

**Fact Sheet**

**Glioblastoma Multiforme: Background and Epidemiology/Statistics**

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**Background Information**

Glioblastoma multiforme (GBM) is a fast-growing brain tumor. It arises from star-shaped glial cells that make up the white matter and support the health of the nerve cells within the brain and spinal cord. Glioma is a general term for tumors that start in the glial cells. Gliomas include astrocytomas (which include GBM), oligodendrogliomas, and ependymomas. GBM is often referred to as a grave IV astrocytoma, the most invasive type of glial tumors, which grows rapidly and commonly spreads into the nearby brain tissues. It can evolve from lower-grade astrocytomas or oligodendrogliomas, or it can arise in the brain “de novo.”1-4

About 3 out of 10 of all brain tumors are gliomas, and GBM makes up more than half of all gliomas. GBM is the most common malignant brain tumors in adults. It occurs often in the cerebral hemisphere, particularly in the frontal and temporal lobes. Though symptoms vary greatly between individual patients, these may include changes in mood and personality (15%)5, changes in cognitive functioning and consciousness (50%)6, speech difficulty, headaches (65%)5, vision problems, vomiting (10%), loss of appetite, and new onset of seizures (25%).6

GBM is best diagnosed by cranial MRI, which is superior to CT and should always be obtained with and without contrast material. GBM appears as contrast-enhancing mass lesions that arise in the white matter and are surrounded by edema.6 After a brain tumor is detected on scan, a biopsy of the tumor tissue is obtained and analyzed under a microscope to assign the tumor type and grade.4

The primary treatment for GBM is surgery, followed by radiation and chemotherapy. The goal of surgery, by providing a debulking of the tumor, is to remove as much of the tumor as possible without injuring surrounding normal brain tissues to prolong the lives of some patients and to improve the quality of remaining life. Radiation therapy aims to selectively kill the remaining tumor cells that have infiltrated the surrounding normal brain tissue. It is usually given 10 to 30 times, once a day, 5 days a week. Each radiation treatment can damage both healthy and normal tissue.4 Temozolomide (Temodar®) is a chemotherapeutic agent given post-surgery and is usually administered 5 days per month. It is usually given every day during radiation therapy, followed by 6 to 12 cycles after radiation. Each cycle lasts for 28 days, with temozolomide given the first 5 days of each cycle, with 23 days of rest period.4,7,8

Electric field therapy, or tumor-treating fields (TTFields), is a non-invasive

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low-intensity alternating electric fields that has shown to disrupt mitosis and inhibit tumor growth with antimitotic properties in a variety of tumor types. It was FDA-approved for recurrent GBM in 2011, and in newly diagnosed GBM in 2015.9,10 Studies have shown that the median progression-free survival was 6.7 months in the TTFields-temozolomide group, and 4.0 months in the temozolomide-alone group; and the median overall survival was 20.9 months in the TTFields-temozolomide group vs. 16.0 month in the temozolomide-alone group.11,12 Common side effects include scalp irritation, headache, malaise, muscle twitching, fall, and skin ulcers.

**Epidemiology/Statistics**

The incidence of GBM is 2 to 3 per 100,000 adults per year. It accounts for 52% for all primary brain tumors, and 17% of all primary and metastatic brain tumors. It tends to occur in adults between 45 and 70 years of age, with a median presentation age of 64, and slightly higher incidence in men than women (1.6:1), and in Caucasians relative to other ethnicities.4,13 GBM typically results in death in the first 15 months after diagnosis.4 The survival rate of GBM is 26-33% at 2 years, and only 4-5% at 5 years.14 Exposure to ionizing radiation is one of the few risk factors to show an increased risk for developing GBM, and may take years after therapeutic radiation indicated for another tumor or condition. Other possible exposures include vinyl chloride, pesticides, smoking, petroleum refining, and synthetic rubber manufacturing have been loosely associated as risk factors. Specific genetic disease, such as neurofibromatosis 1 and 2, tuberous sclerosis, Li-Fraumeni syndrome, retinoblastoma, and Turcot syndrome, may have increased risk of GBM.13

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