

Hyperthyroidism and Hypothyroidism: The Basics

The thyroid is a small, bow-tie shaped gland that lies just below the Adam's apple in the lower neck anterior to the trachea. Normally you can not see it, and it is difficult to feel.

The thyroid secretes hormones, which regulate the speed of metabolism. Thyroid hormones affect:

- Heart rate
- Respiratory rate
- Rate at which calories are burned
- Skin maintenance
- Growth
- Heat production
- Calcium regulation
- Fertility
- Digestion

Hyperthyroidism

Hyperthyroidism is overactivity of the thyroid, leading to speeding up of body functions. Hyperthyroidism affects 1% of the population, and usually affects women during menopause and after childbirth. Hyperthyroidism is eight times more common in females than males.

Causes of hyperthyroidism

The causes of hyperthyroidism include:

- Graves' disease (an autoimmune disorder)
- Genetic predisposition
- Neoplasms
- Excessive intake of thyroid medications
- Thyroiditis (inflammation of the thyroid gland)
- Toxic substance exposure
- Radiation exposure
- Toxic thyroid nodules (overgrowth of tissue of the thyroid gland)
- Overactive pituitary gland

Thyroid storm is a life-threatening condition, wherein a rapid increase in thyroid hormone causes a rapid increase in metabolic rate, and will result in death if not immediately treated. Thyroid storm presents with hyperthermia, tachycardia, agitation, fast respiration, and seizures.

Symptoms of hyperthyroidism

The following are symptoms of hyperthyroidism

- Enlarged thyroid gland (goiter)
- Increased heart rate
- Increased blood pressure
- Abnormal heart rhythms

- Excessive perspiration
- Eye and hand tremors
- Amenorrhea
- Decreased libido and impotence
- Nervousness and anxiety
- Dyspnea
- Muscle wasting
- Insomnia
- Weight loss, despite increased appetite
- Increased activity, despite fatigue and weakness
- Frequent bowel movements, sometimes with diarrhea
- The elderly may become weak, sleepy, confused, withdrawn, and depressed
- Problems with the eyes; individuals may look like they are staring
- People with Graves' disease may have puffiness around the eyes, and increased tear formation, irritation, and sensitivity to light; bulging eyes and double vision also may occur

Treatment of hyperthyroidism

The following are used to treat hyperthyroidism:

- Beta-blockers
- Propylthiouracil or methimazole to decrease the production of thyroid hormones
- Propranolol to treat dysrhythmias
- Glucocorticoids to interfere with conversion of thyroid hormones
- Iodine, given orally, short term until surgery or for those needing rapid treatment
- Radioactive iodine to destroy part of the thyroid gland
- Surgical removal of the thyroid gland
- Graves' disease—additional treatment for skin and eye symptoms

Hypothyroidism

Hypothyroidism is underactivity of the thyroid gland, which leads to inadequate production of thyroid hormones and a slowing of bodily functions.

Causes of hypothyroidism

The most common cause is Hashimoto's thyroiditis. Other causes include radioactive iodine treatment and thyroidectomy surgery used to treat hyperthyroidism or thyroid cancer. In developing countries, iodine deficiency is a common cause of hypothyroidism. Lithium use can lead to iodine deficiency. Inherited disorders and failure of the hypothalamus or pituitary glands to secrete enough thyroid-stimulating hormone are rarer causes. Immunological disorders, peripheral resistance to thyroid hormones, and congenital defects are also causes.

Symptoms of hypothyroidism

The following are symptoms of hypothyroidism:

- Dull facial expressions
- Enlarged thyroid gland (goiter)
- Hoarse voice and slow speech

- Drooping eyelids
- Puffy face and eyes
- Weight gain
- Constipation
- Muscle stiffness and weakness
- Fatigue
- Hand and foot paresthesias
- Sparse, coarse, and dry hair
- Coarse, dry, scaly, and thick skin
- Thinning eyebrows
- Low tolerance for cold
- Carpal tunnel syndrome
- Slowed pulse
- Hypotension
- Bradycardia
- Dysrhythmias
- Enlarged heart
- Menorrhagia
- Infertility in females
- Decreased libido in males
- Slightly orange palms and soles
- Confusion, forgetfulness, and dementia
- Anemia
- If left untreated—coma with seizures, lactic acidosis, hypoglycemia, hyponatremia, hypotension, bradycardia, heart failure, hypothermia, and hypoventilation with decreased blood flow to the brain (myxedema coma) may result

Treatment of hypothyroidism

These treatments and recommendations are used to treat hypothyroidism:

- Avoid excessive intake of these foods, which can inhibit thyroid utilization:
 - Cruciferous vegetables—broccoli, brussels sprouts, cabbage, cauliflower, kale, kohlrabi, mustard, rutabaga, and turnips
 - Asparagus
 - Millet
 - Peaches
 - Peanuts
 - Peas
 - Radishes
 - Soybeans
 - Soy products
 - Spinach
 - Strawberries
- **Note:** Some research shows that walnuts may decrease the absorption of Synthroid®
- Aim for a consistent intake of fiber; a high-fiber diet affects digestion speed and can reduce the ability to absorb thyroid replacement medication

- Take oral medications, as prescribed, to replace thyroid hormones
 - Do not take thyroid replacements at the same time as a calcium supplement or an iron-containing vitamin
 - Allow a minimum of 2 hours separation between taking your thyroid medication and any supplements that contain iron or calcium
 - Take thyroid medication on an empty stomach for optimal utilization
 - Take thyroid replacements in the morning, 1 to 2 hours before or 2 hours after meals for optimal absorption

References

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