

# STEREOTACTIC RADIOTHERAPY OF RECURRENT MALIGNANT GLIOMAS

Clinical White Paper

Tumors of the central nervous system (CNS) represent approximately 175,000 newly diagnosed cases worldwide per year, with an estimated annual mortality of 125,000<sup>1,2</sup>. Malignant gliomas comprise 30% of all primary CNS tumors and remain one of the greatest challenges in oncology today, despite access to state-of-the-art surgery, imaging, radiotherapy and chemotherapy<sup>3</sup>.

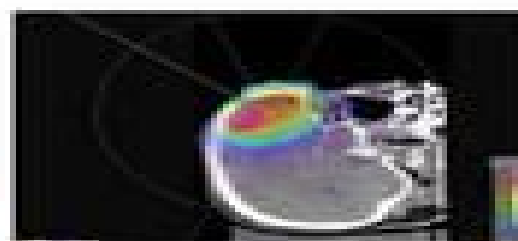
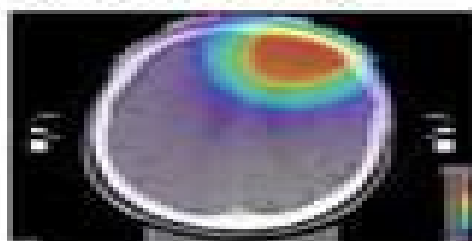
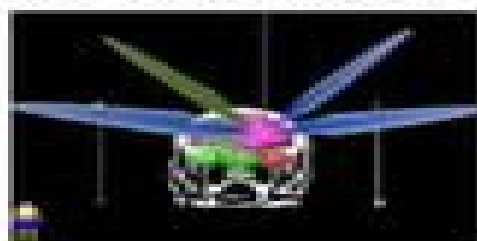


Figure: Details of a typical malignant glioma treatment plan

Signs and symptoms of malignant gliomas depend on the location, size and growth of the tumor and may include headaches, seizures, focal neurologic deficits and changes in mental status<sup>4</sup>. Both the tumor and its treatment often result in profound quality of life changes. Early failure of local treatment is common with this disease and relapse occurs in form of continuous growth close to the margin of the original lesion in approximately 80% of all cases<sup>5</sup>.

The World Health Organization classification system is predominantly used for naming and grading malignant gliomas; within this system, grade III astrocytomas and grade IV glioblastoma multiforme (GBM) are the most prevalent types with poor prognosis<sup>6</sup>. For glioblastoma, median survival time is limited to approximately 12 – 17 months<sup>7</sup>.

Although malignant gliomas are incurable in the vast majority of patients, surgery and radiotherapy are the traditional cornerstones of initial therapy protocols and provide palliative survival benefit<sup>8,9</sup>. Surgical techniques remain an important tool for glioma management, with complete surgical resection as the goal<sup>10</sup>.

Regardless of the degree of resection, adjuvant radiotherapy is administered after surgery. In early randomized studies, significant increases in survival were achieved in patients with high-grade gliomas with the administration of 50 – 60 Gy of whole brain radiotherapy following surgery<sup>11,12</sup>. Adjuvant chemotherapy is also used in the initial treatment of high-grade gliomas, with increased survival recently demonstrated in clinical trials<sup>13,14</sup>.

The vast majority of gliomas recur within or adjacent to the original tumor bed<sup>15</sup>. Treatment options for recurrent gliomas are limited because most therapeutic alternatives have already been performed, including neurosurgery and a full course of radiotherapy and chemotherapy. Optimal surgical resection might be possible in a subgroup of patients; however, it is accompanied by a high risk of morbidity because of the infiltrative nature of the tumor<sup>16</sup>. Conventional radiotherapy alternatives are often limited with respect to dose prescription because radiotherapy is already a component of first-line therapy in most patients.

Stereotactic radiosurgery (SRS) is appealing because of its ability to precisely deliver high doses of irradiation to a defined target volume in a single fraction with less treatment-associated morbidity compared with surgery<sup>17</sup>. However, SRS is limited to smaller lesions and low doses, as the risk of radiation-induced side effects rises with increasing treatment volume and dose<sup>18</sup>. Fractionated stereotactic radiotherapy (FSRT) enables the precise application of radiotherapy to a defined target volume while exploiting the radiobiologic advantage of fractionation and minimizing the risk for severe radiation-induced side effects<sup>19,20</sup>.

Combining FSRT with chemotherapy further increases high-grade recurrent glioma treatment efficiency. For recurrent GBM, temozolomide has been shown to improve quality of life and progression-free survival<sup>21</sup>.

An overview of the recent literature on hypofractionated FSRT treatments for recurrent malignant gliomas is presented in the table below.

# Radiotherapy Of Malignant Disease

**JA Banks**



## **Radiotherapy Of Malignant Disease:**

## Embracing the Track of Phrase: An Emotional Symphony within **Radiotherapy Of Malignant Disease**

In some sort of taken by monitors and the ceaseless chatter of quick communication, the melodic elegance and mental symphony produced by the written term usually fade in to the background, eclipsed by the persistent noise and distractions that permeate our lives. Nevertheless, located within the pages of **Radiotherapy Of Malignant Disease** a charming literary prize full of organic emotions, lies an immersive symphony waiting to be embraced. Crafted by a wonderful composer of language, that captivating masterpiece conducts visitors on an emotional journey, skillfully unraveling the concealed tunes and profound impact resonating within each cautiously constructed phrase. Within the depths with this touching assessment, we shall examine the book is central harmonies, analyze its enthralling publishing design, and submit ourselves to the profound resonance that echoes in the depths of readers souls.

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