CONDITION

Hyperparathyroidism

Hyperparathyroidism is excess parathyroid hormone production that can raise calcium and weaken bones or kidneys.

WHAT IT IS
Excess production of parathyroid hormone

BODY SYSTEM
Hormone system, bones, and kidneys

MAIN SYMPTOMS
Often none, fatigue, bone pain, frequent urination

WHAT CAUSES IT
Overactive glands, often from a benign growth

HOW IT IS DIAGNOSED
Repeated calcium and parathyroid hormone blood tests

MAIN TREATMENT
Monitoring, surgery, or medicines based on type

CAN IT BE CURED?
Sometimes - surgery can cure primary forms

IS IT AN EMERGENCY?
Sometimes - severe high calcium causing confusion or reduced consciousness

LONG-TERM OUTLOOK
Usually manageable; untreated cases can harm bones and kidneys

Overview

Hyperparathyroidism means that one or more parathyroid glands produce too much parathyroid hormone, usually called PTH. The four parathyroid glands are usually located behind the thyroid gland in the neck. Despite the similar name, they have a different job from the thyroid.

PTH helps control calcium and phosphate levels in your blood. It acts on your bones, kidneys, and intestines. Too much PTH can pull calcium from bone and reduce the amount lost in urine. Depending on the type of hyperparathyroidism, blood calcium may be high, normal, or low.

Many people have no clear symptoms. The condition may be found through a routine blood test. Even without symptoms, continued hormone changes can sometimes weaken bones, cause kidney stones, or affect kidney function.

The three main forms are primary, secondary, and tertiary hyperparathyroidism. Their causes, calcium results, and treatments are different, so identifying the type matters.

Symptoms

Mild hyperparathyroidism often causes no noticeable symptoms. When symptoms occur, they may develop slowly and can resemble those of many other conditions.

Possible symptoms include:

Symptoms are more likely when blood calcium becomes significantly raised, but the calcium level does not always match how someone feels. Fatigue or memory problems alone do not confirm hyperparathyroidism.

Secondary hyperparathyroidism may not cause separate symptoms. People may instead have symptoms related to chronic kidney disease, vitamin D deficiency, or weakened bones.

- Tiredness, muscle weakness, or difficulty concentrating
- Bone, joint, or general aches
- Increased thirst and frequent urination
- Constipation, nausea, or reduced appetite
- Low mood, irritability, or forgetfulness
- Kidney-stone symptoms, such as severe pain in the side or blood in urine
- Fractures after a minor fall or injury

Causes and risk factors

Primary hyperparathyroidism begins within the parathyroid glands. The most common cause is a non-cancerous growth called an adenoma in one gland. Sometimes several glands become enlarged and overactive, known as hyperplasia. Parathyroid cancer is a rare cause.

Primary hyperparathyroidism is usually not inherited. In a small number of people, it is related to an inherited condition affecting hormone-producing glands. A family history of hyperparathyroidism, parathyroid tumours, or multiple endocrine tumours may lead to consideration of genetic assessment.

Lithium, a medicine used for some mental health conditions, can change calcium regulation and contribute to hyperparathyroidism. Lithium should not be stopped suddenly without medical guidance.

Secondary hyperparathyroidism is a response to another long-term problem. The glands release more PTH because the body is struggling to maintain calcium balance. Common causes include chronic kidney disease, severe or prolonged vitamin D deficiency, and poor calcium absorption from the intestines.

In chronic kidney disease, the kidneys have difficulty activating vitamin D and removing phosphate. These changes stimulate PTH production and can affect bones over time.

Tertiary hyperparathyroidism can develop after prolonged secondary hyperparathyroidism, most often in advanced kidney disease. The glands begin producing PTH independently, even when the original trigger has changed. Blood calcium may then become high.

Previous radiation treatment to the neck may increase the likelihood of primary hyperparathyroidism. However, many people have no identifiable risk factor.

Diagnosis

Diagnosis starts with blood tests. A raised calcium result is usually repeated because dehydration, laboratory variation, and changes in blood proteins can affect the measurement. Testing may include adjusted calcium, which accounts for the protein albumin, or ionised calcium, the active form circulating in blood.

PTH is measured at the same time as calcium. In primary hyperparathyroidism, calcium is usually high while PTH is high or "inappropriately normal." This means PTH has not fallen as it normally should when calcium rises.

Further tests may include:

Urine testing can help distinguish primary hyperparathyroidism from familial hypocalciuric hypercalcaemia. This inherited condition usually causes lifelong mild high calcium with unusually low urine calcium and often does not require parathyroid surgery.

Some people have high PTH while calcium remains normal. "Normocalcaemic primary hyperparathyroidism" is considered only after repeated tests and after causes such as vitamin D deficiency, kidney disease, low calcium intake, poor absorption, and medicine effects have been excluded.

Neck ultrasound, a sestamibi scan, or other imaging may locate an overactive gland before surgery. These scans help plan an operation; they do not establish the diagnosis by themselves.

- Kidney function, phosphate, magnesium, and vitamin D blood tests
- A 24-hour urine collection or another urine calcium measurement

- A bone-density scan to look for reduced bone strength
- Kidney imaging to check for stones or calcium deposits
- Genetic testing when age, family history, or other findings suggest an inherited cause

Treatment and management

Treatment depends on the type of hyperparathyroidism, calcium level, symptoms, bone and kidney health, age, and other medical conditions.

For primary hyperparathyroidism, surgery to remove the overactive gland or glands is the only treatment that corrects the source directly. It can cure the condition when all abnormal tissue is removed. Surgery is particularly considered when there are kidney stones, reduced kidney function, osteoporosis, fractures, significant calcium elevation, symptoms attributable to the condition, or other features linked to future risk.

Parathyroid surgery is usually performed by a surgeon with relevant experience. Possible complications include bleeding, temporary or lasting low calcium, and injury to a nerve controlling the voice, although serious complications are uncommon in experienced centres.

Not everyone with mild primary hyperparathyroidism needs immediate surgery. Monitoring may be appropriate in selected people. Follow-up commonly includes calcium and kidney blood tests, bone-density scans, and assessment for kidney stones. The timing is based on individual findings.

If surgery is not suitable or is postponed, medicines may sometimes be used. Calcimimetic medicines make the parathyroid glands more sensitive to calcium and can lower blood calcium. Medicines used for osteoporosis may improve bone density, but they do not remove an overactive gland. Treatment needs monitoring because these medicines have different aims and side effects.

Secondary hyperparathyroidism is managed by treating the underlying cause. This may include correcting vitamin D deficiency, reviewing calcium and phosphate balance, and managing chronic kidney disease. Some people with advanced kidney disease receive phosphate-lowering treatment, active forms of vitamin D, or calcimimetic medicines under specialist supervision.

Tertiary hyperparathyroidism may require medicines or parathyroid surgery, particularly when PTH and calcium remain high or complications develop.

You may be advised to maintain normal hydration and avoid becoming dehydrated. Do not sharply restrict dietary calcium unless specifically told to do so; too little calcium can further

stimulate PTH. Calcium or vitamin D supplements should be reviewed rather than started, increased, or stopped without considering your test results.

Medicines that can influence calcium, including lithium and thiazide diuretics, should also be reviewed. Do not stop a prescribed medicine on your own.

Medicines commonly used for this include calcitriol . Which one suits you, if any, is a decision for you and your doctor.

Complications

Persistently raised PTH can reduce bone density. Over time, this may lead to osteoporosis and a higher risk of fractures. Severe long-standing cases can cause more marked bone changes, although these are now less common where blood testing is readily available.

High calcium in urine can contribute to kidney stones. Calcium may also collect within kidney tissue, and kidney function can decline in some people.

Very high blood calcium can cause dehydration, worsening kidney function, confusion, abnormal heart rhythms, or reduced consciousness. This is uncommon but requires urgent treatment.

After successful surgery, calcium may temporarily fall while bones take up calcium again. Blood tests and, in some cases, short-term calcium or vitamin D treatment are used to manage this.

Prevention

Most primary hyperparathyroidism cannot be prevented. A parathyroid adenoma usually develops without a known avoidable cause. Inherited forms also cannot be prevented, although genetic counselling may help affected families understand testing and risk.

Some cases of secondary hyperparathyroidism may be reduced by identifying and treating vitamin D deficiency, poor calcium absorption, or chronic kidney disease-related mineral changes. This should be guided by blood tests because taking excessive vitamin D or calcium can be harmful.

Keeping scheduled follow-up appointments can help detect bone or kidney effects before they become more serious.

Living with it and what to expect

The course differs by type and severity. Mild primary hyperparathyroidism may remain stable for years, but calcium, bone density, or kidney health can change over time. Feeling well does not remove the need for planned monitoring.

After successful surgery, PTH and calcium often return to an appropriate range. Bone density may improve over the following years, although existing osteoporosis or kidney damage may still need treatment. Symptoms such as tiredness or poor concentration may improve, but they can have other causes and are not guaranteed to resolve.

People who are monitored without surgery can usually continue their normal activities. Regular movement and weight-bearing activity support bone health where physically suitable. Drinking enough fluid is particularly important during hot weather, illness, or exercise because dehydration can raise calcium further.

Secondary hyperparathyroidism may continue as long as the underlying kidney, vitamin D, or absorption problem remains. In chronic kidney disease, treatment and monitoring are often long term and may change as kidney function changes.

Pregnancy requires specialist planning because high calcium can affect both the pregnant person and the developing baby. Treatment decisions are based on the calcium level, symptoms, complications, and stage of pregnancy.

When to get medical help

Arrange routine medical review if you have a raised calcium result, repeated kidney stones, unexplained osteoporosis, or a family history of hyperparathyroidism. Follow-up is also appropriate if known hyperparathyroidism is accompanied by new thirst, frequent urination, constipation, weakness, or worsening bone pain.

Seek prompt medical advice if you develop severe side or back pain that could be a kidney stone, especially with blood in the urine. Fever or chills with stone symptoms, or being unable to pass urine, needs urgent assessment because infection or blockage may be present.

Get emergency help for:

These symptoms do not automatically mean severe hypercalcaemia, but they need urgent evaluation.

- New confusion, extreme drowsiness, or reduced consciousness
- Repeated vomiting with inability to keep fluids down

- Severe weakness or signs of marked dehydration
- A collapse, seizure, or new irregular or very rapid heartbeat

Common questions

Is hyperparathyroidism the same as a thyroid problem?

No. The parathyroid and thyroid glands sit close together in the neck, but they make different hormones. Hyperparathyroidism concerns PTH and calcium balance. It does not mean that your thyroid hormone level is abnormal.

Can hyperparathyroidism go away on its own?

Primary hyperparathyroidism usually does not resolve on its own. Surgery can cure many primary cases. Secondary hyperparathyroidism may improve when its cause, such as vitamin D deficiency, is corrected. Kidney-related cases may require continuing management.

Do I need surgery if I have no symptoms?

Not always. Surgery may still be recommended if testing shows effects on your bones or kidneys, a significant calcium elevation, or other risk features. Some people with mild findings can be monitored safely with regular blood tests and bone and kidney checks.

Should I stop eating calcium-rich foods?

Usually not. Severe calcium restriction can stimulate more PTH production and may harm bone health. Your total calcium intake, supplements, vitamin D level, kidney function, and blood calcium should be considered together.

Is hyperparathyroidism cancer?

Usually not. Primary hyperparathyroidism is most often caused by a benign adenoma or enlargement of several glands. Parathyroid cancer is rare and is more likely to cause very high calcium and PTH levels.

Will my tiredness improve after treatment?

It may, particularly if high calcium contributed to the tiredness. However, fatigue has many possible causes, and improvement cannot be guaranteed. Persistent symptoms may need assessment for other explanations even after calcium and PTH are controlled.

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