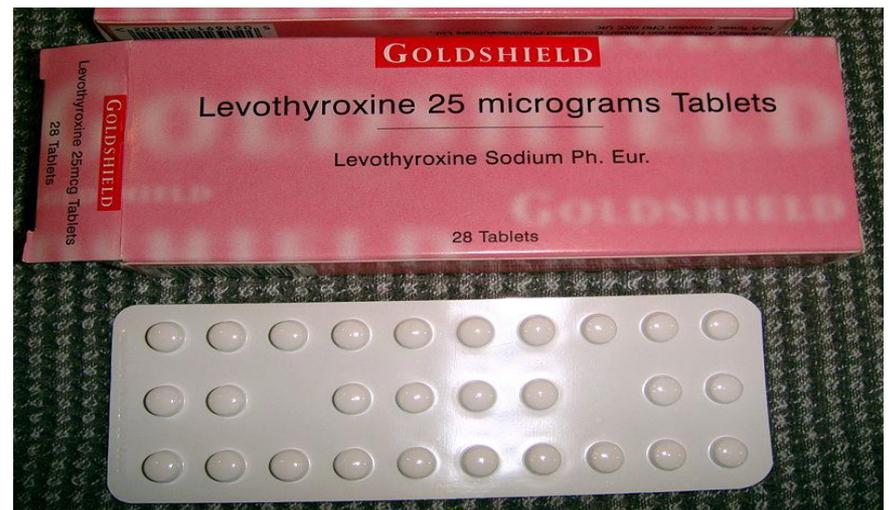
Diagnosis

1- Clinical manifestations of hypothyroidism as fatigue, cold intolerance, depression, weight gain, weakness, joint aches, constipation, dry skin, hair loss, and menstrual irregularities.

2- Laboratory tests . TSH, free T3 and free T4 levels.

Treatment

- All patients with overt hypothyroidism should be treated with levothyroxine replacement therapy (LT4).
- Treatment is also generally recommended for subclinical hypothyroidism.
- Regular monitoring and dose adjustment are recommended.





Cases

Case scenario 1

- A 45-year-old woman suffered from weight loss, palpitations, tremor, anxiety and sweating, plus eyelid retraction and orbital and ocular inflammation. Blood tests showed increased levels of free and bound T3 and T4 and suppressed TSH. A diagnosis of Graves' thyrotoxicosis was made. An electrocardiogram showed atrial fibrillation.
1. How could her symptoms be controlled?
 2. Which therapeutic options can help her to achieve remission of hyperthyroidism?

3. Her doctor prescribed carbimazole. With treatment, she became euthyroid, but relapsed in the following year. A decision was made to treat her with Iodine¹³¹.

- What treatment should be given before administering the Iodine¹³¹ and why?

4. How long after treatment will benefit be seen?

1. **Drugs of choice** for controlling symptoms are **β -adrenoceptor antagonists**, although they do not improve fatigue and muscle weakness. Propranolol should also control a high ventricular rate due to the atrial fibrillation and anticoagulation with warfarin to prevent thromboembolism, which has an increased incidence in people with both atrial fibrillation and thyrotoxicosis.

2. **Options for treating graves**

- ❖ Medical treatment
- ❖ Radioactive iodine
- ❖ Surgical treatment

3. **The clinical state should be stabilized with carbimazole** and a β -adrenoceptor antagonist. Carbimazole is stopped 3–4 days before radioiodine is given, as it can prevent the uptake of iodine by thyroid cells.

4. **It can take 3- 6 months** for the maximum benefit of ^{131}I to occur

Case scenario 2

- A 26-year-old first trimester pregnant woman is diagnosed with hyperthyroidism.
 1. What are the treatment options for this woman?
 2. What adverse effects of prescribed drug should this patient be cautioned about?

1. Antithyroid drugs are the treatment of choice; radioactive iodine is clearly contraindicated. Methimazole is generally preferred over PTU because it has a longer half-life and lower incidence of adverse effects. However, **PTU** is recommended in the first trimester of pregnancy due to a greater risk of teratogenic effects with methimazole.
2. The most common adverse reaction is a **purpuric, urticarial, papular rash**. **Relapse (50-68%) and hypothyroidism** also may occur. More serious is agranulocytosis although it is rare. A baseline white blood cell count and differential should be obtained before starting therapy with antithyroid drugs. Patients should be cautioned to immediately report the development of a sore throat or fever. **Agranulocytosis** is reversible upon discontinuation of the drug. **Hepatotoxicity** which may be fatal (with PTU)

Case scenario 3

- A 33-year-old woman comes to the clinic complaining of fatigue, lethargy, heavy periods, dry skin, and constipation for the past 6 months. The symptoms have not improved despite her primary care provider giving her a vitamin with iron. She noticed a 2.5-kg weight gain over the past 4 months. The patient's TSH is elevated and his T4 is slightly decreased. The doctor suspects hypothyroidism and begins replacement therapy with levothyroxine

1- What are the goal of therapy and precautions must be taken during therapy?

2. What are the adverse effects of levothyroxine therapy?

1. **The goal of therapy** is to normalize the serum TSH (in primary hypothyroidism) or free T4 (in secondary hypothyroidism) and to relieve the symptoms of hypothyroidism.

- Start with small dose and increase according TSH plasma level
- Lab investigations done after 5 to 6 weeks after starting treatment because L-thyroxine has long half life (7 days) , you must wait until achieving its plasma steady state concentration
- Assess for signs and symptoms of over- and undertreatment
- Identify potential interactions between LT4, and foods and/or drugs

- 2. **Adverse effects** would generally occur only upon overtreatment and would be similar to the consequences of hyperthyroidism. An excess of thyroid hormone can increase the risk of atrial fibrillation, especially in the elderly, and can increase the risk of osteoporosis, especially in postmenopausal women.

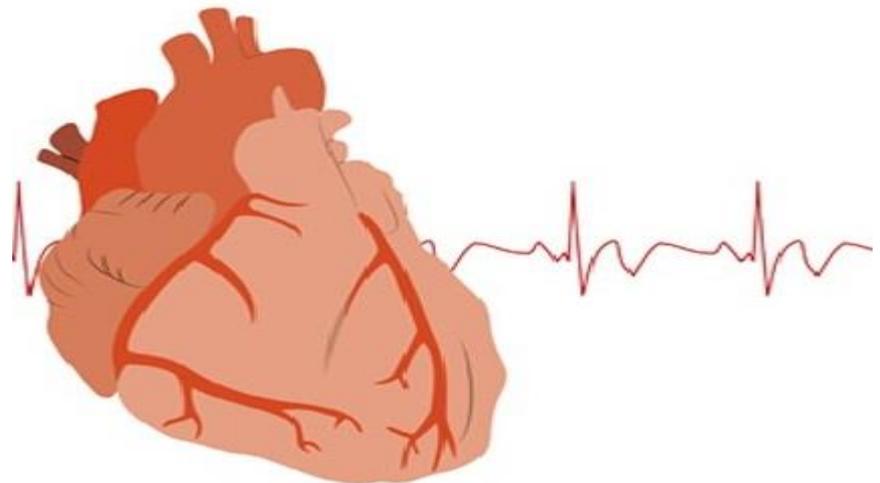
Case scenario 4

A 62-year-old woman who is taking drug X for treatment of cardiac arrhythmia. Now she is diagnosed with hypothyroidism that is suspected to be induced by her antiarrhythmic drug. Which of the antiarrhythmic drugs listed below might be drug X

- A. Amiodarone
- B. Lidocaine
- C. Procainamide
- D. Sotalol
- E. Verapamil

The answer is Amiodarone

Heart Arrhythmia



Case scenario 5

A 53-year-old woman with the diagnosis of Graves disease is being treated with radioactive iodine. She should be warned of the high likelihood of

- a. Hashimoto's disease.
- b. iodism.
- c. hypothyroidism.
- d. thyroid nodules.
- e. thyroid cancer.

The answer is hypothyroidism.

Case scenario 6

A 25-year-old woman has been treated with thyroxine for hypothyroidism. She has become pregnant. She complains now of being constantly fatigued. The proper course of action would be to

- a. do nothing, fatigue is normal during pregnancy.
- b. increase the iodine in her diet.
- c. measure her serum TSH, free T3 and free T4 levels during the first trimester and adjust her thyroxine dose based on the result.
- d. double her dose of thyroxine.
- e. decrease the dose of thyroxine as the need for thyroid replacement therapy decreases during pregnancy

The answer is C

Case scenario 7

- A 34-year-old woman is being prepared for thyroidectomy. As part of the preparation, she is given a solution containing high iodide concentration. She wonders why she is being treated with something that is added to food (salt). The explanation is that
 - a. iodide in food is poorly absorbed.
 - b. iodide in food is rapidly taken up by skeletal muscle.
 - c. low levels of iodide are required for thyroxine synthesis, but high levels inhibit thyroxine synthesis and release.
 - d. iodide in food is not utilized by the thyroid gland.
 - e. high concentrations of iodide block the RH receptor on the pituitary gland
- Answer is c. Low levels of iodine are required for thyroid synthesis, but high levels of iodine inhibit thyroid synthesis and release.

8. When initiating T4 therapy for an elderly patient with long standing hypothyroidism, it is important to begin with small doses to avoid which of the following?

- A. A flare-up of exophthalmos
- B. Acute renal failure
- C. Hemolysis
- D. Overstimulation of the heart
- E. Seizures

Answer is Overstimulation of the heart

9- When considering an appropriate treatment for your hyperthyroid patient, you decide to prescribe a drug that can produce a relatively rapid inhibition of thyroid hormone release, but should not be given for more than a few weeks. Which drug has these characteristics?

- A. levothyroxine
- B. methimazole
- C. potassium iodide
- D. propylthiouracil
- E. Propranolol

Answer is C

10- When treating the same hyperthyroid patient you decide to prescribe an additional drug that can also help to rapidly reduce their symptoms by reducing the peripheral conversion of T4 to T3 ,as well as blunting cardiovascular responses to elevated thyroid hormone levels.

Which of the following would you most likely prescribe?

- A. amiodarone
- B. glucose
- C. insulin
- D. propranolol
- E. methimazole

Answer is D

11-Two months after starting treatment for hyperthyroidism with methimazole, your patient returns to your clinic complaining of chronic cough and sore throat that will not go away.

You recognize that because your patient is being treated with a thioamide, What condition should you be looking for , that could be confirmed by ordering a blood test?

- A. anemia
- B. angioedema
- C. eosinophilia
- D. leukopenia
- E. thrombocythemia

Answer is D

thanks
For Watching

