

Shalamar Hospital is striving to provide our patients quality health care, at lowest possible costs. Our hospital is continually active in pioneering new treatments and therapies to improve the lives of people in our community.

HOW CAN BLOOD TESTS BE USED TO MANAGE THYROID DISORDERS?

Blood tests for thyroid-stimulating hormone (TSH) are crucial in managing thyroid disorders. The main goal of treatment is to improve your symptoms and prevent long-term harm. TSH levels indicate your thyroid status and are used as a biochemical marker to ensure that your thyroid hormone replacement is adequate. For patients on thyroid hormone replacement, it is recommended to keep their TSH within the reference range to avoid osteoporosis and harm to the cardiovascular system. In thyroid cancer, the goal is to keep the TSH level just below the reference range (usually 0.1-0.5mU/L) for a period of time.

IS IT NECESSARY TO MAINTAIN TSH LEVELS WITHIN THE REFERENCE RANGE?

It is preferable to avoid having TSH levels that are either below or above the reference range during treatment for hypothyroidism. Studies show that people who are overtreated or undertreated with levothyroxine have a slightly lower life expectancy and a small increased risk of long-term health problems. If you have thyroid blood tests outside the reference range for an extended period, you should discuss the associated risks with your doctor.

CAN INDIVIDUAL TARGETS BE SET FOR MANAGING THYROID DISORDERS?

It is recommended that you and your doctor set individual targets for managing your thyroid disorder based on your specific circumstances.

HOW ARE THYROID DISORDERS TREATED?

Hypothyroidism is treated with levothyroxine, a synthetic version of thyroxine (T4) produced by the thyroid gland. Treatment for hyperthyroidism includes antithyroid drugs, surgery to remove all or part of the thyroid gland, or radioactive iodine to reduce the activity of the thyroid. Your doctor will discuss treatment options with you.

HOW OFTEN SHOULD BLOOD TESTS BE CARRIED OUT DURING TREATMENT FOR THYROID DISORDERS?

At the start of treatment, blood tests are carried out usually every few weeks to fine-tune treatment. When stable on treatment, you will have less frequent tests. In hypothyroidism, a TSH test once a year will check that levels are within the reference range. In hyperthyroidism, the usual tests are TSH and FT4, and the frequency of these tests depends on the treatment.

WHAT AFFECTS THE RESULTS OF THYROID FUNCTION TESTS?

Thyroid function tests can be affected by medications and illnesses. You

should inform the person taking your blood test of any medications you are taking, including those for thyroid disorders, and any serious illnesses such as heart attack, infection, trauma, serious liver or kidney disease. Other medications such as the contraceptive pill, steroid hormones, anticonvulsants, anti-inflammatory drugs, lithium, amiodarone, and mineral or vitamin supplements can also affect the results.

WHEN SHOULD I HAVE A THYROID FUNCTION BLOOD TEST?

You should have a blood test if you experience symptoms of an over- or underactive thyroid, swelling or thickening in the neck, an irregular or fast heart rate, high cholesterol, osteoporosis, fertility problems, abnormal menstrual cycles, recurrent miscarriage, low libido, or have a family history of autoimmune disorders. If you are feeling unwell after having a baby, planning pregnancy, or in early pregnancy with a family history or personal history of thyroid disorders, a past history of postpartum thyroiditis, or type 1 diabetes, you should also have a blood test. People with certain medical conditions, such as Down's syndrome, Turner's syndrome, Addison's disease, type 1 diabetes, or other autoimmune diseases should be tested regularly. Here are some alternative ways to express the given points:

1. The most precise way to detect and manage thyroid issues is through blood tests.
2. Your symptoms and how you feel play a crucial role in diagnosing thyroid disorders.
3. Keeping TSH level within the reference range is vital for your overall health.
4. In Hashimoto's disease, repeating antibody tests is rarely necessary.
5. Adjustments in medication dosage may be possible to improve your well-being if you're taking medication for thyroid disease.
6. Regular blood tests, at least once every 12 months, are important if you have a thyroid disorder or history of overactive thyroid treatment, as recommended by your doctor.
7. Early pregnancy or pregnancy planning requires a blood test if you have thyroid disease.
8. Consult with your doctor before altering your medication dose if you are taking thyroid medication.
9. If thyroid problems exist in your family, urge your family members to consult their doctor to determine if thyroid testing is necessary.

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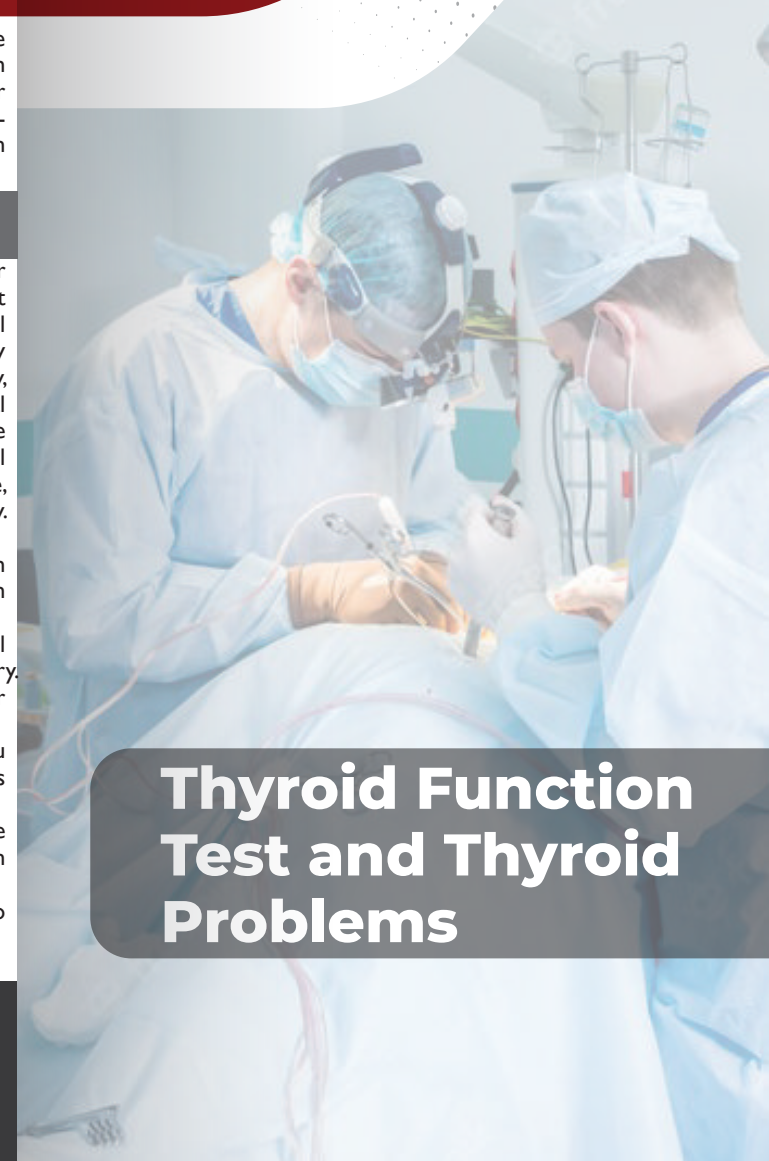
Department of Surgery, Shalamar Hospital

📍 Shalimar Link Road, Lahore.

📱 Shalamar74

☎ +92 (42) 111-205-205 Ext: 325

🌐 www.shalamarhospital.org.pk



Thyroid Function Test and Thyroid Problems

WHAT IS THE THYROID GLAND AND HOW DOES IT WORK?

The thyroid gland is a small butterfly-shaped gland located in the front of your neck just below your Adam's apple. It produces two hormones called thyroxine (T4) and tri-iodothyronine (T3). These hormones play an essential role in regulating your body's metabolism. T4 contains four atoms of iodine and is converted into T3, which is the biologically active form of thyroid hormone that regulates the body's metabolism.

The amount of T4 and T3 produced by the thyroid gland is regulated by the pituitary gland, located at the base of your brain. The pituitary gland senses the level of thyroid hormones in your bloodstream and secretes thyroid-stimulating hormone (TSH) to activate the thyroid gland to produce more T4 when the level drops just below normal. The pituitary gland stops secreting TSH to decrease the production of T4 when thyroid hormone levels rise above normal.

WHAT ARE THYROID FUNCTION TESTS?

Thyroid function tests are blood tests that measure the levels of thyroid hormones in your blood to evaluate how well your thyroid gland is functioning. The most common thyroid function tests are TSH, T4, and sometimes T3. In most cases, the TSH level is the first hormone to be measured because if this level is normal, it is highly likely that your thyroid gland is functioning properly. However, if a pituitary problem is suspected, T4 may be measured as well. Doctors usually measure T4 in addition to TSH in children as T4 is crucial for brain development. Many laboratories use a "cascade" system where additional hormones are measured if the TSH level is not normal:

- If the TSH level is above the reference range, the blood T4 will be measured.
- If the TSH level is below the reference range, the blood T4 and T3 will be measured.

A blood sample is taken from a vein in the arm and sent to a laboratory for analysis. The laboratory measures the "free" or active portion of T4 and T3 (FT4 and FT3). Reference ranges are used to compare the blood test results with results in the normal healthy population. Typical reference ranges for healthy adults are:

Test	From	To	Units
TSH	0.4	4.0	mU/L (milliunits per litre)
FT4	9.0	25.0	pmol/L (picomoles per litre)
FT3	3.5	7.8	pmol/L (picomoles per litre)

Note that these ranges are only a guide and vary according to the laboratory. In pregnancy, the serum TSH reference range is different from the general population and should be based on reference ranges derived from healthy pregnant women in the same population. There are different reference ranges for testing babies and young children.

HOW CAN BLOOD TESTS BE USED TO DIAGNOSE THYROID DISORDERS?

Your doctor will interpret your test results, along with your symptoms and how you feel, to diagnose whether you have a thyroid disorder, how severe it is, and how to treat it. Thyroid hormone replacement is not advised if thyroid hormone levels are within normal limits according to current guidelines.

- TSH and FT4
- If the TSH level is high and the FT4 result is low, it suggests an underactive thyroid (hypothyroidism) that requires treatment.

- If the TSH level is low and the FT4 result is high, it suggests an overactive thyroid (hyperthyroidism) that requires treatment.
- If the TSH level is slightly raised, but the FT4 level is still within the normal reference range, it is called subclinical hypothyroidism.
- A low TSH with a low FT4 may be a result of a failure of the pituitary gland (secondary hypothyroidism caused by hypopituitarism) or a response to any significant illness that doesn't involve your thyroid.

FT3
This is usually only used in testing for hyperthyroidism or assessing its severity.

HOW ARE THYROID FUNCTION TESTS PERFORMED?

Thyroid function tests involve taking a blood sample from a vein in your arm. The sample is sent to a laboratory for analysis. The laboratory measures the levels of TSH, T4, and sometimes T3 in your blood. The free or active portion of T4 and T3 is usually measured (i.e., FT4 and FT3).

WHAT DO ABNORMAL THYROID FUNCTION TEST RESULTS MEAN?

Abnormal thyroid function test results can indicate a thyroid disorder. Your doctor will interpret the test results, along with your symptoms and physical exam findings, to diagnose the type and severity of the thyroid disorder.

- High TSH levels with low FT4 levels can indicate hypothyroidism, which means that your thyroid gland is not producing enough thyroid hormones. Hypothyroidism can cause symptoms such as fatigue, weight gain, and dry skin.
- Low TSH levels with high FT4 levels can indicate hyperthyroidism, which means that your thyroid gland is producing too much thyroid hormone. Hyperthyroidism can cause symptoms such as weight loss, tremors, and rapid heart rate.
- Subclinical hypothyroidism, which is characterized by slightly elevated TSH levels and normal FT4 levels, may not cause any symptoms initially, but it may progress to overt hypothyroidism over time.
- Thyroid antibody tests can indicate whether an autoimmune disorder is causing your thyroid disorder. Positive thyroid antibodies can be present in people with autoimmune thyroid diseases, such as Hashimoto's thyroiditis and Graves' disease.

WHAT SHOULD I DO IF I HAVE ABNORMAL THYROID FUNCTION TEST RESULTS?

If you have abnormal thyroid function test results, you should talk to your doctor. Your doctor may order additional tests, such as thyroid antibody tests, to help diagnose the underlying cause of your thyroid disorder. Depending on the type and severity of the thyroid disorder, your doctor may recommend treatment options such as thyroid hormone replacement therapy, radioactive iodine therapy, or surgery. In conclusion, thyroid function tests are important diagnostic tools that help to evaluate thyroid function and diagnose thyroid disorders. If you have any concerns or questions about your thyroid function test results, speak to your healthcare provider.

Thyroid Antibodies: Information for Patients
Your healthcare provider may have recommended a test for thyroid antibodies if your initial thyroid test results show signs of a thyroid

problem, or if there is a suspicion of an autoimmune thyroid disease. This information leaflet is intended to help you understand what thyroid antibodies are, what they indicate, and whether it is necessary to repeat testing for thyroid antibodies.

WHAT ARE ANTIBODIES?

Antibodies are proteins that the immune system produces in response to foreign substances or cells in the body. Antibodies attach to specific targets, called antigens, and can either help to remove them from the body or trigger other immune cells to do so.

WHAT DO THYROID ANTIBODIES INDICATE?

Thyroid antibodies are produced when the immune system mistakenly attacks the thyroid gland, leading to an autoimmune thyroid disease. Some people may test positive for more than one type of thyroid antibody. There are three types of thyroid antibodies that are commonly tested:

- Thyroid peroxidase antibodies (TPOAb)
TPOAb is raised in Hashimoto's thyroiditis (or autoimmune thyroiditis) and sometimes raised in Graves' disease.
- Thyroglobulin antibodies (TgAb)
Tg Ab is sometimes raised in Hashimoto's thyroiditis.
- Thyroid stimulating hormone receptor antibodies (TSHR Ab, also known as TRAb)
TSHR Ab is raised in Graves' disease.

In people with subclinical thyroid disease, the presence of antibodies can indicate that a person may go on to develop full-blown thyroid disease in the future, but that treatment is not yet required. It is also important to note that positive antibodies can be present in people without thyroid disease.

IS IT NECESSARY TO REPEAT TESTING FOR THYROID ANTIBODIES?

It is rarely useful to repeat measurements of TPOAb and Tg Ab in adults, and their level does not usually influence the treatment given. In children, antibodies may be tested when they move from pediatric to adult care in cases where the underlying cause of the thyroid dysfunction has not been established.

In contrast, measurements of TSHR Ab can be used to guide treatment decisions in Graves' disease (autoimmune thyroid overactivity). For example, relapse of Graves' disease is more likely if anti-thyroid medicines are stopped when TSHR Abs are still elevated.

Other more specialized tests are thyroglobulin (Tg) (used in monitoring people who have already been treated for differentiated thyroid cancer) and calcitonin (used in monitoring people with medullary thyroid cancer, or rarely as part of the diagnosis of thyroid disease where medullary cancer is suspected).

Thyroid antibodies are produced when the immune system attacks the thyroid gland, leading to an autoimmune thyroid disease. The presence of antibodies can indicate that a person may go on to develop full-blown thyroid disease in the future, but that treatment is not yet required. Positive antibodies can also be present in people without thyroid disease. If you have any concerns about your thyroid antibodies or thyroid function, please speak to your healthcare provider.