Brain tumor-related epilepsy

- Cognitive Decline in Nasopharyngeal Carcinoma Survivors with Post-Radiation Epilepsy: A Prospective Cohort Study
- Antiseizure medication in patients with meningioma: a retrospective cohort study on the long-term impact on depression, anxiety and neurocognitive functioning
- Efficacy and Safety of Oxcarbazepine as Monotherapy for Prevention of Epileptic Seizures in Patients With Supratentorial Brain Tumors: A Prospective Multicentric Study
- Risk Factors and Prognostic Implications of Tumor-Related Epilepsy in Diffuse Glioma Patients: A Real-World Multicenter Study
- A review of epilepsy syndromes and epileptogenic mechanism affiliated with brain tumor related genes
- Apolipoprotein E3 functionalized mesoporous silica nanoparticles for targeted and enhanced therapeutic efficacy of Levetiracetam in brain tumor-associated epilepsy: Insights into brain uptake, biodistribution and pharmacokinetic behavior
- Prognostic models for seizures and epilepsy after stroke, tumors and traumatic brain injury
- Seizures in brain tumors: pathogenesis, risk factors and management (Review)

Epidemiology

Brain tumor-related epilepsy (BTRE) is a common brain tumor complication and its incidence is highly dependent on the type of tumor, ranging from 10-15% in brain metastases to > 80% in low-grade gliomas. About 5% of new epilepsy patients have a brain tumor, and a brain tumor causes about 10% of epilepsy with focal seizures

Pathogenesis

Next to neuroinflammation, findings on the pathogenesis have established that certain genetic mutations are involved, of which the most known would be IDH mutations in gliomas. Others discussed more thoroughly in the present review include genes such as PTEN, TP53, and IGSF3, and these findings all provide fresh and fascinating insights into the pathogenesis of BTRE [1)]

Pathophysiology

Increasing knowledge about the pathophysiology of BTRE, particularly on glutamatergic mechanisms of oncogenesis and epileptogenesis, might influence the management of anti-tumor and BTRE treatment in the future. The first seizure implies the epilepsy diagnosis in patients with brain tumors. Due to the lack of prospective randomized trials in BTRE, general recommendations for focal epilepsy currently apply concerning the initiation of antiepileptic drug. Non-enzyme-inducing antiepileptic drug is preferable. Prospective trials are needed to evaluate if AMPA inhibitors like perampanel possess anti-tumor effects. antiepileptic drug withdrawal has to be weighed very carefully against the risk of seizure recurrence, but can be achievable in selected patients. Permission to drive is possible for some patients with BTRE under well-defined conditions but requires thorough neurological, radiological, ophthalmological, and neuropsychological examination.

Evolving knowledge of the pathophysiology of BTRE might influence future therapy. Randomized trials on antiepileptic drug in Brain tumor-related epilepsy with reliable endpoints are needed. Management of withdrawal of antiepileptic drugs and permission to drive demands thorough diagnostic as well as neurooncological and epileptological expertise [2)]

Treatment

Brain tumor-related epilepsy treatment.

1)
Dantio CD, Fasoranti DO, Teng C, Li X. Seizures in brain tumors: pathogenesis, risk factors and management (Review). Int J Mol Med. 2025 May;55(5):82. doi: 10.3892/ijmm.2025.5523. Epub 2025 Mar 21. PMID: 40116082.
2)
Seidel S, Wehner T, Miller D, Wellmer J, Schlegel U, Grönheit W. Brain tumor related epilepsy: pathophysiological approaches and rational management of antiseizure medication. Neurol Res Pract. 2022 Sep 5;4(1):45. doi: 10.1186/s42466-022-00205-9. PMID: 36059029.