

Overview on Current Research and Treatments of Brain Tumor

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A brain tumor (intracranial tumor) is an abnormal growth of cells / tissue in brain, where the cells grow at an uncontrollable rate, unchecked by the control mechanisms of the body. Brain tumors are more challenging compared with tumors elsewhere in the body for detection, diagnosis, and therapy. Like other types of cancer, even brain tumor has both benign (non-cancerous) and malignant (cancerous) kinds. As per the American Association of Neurological Surgeons, there has been at least 150 kinds of brain cancer has been documented [1].

Benign tumor can be normally detected using an MRI or CT scan. These cells do not follow a regular pattern of brain cells and be easier to identify. These cells do not possess the characteristics of cancer cells either. Benign tumor when identified has the higher rate of success in treatment. Schwannomas, Gangliocytomas (gangliomas and anaplastic gangliogliomas), Chordomas, Hemangioblastomas, Craniopharyngiomas, Glomus jugulare Meningiomas, Pineocytomas, Pituitary adenomas, are common benign brain tumors [1, 2].

Malignant tumors are cancerous type which has a rapid growth and tends to spread fast. These are harder to detect. Based on the symptoms, doctors may request for imaging results from MRI, CT, PET, US, and X-ray. In few cases a biopsy may be performed. Astrocytomas, Ependymomas, Glioblastoma multiforme (GBM), Medulloblastomas, Oligodendrogliomas, are general types of malignant tumors found in brain tumor [1, 2].

Advancement in medical sciences, has resulted in providing specific treatment based on upon the tumor type, patient history, stage of cancer and other requirements. Radiation therapy, Chemotherapy are well known methods used for tumors. Surgery can be considered for special case scenarios, where the tumor is low grade and low risk. In modern medicine has developed other kinds of treatments like targeted therapy.

Alternating electric field therapy is another approach of treatment that uses noninvasive portable device which interferes with cell part that are required in growth in tumor cells. Immunotherapy is another therapy that has shown some positive impact in diagnosis.

Immunotherapy is a series of treatments that uses the persons own immune system to kill cancerous cells. FDA has approved 3 immunotherapy options for brain and nervous system cancers [3].

Immunomodulators: Granulocyte-macrophage colony-stimulating factor (GM-CSF), Pembrolizumab (Keytruda*)

Targeted Antibodies: Bevacizumab (Avastin*), Dinutuximab (Unituxin*), Naxitamab-gqgk (Danyelza*).

Current Research and Prospects

Researchers are working on new diagnosis, ways to treat cancer, to find out the reasons of causes, and ways to stop the tumor from ever forming in the human body. The research does not only focus on the new trends, but also works on fine tuning the existing therapies that are being used [4].

For Example. new imaging tests are being developed to make the detection of tumor easier. Detecting a tumor early on will always help in early diagnosis. New biomarkers are being developed, which can help in understanding the progress of treatment. Gene therapy is another way of treatment, where the specific genes will be treated. Here, treatment will only be provided to the gene which is cause for tumor.

Brain tumor research has seen an increase in genetic research as well, to understand the mutations, risk, and growth of tumor. The Cancer Genome Atlas (TCGA), developed by National Cancer Institute is a landmark cancer genomics program, molecularly characterized over 20,000 primary cancer and matched normal samples spanning 33 cancer types [5]. All the details are available publicly for patient and doctor use to understand the disease. As per WHO-International Clinical Trials Registry Platform, current trials are happening on topics of WBRT (Whole brain Radiation Therapy), Recurrent cancers, CSF Biomarker study, Feasibility of MRI Workflow, Assessing Sleep and Circadian Rhythms in brain cancer patients to understand the tumor, many others [6].

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