

Hypothyroidism

[Disclaimer](#)

This pathway is for adults and includes information on subclinical hypothyroidism.

Contents

Disclaimer.....	1
This pathway is for adults and includes information on subclinical hypothyroidism.....	1
Red Flags	2
Background – About Hypothyroidism	2
<i>Subacute thyroiditis</i>	2
Assessment	3
Practice Point	3
Management	4
Thyroxine	4
Referral	5
Information	6
For health professionals.....	6
For patients.....	6
References	6
Disclaimer.....	6

Red Flags

- Suspected myxoedema coma (impaired conscious state, hypothermia, bradycardia) with high thyroid stimulating hormone level
- Myxoedema with undetectable FT4 or heart failure

Background – About Hypothyroidism

Hypothyroidism is characterised biochemically by high thyroid-stimulating hormone (TSH), plus low FT4 or FT3.

Subclinical hypothyroidism is defined biochemically as a normal FT4 concentration in the presence of an elevated TSH concentration.

The clinical manifestations of hypothyroidism are highly variable. Primary thyroid disease accounts for > 95% of cases of hypothyroidism.

Causes include:

- autoimmune hypothyroidism ([Hashimoto's thyroiditis](#)) – most common cause in iodine-sufficient areas of the world.
- post radioiodine, thyroidectomy, or external radiation therapy.
- medications e.g., lithium or amiodarone.
- **subacute thyroiditis** or postpartum thyroiditis after the initial hyperthyroid phase
Subacute thyroiditis (also known as de Quervain's)
Where there is a tender diffuse goitre with transient hyperthyroidism followed by hypothyroidism before the restoration of normal thyroid function. It is presumed to be caused by a viral infection or post-viral inflammatory process. Beta blockers and non-steroidal anti-inflammatory drugs may be used for symptom control.
- iodine deficiency or excess.
 - In Australia, autoimmune disease is the most common cause of hypothyroidism.
 - Worldwide, iodine deficiency is the most common cause.
 - Patients who have any abnormality of the thyroid gland are at risk for iodine-induced hypothyroidism (or hyperthyroidism) if they ingest excess iodine from dietary supplements, such as kelp tablets.
- **central hypothyroidism** – a rare cause of hypothyroidism (normal or low TSH and low T4).
 - *Either due to impaired ability to secrete TSH from the pituitary or impaired ability to secrete thyrotropin releasing hormone (TRH) from the hypothalamus.*
 - *Uncommon cause of hypothyroidism (< 1%).*
 - *Assess pituitary status e.g., menstrual cycle, cortisol deficiency, hypogonadism, visual fields.*
 - *Suspect if there is known hypothalamic or pituitary disease, previous pituitary surgery, or when symptoms and signs of hypothyroidism are associated with other pituitary symptoms.*
 - *Only commence thyroid hormone replacement after ensuring normal adrenal function, to prevent adrenal crisis.*
 - *Discuss with an [endocrinologist](#).*

Practice Point

Thyroid function tests (TFT's)

Do not order thyroid function tests routinely. Consider testing only those with signs or symptoms.

1. Take a history and perform examination.
 - Assess clinical thyroid hormone status.
 - Check for signs and symptoms e.g., weight gain, bradycardia, constipation, dry skin, slow reflexes.
 - Palpate for [thyroid nodules](#) and [lymph nodes](#).
 - Ask about any **medications** which can affect thyroid function, especially amiodarone and lithium, or supplements that may interfere with the TFTs e.g., biotin.

Medications and supplements

Drug induced hypothyroidism include:

- Lithium
- Iodine and iodine-containing drugs:
 - Amiodarone
 - Contrast agents
 - Complementary therapies e.g., kelp tablets
- Minocycline and other tetracyclines
- Hyperthyroid medications e.g., carbimazole, propylthiouracil (PTU), radioiodine therapy
- Other agents including interferons, interleukin-2, immune checkpoint inhibitors (e.g., ipilimumab, nivolumab, pembrolizumab), tyrosine kinase inhibitors (e.g. sunitinib)

Medications and supplements may interfere with TFTs:

- Serum TSH is altered by Biotin (Vitamin B7) and glucocorticoids
- Serum T4 is altered by phenytoin, carbimazole, frusemide, heparin, and aspirin depending on the testing method.

Check TSH and FT4 every 6 months, as patients can become either hyperthyroid or hypothyroid.

2. If signs or symptoms, arrange **investigations**:
 - [TSH](#) initially
 - Additional tests if:
 - TSH elevated – [FT4](#), [anti-thyroid peroxidase antibody](#)
 - TSH decreased – [FT4](#) and [FT3](#)See [interpretation of hypothyroid function test results](#).
 - Consider **other investigations** if clinically indicated:
 - FBE – to exclude anaemia
 - Electrolytes for hyponatraemia
 - Creatinine kinase (CK)
 - Lipids for hypercholesterolaemia – avoid statin therapy in hypothyroid patients due to the increased risk of rhabdomyolysis
 - Ultrasound scan of thyroid and neck if a palpable lump is present

3. Consider [central hypothyroidism](#) if low or normal TSH with low FT4 and FT3, particularly if there are other pituitary symptoms.

Management

1. If myxoedema and undetectable FT4 or heart failure, or suspected myxoedema coma (impaired conscious state, hypothermia, bradycardia) with high TSH, arrange [immediate endocrinology referral or admission](#).
2. If pregnant or postpartum, patients require [close management](#) to remain euthyroid for fetal and maternal wellbeing.
 - Discuss with and consider early referral to an [endocrinologist](#).
 - If there is delay in accessing services, repeat TFTs with thyroid antibodies and commence treatment while waiting:
 - If TSH confirmed between 4 and 10, start thyroxine 50 micrograms
 - If TSH confirmed > 10, start thyroxine 100 micrograms
 - See [Thyroid Disease in Pregnancy](#).
3. If [central hypothyroidism](#) suspected, discuss with or refer to an [endocrinologist](#) for further investigations.
4. If primary hypothyroidism (high TSH, plus low FT4), treat with **thyroxine**.

Thyroxine

- [Levothyroxine sodium](#) (commonly known as thyroxine):
 - *If the patient is healthy with no ischaemic heart disease, start 100 micrograms per day. If the patient has a raised BMI, the dose in micrograms can be estimated as 1.6 multiplied by their weight in kilograms.*
 - *If co-morbidities, especially if the patient is elderly with ischaemic heart disease, start 25 to 50 micrograms per day and increase by 25 micrograms every 4 to 8 weeks.*
 - *Thyroxine has a half-life of 7 days.*
 - *Check TSH after 4 to 8 weeks of any dose change.*
 - *Aim for TSH in the normal range. Warn the patient that it may take up to 6 months after TSH is normal for symptom relief.*
 - *Once stable, check TSH yearly.*
- *Manufacturers advise that levothyroxine tablets should not be split or halved.*
- *Do not recommend other forms of **thyroid replacement therapy** that are not registered as medicines.*

Thyroid replacement therapy

Products such as natural thyroid extract are derived from animals and contain varying amounts of T4 and T3. This makes monitoring therapy difficult. There is no robust evidence that shows a benefit of such products, or the addition of T3 or T4.

5. If subclinical hypothyroidism, (high TSH, normal FT4):
 - TSH > 10, treat with [thyroxine](#).
 - TSH 6 to 10, repeat in 2 months.
 - If TSH persistently 6 to 10, check **autoantibodies**, as the progression to hypothyroidism is more likely if autoantibodies are positive and the threshold for starting thyroxine is lower.

Thyroid autoantibodies

- 5% of patients per year with subclinical disease who are antibody positive will progress to overt hypothyroidism.
 - If antibody positive, but thyroid function test normal, consider testing TSH annually.
- If TSH persistently 6 to 10 and either positive thyroid **antibodies** or a palpable [goitre](#), consider starting thyroxine. Otherwise, continue intermittent monitoring of TSH 6- to 12-monthly.
- If TSH 4 to 6, monitor every 6 to 12 months.

Advise that it may take up to 6 months after TSH is normal for symptom relief.

6. If results do not indicate hypothyroidism or subclinical hypothyroidism, review the clinical picture and consider repeating TFTs at regular intervals e.g., every 3 months. If the diagnosis remains uncertain, seek [endocrinologist advice](#).
7. Manage any [goitre](#), thyroid nodule, or lymphadenopathy.
8. Address possible **factors** if persistent hypothyroidism despite adequate replacement treatment.

Factors

- Compliance
- Storage of medication – needs to be kept away from heat, light and humidity
- Drug interactions:
 - Reduce absorption – calcium, iron, proton pump inhibitors, and multivitamins
 - Increase Thyroxine requirements – oral contraceptive, phenytoin, carbamazepine, and antibiotics e.g., rifampicin
- Absorption affected by gastrointestinal disorders e.g., coeliac disease, *H. pylori*, and inflammatory bowel disease

Instruct patients to take thyroxine on an empty stomach, at least half an hour before other drugs and espresso coffee.

Referral

Include the results of thyroid function tests in all referrals, and anti-thyroid peroxidase (TPO) antibody results if available.

- If myxoedema and undetectable FT4 or heart failure, or suspected myxoedema coma (impaired conscious state, hypothermia, bradycardia) with high thyroid stimulating hormone level, arrange [immediate endocrinology referral or admission](#).
- If pregnant or postpartum, discuss management with an [endocrinologist](#).
- Arrange [urgent or routine endocrinology referral](#) if:
 - persistent hypothyroidism despite adequate replacement treatment.
 - pregnant woman with TSH > 10 with a history of Graves' disease or treatment with radioactive iodine.
 - suspected or confirmed secondary hypothyroidism i.e., low thyroid stimulating hormone level (TSH) and low free thyroxine (T4).
 - persistent thyroiditis that has lasted for more than 6 months.
 - central hypothyroidism suspected.

Information

For health professionals

Further information

- Australian Family Physician – [Hypothyroidism: Investigation and Management](#)
- eTG complete – [Bones and Metabolism: Thyroid Disorders: Overview](#) [subscription required]
- RCPA – [Hypothyroidism](#)
- Royal College of Pathologists of Australasia (RCPA) – [Common Sense Pathology \(CSP\): Investigation of Common Thyroid Problems](#)

For patients

- Better Health Channel:
 - [Thyroid: Hyperthyroidism](#)
 - [Thyroid Gland](#)

References

Select bibliography

- Salvatore Benvenia, Giampaolo Papi, Alessandro Antonelli. [Refractory Hypothyroidism Due to Improper Storage of Levothyroxine Tablets](#). Front Endocrinol (Lausanne). 2017 Jul 10.
- So M, Maclsaac R, Grossmann M. [Hypothyroidism Investigation and management](#). Australian Family Physician. 2012;41(8):556-562.

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Last updated: September 2020