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Brain Tumors

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It is known that a primary brain tumor is an abnormal growth that starts in the brain and usually does not spread to other parts of the body. Although they are often called brain cancer, malignant brain tumors do not fit the definition of cancer because they do not spread to organs outside the brain and spine [1]. Metastatic (secondary) brain tumors begin as cancer elsewhere in the body and spread to the brain. They form when cancer cells are carried in the blood stream. The most common cancers that spread to the brain are lung and breast.

The World Health Organization (WHO) developed a classification and grading system to standardize communication, treatment planning, and predict outcomes for brain tumors. Tumors are classified by their cell type and grade by viewing the cells, usually taken during a biopsy, under a microscope. If a diagnosis cannot be made clearly from the scans, a biopsy may be performed to determine what type of tumor is present. Biopsy is a procedure to remove a small amount of tumor cells to be examined by a pathologist under a microscope.

Medical science neither knows what causes brain tumors nor how to prevent primary tumors that start in the brain. People most at risk for brain tumors include those who have:

- cancer elsewhere in the body;
- prolonged exposure to pesticides, industrial solvents, and other chemicals;

- inherited diseases, such as neurofibromatosis [2].

Treatment options vary depending on the type, grade, size and location of the tumor; whether it has spread; and your age and general health. Radiation therapy and chemotherapy are used to treat tumors that cannot be removed by surgery alone. Sometimes the best treatment is observation. Medications are used to control some of the common side effects of brain tumors. Surgery is the treatment of choice for brain tumors that can be reached without causing major injury to vital parts of the brain.

Radiation or chemotherapy may be used on the remaining tumor cells.

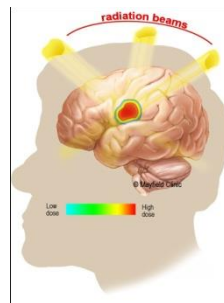


Figure 1. Radiation Therapy

A machine rotates around the patient, aiming radiation beams at the tumor. The radiation beams are shaped to match the tumor and minimize exposure to normal brain tissue [3].

Image-guided surgery technologies, tumor fluorescence, intraoperative MRI/CT, and functional brain mapping have improved the surgeon's ability to precisely locate the tumor, define the tumor's borders, avoid injury to vital brain areas, and confirm the amount of tumor removal while in the operating room. Laser ablation is a minimally invasive treatment that transmits heat to "cook" brain tumors from the inside out.

Chemotherapy drugs work by disrupting cell division. Over time, chemotherapy causes the abnormal cells to die and the tumor may shrink. Chemotherapy is typically used for high-grade gliomas; it is not routinely used for benign tumors [5].

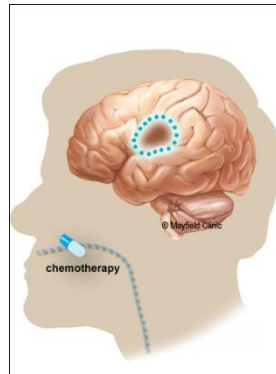


Figure 2. Chemotherapy

Chemotherapy for high-grade gliomas is usually taken as a pill daily for a set period of time called a cycle. The drug circulates through the bloodstream to the brain where it crosses the blood-brain-barrier to the tumor.

Immunotherapy or biotherapy activates the immune system (T-cells and antibodies) to destroy tumor cells. Research is exploring ways to prevent or treat cancer through vaccines.

Because brain tumors develop in parts of the brain that control movement, speech, vision and thinking, rehabilitation may be a necessary part of recovery. Although the brain can sometimes heal itself after the trauma of treatment, it will take time and patience. A neuropsychologist can help patients evaluate changes caused by their brain tumor and develop a plan for rehabilitation. A neuropsychological evaluation

assesses the patient's emotional state, daily behavior, cognitive (mental) abilities, and personality [4].

Physical therapy, occupational therapy, and speech therapy may be helpful to improve or correct lost functions.

Clinical trials are research studies in which new treatments – drugs, diagnostics, procedures, and other therapies – are tested in people to see if they are safe and effective. Research is always being conducted to improve the standard of medical care. Since it is impossible to predict whether or when a particular tumor may recur, lifelong monitoring with MRI or CT scans is essential for people treated for a brain tumor, even a benign lesion [5].

References:

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