

1. The Serum TSH level is the best measure of thyroid function. Third generation TSH assays have a remarkable sensitivity.
  - The normal range of TSH is between ( 0.5 – 4.0 ) mu/L
2. Serum total T4 approximates the functional status of the thyroid gland.
  - A change in the level of thyroxine binding globulin, the principal carrier of ( T<sub>3</sub>,T<sub>4</sub> ), is the most common cause effecting thyroid hormone levels ( total T4 or total T3 )
  - An increase or decrease in TBG levels will raise or lower serum total T4.
  - As a result, relying on the serum total T4 level alone as an indicator of thyroid status is not recommended ( EXPLAIN WHY ? )

Ⓐ What are the factors affecting the concentration of TBG ?

Answer :

**1. Factors leading to ↑ TBG:**

- a. Genetic factor.
- b. Estrogen.
- c. Pregnancy.
- d. Hepatitis.
- e. Drugs.

**2. Factors leading to ↓ TBG:**

- a. Genetic factors.
- b. Androgens.
- c. Anabolic steroids.
- d. Glucocorticoids.
- e. Nephrotic syndrome.

3. The most accurate technique available in the measurement of the serum free T4 level is **equilibrium dialysis**. When this method is used, factors that may alter the serum total T4 levels, such as TBG changes or nonthyroidal illness, do not have an effect on the serum free T4 level.

This technique, however, is difficult to perform, as a result, most measurements of S. free T4 (**FT4**) level are determined by **immunoassay**. Immunoassays are not as reliable as equilibrium dialysis.

If FT4 is not available, serum free thyroxine index ( FT4I ) is generally adequate as a measure of FT4 level.

$$\text{FT}_4\text{I} = \text{Serum Tot. T}_4 \times \text{T}_3 \text{ resin uptake}$$

**T3 resin uptake** test is really a measure of TBG, it is inversely proportional to the concentration of TBG. For example, the patient with ↑ TBG has an ↑ total T4 level. In this patient, the T3 uptake test will be low.

When multiplied together, the calculated FT4I will approximate the actual free T4 status.

#### 4. Serum Total T<sub>3</sub>

The major indication for obtaining serum total T<sub>3</sub> level is to confirm the diagnosis of hyperthyroidism in patient who are found to have normal serum T<sub>4</sub> in the setting of ↓ TSH. When the serum level of T<sub>3</sub> is found to be elevated, the patient is said to have **T<sub>3</sub> thyrotoxicosis.**

#### 5. Thyroid Antibodies

- a. Antimicrosomal antibodies.
- b. Antithyropoxidase ( anti-TPO ).
- c. Antithyroglobulin antibodies.
- d. Thyroid-stimulating antibodies.

Those are the major antibodies present in patient with autoimmune thyroid disease. In **Hashimoto disease**, antimicrosomal antibodies may be detected in close to 100% of cases. Over 80% of patients with **Graves' disease** have such antibodies.

Thyroid stimulating antibodies (**TSab**) also known as long acting thyroid stimulator (**LATS**) are found in patient with *Graves' disease*. ( 80% - 95% of the patients ).

It is not necessary to obtain this test in the routine evaluation of patients suspected of having Graves' disease. When the diagnosis of Graves' disease is not clear, it's necessary to do this test.

It is necessary to mention here that high levels of their antibodies in the pregnant patient increase the likelihood of **neonatal hyperthyroidism.**

#### 6. Serum Thyroglobulin

The major use of this test is in the patients with thyroid cancer, After total thyroidectomy and iodine ablation thyroglobulin levels should be undetectable if there is a rise after a certain period, this ***mandates metastatic.***

.....  
"Nothing Happens Until Something Moves."

**Albert Einstein**

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