CONDITION

Posterior fossa tumor

A posterior fossa tumor is an abnormal growth in the lower back area of the skull that contains the cerebellum and brainstem.

WHAT IT IS
Tumor in the lower back part of the skull

BODY SYSTEM
Brain and nervous system

MAIN SYMPTOMS
Headache, vomiting, poor balance, vision changes

WHAT CAUSES IT
Usually unknown; rarely inherited genetic changes

HOW IT IS DIAGNOSED
Brain MRI and tumor tissue testing

MAIN TREATMENT
Surgery, sometimes radiation therapy or chemotherapy

CAN IT BE CURED?
Sometimes - based on tumor type and spread

IS IT AN EMERGENCY?
Sometimes - reduced alertness or rapidly worsening pressure symptoms

LONG-TERM OUTLOOK
Shaped by tumor type, spread, and treatment response

Overview

A posterior fossa tumor is a growth in the posterior fossa, the small space at the lower back of the skull. This area contains the cerebellum, which coordinates balance and movement, and the brainstem, which supports functions such as breathing, swallowing, and alertness. It also contains pathways that drain cerebrospinal fluid, the clear fluid surrounding the brain and spinal cord.

"Posterior fossa tumor" describes where a tumor is located, not one specific tumor type. Tumors in this area can be noncancerous or cancerous. Some grow slowly and remain contained, while others grow more quickly or spread through the cerebrospinal fluid.

Several tumor types can occur there. In children, examples include medulloblastoma, pilocytic astrocytoma, ependymoma, and diffuse midline glioma. In adults, possible tumors include

metastases from cancer elsewhere, meningioma, schwannoma, hemangioblastoma, and glioma. These conditions differ greatly in treatment and outlook.

Even a noncancerous tumor can cause serious problems in this location. The posterior fossa is a tight space, so a growing mass or swelling can press on important structures. It can also block fluid drainage and cause hydrocephalus, a buildup of cerebrospinal fluid that raises pressure inside the skull.

Symptoms

Symptoms depend on the tumor's exact location, size, growth rate, and effect on fluid flow. Slowly growing tumors may cause subtle changes over weeks or months. A tumor that blocks fluid drainage may lead to symptoms more quickly.

Possible symptoms include:

Young children may not be able to describe a headache or vision problem. Signs can include irritability, loss of previously learned skills, poor feeding, increasing head size in an infant, or a new reluctance to walk.

These symptoms have many possible causes and do not necessarily mean that a brain tumor is present. Persistent, unexplained, or worsening symptoms need medical assessment.

- Headaches, sometimes worse in the morning or with coughing
- Nausea or repeated vomiting
- Unsteady walking, clumsiness, or frequent falls
- Dizziness or poor coordination
- Blurred or double vision
- Unusual eye movements
- Weakness, numbness, or changes in facial movement
- Trouble speaking clearly or swallowing
- Hearing changes
- Unusual sleepiness, confusion, or personality changes

Causes and risk factors

A tumor develops when cells acquire changes that allow them to grow or survive when they

normally would not. In most people with a posterior fossa tumor, it is not possible to identify why those changes occurred.

A small proportion are associated with an inherited genetic condition. Examples include neurofibromatosis type 2, von Hippel-Lindau syndrome, Li-Fraumeni syndrome, and certain changes involving the APC gene. The tumor pattern and family history help determine whether genetic assessment may be useful.

Previous radiation therapy to the head can increase the risk of some brain tumors many years later. This is uncommon and is mainly relevant to people who received radiation for an earlier cancer or another serious condition.

Everyday activities, minor head injuries, stress, and use of mobile phones have not been established as causes of posterior fossa tumors. The condition is not contagious.

Diagnosis

Assessment begins with a medical history and neurological examination. This checks functions such as eye movement, hearing, facial movement, strength, reflexes, coordination, balance, walking, speech, and alertness.

Magnetic resonance imaging, or MRI, is the main imaging test. It uses a strong magnetic field to create detailed pictures of the brain. Contrast material may be given into a vein to make the tumor and nearby structures easier to assess.

A computed tomography, or CT, scan may be used when MRI is not immediately available or when urgent imaging is needed. CT can quickly show hydrocephalus, bleeding, or a large mass, but MRI usually provides more detail.

Imaging can suggest a tumor type, but it often cannot confirm one. A sample obtained during surgery or biopsy is examined under a microscope. Laboratory testing may look for molecular changes in the tumor cells. These results help establish the diagnosis and guide treatment.

MRI of the spine and testing of cerebrospinal fluid may be needed for tumors that can spread through the brain and spinal fluid pathways. A lumbar puncture, sometimes called a spinal tap, is not performed when raised pressure could make it unsafe. The clinical team decides whether and when it is appropriate.

Treatment and management

Treatment is planned according to the tumor type, molecular features, size, location, spread,

symptoms, and the person's age and general health. Care often involves neurosurgery, oncology, radiation oncology, neurology, rehabilitation, and other specialties.

Surgery may be used to remove as much of the tumor as can be done safely and to obtain tissue for diagnosis. Complete removal is not always possible. A tumor may be attached to the brainstem, cranial nerves, or blood vessels, where aggressive removal could cause major harm.

Hydrocephalus may need treatment before, during, or after tumor surgery. Fluid can sometimes be drained temporarily. Some people need a longer-term drainage tube called a shunt or a procedure that creates a new route for fluid flow.

Corticosteroid medicines may be used for a limited period to reduce swelling around the tumor. They relieve pressure-related symptoms but do not treat most tumor cells directly.

Radiation therapy uses focused high-energy beams to damage tumor cells. Whether it is used depends strongly on the diagnosis and age. In young children, its possible effects on the developing brain require particular consideration.

Chemotherapy or other drug treatments may be recommended for certain cancerous tumors. Molecular test results increasingly help identify whether a targeted treatment could be relevant. Not every posterior fossa tumor responds to chemotherapy.

Rehabilitation may include physiotherapy for walking and balance, occupational therapy for daily activities, and speech and language therapy for communication or swallowing. Hearing, vision, learning, and emotional support may also be needed.

Complications

A posterior fossa tumor can block cerebrospinal fluid and cause hydrocephalus. Rising pressure may produce worsening headaches, vomiting, double vision, sleepiness, or reduced consciousness. Severe pressure on the brainstem can become life-threatening.

The tumor itself may affect balance, coordination, hearing, facial movement, speech, or swallowing. Swallowing difficulty can allow food or fluid to enter the lungs, which is known as aspiration.

Possible effects of surgery include bleeding, infection, fluid leakage, weakness, cranial nerve problems, and changes in coordination. Some children develop posterior fossa syndrome after surgery. This can involve reduced or absent speech, low muscle tone, swallowing difficulty, emotional changes, and impaired movement. Recovery can take months or longer, and some effects may remain.

Radiation and chemotherapy can cause short-term side effects and delayed effects.

Depending on the treatment, these may involve hearing, hormones, growth, fertility, thinking, learning, or the risk of another tumor later in life.

Some tumors return after treatment or spread through cerebrospinal fluid. The chance of this is tied to the exact diagnosis, molecular group, extent of spread, and response to treatment.

Prevention

Most posterior fossa tumors cannot be prevented. There is no recommended screening test for people without symptoms or a known inherited risk.

Avoiding unnecessary exposure to ionizing radiation is sensible, but medically needed scans and treatments should not be delayed because of this concern. MRI does not use ionizing radiation.

If an inherited condition is suspected, genetic counselling can explain testing and any recommended monitoring for the person and their relatives. Genetic testing is not needed for everyone with a posterior fossa tumor.

Living with it and what to expect

The course over months and years is different for each tumor type. Some noncancerous tumors can be removed and may never return. Others cannot be fully removed but can remain stable for long periods with monitoring. Aggressive tumors may require several forms of treatment and can recur despite treatment.

Recovery from surgery often happens gradually. Fatigue, poor balance, headaches, or coordination problems may continue for weeks or months. Rehabilitation can help the brain and body adapt, although it cannot guarantee complete recovery.

Follow-up usually includes neurological examinations and scheduled MRI scans. Scans may be closer together after treatment and less frequent later if the tumor remains stable. The exact schedule is based on the diagnosis and treatment history.

Children may need support with school, hearing, growth, hormones, or learning. Adults may need a gradual return to driving, employment, exercise, or caregiving. Driving rules differ by location, and a brain tumor or related symptoms may need to be reported to the licensing authority.

Many people continue with school, work, relationships, and everyday activities, sometimes with adjustments. Others have lasting disability or need ongoing assistance. Emotional

reactions such as fear, frustration, or low mood are understandable, particularly around scans or changes in ability. Psychological support and tumor-specific support groups can help.

When to get medical help

Call emergency services for symptoms suggesting rapidly rising pressure or sudden brain dysfunction, including:

Seek urgent medical assessment for repeated unexplained vomiting, a worsening headache pattern, new double vision, increasing unsteadiness, or marked sleepiness. These symptoms are especially important if several occur together.

Arrange a routine appointment for persistent but mild problems such as ongoing headaches, gradual balance changes, hearing changes, or unexplained clumsiness. Most such symptoms are not caused by a tumor, but they still deserve assessment when they continue or worsen.

Someone already receiving treatment should use the contact instructions provided by their treatment centre. New fever during chemotherapy, problems with a surgical wound, fluid leaking from the wound, or a sudden change in neurological symptoms may need prompt review.

- Reduced alertness, difficulty waking, or loss of consciousness
- A first seizure or a seizure lasting longer than expected
- Sudden severe headache with vomiting or neurological changes
- New inability to stand or walk
- Sudden weakness, severe swallowing difficulty, or breathing problems

Common questions

Is a posterior fossa tumor always cancer?

No. Some posterior fossa tumors are noncancerous and grow slowly. Others are cancerous and may invade nearby tissue or spread through cerebrospinal fluid. A noncancerous tumor can still be serious because there is little spare room around the cerebellum and brainstem.

Can a posterior fossa tumor be cured?

Sometimes. A completely removable, slow-growing tumor may be cured by surgery. Other tumors can be controlled with surgery, radiation therapy, medicines, or a combination of treatments. The tissue diagnosis and molecular results provide more useful information than

location alone.

Does everyone need brain surgery?

No, but surgery is common because it can relieve pressure, remove tumor, and provide tissue for diagnosis. Observation may be appropriate for selected small, slow-growing tumors. Surgery may also be limited when a tumor involves structures that cannot be safely separated.

Can a posterior fossa tumor come back?

Yes, some can return after apparently successful treatment. The risk is different for each tumor type and is influenced by whether it could be fully removed, whether it had spread, and how it responded to treatment. Follow-up MRI scans are used to look for recurrence.

How long does recovery take?

Recovery can range from weeks to many months. It may take longer when balance, speech, swallowing, or coordination are affected. Some people regain most previous abilities, while others have lasting changes and need ongoing rehabilitation or practical support.

Are posterior fossa tumors hereditary?

Most are not. A minority are linked to inherited genetic conditions. Genetic counselling may be considered when the tumor type, age at diagnosis, personal medical history, or family history suggests an inherited cause.

Sources

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