

Hypothyroidism

Causes of Hypothyroidism

Primary

Autoimmune hypothyroidism: Hashimoto's thyroiditis, atrophic thyroiditis

Iatrogenic: ¹³¹I treatment, subtotal or total thyroidectomy, external irradiation of neck for lymphoma or cancer

Drugs: iodine excess (including iodine-containing contrast media and amiodarone), lithium, antithyroid drugs, p-aminosalicylic acid, interferon- α and other cytokines, aminoglutethimide

Congenital hypothyroidism: absent or ectopic thyroid gland, dyshormonogenesis, TSH-R mutation

Iodine deficiency

Infiltrative disorders: amyloidosis, sarcoidosis, hemochromatosis, scleroderma, cystinosis, Riedel's thyroiditis

Causes of Hypothyroidism

Secondary

Hypopituitarism: tumors, pituitary surgery or irradiation, infiltrative disorders, Sheehan's syndrome, trauma, genetic forms of combined pituitary hormone deficiencies

Isolated TSH deficiency or inactivity

Bexarotene treatment

Hypothalamic disease: tumors, trauma, infiltrative disorders, idiopathic

NOTE: TSH, thyroid-stimulating hormone; TSH-R, TSH receptor.

Causes of Hypothyroidism

Transient

Silent thyroiditis, including postpartum thyroiditis

Subacute thyroiditis

Withdrawal of thyroxine treatment in individuals with an intact thyroid

After ¹³¹I treatment or subtotal thyroidectomy for Graves' disease

Serum TSH	Serum Free T4	Serum T3	Assessment
Normal hypothalamic-pituitary function			
Normal	Normal	Normal	Euthyroid
Normal	Normal or high	Normal or high	Euthyroid hyperthyroxinemia
Normal	Normal or low	Normal or low	Euthyroid hypothyroxinemia
Normal	Low	Normal or high	Euthyroid: triiodothyronine therapy
Normal	Low normal or low	Normal or high	Euthyroid: thyroid extract therapy
High	Low	Normal or low	Primary hypothyroidism
High	Normal	Normal	Subclinical hypothyroidism
Low	High or normal	High	Hyperthyroidism
Low	Normal	Normal	Subclinical hyperthyroidism
Abnormal hypothalamic-pituitary function			
Normal or high	High	High	TSH-mediated hyperthyroidism
Normal or low*	Low or low-normal	Low or normal	Central hypothyroidism

Screening

"**Screening**" refers to the measurement of thyroid function tests in patients at risk of having thyroid disease who are presently not known to have thyroid disease. Most laboratories use serum TSH as the initial screening test as follows:

- **Serum TSH normal** — no further testing performed
- **Serum TSH high** — free T4 added to determine the degree of hypothyroidism
- **Serum TSH low** — free T4 and T3 added to determine the degree of hyperthyroidism

Screening

- We make two amendments to this strategy:
- We measure both serum **TSH and free T4** if pituitary or hypothalamic disease is suspected (eg, a young woman with amenorrhea and fatigue).
- We measure serum **free T4** if the patient has convincing **symptoms** of hyper- or hypothyroidism despite a normal TSH result.

Monitoring thyroxine therapy

- Patients with primary hypothyroidism who are taking levothyroxine replacement therapy can be monitored by assessing the serum TSH. If serum TSH is high, the dose needs to be increased; if it is low, the dose needs to be reduced.
- The goal and requirement for monitoring are different in patients taking levothyroxine for suppression of TSH secretion to prevent recurrence of thyroid cancer or growth or regrowth of goitrous tissue.

Monitoring hyperthyroid patients

- During the early treatment of hyperthyroidism, ***serum TSH may remain subnormal for several weeks and rarely for several months.***
- One must therefore rely upon serum ***free T4 and T3*** measurements when assessing the efficacy of antithyroid drugs, radioiodine, or surgery.
- Once ***steady-state*** conditions are assured, measurement of serum TSH is required to assess the efficacy of therapy.

49 y F

- TSH=10.1
- Thyroid = N
- Anti TPO = Neg
- Repeated =TSH 8
- Repeated TSH = 4

73 y F

- TSH = 7.5
- Anti TPO +
- Nodule 1*1
- Sono

24 y F case RA + Hashimoto

- Thyroid 25 g
- LT4 100 mcg /d
- TSH = 18
- LT4 800 mcg /w
- TSH = 5.7
- LT4 850 mcg /w

34 y M

- Hypo after surgery for goiter
- On LT4 150 mcg/d
- TSH = 27
- Recent BW increase
- LT4 175 mcg/d
- TSH =3

68 y M

- Left Thyroid Nodule 31*32
- TSH = 0.2
- FT4 =1.8
- Scan : hot nodule
- I₁₃₁ :15 mci
- TSH = 10.2
- LT4 50 mcg
- TSH = 7.2
- LT4 75 mcg

46 y M Graves

- I 131 16mcg
- TSH = 30
- LT4 50 mcg
- TSH = 0.1
- LT4 DC
- TSH = 9
- TSH = 7
- TSH = 4
- TSH = 29
- LT4 50 mcg
- TSH = 11

