CONDITION

Ganglioneuroma

A ganglioneuroma is a usually slow-growing, noncancerous tumor of mature nerve cells.

WHAT IT IS
Benign tumor of mature nerve tissue

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Usually none, local pain, cough, high blood pressure

WHAT CAUSES IT
Usually unknown; most are sporadic

HOW IT IS DIAGNOSED
CT or MRI, confirmed by tissue examination

MAIN TREATMENT
Observation or surgery

CAN IT BE CURED?
Yes - surgical removal is usually definitive

IS IT AN EMERGENCY?
Sometimes - new weakness or breathing trouble

LONG-TERM OUTLOOK
Usually excellent after removal or stable observation

Overview

A ganglioneuroma is a rare, noncancerous tumor made from mature nerve cells and supporting cells. It belongs to a group called neuroblastic tumors, which develop from early cells of the sympathetic nervous system. This system helps control automatic functions such as heart rate, blood pressure, and digestion.

Ganglioneuromas differ from neuroblastomas and ganglioneuroblastomas. A ganglioneuroma contains mature cells and is benign, meaning it does not spread to distant parts of the body like cancer. Confirming the tumor type is important because related neuroblastic tumors can behave differently.[1,2]

These tumors are often found beside the spine, where sympathetic nerves run. Common locations include the chest, abdomen, pelvis, neck, and adrenal glands above the kidneys. Many are discovered by chance during imaging for another reason.

Most ganglioneuromas grow slowly and may remain stable for years. Although benign, they can cause problems by pressing on nerves, organs, airways, or blood vessels. A small number release hormones that affect blood pressure or digestion.[2,3]

Symptoms

Many ganglioneuromas cause no symptoms. When symptoms occur, they usually depend on the tumor's size and location.

A chest tumor may cause cough, discomfort, shortness of breath, or trouble swallowing. An abdominal or pelvic tumor may cause persistent pain, fullness, constipation, or a noticeable lump. A neck tumor may appear as a painless swelling or affect nearby nerves.

Pressure on nerves may cause:

Some ganglioneuromas produce catecholamines, hormones involved in the stress response. Effects may include high blood pressure, headaches, sweating, tremor, or a pounding heartbeat. Rarely, production of vasoactive intestinal peptide causes frequent watery diarrhea and abnormal blood salt levels.[2,3]

These symptoms have many more common causes and do not necessarily mean someone has a ganglioneuroma.

- Pain, tingling, numbness, or weakness
- Changes in sweating on one side
- A drooping eyelid or smaller pupil
- Difficulty walking or controlling the bladder or bowel if the spinal cord is compressed

Causes and risk factors

A ganglioneuroma develops from cells that form the sympathetic nervous system. Within the tumor, these cells have matured into ganglion cells and supporting Schwann cells.

It is usually unclear why a tumor forms. Most cases are sporadic, meaning they are not caused by a known inherited change or passed through families.

Occasionally, ganglioneuromas or related nerve-cell growths occur with inherited conditions such as neurofibromatosis type 1 or multiple endocrine neoplasia type 2B. The latter may cause multiple small growths around the lips, mouth, or digestive tract, a pattern different from the usual single ganglioneuroma.

Assessment for an inherited condition may be considered when someone has multiple tumors, characteristic physical features, another related tumor, or a relevant family history. Most people with a solitary ganglioneuroma do not have one of these syndromes.

Sometimes a neuroblastoma or ganglioneuroblastoma matures into tissue resembling a ganglioneuroma, naturally or after treatment. This differs from a tumor that was mature from the start.[1]

Diagnosis

A ganglioneuroma may first be seen on ultrasound, CT, or MRI. CT shows its size and relationship to nearby organs and blood vessels. MRI provides more detail about nerves, soft tissues, and the spinal canal. Imaging may suggest the diagnosis but cannot always distinguish it from related tumors.[2,4]

Blood or urine tests may check for catecholamines and their breakdown products, particularly for an adrenal tumor or symptoms such as high blood pressure, sweating, or palpitations. Identifying hormone activity also helps the team plan a biopsy or operation safely.

Diagnosis is confirmed by examining tumor tissue under a microscope. Tissue may be obtained through a needle biopsy or during surgery. A pathologist looks for mature ganglion and Schwann cells and checks for immature neuroblasts, which suggest a different neuroblastic tumor.

Different parts of a mass may contain different cells, so a small biopsy does not always provide a complete answer. Larger samples or examination of the removed tumor may be needed. Review by a pathologist experienced in neuroblastic tumors can help when findings are uncertain.[1,2]

Additional tests depend on the tumor's features. These may include an MIBG scan, which tracks a substance absorbed by some nerve-derived tumors. Not everyone needs this test.

Treatment and management

Treatment depends on symptoms, location, imaging findings, hormone activity, growth, and confidence in the diagnosis.

Observation may be appropriate for a small, symptom-free tumor when the diagnosis is reasonably secure and surgery carries meaningful risk. This involves appointments and repeat imaging. The follow-up schedule is individualized according to the tumor and whether it changes.

Surgery may be recommended when the tumor:

The surgical approach depends on location. Some tumors can be removed with keyhole surgery, while larger tumors or those near major nerves and blood vessels may require open surgery.

Complete removal is often curative. However, ganglioneuromas may wrap around important nerves or blood vessels. Removing every part could then cause more harm than leaving a small amount behind. Limited residual tumor can often be monitored when complete removal would risk major injury.[3]

A hormone-producing tumor may require extra preparation and monitoring around surgery, arranged by the specialist team.

Chemotherapy and radiation therapy are not standard treatments for a confirmed ganglioneuroma because its mature cells are benign and slow-growing. They may be considered only if pathology identifies a different neuroblastic tumor.

- Causes pain, pressure, nerve problems, or hormone-related symptoms
- Grows on follow-up scans
- Cannot be clearly distinguished from another tumor
- Can be removed with acceptable risk to nearby structures

Complications

Complications usually result from pressure on nearby structures rather than tumor spread. A ganglioneuroma may compress a nerve, the spinal cord, an airway, the bowel, a kidney drainage tube, or a blood vessel. Hormone release can cause high blood pressure or persistent diarrhea.

Surgical risks depend on location and may include bleeding, infection, nerve injury, weakness, altered sweating, or damage to an organ or blood vessel. The surgical team should explain the risks for the tumor's exact position.

A correctly classified ganglioneuroma does not usually return after complete removal. If part remains, follow-up imaging checks for growth.

Prevention

There is no established way to prevent a sporadic ganglioneuroma. It is not known to result

from diet, exercise, stress, or anything the affected person did.

Associated inherited conditions also cannot be prevented. If medical or family history suggests a syndrome, genetic counseling can explain testing and what results may mean for the person and their relatives. This is not needed for everyone with a ganglioneuroma.

Living with it and what to expect

The long-term outlook for a confirmed ganglioneuroma is usually excellent. The tumor is benign and does not normally spread to distant organs. Many are cured by surgery, while selected symptom-free tumors remain stable during observation.[2,3]

Follow-up may include scans, symptom reviews, and hormone tests if the tumor has shown hormone activity. Monitoring may continue longer when part of the tumor remains. Slow growth does not automatically mean further surgery is necessary; symptoms, location, and rate of change also matter.

Recovery after surgery depends mainly on the tumor's size and location. Nerve symptoms caused by long-term pressure may improve slowly and may not disappear completely.

If the tumor is being observed, it can help to know when the next scan is planned, what it will assess, and which symptoms require earlier review. Most people can continue their usual activities unless symptoms or recovery require temporary changes.

When to get medical help

Arrange a routine medical appointment for a persistent lump, unexplained localized pain, ongoing cough, repeated sweating and palpitations, frequent watery diarrhea, or blood pressure readings that remain higher than expected. These symptoms are not specific to ganglioneuroma but deserve assessment.

If you are being monitored for a known ganglioneuroma, contact your care team before the next planned visit if symptoms are new, worsening, or different from usual. Attend routine follow-up even when you feel well because scans may detect change before symptoms develop.

Seek urgent medical assessment for new or rapidly worsening weakness, numbness, difficulty walking, or loss of bladder or bowel control. These may indicate pressure on the spinal cord or major nerves.

Call emergency services for severe breathing difficulty, fainting, sudden paralysis, or chest

pain with a pounding heartbeat, heavy sweating, or a severe headache. These unusual events need immediate assessment.

Common questions

Is a ganglioneuroma cancer?

No. It is a benign tumor made of mature nerve-related cells and does not normally spread like cancer. Tissue examination remains important because neuroblastoma and ganglioneuroblastoma belong to the same tumor family but behave differently.

Can a ganglioneuroma turn into cancer?

A fully examined and correctly classified ganglioneuroma is expected to remain benign. Malignant change is exceptional. A more practical concern is whether a small biopsy adequately excluded immature or more active areas, which is why pathology review and follow-up matter.

Does every ganglioneuroma need to be removed?

No. Observation may be reasonable when the tumor causes no symptoms, appears stable, and the diagnosis is secure. Removal is more likely for symptoms, growth, hormone effects, or uncertainty about the tumor type. Surgical benefits must be weighed against possible injury to nearby structures.

Can a ganglioneuroma cause high blood pressure?

Yes, but most do not. Some release catecholamines, which can raise blood pressure and cause headaches, sweating, tremor, or palpitations. Blood or urine tests can check for these hormones.

Can it come back after surgery?

Recurrence is uncommon after complete removal. If a small part is left because it is attached to an important nerve or blood vessel, it may remain stable for years. Follow-up imaging checks for growth.

Is ganglioneuroma the same as neuroblastoma?

No. Ganglioneuroma contains mature cells and is benign, while neuroblastoma contains immature cells and is cancerous. Ganglioneuroblastoma has a mixture of features, making accurate tissue diagnosis essential.[1,2]

Sources

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