Glioma recurrence

see also Glioblastoma recurrence

Glioma recurrence is a significant clinical challenge in neuro-oncology. The recurrence rate depends on multiple factors, including the tumor's grade, molecular characteristics, and initial treatment response. Here are some key aspects of glioma recurrence:

1. Risk Factors for Recurrence

Tumor Grade: High-grade gliomas (e.g., glioblastoma, WHO grade 4) have a higher recurrence rate than low-grade gliomas. Extent of Resection: Incomplete surgical removal leads to a higher risk of recurrence. Molecular Markers: IDH wild-type gliomas tend to be more aggressive. MGMT promoter methylation is associated with better response to temozolomide (TMZ). TERT promoter mutations and EGFR amplification are linked to poor prognosis. Location: Tumors in eloquent areas may be less resectable, leading to residual disease and recurrence. Therapeutic Response: Resistance to radiotherapy and chemotherapy contributes to recurrence.

2. Patterns of Recurrence

Local recurrence is the most common pattern, occurring within 2 cm of the original tumor site. Distant recurrence may occur due to migratory tumor cells or treatment-induced changes. Leptomeningeal spread is rare but seen in aggressive cases.

3. Diagnostic Workup for Recurrence

MRI with contrast: T1-weighted imaging with gadolinium contrast is the standard for detecting recurrence.

MR Spectroscopy (MRS): Helps differentiate recurrence from radiation necrosis.

PET Imaging (e.g., FDG-PET, amino acid PET): Can assist in distinguishing viable tumor tissue from treatment effects.

Liquid biopsy (circulating tumor DNA, cfRNA): Emerging tool for non-invasive monitoring.

4. Treatment Options for Recurrent Gliomas

Repeat Surgery: Considered in select cases, particularly if mass effect is present. Re-irradiation: Stereotactic radiosurgery (SRS) or fractionated radiation may be used cautiously. Chemotherapy: Temozolomide (TMZ) rechallenge (if MGMT methylated and prior response was good). Bevacizumab (Avastin): Anti-VEGF therapy for edema control and symptom relief. Lomustine (CCNU), procarbazine,

vincristine (PCV regimen): Used in some recurrent cases. Targeted and Experimental Therapies: TTFields (Tumor Treating Fields): Device-based therapy for recurrent glioblastoma. Immunotherapy (e.g., checkpoint inhibitors, vaccines): Limited success but ongoing research. CAR-T therapy and oncolytic viruses: Under investigation.

5. Prognosis and Survival

Recurrent glioblastoma has a poor prognosis, with median survival of 6–9 months after recurrence. Low-grade gliomas have better outcomes but may transform into higher-grade tumors over time.

MicroRNAs (miRs) act as oncogenes or tumor-suppressor genes and regulate the proliferation, apoptosis, invasion, differentiation, angiogenesis, and behavior of glioma stem cells, which are important in glioma recurrence and development.