CONDITION

Astrocytoma giant cell glioblastoma

Learn what giant cell glioblastoma is, how it may affect the brain, how doctors diagnose and treat it, and which symptoms need urgent care.

WHAT IT IS
Rare aggressive brain cancer

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Headaches, seizures, weakness, speech difficulty

WHAT CAUSES IT
Unknown in most people

HOW IT IS DIAGNOSED
Tumor tissue pathology and molecular tests

MAIN TREATMENT
Surgery, radiation therapy and chemotherapy

CAN IT BE CURED?
No, surgery is generally not curative

IS IT AN EMERGENCY?
Sometimes, seizure lasting five minutes or longer

LONG-TERM OUTLOOK
Aggressive cancer that may return after treatment

Overview

Giant cell glioblastoma is a rare microscopic pattern of glioblastoma, an aggressive cancer that begins in the brain. It develops from cells related to astrocytes, which normally support and protect nerve cells. The name "giant cell" refers to unusually large tumor cells seen under a microscope. It does not describe the overall size of the tumor.

Modern diagnosis uses more than the tumor's appearance. Doctors combine its microscopic features with molecular tests that look for changes in the tumor's genes and chromosomes. Under the current World Health Organization classification, glioblastoma is an adult-type diffuse glioma that is usually IDH-wildtype . This means the tumor does not have a mutation in the IDH1 or IDH2 genes.

A tumor with an IDH mutation is classified differently, even if it has aggressive or giant-cell

features. It may instead be called an IDH-mutant astrocytoma, grade 4. The exact wording on a pathology report therefore matters.

Glioblastoma is assigned CNS WHO grade 4, the highest grade for tumors of this type. It can grow into nearby brain tissue, which makes complete removal difficult. It generally does not spread outside the brain and spinal cord, but it may return within the nervous system after treatment.

Some older studies found that people with giant cell features lived longer on average than people with more typical glioblastoma. These findings cannot predict what will happen to one person. Age, overall health, tumor location, molecular findings, amount of tumor removed, and response to treatment can all affect the outlook.

Symptoms

Symptoms depend on where the tumor is located, how quickly it grows, and whether it causes swelling or increased pressure inside the skull. Symptoms may develop over days to weeks, although some changes are more gradual.

Possible symptoms include:

These symptoms can have many causes other than a brain tumor. Medical evaluation is needed to determine the cause.

Call emergency services for a seizure lasting five minutes or longer, repeated seizures without recovery, sudden loss of consciousness, or rapidly developing weakness, speech difficulty, or severe confusion. A sudden severe headache with collapse, repeated vomiting, or reduced alertness also needs emergency care.

Contact the treating team promptly for new neurological symptoms, a clear increase in headaches, new vomiting, worsening balance, or a change in seizure pattern. These concerns may need quick assessment, but they are not always emergencies.

- New or worsening headaches, sometimes stronger in the morning
- Nausea or vomiting that is not otherwise explained
- A first seizure or a change in an existing seizure pattern
- Weakness, numbness, or poor coordination on one side of the body
- Difficulty speaking, understanding words, reading, or writing
- Changes in vision
- Problems with balance or walking

- Memory, attention, judgment, mood, or personality changes
- Increasing sleepiness, confusion, or difficulty completing familiar tasks

Causes and risk factors

Giant cell glioblastoma develops when genetic changes allow abnormal brain cells to grow and survive without normal control. These changes are usually found only in the tumor. They are not necessarily inherited or passed to children.

The direct cause is unknown in most people. Known or suspected factors include:

Most people with glioblastoma have no known inherited syndrome and no clear preventable exposure. Everyday activities, minor head injuries, diet, and stress have not been shown to cause giant cell glioblastoma. Research has also not established routine mobile phone use as a cause of glioblastoma.

Genetic counseling may be considered when a person is unusually young, has several close relatives with related cancers, develops multiple primary cancers, or has tumor findings that suggest an inherited condition.

- Age: Glioblastoma occurs most often in adults, although giant cell morphology has been reported in younger people more often than conventional glioblastoma.
- Previous ionizing radiation: Radiation to the head for another medical condition can rarely increase the risk of a later brain tumor.
- Inherited cancer syndromes: A small proportion of gliomas occur in people with conditions such as Li-Fraumeni syndrome, neurofibromatosis type 1, or certain DNA-repair syndromes.
- Tumor biology: Giant cell tumors often have changes involving the TP53 pathway, but this finding alone does not establish the diagnosis or show that a person inherited a TP53 mutation.

Diagnosis

Evaluation usually begins with a neurological examination. The clinician checks strength, sensation, coordination, reflexes, vision, speech, memory, and alertness.

Magnetic resonance imaging, or MRI, is the main imaging test. Contrast material is usually given through a vein to show areas where the blood-brain barrier has been disrupted. Glioblastoma often appears as an irregular mass with contrast enhancement, dead tissue in

the center, and surrounding swelling. MRI can suggest a high-grade tumor, but imaging alone cannot confirm giant cell glioblastoma.

A tissue sample is required for a firm diagnosis. A neurosurgeon may remove as much tumor as can be safely reached, or perform a biopsy if removal would carry too much risk. A neuropathologist then examines the tissue.

Testing may assess:

MGMT is a DNA-repair gene. When its promoter is methylated, the gene is less active, and the tumor may be more likely to respond to temozolomide chemotherapy. This result helps guide treatment discussions but does not guarantee a response.

A second pathology review at a center experienced in brain tumors can be useful when the diagnosis is uncertain or the findings are unusual. Functional MRI, specialized MRI methods, or mapping during surgery may help show how close the tumor is to areas responsible for language, movement, or other important abilities.

- IDH1 and IDH2 mutation status
- MGMT promoter methylation
- Chromosome changes and other features used to classify IDH-wildtype glioblastoma
- Microscopic features, including giant cells, abnormal cell division, tissue death, and new blood-vessel growth

Treatment and management

Care is usually coordinated by a team that may include a neurosurgeon, neuro-oncologist, radiation oncologist, neuropathologist, neurologist, rehabilitation specialists, nurses, and palliative care clinicians.

When possible, treatment begins with maximal safe surgical removal . The goal is to remove as much visible tumor as possible without causing unacceptable loss of brain function. Surgery may also reduce pressure and provide enough tissue for an accurate diagnosis. Because tumor cells can extend into nearby brain tissue, surgery alone is generally not curative.

For many adults who are well enough for combined treatment, surgery is followed by radiation therapy with temozolomide chemotherapy. Temozolomide is commonly continued for additional cycles after radiation. Treatment plans may differ for older adults, people with significant health problems, or those whose tumors have particular molecular features. Shorter radiation schedules or treatment based on MGMT status may be discussed in some situations.

Tumor treating fields may be offered to selected adults after initial radiation and

chemotherapy. This treatment uses adhesive arrays placed on the shaved scalp to deliver low-intensity alternating electrical fields. It requires wearing the device for much of each day and can irritate the scalp.

Supportive treatment is also important. Corticosteroids such as dexamethasone may be used for brain swelling and related symptoms. Because these medicines can cause significant side effects, clinicians try to use the lowest effective amount and reduce them when appropriate. Anti-seizure medicine is used when seizures occur. Routine long-term anti-seizure treatment is generally not recommended solely because a brain tumor is present in someone who has never had a seizure.

Rehabilitation may address weakness, speech problems, balance, memory, fatigue, or difficulty with daily tasks. Palliative care can be added at any stage to manage symptoms, support decision-making, and help patients and families cope. It can be provided alongside tumor-directed treatment.

If the tumor returns, options may include another operation, focused radiation in selected cases, systemic medicines, tumor treating fields, supportive care, or a clinical trial. Bevacizumab may reduce swelling and improve symptoms in some people with recurrent glioblastoma, although it has not clearly been shown to extend overall survival. The best approach depends on prior treatment, tumor location, symptoms, and personal goals.

Complications

The tumor can affect movement, speech, vision, thinking, behavior, or independence. Brain swelling may worsen headaches, nausea, weakness, or confusion. Seizures can lead to injury and may affect driving and other safety decisions.

Treatment can also cause complications. Surgery may lead to bleeding, infection, seizures, blood clots, or new neurological problems. Radiation may cause fatigue, hair loss in the treated area, skin irritation, swelling, and later changes in memory or thinking. Temozolomide can cause nausea, tiredness, constipation, and low blood-cell counts, which may increase the risk of infection or bleeding.

Corticosteroids like prednisone or hydrocortisone may cause sleep problems, mood changes, increased blood sugar, muscle weakness, fluid retention, or infection risk. These medicines should not be stopped suddenly unless the treating clinician says it is safe.

Contact the care team urgently for fever during chemotherapy, unusual bleeding, inability to keep fluids down, worsening confusion, new weakness, or redness, drainage, or opening of a surgical incision. Severe breathing difficulty, loss of consciousness, or a prolonged seizure

requires emergency care.

Follow up

Follow-up usually includes neurological examinations and repeat brain MRI scans. Imaging is often performed after surgery, after radiation, and at intervals chosen by the treating team. The schedule depends on treatment stage, symptoms, and prior scan findings.

MRI changes after radiation and chemotherapy do not always mean the cancer is growing. Treatment can cause inflammation and contrast enhancement that resembles tumor progression, sometimes called pseudoprogression. Doctors may compare several scans, review symptoms, or use specialized imaging before deciding whether treatment should change.

Routine visits are also used to review seizures, steroid use, blood counts, medication effects, rehabilitation needs, emotional health, and the ability to work, drive, or manage daily activities. New or worsening symptoms should be reported between scheduled visits rather than waiting for the next routine appointment.

Survivorship and advance-care planning can occur alongside active treatment. Discussing goals, decision-makers, and preferred types of care does not mean treatment is stopping. It helps the team provide care that matches the patient's priorities.

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