



DRUG THERAPY AND TEST ASSOCIATED WITH THYROIDISM

Mr. Rehan Uddin

Assistant Professor, Department of Pharmaceutics, Sir Madanlal Institute Of Pharmacy, Alampur Hauz, Agra Road, Etawah

Dr. Uma Shankar Sharma

Director and Professor, Sir Madanlal Institute Of Pharmacy, Alampur Hauz, Agra Road, Etawah

ABSTRACT

The thyroid is a small butterfly shaped gland that lies just under the skin below the Adam's apple in the neck. When the thyroid gland is overactive and produces too much thyroid hormone an individual develops hyperthyroidism. When the thyroid gland is under active and produces too little thyroid hormone an individual develops hypothyroidism. Both the conditions are known as thyroidism. Several tests are associated in determining the thyroidism. The good news is that accurate thyroid function tests are available to diagnose thyroidism, and treatment of thyroidism, safe and effective once you and your doctor find the right dose for you

KEYWORDS :

INTRODUCTION : The thyroid is a small butterfly shaped gland that lies just under the skin below the Adam's apple in the neck. It measures about 2 inches across. The thyroid gland secretes hormones that help regulate the body's metabolism (how the body uses energy.) There are two main thyroid hormones: T3 (triiodothyronine) and T4 (thyroxine.) T3 is the more active form of hormone, and T4 is converted into T3 by the body as needed. Most of T3 and T4 are bound to proteins in the blood stream. They are inactive until they are separated from the protein. To make these hormones the thyroid gland uses proteins and iodine supplied by the diet. Normally the amount of thyroid hormones that is made and produced is controlled by the pituitary gland. When the thyroid gland is overactive and produces too much thyroid hormone an individual develops hyperthyroidism. When the thyroid gland is under active and produces too little thyroid hormone an individual develops hypothyroidism.

Hypothyroidism : Hypothyroidism (underactive thyroid) is a condition in which your thyroid gland doesn't produce enough of certain important hormones. Women, especially those older than age 60, are more likely to have hypothyroidism. Hypothyroidism upsets the normal balance of chemical reactions in your body. It seldom causes symptoms in the early stages, but over time, untreated hypothyroidism can cause a number of health problems, such as obesity, joint pain, infertility and heart disease.

Hyperthyroidism : In hyperthyroidism the thyroid gland is overactive and produces too much thyroid hormone. Over 2 ½ million Americans have hyperthyroidism. It is much more common in women than in men. There are several causes of hyperthyroidism. The most common include immunologic conditions (like Graves' disease and thyroiditis,) toxic thyroid nodules (adenomas), and toxic multinodular (many nodules or adenomas) goiter (enlargement of the thyroid gland.) Graves disease is a syndrome of hypermetabolism, enlarged thyroid gland and exophthalmous (bulging of the eyeballs due to the collection of abnormal substances in the tissues of the orbit.) Autoimmune thyroiditis is an inflammation of the thyroid gland that may cause damage to the gland and eventually result in hypothyroidism. Thyroid nodules (one or many) are areas of abnormal thyroid tissue within the thyroid gland. They can be benign or malignant (cancer) but most are benign (not cancer.)

TEST ASSOCIATED WITH THYROIDISM+

Health care providers perform thyroid tests to assess how well the thyroid is working. The tests are also used to diagnose and help find the cause of thyroid disorders such as hyperthyroidism and

hypothyroidism. A health care provider may order several blood tests to check thyroid function, including like TSH test, T4 tests, T3 test, thyroid-stimulating immunoglobulin (TSI) test and antithyroid antibody test, also called the thyroid peroxidase antibody test (TPOab).

TSH Test : A health care provider usually performs the TSH blood test first to check how well the thyroid is working. The TSH test measures the amount of TSH a person's pituitary is secreting. The TSH test is the most accurate test for diagnosing both hyperthyroidism and hypothyroidism. Generally, a below-normal level of TSH suggests hyperthyroidism. An abnormally high TSH level suggests hypothyroidism.

T4 Tests : The thyroid primarily secretes T4 and only a small amount of T3. T4 exists in two forms: T4 that is bound to proteins in the blood and is kept in reserve until needed and a small amount of unbound or "free" T4 (FT4), which is the active form of the hormone and is available to enter body tissues when needed. A high level of total T4—bound and FT4 together—or FT4 suggests hyperthyroidism, and a low level of total T4 or FT4 suggests hypothyroidism.

T3 Test : If a health care provider suspects hyperthyroidism in a person who has a normal FT4 level, a T3 test can be useful to confirm the condition. In some cases of hyperthyroidism, FT4 is normal yet free T3 (FT3) is elevated, so measuring both T4 and T3 can be useful if a health care provider suspects hyperthyroidism. The T3 test is not useful in diagnosing hypothyroidism because levels are not reduced until the hypothyroidism is severe.

TSI Test : Thyroid-stimulating immunoglobulin is an autoantibody present in Graves' disease. TSI mimics TSH by stimulating the thyroid cells, causing the thyroid to secrete extra hormone. The TSI test detects TSI circulating in the blood and is usually measured.

Antithyroid Antibody Test : Antithyroid antibodies are markers in the blood that are extremely helpful in diagnosing Hashimoto's disease. Two principal types of antithyroid antibodies are -; anti-TG antibodies, which attack a protein in the thyroid called thyroglobulin and anti-thyroperoxidase, or anti-TPO, antibodies, which attack an enzyme in thyroid cells called thyroperoxidase.

DRUG THERAPY+

TREATMENT OF HYPOTHYROIDISM : Standard treatment for hypothyroidism involves daily use of the synthetic thyroid hormone levothyroxine (Levothroid, Synthroid, others). This oral medication restores adequate hormone levels, reversing the signs and symptoms

of hypothyroidism. Although most doctors recommend synthetic thyroxine, natural extracts containing thyroid hormone derived from the thyroid glands of pigs are available. These products contain both thyroxine and triiodothyronine. Synthetic thyroid medications contain thyroxine only, and the triiodothyronine your body needs is derived from the thyroxine.

TREATMENT OF HYPERTHYROIDISM : Treatment for hyperthyroidism includes administration of propylthiouracil (300-600 mg/day total at eight-hour intervals) or methimazole (30-60 mg/day total, administered in two doses), which are thioamides that inhibit hormone biosynthesis by aborting the iodotyrosine residue coupling. Glucocorticosteroids, such as dexamethasone, can be used in cases of severe thyrotoxicosis. Adrenergic antagonists such as propranolol are used to control the symptoms associated with thyrotoxicosis such as sweating, tremor, anxiety and tachycardia. Subtotal thyroidectomy (partial removal of the thyroid gland) is being used less owing to the efficacy of iodine treatment, but it persists as an option in young patients who are resistant to pharmacological treatment and in some people who have thyroid neoplasms.

CONCLUSION : Abnormalities of thyroid gland function are more common among individuals with developmental disabilities than in the general population. Most will have either hypothyroidism (underactive thyroid function) or hyperthyroidism (over active thyroid function.) Both conditions are treatable. Onset of hypothyroidism can occur over a fairly long time and the symptoms can be subtle. In contrast, onset of hyperthyroidism is usually more rapid and the symptoms are often dramatic. If we can keep the possibility of abnormal thyroid function in mind we will not be likely to miss the diagnosis. Screening tests of thyroid function should be a part of routine health maintenance for all individuals with a developmental disability.

REFERENCE

- Larsen PR, Davies TF, Hay ID. The thyroid. In: Williams RH, Wilson JD, Foster DW, Kronenberg HM, eds. Williams textbook of endocrinology. 9th ed. Philadelphia: Saunders; 1998:389-416.
- Pyle MA, Faddoul FF, Terezhalmay GT. Clinical implications of drugs taken by our patients. *Dent Clin North Am* 1993;37(1):73-90.
- Franklyn JA, Daykin J, Betteridge J, et al. Thyroxine replacement therapy and circulating lipid concentrations. *Clin Endocrinol* 1993;38:453-9.
- Klein I. Thyroid hormone and the cardiovascular system. *Am J Med* 1990;88:631-7.
- Herrmann HJ II, Myall RW. Observations on the significance of the thyroid gland to the dentist. *Spec Care Dentist* 1983;3(1):13-6.
- Lambert M. Thyroid dysfunction in HIV infection. *Baillieres Clin Endocrinol Metab* 1994;8:825-35.
- Poumpros E, Loberg E, Engstrom C. Thyroid function and root resorption. *Angle Orthod* 1994;64:389-94.
- Fulop M. Pouting sublinguals: enlarged salivary glands in myxoedema. *Lancet* 1989;2(8662):550-1.
- Uzzan B, Campos J, Cucherat M, Nony P, Boissel JP, Perret GY. Effects on bone mass of long term treatment with thyroid hormones: a meta-analysis. *J Clin Endocrinol Metab* 1996;81:4278-89.
- Klein I, Levey GS. The cardiovascular system in thyrotoxicosis. In: Braverman LE, Utiger RD, eds. The thyroid. 8th ed. Philadelphia: Lippincott-Raven; 2000:596-604.
- O'Reilly DS. Thyroid function tests: time for reassessment. *BMJ* 2000;320:1332-4.
- Malamed SF. Thyroid gland dysfunction in medical emergencies in the dental office. 5th ed. St. Louis: Mosby; 2000:275-86.
- Ekins R. Measurement of free hormones in blood. *Endocr Rev* 1990;11(1):5-46.
- Weiss RE, Murata Y, Cua K, Hayashi Y, Seo H, Refetoff S. Thyroid hormone action on liver, heart, and energy expenditure in thyroid hormone receptor beta-deficient mice. *Endocrinology* 1998;139:4945-52.
- Johnson AB, Webber J, Mansell P, Gallan I, Allison SP, Macdonald I. Cardiovascular and metabolic responses to adrenaline infusion in patients with short-term hypothyroidism. *Clin Endocrinol* 1995;43:747-51.
- Ladenson PW, Singer PA, Ain KB, et al. American Thyroid Association guidelines for detection of thyroid dysfunction. *Arch Intern Med* 2000;160:1573-5.
- Wartofsky L. Update in endocrinology. *Ann Intern Med* 2001;135:601-9.
- Bagehi N, Brown TR, Parish RF. Thyroid dysfunction in adults over age 55 years: a study in an urban US community. *Ach Intern Med* 1990;150:785-7.
- Singer PA, Cooper DS, Levy EG, et al. Treatment guidelines for patients with hyperthyroidism and hypothyroidism. *JAMA* 1995;273:808-12.
- Biondi B, Fazio S, Cuocolo A, et al. Impaired cardiac reserve and exercise capacity in patients receiving long-term thyrotropin suppressive therapy with levothyroxine. *J Clin Endocrinol Metab* 1996;81:4224-8.