Thyroid Disorders

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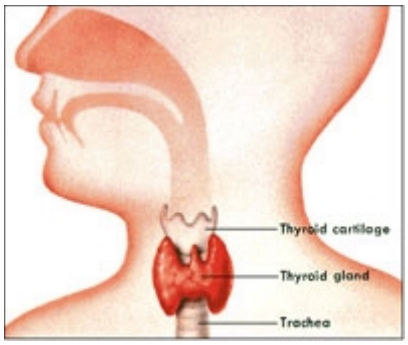
Introduction

About 200 million people in the world have some form of thyroid disease. Thyroid disorders for the most part are treatable; however, untreated thyroid disease can produce serious results in other parts of the body. Improved public awareness and understanding of thyroid disorders will enable patients and their families to cope more effectively with the sometimes-disturbing course of thyroid illness. In this way individuals will also be better equipped to play a role in alerting their physicians to a suspected thyroid condition that may otherwise be difficult to diagnose in the sometimes slowly developing initial phases.

Thyroid gland is a body organ located in the front of the neck. It has two lobes (parts), one on each side of the trachea (windpipe). The thyroid takes iodine from the blood and uses it to make the active hormones thyroxine, also called tetraiodothyronine (T4), and triiodothyronine (T3). An inactive form of thyroid hormones is stored inside the lobes in small chambers called follicles.



Thyroid hormones control the body's cell metabolism. When thyroid hormones are released into the bloodstream, cells increase the rate at which they convert oxygen and nutrients into energy and heat for the body's use. During a child's development, thyroid hormones stimulate an increase in growth rate. Release of thyroid hormones also stimulates mental activity and increases the activity of the other hormone-producing glands.

Thyroxine and triiodothyronine are released into the bloodstream in response to such conditions as stress, pregnancy, and low levels of thyroid hormones in the blood. These conditions activate a hormone in the pituitary gland called thyroid-stimulating hormone (TSH). TSH regulates the thyroid's production of hormones.

The thyroid gland produces another hormone, calcitonin, in response to high levels of calcium in the blood. Calcitonin causes the kidneys to discharge more calcium into the urine, and it raises the amount of calcium stored in the bones.

The gland is a regulator of all body functions. There are many types of thyroid disease. However, the main conditions present in most thyroid illnesses are Hypothyroidism (thyroid under activity) and Hyperthyroidism (thyroid over activity).

Hyperthyroidism

(Graves' Disease, Thyrotoxicosis, Toxic Diffuse Goiter, Toxic Nodular Goiter, Plummer's Disease, Basedow's Disease)

Hyperthyroidism is an autoimmune disorder marked by hyperactivity of the thyroid gland. The gland is usually swollen, releasing greater-than-normal amounts of thyroid hormones, and the body processes are accelerated.

Signs and Symptoms

- Goiter
- Warm, moist skin
- Profuse sweating and heat intolerance
- Sweating
- Tremor
- Weakness
- Insomnia
- Emotional liability
- Rapid forceful heartbeat
- Weight loss in spite of increased appetite
- Restlessness, anxiety and sleeplessness
- Diarrhea
- Eye changes
- Tearing and a startled look.

Enlargement of the thyroid gland is called **goiter**. Goiter does not always indicate a disease, since thyroid enlargement can also be caused by physiological conditions such as puberty and pregnancy.

Hypothyroidism

(Myxedema)

Hypothyroidism or under active thyroid occurs when the thyroid gland fails to produce sufficient amounts of the thyroid hormones T4 and T3. There are four main causes:

- Treatment of Grave’s hyperthyroidism with radioactive iodine or by thyroidectomy;
- End result of Hashimoto's thyroiditis, an inflammatory process of the thyroid gland; this may occur spontaneously during the course of Graves' disease;
- Birth of a baby, born without a thyroid gland (congenital hypothyroidism);
- Surgical removal of the thyroid gland as a treatment for thyroid cancer.

Hypothyroidism can also be caused by disease of either the pituitary gland or the hypothalamus. This is because normal function of the thyroid gland depends on carefully regulated secretion of thyroid stimulating hormone (TSH) from the pituitary gland and thyrotropin-releasing hormone (TRH) from the hypothalamus. Another important, but transient form of hypothyroidism occurs with postpartum thyroiditis

Signs and Symptoms

- Poor appetite,
- Intolerance to cold,
- Dry, coarse skin,
- Brittle hair,
- Tiredness,
- A croaky, hoarse voice,
- Constipation, and
- Muscle weakness.

Examination may reveal an absence of the thyroid gland, dry, scaly, cold, pale skin, a thickening of the skin and underlying tissues (called myxedema), very slow reflexes and a slow heart rate. The patient can have poor memory retention. The diagnosis of hypothyroidism is confirmed by finding very low levels of thyroid hormones (T3, T4 and TSH) in the blood.

Borderline Hypothyroidism (Compensated Hypothyroidism) is quite common and almost impossible to diagnose clinically. The hallmark is that of an elevated TSH concentration, with normal or only slightly reduced thyroid hormone levels. There may be no symptoms, or very vague symptoms, associated with this condition. It is important to make the correct diagnosis because once treatment is started it usually continues for life as it becomes very difficult to stop treatment to determine whether the original diagnosis was correct. The measurement of TSH in the blood helps to define even minor degrees of hypothyroidism.

Thyroid "Nodule"

A Thyroid "nodule" is a localized swelling within the thyroid gland. Of most concern is a single swelling, but sometimes it is part of a "multinodular goiter" in which several such swellings are present.

The single thyroid nodules is usually one of four things:

- A fluid-containing cyst;
- A degenerated benign tumor/adenoma;
- A slowly growing adenoma;
- A small percentage is malignant.

Because the rest of the thyroid gland is usually normal, thyroid function is normal and patients are not hyper- or hypothyroid. One of the most important tests for nodules is the radioactive iodine scan, which allows the physician to look at the nodule as well as the surrounding thyroid gland.

Thyroiditis

Thyroiditis, inflammation of the thyroid gland. Sudden thyroiditis is caused by infections. It is marked by pus and abscess formation. It may progress to the less sudden (subacute) disease of the gland. Subacute thyroiditis is marked by fever, weakness, sore throat, and a painfully large gland with tumor like lumps of tissue (granulomas). Long-term lymphocytic thyroiditis (Hashimoto's disease) is marked by lymphocyte and plasma cell infiltration of the gland and by a larger gland. It seems to be carried as a dominant trait. Another long-term form of thyroiditis is Riedel's struma, a rare progressive formation of fibers (fibrosis) usually of one lobe of the gland but sometimes involving both lobes, the windpipe, and surrounding muscles, nerves, and blood vessels. Radiation thyroiditis occasionally occurs 7 to 10 days after the treatment of hyperthyroidism with radioactive iodine 131.

Laboratory Investigation Of Thyroid Disease

The most important uses of laboratory tests are:

- To confirm the clinical diagnosis of thyroid disease;
- To monitor patients with thyroid disease who have been treated &
- To select, for removal by the surgeon, those single nodules which may be malignant.

Measurement of TSH (Thyrotropin)

The pituitary hormone TSH stimulates the thyroid gland to make and release the thyroid hormone. When thyroid hormone levels decrease, the TSH rises and vice versa. Measurement of TSH using a sensitive assay is presently the recommended initial screening test when thyroid disease is suspected. The TSH assay is able to separate hypothyroid and hyperthyroid patients from normal individuals. Basically, a normal TSH excludes primary thyroid disease. When the TSH is elevated, this suggests hypothyroidism and when suppressed suggests hyperthyroidism. Rarely the TSH level may be suppressed by drugs (such as corticosteroids) or by severe psychiatric or non-thyroidal illness. However, such circumstances are extremely rare in the outpatient setting.

Measurement of Blood T3 and T4

When the TSH is abnormal, measurement of thyroxine (T4) or triiodothyronine (T3) is performed to determine the extent of the thyroid abnormality. An elevated T4 or T3, in association with a low or suppressed TSH, establishes hyperthyroidism. An elevated TSH in conjunction with a low T4 establishes hypothyroidism.

Since using the TSH assay as a primary test, doctors have identified patients who have an isolated low or high TSH in association with normal T4 and T3 levels. Although some of these patients will eventually develop overt thyroid disease, it is presently difficult to predict who they will be. The assessment and management of such patients needs to be individualized.

Thyroid Hormone Binding Proteins

Thyroid hormones circulate in association with proteins that bind thyroid hormones. It is only the free or unbound portion that we believe to be active at the tissue level. However, free levels represent less than 1% of the total thyroid hormone levels. In certain circumstances, such as pregnancy or the birth control pill, the elevated estrogen or female sex hormone, associated with these conditions, raises the level of thyroid hormone binding protein. The body will compensate by increasing the production of T4 and T3 so that the free level remains normal. However, such individuals will have a higher total T4 and T3. Because the free level remains normal, their TSH does not change. In many circumstances, measurement of the free T4 and free T3 is available. Alternatively, the T3 resin uptake test can be performed and provides an indirect measurement of the level of thyroid binding protein. The FT4 index is the total T4 multiplied by the T3 resin uptake and should be proportional to the true free T4 level. In pregnancy, the total T4 is elevated, the T3 resin decreased and the free T4 index is normal. The availability of the TSH screening has largely eliminated any confusion caused by changes in thyroid binding proteins, as the TSH will remain normal in these circumstances.

Radioactive Iodine Uptake and Thyroid Scan

The thyroid gland takes up iodine and uses this to make thyroid hormone. Radioactive iodine is taken up and metabolized by the thyroid in exactly the same way. Approximately 20% of a dose of radioactive iodine, given orally, is taken up by the thyroid gland within 24 hours after the dose is given. This is measured by counting the radioactivity over the thyroid gland. The test is safe since the radiation dose is very small, although it is usually not carried out in children or pregnant women. In a patient with hyperthyroidism the radioactive iodine uptake test will separate those permanent causes of hyperthyroidism such as Graves' disease in which it will be elevated from those temporary causes of hyperthyroidism such as thyroiditis in which it will be suppressed. Alternatively, the gland can be photographed or "imaged" and the distribution within the gland of a radio labeled tracer, (usually technetium) recorded. This is called a thyroid scan. The scan can be used as an alternative to the radioactive iodine uptake as described. In addition, the scan gives an idea of the shape and size of the thyroid gland and can be used for patients with thyroid nodules to determine whether the nodule is functioning.

Thyroid Antibodies

Patients with Hashimoto's thyroiditis have an autoimmune disease. Thyroid antibodies are blood proteins, which react against certain of the patient's, own proteins (called antigens) within the thyroid gland. In-patients with Hashimoto's thyroiditis high levels of antibodies are usually found and, therefore, are markers of the autoimmune process. Low levels of antibodies are sometimes found in older, normal women and do not indicate disease. Patients with Graves' hyperthyroidism have circulating thyroid stimulating antibodies that act like TSH and cause the thyroid cells to over-function

Thyroid Biopsy

Thyroid biopsy is presently in common used and is considered to be the first line of investigation for patients with solitary thyroid nodules (by many physicians). In this procedure, a small needle on the end of a syringe is inserted into the abnormal part of the thyroid gland. The plunger of the syringe is drawn out and a small number of thyroid cells is drawn up into the base of the needle. These cells are then smeared onto glass slides. The pathologist can then examine the smears for evidence of thyroid disease. This procedure is simple, quick, and painless and is equivalent to having blood taken. In patients with a thyroid nodule due to thyroid cyst, the fluid can be evacuated using the biopsy technique. The patients may experience mild pain at the site and, rarely, swelling and bruising. It is almost unheard of that the needle would damage structures outside the thyroid gland. There have been no reports of spread of thyroid cancer. Local anaesthetic is usually not necessary even with children.

Thyroid biopsy is not carried out if there is no thyroid swelling or nodule to feel. However, for patients with thyroid nodules, multinodular goiter, or possible thyroiditis, the procedure can be extremely useful. Although only surgery can absolutely guarantee the nature of the thyroid nodule, the thyroid biopsy is 85-90% effective in diagnosing the nature of the nodule and distinguishing between benign tumors and thyroid cancer.

Newborn babies are tested for hypothyroidism by using a **"heelpad blood-spot test."** Neonatal hypothyroidism is caused, for unknown reasons, by an absence of the baby's thyroid gland at birth. Thyroid hormones are essential for brain development and growth. Newborn infants with hypothyroidism that is not treated are called cretins and have severe body and mental defects. These include mental retardation, poor vision, thick dry skin, protrudent tongue, muscle weakness, severe lethargy and tiredness. If diagnosed and treated soon after birth, growth and mental development can proceed relatively normally.

Thyroid Disorders Complications

Pregnancy and Fertility

Thyroid disease is not common during pregnancy. This is because the immune system, of which the thyroid is a part, is depressed in pregnancy in order to protect the developing fetus. As a result of the loss of this protective effect at the end of pregnancy, there is a tendency for thyroid disease to occur in those women who have had previous thyroid disease. Thyroiditis is particularly common after pregnancy. In most cases, so called "Post Partum Thyroiditis" tends to get better after a few weeks although recurrence in subsequent pregnancies is highly likely.

Women after treatment can become pregnant since normal fertility is restored once their diseases have been treated.

Thyrotoxicosis and Pregnancy

Treatment of Grave's hyperthyroidism (thyrotoxicosis) during pregnancy is different from that in non-pregnant women, since radioactive iodine cannot be given and surgery should not be performed (particularly in the first and third trimesters of the pregnancy for fear of inducing a miscarriage). Because of the immunosuppressive effect of pregnancy, antithyroid drugs can be given in doses lower than with non-pregnant patients. Overtreatment of the hyperthyroidism with antithyroid drugs can affect the baby's thyroid since the drugs cross the placenta into the baby's blood stream and will affect the baby's thyroid gland.

Breast Feeding and Thyroid Disease

Radioactive isotopes are secreted in milk and no isotope tests or isotope scans should be performed on someone who is breast-feeding. Propylthiouracil can be used when breast feeding, as only negligible amounts actually get into the milk. Thyroxine is also secreted in the milk, but providing the dosage in the mother is in the physiologic range, it appears to be quite safe for the mother on Thyroxine to breast-feed.

Infertility

Patients with either hyper- or hypothyroidism tend to be infertile, although it is certainly possible to have these diseases and still get pregnant. Once the diseases have been treated, it is important to recommence birth control (if desired), since fertility is restored quickly once the patient is euthyroid. In addition, both men and women with untreated thyroid disease often have decreased sexual desire (libido).

Menstruation tends to be increased in hypothyroidism and decreased in hyperthyroidism. The effects of thyroid hormones on menstrual periods, ovarian function and the endocrine system in general are complicated but important, so that with too much or too little thyroid hormone a variety of effects on the reproductive system can occur. Girls who become hyper- or hypothyroid during puberty may have delayed menstrual function.

Male Infertility Hyper- or hypothyroidism is also a cause for male infertility since sperm development requires normal thyroid hormone levels.

Female Infertility One other cause of infertility in-patients with thyroid disease is the uncommon condition of primary ovary failure. This is an autoimmune disorder, like Graves' disease and Hashimoto's thyroiditis, caused by proteins and white cells in the blood, which attack proteins in the patient's ovaries. This leads to shrivelling of the ovary, failure to ovulate, premature menopause, and infertility.

Relationship between Thyroid Disease and Iodine Treatment for Fibrocystic Disease of the Breast

For unknown reasons, the breasts, like the thyroid gland trap iodine from the blood. Furthermore, it is found that iodine treatment for various breast conditions markedly improves these abnormalities. For example, iodine is frequently given for fibrocystic disease, a lumpy nodularity of the breast common in middle-aged women.

In normal amounts, iodine is necessary for thyroid hormone production. Large amounts can produce goiter and various forms of thyroid disease. Women taking iodine for breast conditions must, therefore, be aware of the possibility of goiter and thyroid disease, particularly if they previously had thyroid disease or have a family history of thyroid abnormalities. Doctors treating breast conditions carry out thyroid blood tests and clinical examination every six months.

Homoeopathic Treatment

The common medicines used for Thyroid disorder are as under:

IODUM is a classical remedy for goiter, simple and the exophthalmic variety; in this we have the exophthalmus, the thyroid enlargement, the tachycardia, and the tremor. The general lymphatic glandular involvement throughout the body is an additional indication for Iodine. A depressed mental condition is also frequently present.

SPONGIA TOSTA: A remedy long used in the treatment of enlarged thyroids. It is also most suitable to the exophthalmic variety. Cardiac tremor is characteristic, in fact the heart symptoms of *Spongia are quite similar to those of many cases of Graves' disease.

THYROIDINE: Produces anaemia, emaciation, sweating and a persistent frontal headache and muscular weakness. It exercises a regulating influence over nutrition, growth and development. Tachycardia and exophthalmic goiter with palpitation from the least excitement, easy excitability of the heart and dry skin. The higher potencies are more efficient in the exophthalmic variety and much safer than the taking of the crude thyroid, which has a large element of danger. It reinforces the action of Lycopus, and is complemented by Fucus vesiculosus.

THYROID GLAND: can be used very successfully in early cases of Thyroid disorder. This can be used as an alternative to Altroxin tablets.

BADIAGA: Exophthalmic goiter, with aching pain in the posterior portion of the eyeballs, aggravated on moving them, accompanied by tremulous palpitation of the heart and glandular swellings. The pulse is rapid and irregular.

HYPOTHALAMUS: Dysfunction of thyroid with falling of basic metabolism (hypothyroidism), Obesity, anxiety, dyspnea, ammonaria, baldness, aggravation from cold, better by heat. The nearest medicine to this is *Pulsatilla* and the only difference is in modalities.

HEDERA HELIX: Swelling of the thyroid gland, palpitations, extreme anxiety with feeling of constriction of the throat, mostly affects left side and may spread towards right side. It is very similar to IODUM in glandular swellings.

Apart from the above constitutional remedies like Cal. Carb, Lycopodium, Thuja, Lachesis, Silicea, Tuberculinum, Carcinocin and Cal. Flour are very useful in thyroid disorders.

References:

- Thyroid Foundation of Canada.
- Materia Medica by Boreicke.
- Materia Medica by Julian