CONDITION

Parathyroid cancer

Parathyroid cancer is a malignant tumor that usually causes dangerously high calcium levels.

WHAT IT IS
A malignant tumor of a parathyroid gland

BODY SYSTEM
Endocrine system and calcium balance

MAIN SYMPTOMS
Thirst, frequent urination, weakness, bone or abdominal pain

WHAT CAUSES IT
Usually unknown, sometimes inherited

HOW IT IS DIAGNOSED
Surgery and tissue examination showing invasion or spread

MAIN TREATMENT
Surgery and control of high calcium

CAN IT BE CURED?
Sometimes - complete surgery before spread

IS IT AN EMERGENCY?
Sometimes - severe hypercalcemia causing confusion or collapse

LONG-TERM OUTLOOK
Better when completely removed before spread

Overview

Parathyroid cancer is a malignant, or cancerous, growth in one of the parathyroid glands. These are usually four tiny glands behind the thyroid gland in the neck. They make parathyroid hormone, often shortened to PTH.

PTH helps control the amount of calcium in your blood. Most parathyroid cancers release too much PTH. This pulls calcium from bones and changes how the kidneys and intestines handle calcium, causing a high blood calcium level called hypercalcemia .

Many symptoms and complications come from high calcium rather than from the tumor itself. The kidneys, bones, digestive system, muscles, and nervous system can all be affected.

Parathyroid cancer is different from the much more common benign, or noncancerous,

parathyroid adenoma. It can be difficult to tell them apart using blood tests or scans alone. Cancer may not be confirmed until the tumor is removed and examined for growth into nearby tissue. Spread to another part of the body also confirms cancer.

Surgery offers the best chance of long-term control and, in some cases, cure. Ongoing monitoring is important because the condition can return, including years after treatment.

Symptoms

Symptoms often develop because calcium in the blood has become too high. They may build gradually, and some can have other causes.

Possible symptoms include:

Very high calcium can cause severe dehydration, worsening confusion, abnormal heart rhythms, or loss of consciousness. This is sometimes called a hypercalcemic crisis and needs emergency treatment.

The tumor itself may occasionally cause a firm neck lump, neck discomfort, trouble swallowing, or a hoarse voice. Hoarseness can happen if the tumor affects a nerve that controls a vocal cord. These symptoms do not automatically mean cancer, but they should be assessed.

- Strong thirst and passing urine more often
- Tiredness, muscle weakness, or difficulty concentrating
- Constipation, nausea, vomiting, or abdominal pain
- Low mood, irritability, confusion, or unusual sleepiness
- Bone or joint pain
- Kidney stones or pain in the side or back
- Reduced appetite and unplanned weight loss

Causes and risk factors

In most people, the exact cause is not known. Cancer develops when cells acquire genetic changes that allow them to grow and invade nearby tissue.

Some cases are related to an inherited change in a gene called CDC73 . This gene normally helps control cell growth. A harmful CDC73 change can cause a group of conditions known as CDC73-related disorders, including hyperparathyroidism-jaw tumor syndrome. People with this syndrome may develop parathyroid tumors, jaw tumors, and certain kidney or uterine

growths.

An inherited change may be considered when parathyroid cancer occurs at a younger age, when there is a family history of parathyroid problems, or when related tumors are present. However, having a CDC73 change does not mean that cancer will definitely develop.

A CDC73 change can also be found only in the tumor, rather than in every cell of the body. That type of change is not inherited and cannot be passed to children.

Most people with an overactive parathyroid gland do not have parathyroid cancer. Lifestyle choices are not considered a usual cause.

Diagnosis

Testing commonly begins with blood tests. These measure calcium and PTH. Both may be markedly raised, but the results cannot confirm cancer by themselves. Kidney function, phosphate, vitamin D, and other blood measurements may also be checked.

You may have urine testing to assess calcium loss and kidney effects. An electrocardiogram, or ECG, may be used if high calcium could be affecting your heart rhythm.

Neck ultrasound and scans such as a sestamibi scan, CT, MRI, or four-dimensional CT can help locate an abnormal gland and show whether nearby structures may be involved. They may also look for spread. However, imaging cannot always separate cancer from a benign parathyroid tumor.

A needle biopsy is generally avoided when parathyroid cancer is suspected. It may not give a reliable answer and could disrupt the tumor or spread cells along the needle path.

The diagnosis is usually made during and after surgery. The surgeon may see that the growth is attached to or invading nearby tissue. A pathologist then examines the removed tissue under a microscope. Clear invasion into blood vessels or surrounding structures, or spread to lymph nodes or distant organs, supports the diagnosis.

Special tests for proteins such as parafibromin may help the pathologist. Genetic counseling and CDC73 testing may be offered when an inherited cause is possible.

Treatment and management

Treatment is planned by a team experienced in parathyroid and endocrine cancer. The approach is based on whether the tumor can be completely removed, whether it has spread, and how high the calcium level is.

Surgery

Surgery is the main treatment and offers the best chance of cure. When cancer is suspected before or during the operation, the aim is to remove the tumor in one piece without breaking its outer covering.

The operation may include the affected parathyroid gland, the nearby part of the thyroid, and tissue that the tumor has directly invaded. Suspicious lymph nodes may also be removed. The exact extent depends on the surgical findings.

If cancer returns in the neck or spreads to a limited area, another operation may sometimes reduce the amount of tumor and lower PTH and calcium levels.

Controlling high calcium

High calcium may need treatment before surgery, after surgery, or when the cancer cannot be fully removed. Treatment may include fluids given into a vein and medicines that reduce calcium levels or the tumor's release of PTH.

Cinacalcet changes how the parathyroid cells sense calcium and can lower PTH and blood calcium. Medicines such as bisphosphonates or denosumab may reduce calcium release from bone. These treatments control the effects of the cancer but do not usually remove the tumor.

After successful surgery, calcium can fall quickly because bones begin taking it up again. This is sometimes called hungry bone syndrome . Calcium and vitamin D may be needed while levels recover, with regular blood testing.

Other cancer treatments

Radiotherapy may be considered in selected cases, such as after surgery when there is concern about local recurrence or when a tumor cannot be fully removed. Its benefit is not certain in every situation.

Standard chemotherapy has generally had limited benefit. For cancer that cannot be removed or has spread, a specialist team may discuss tumor testing, targeted treatment, or a clinical trial.

Complications

Untreated or persistent high calcium can lead to:

Parathyroid cancer most often returns in the neck. It can also spread to the lungs, liver, bones, or lymph nodes. Even when cancer has spread, high calcium may remain the main cause of illness.

Treatment can also have lasting effects. Neck surgery may affect the voice, swallowing,

thyroid function, or the remaining parathyroid glands. Your care team will monitor for these problems and offer treatment or rehabilitation when needed.

- Kidney stones, kidney damage, and dehydration
- Thinning or weakening of the bones
- Muscle weakness and reduced mobility
- Pancreas inflammation or other digestive problems
- Confusion, severe drowsiness, or abnormal heart rhythms

Prevention

Most parathyroid cancer cannot be prevented because its cause is usually unknown. There is no proven diet, supplement, or lifestyle change that prevents it.

If you have an inherited CDC73 change, you cannot change the gene itself. Genetic counseling can explain what the result means for you and your biological relatives. Planned monitoring may find parathyroid or related problems earlier, although it cannot guarantee that cancer will be prevented.

Relatives should not assume that they carry the same gene change. Testing usually begins only after counseling and confirmation of a specific inherited change in the family.

Living with it and what to expect

Recovery after surgery may involve temporary neck soreness, voice changes, tiredness, and repeated calcium checks. Calcium levels can shift quickly, so follow the monitoring plan and report new tingling, muscle cramps, severe weakness, or confusion.

Long-term follow-up usually includes calcium and PTH blood tests. Imaging may be arranged if these levels rise or symptoms return. Follow-up continues for years because recurrence can occur long after the first operation.

When the tumor is completely removed before it spreads, long-term control and cure are possible. The outlook is more difficult when the tumor cannot be fully removed, returns repeatedly, or has spread to distant organs. In those situations, treatment often focuses on controlling calcium, reducing the amount of cancer when possible, and maintaining daily function.

Some people need ongoing medicine for high calcium. Others have periods when no active

treatment is required but monitoring continues. Work, exercise, travel, and family life may remain possible, although appointments and blood tests can become a regular part of life.

Living with a rare cancer can feel isolating. An endocrine cancer team, specialist nurse, genetic counselor, or cancer support service may help with practical concerns, emotional support, and family communication.

When to get medical help

Arrange prompt medical assessment if you develop a new neck lump, persistent hoarseness, increasing thirst, frequent urination, worsening constipation, bone pain, kidney-stone symptoms, or unexplained weakness. These symptoms have many possible causes, but blood calcium may need to be checked.

If you have been treated for parathyroid cancer, contact your care team promptly if previous symptoms return or blood tests show rising calcium or PTH. Keep routine follow-up appointments even when you feel well.

Seek emergency help for:

These symptoms can occur with severely high calcium or another urgent condition.

- New confusion, extreme drowsiness, fainting, or loss of consciousness
- Repeated vomiting with an inability to keep fluids down
- Severe weakness, collapse, chest pain, or a fast or irregular heartbeat
- Signs of severe dehydration, such as very little urine and marked dizziness

Common questions

Is parathyroid cancer curable?

Sometimes. Complete removal during the first operation offers the best chance of cure, especially before the cancer has spread. Continued monitoring is still needed because it can return later.

Is parathyroid cancer the same as thyroid cancer?

No. The parathyroid and thyroid glands are close together, but they make different hormones and develop different cancers. Parathyroid cancer mainly disrupts PTH and calcium balance.

How can doctors tell cancer from a benign parathyroid tumor?

Blood tests and scans may raise concern, but they often cannot give a definite answer.

Diagnosis usually relies on surgical findings and tissue evidence that the tumor has invaded nearby structures or spread elsewhere.

Where does parathyroid cancer spread?

It may grow into nearby neck structures or spread to lymph nodes. Distant spread most often involves the lungs, liver, or bones. Not everyone develops metastatic, or distant, cancer.

Can parathyroid cancer run in families?

Most cases are not clearly inherited. Some are linked to an inherited CDC73 gene change. Genetic counseling can help decide whether testing is appropriate and explain what a result could mean for relatives.

Does removing the cancer immediately fix high calcium?

Calcium often falls after successful surgery, but it may take time to stabilize. It can sometimes fall too low as recovering bones absorb calcium. Blood tests and short-term calcium or vitamin D treatment may be needed.

Sources

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