CONDITION

Thyrotoxicosis

Thyrotoxicosis is the harmful effect of having too much thyroid hormone in the body.

WHAT IT IS
Excess thyroid hormone activity in the body's tissues

BODY SYSTEM
Hormones, heart and circulation, muscles, bones, and nerves

MAIN SYMPTOMS
Fast heartbeat, weight loss, sweating, tremor

WHAT CAUSES IT
Graves disease, thyroid inflammation, nodules, or excess thyroid medicine

HOW IT IS DIAGNOSED
TSH, free T4, and sometimes T3 blood tests

MAIN TREATMENT
Symptom control and cause-specific thyroid treatment

CAN IT BE CURED?
Sometimes - when the underlying cause is removed or treated

IS IT AN EMERGENCY?
Sometimes - fever with confusion and a very fast heartbeat

LONG-TERM OUTLOOK
Usually controllable, though lifelong monitoring may be needed

Overview

Thyrotoxicosis means that thyroid hormone is having too much effect on your body. Thyroid hormones help control how quickly your organs use energy. Too much can speed up your heart, digestion, temperature control, muscles, and nervous system.

The thyroid is a small gland at the front of the neck. It makes the hormones thyroxine, called T4, and triiodothyronine, called T3.

Thyrotoxicosis and hyperthyroidism are closely related, but they are not exactly the same. Hyperthyroidism means the thyroid gland is actively making too much hormone. Thyrotoxicosis includes hyperthyroidism, but it can also happen when stored hormone leaks from an inflamed thyroid or when someone takes more thyroid hormone medicine than their body needs.

The condition matters because untreated excess thyroid hormone can strain the heart and weaken bones and muscles. A rare, severe worsening called thyroid storm is an emergency. Most cases do not reach this stage, and treatment can usually control the hormone excess.

Symptoms

Symptoms often develop gradually, but they can appear quickly. They may be mild in older adults or mistaken for anxiety, menopause, heart disease, or another condition.

Possible symptoms include:

Older adults may have fewer typical symptoms. Loss of appetite, weakness, low mood, confusion, or an irregular heart rhythm may be more noticeable than sweating or tremor.

Some findings point toward a particular cause. Graves disease can cause gritty, dry, bulging, or painful eyes. It may also cause double vision. A painful, tender thyroid may suggest inflammation. A painless lump or uneven thyroid may be caused by one or more thyroid nodules.

- A fast, pounding, or irregular heartbeat
- Feeling hot and sweating more than usual
- Shaking hands, called a tremor
- Losing weight despite eating normally or more
- Nervousness, restlessness, irritability, or difficulty sleeping
- Muscle weakness and tiredness
- Frequent bowel movements or diarrhoea
- Shortness of breath during activity
- Changes in menstrual periods
- Reduced interest in sex or problems with erections
- Thinning hair or fragile nails
- An enlarged thyroid, known as a goitre

Causes and risk factors

The most common causes involve either making too much thyroid hormone or releasing hormone that was already stored in the gland.

Graves disease is an autoimmune condition. The immune system mistakenly makes antibodies that stimulate the thyroid. It can affect people of any age and sometimes runs in families.

Toxic thyroid nodules are areas of thyroid tissue that make hormone without responding normally to the body's control signals. There may be one overactive nodule or several.

Thyroiditis means inflammation of the thyroid. It can cause stored hormone to leak into the blood. Some forms cause neck pain, while others are painless. Thyroiditis can occur after pregnancy or following a viral illness.

Thyroid hormone medicine can cause thyrotoxicosis if the amount is higher than the body needs. Rarely, someone may take thyroid hormone from another source without realising the risks.

Large iodine exposures can trigger thyrotoxicosis in some people, especially those with thyroid nodules or underlying thyroid disease. Sources can include certain medicines, medical contrast agents, and high-dose iodine or kelp supplements. The heart medicine amiodarone can cause thyrotoxicosis in more than one way.

Risk is higher if you have a personal or family history of thyroid or autoimmune disease. Previous thyroid problems, pregnancy within the past year, thyroid nodules, and some medicines can also increase risk. Having a risk factor does not mean that you will develop the condition.

Diagnosis

Symptoms alone cannot confirm thyrotoxicosis. Diagnosis starts with blood tests.

Thyroid-stimulating hormone, or TSH, is usually low because the brain is trying to tell the thyroid to slow down. Free T4 and sometimes T3 are measured to show how much active thyroid hormone is circulating. In some people, T3 rises before T4.

If TSH is low but T4 and T3 remain within the laboratory ranges, this may be called subclinical thyrotoxicosis. It still needs assessment because its importance depends on the cause, how low the TSH is, your age, symptoms, and heart and bone health.

Further tests help identify the cause. These may include:

An uptake test shows whether the thyroid is actively making hormone. It is not used during pregnancy and is generally avoided while breastfeeding. Ultrasound shows the gland's structure but does not by itself confirm thyrotoxicosis.

Pregnancy changes normal thyroid test ranges, so results need pregnancy-specific interpretation. Biotin supplements can interfere with some thyroid blood tests. Tell the

healthcare professional arranging the test about medicines and supplements rather than stopping them without instructions.

- Blood tests for antibodies linked to Graves disease
- A radioactive iodine uptake test or thyroid scan
- Ultrasound when a lump, enlarged gland, or structural problem needs assessment
- An electrocardiogram, or ECG, to check the heart rhythm

Treatment and management

Treatment is matched to the cause, symptom severity, and your wider health. Options that are helpful for Graves disease or toxic nodules may not help thyroiditis.

A beta blocker like metoprolol or propranolol may be offered to reduce symptoms such as tremor, palpitations, and a fast heartbeat. It controls the body's response to thyroid hormone but does not correct the cause.

Antithyroid medicines reduce new hormone production. They are commonly used for Graves disease and may be used before other treatment for toxic nodules. Regular blood tests help show whether hormone levels are returning to the target range.

Rarely, antithyroid medicines can seriously reduce infection-fighting white blood cells or injure the liver. If you develop fever, a severe sore throat, mouth ulcers, yellow skin, dark urine, or marked itching while taking one, seek same-day medical advice and follow the medicine's safety instructions.

Radioactive iodine is swallowed and taken up by overactive thyroid cells. It gradually reduces their ability to make hormone. It is not used during pregnancy or breastfeeding. Many people develop an underactive thyroid afterward and then need lifelong thyroid hormone replacement.

Surgery removes most or all of the thyroid. It may be considered for a large goitre, concerning nodules, severe or returning hyperthyroidism, or when other approaches are unsuitable. Thyroid hormone replacement is usually needed after the whole gland is removed.

Thyroiditis often improves as the inflammation settles. Antithyroid medicines generally do not help because the gland is leaking stored hormone rather than making too much. Treatment may instead focus on heart-rate control, pain, and follow-up blood tests.

If thyroid medicine is the cause, the amount usually needs review. Do not change or stop prescribed thyroid medicine without discussing how to do so safely.

Complications

Long-lasting or poorly controlled thyrotoxicosis can affect several parts of the body.

Heart complications include atrial fibrillation, an irregular and often fast rhythm that can increase stroke risk. Persistent strain can also contribute to heart failure, particularly in people with existing heart disease.

Excess thyroid hormone speeds bone loss. Over time, this can contribute to osteoporosis, meaning weaker bones, and a higher risk of fractures. Muscle wasting and weakness can affect mobility.

Thyrotoxicosis can affect fertility and pregnancy. Poorly controlled disease during pregnancy can increase risks for both the pregnant person and baby, so treatment and monitoring need specialist planning.

Graves eye disease is caused by the same autoimmune process as Graves thyroid disease, rather than by high hormone levels alone. Smoking increases the chance that eye disease will develop or worsen.

Thyroid storm is a rare, extreme worsening. It may involve high fever, severe agitation or confusion, vomiting or diarrhoea, and a very fast or irregular heartbeat. It requires emergency hospital treatment.

Prevention

Many causes of thyrotoxicosis cannot be prevented. There is no proven way to prevent Graves disease, thyroiditis, or an overactive thyroid nodule from developing.

If you take thyroid hormone, scheduled blood tests can help keep the amount appropriate as your health, weight, pregnancy status, or other medicines change.

Avoid taking thyroid hormone, high-dose iodine, or kelp products unless they have been recommended for a clear medical reason. Ordinary foods containing iodine are not usually a problem, and there is no general "thyroid diet" that prevents thyrotoxicosis.

If you smoke and have Graves disease, stopping can reduce the risk of Graves eye disease becoming more severe. Support with quitting may make this easier.

Living with it and what to expect

The course depends strongly on the cause. Thyroiditis often has a temporary thyrotoxic phase

lasting weeks to months. It may be followed by a period of low thyroid function before recovery. Some people are left with permanent underactivity.

Graves disease may settle with antithyroid medicine, but it can return after treatment ends. Radioactive iodine or surgery usually controls the hormone excess more permanently, although an underactive thyroid is then common or expected.

Toxic nodules usually continue producing excess hormone unless treated. Medicines can control hormone production, while radioactive iodine or surgery may provide longer-term control.

Symptoms such as palpitations and tremor may improve before blood tests return fully to normal. Muscle strength, sleep, weight, and exercise tolerance can take longer to recover. Weight gain after treatment can occur as metabolism returns toward its usual rate.

Follow-up blood tests are important during treatment and after major treatment changes. Even after the thyrotoxicosis has resolved, periodic monitoring may be needed to detect recurrence or an underactive thyroid. With appropriate treatment and monitoring, many people return to their usual work, family life, and activities.

When to get medical help

Arrange a routine appointment if you have ongoing palpitations, unexplained weight loss, tremor, heat intolerance, neck swelling, or several other possible thyroid symptoms. These symptoms have many possible causes, so testing is needed rather than assuming they come from the thyroid.

Seek prompt medical advice if you have known thyrotoxicosis and your symptoms are worsening, your heartbeat is persistently fast or irregular, or you are vomiting and cannot keep medicines down.

If you take an antithyroid medicine, seek same-day advice for fever, severe sore throat, mouth ulcers, yellow skin, dark urine, or marked itching.

Call emergency services for:

These symptoms do not always mean thyroid storm, but they require urgent assessment.

- High fever with confusion, severe agitation, or unusual drowsiness
- A very fast heartbeat with severe weakness or breathing difficulty
- Chest pain, fainting, or signs of a stroke
- Sudden severe breathing problems or collapse

Common questions

Is thyrotoxicosis the same as hyperthyroidism?

Not quite. Hyperthyroidism means the thyroid is making too much hormone. Thyrotoxicosis means there is too much thyroid hormone activity from any source. Thyroid inflammation or excess thyroid medicine can therefore cause thyrotoxicosis without true hyperthyroidism.

Can thyrotoxicosis go away on its own?

Some forms of thyroiditis settle without permanent treatment, but Graves disease and toxic nodules may continue or return. Because untreated hormone excess can affect the heart and bones, it is safer to have symptoms and abnormal tests assessed rather than waiting for them to pass.

Will I gain weight after treatment?

Some weight gain can occur when an overactive metabolism returns toward normal. The amount is different for each person. Continuing weight gain may mean thyroid levels have become too low or may have another cause, so follow-up blood tests are useful.

Are there foods I should avoid?

Most people do not need a special diet. Avoid high-dose iodine and kelp supplements unless specifically advised, because they can worsen some forms of thyrotoxicosis. A balanced diet with enough protein, calcium, and vitamin D supports muscles and bones but does not replace thyroid treatment.

Can I exercise with thyrotoxicosis?

Gentle activity may be reasonable if symptoms are mild, but strenuous exercise can place extra strain on a fast or irregular heartbeat. Ask about safe activity if you have significant palpitations, breathlessness, weakness, heart disease, or uncontrolled hormone levels.

Does treatment always cause an underactive thyroid?

No. Temporary thyroiditis may resolve with normal thyroid function, and antithyroid medicines do not always cause lasting underactivity. After total thyroid removal, lifelong thyroid hormone replacement is required. Underactivity is also common after radioactive iodine and can be treated with replacement hormone.

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