Hypothyroidism and Hyperthyroidism

Hypothyroidism

Inability of the thyroid gland to supply enough thyroid hormone, is known as hypothyroidism. There are varying degrees of hypothyroidism from mild, clinically insignificant forms to the life threatening extreme, myxedema coma

Classification:

Primary hypothyroidism:

>90% of hypothyroidism cases

Gland destruction or dysfunction caused by disease or medical therapies (e.g., radiation, surgical procedures)

Failure of the gland to develop or congenital incompetence (i.e., cretinism)

Secondary hypothyroidism

Result of a pituitary disorder that inhibits TSH secretion. The thyroid gland is normal but lacks appropriate stimulation by TSH.

Tertiary hypothyroidism

Refers to a condition in which the pituitary–thyroid axis is intact, but the hypothalamus lacks the ability to secrete TRH to stimulate the pituitary.

Subclinical hypothyroidism

It refers to patients without clinical symptoms, a normal FT4, and elevated TSH levels.Currently, there is insufficient evidence to support treatment because consequences of nontreatment are minimal. However, pregnant women with subclinical hypothyroidism may benefit from T4 replacement.

Aetiology Hypothyroidism may have several causes, it often results from autoimmune destruction of the thyroid gland (Hashimoto's disease). The symptoms are, in general, opposite to those of hyperthyroidism:

(1) Decreased metabolic rate

(2) cold intolerance and decreased sweating;
(3) Weight gain without increased caloric intake;
(4) Bradycardia;
(5) Slowness of movement, speech, and thought; and
(6) Lethargy and sleepiness. There is accumulation of mucopolysaccharides in interstitial spaces, giving rise to nonpitting edema.

Myxedema:

The puffiness of the skin is referred to as myxedema, a term used synonymously for adult hypothyroidism.

Cretinism:

If severe hypothyroidism occurs in utero or during infancy, irreversible mental retardation results, and growth is impaired; this condition is referred to as cretinism.

Goiter:

Hypothyroidism can also be associated with goiter. In certain areas of the world, dietary iodine is deficient, so thyroid hormone secretion is depressed. Many individuals in these regions have enlarged thyroids, or endemic goiter, because high plasma levels of TSH stimulate the gland. The practice of adding iodine to table salt has decreased the incidence of endemic goiter in many areas of the world.

Hyperthyroidism/thyrotoxicosis

Hyperthyroidism is defined as the production by the thyroid gland of excessive amounts of thyroid hormones.

Thyrotoxicosis refers to the clinical syndrome associated with prolonged exposure to elevated levels of thyroid hormone.This distinction is important when evaluating thyroid function tests.

Epidemiology

Hyperthyroidism is a common condition. It has been estimated that there are 4.7/1000 women with active disease. When previously treated cases were included, the population prevalence rose to 20/1000 in women. As for hypothyroidism, it is much less common in men who have a lifetime prevalence of around 2/1000.

Aetiology

Hyperthyroidism is a disorder of various aetiologies. In clinical terms, thyrotoxicosis is the result of persistently elevated levels of thyroid hormones.

Graves' disease

Graves' disease is the commonest cause of thyrotoxicosis. It is an autoimmune condition and results from production of an abnormal IgG immunoglobulin which is able to occupy the TSH receptor on the thyroid follicular cell. Here, it mimics the effect of TSH, causing cell division and stimulating thyroid hormone secretion. These stimulatory imunoglobulins are known as thyroid receptor antibodies (TRABs). Very rarely, the TRABs are inhibitory to the TSH receptor, resulting in hypothyroidism.

Ninety per cent of patients with Graves' disease are young women often with a family history of the condition. In addition to the effects of thyrotoxicosis, around 30% of patients develop additional features including a congestive ophthalmopathy which is thought to result from antibody-mediated inflammation of orbital contents. Pretibial myxoedema, gynaecomastia and thyroid acropachy are rare manifestations. In pregnancy, the maternal TRABs can pass across the placenta to the fetus resulting in transient neonatal thyrotoxicosis.

Nodular disease

Toxic multinodular goitre is also common but more often affects older women in whom an euthyroid nodular goiter may have been present for many years. Individual nodules become autonomous, producing T3 and/or T4. Clinically, the thyrotoxicosis is generally less severe and more gradual in onset. Often, only T3 levels are elevated, though the TSH will be suppressed in all cases.

Signs and symptoms of thyrotoxicosis

Skin and appendages Warm, moist skin
Thinning or loss of hair
Increased sweating
Heat intolerance
Nervous system Insomnia
Irritability, nervousness
Lid retraction – staring eyes
Symptoms of an anxiety state
Psychosis
Musculoskeletal Fine motor tremor
Proximal muscle weakness

Rapid deep tendon reflexes
Osteoporosis
Gastro-intestinal Weight loss despite increased appetite
Thirst
Diarrhoea
Cardiovascular
Palpitations, tachycardia
Shortness of breath on exertion
Atrial fibrillation
Congestive cardiac failure
Worsening angina