WHO Grade 3 glioma

- Efficacy and safety of combining re-irradiation with bevacizumab compared to bevacizumab alone in the management of recurrent high-grade gliomas: a meta-analysis and systematic review
- Supratentorial glioma grading in children by using apparent diffusion coefficient map: application of histogram analysis based on segmentation
- Diagnostic Utility of Intratumoral Susceptibility Signals in Adult Diffuse Gliomas: Tumor Grade Prediction and Correlation with Molecular Markers Within the WHO CNS5 (2021) Classification
- Characteristics and Outcomes of Patients With IDH-Mutant Grade 2 and 3 Gliomas After Deferred or Adjuvant Radiotherapy
- Methionine PET Findings in the Diagnosis of Brain Tumors and Non-Tumorous Mass Lesions: A Single-Center Report on 426 Cases
- Automated Diffusion Analysis for Non-Invasive Prediction of IDH Genotype in WHO Grade 2-3 Gliomas
- Challenges in implementing 2021 WHO CNS tumor classification in a resource-limited setting
- Low-grade IDH-mutant gliomas: from standard post-surgical treatments to novel IDH inhibitors

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see (Anaplastic astrocytoma, anaplastic oligodendroglioma, anaplastic oligoastrocytoma, anaplastic ependymoma).

Anaplastic glioma is Grade III and the median overall survival is about 37.6 months. However, there are still other factors that affect the prognosis for anaplastic glioma patients due to variable overall survival.

Prospective observational diagnostic studies

Hemodynamic measurements such as cerebral blood flow (CBF) and cerebrovascular reactivity (CVR) can provide useful information for diagnosing and characterizing brain tumors. Previous work showed that arterial spin labeling (ASL) in combination with vasoactive stimulation enabled simultaneous non-invasive evaluation of both parameters, however, this approach had not been previously tested in tumors. This work aimed to investigate the application of this technique, using a pseudo-continuous ASL (PCASL) sequence combined with breath-holding at 3 T, to measure CBF and CVR in high-grade gliomas and metastatic lesions, and to explore differences across tumoral- - peritumoral regions and tumor types. To that end, 27 patients with brain tumors were studied. Baseline CBF and CVR were measured in the tumor, edema, and gray matter (GM) volumes of interest (VOIs). Peritumoral ipsilateral ring-shaped VOIs were also generated and mirrored to the contralateral hemisphere. Differences in baseline CBF and CVR were evaluated between contralateral and ipsilateral GM, contralateral and ipsilateral peritumoral rings, and among VOIs and tumor types. CBF in the tumor was higher in grade 4 gliomas than metastases. In grade 4 gliomas, edema had lower CBF than the tumor and contralateral GM. CVR values differed between grade 3 and grade 4 gliomas and between grade 4 and metastases. CVR values in the tumor were lower compared to the contralateral GM. Differences in CVR between contralateral and ipsilateral-ring VOIs were also found in grade 4 gliomas, presumably suggesting tumor infiltration within the peritumoral tissue. A cut-off value for CVR of

27.9%-signal-change is suggested to differentiate between grade 3 and grade 4 gliomas (specificity = 83.3%, sensitivity = 70.6%). In conclusion, CBF and CVR mapping with ASL offered insights into the perilesional environment that could help to detect infiltrative disease, particularly in grade 4 gliomas. CVR emerged as a potential biomarker to differentiate between WHO Grade 3 glioma and WHO Grade 4 glioma [1)]

This study presents an innovative approach to assessing hemodynamic parameters in brain tumors and highlights the potential of CVR as a diagnostic biomarker. While promising, limitations in sample size, patient variability, and lack of validation necessitate further research. With refinement and validation, PCASL-based CVR mapping could become a valuable tool for non-invasive tumor characterization, aiding in personalized treatment planning and prognosis.

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Calvo-Imirizaldu M, Solis-Barquero SM, Aramendía-Vidaurreta V, García de Eulate R, Domínguez P, Vidorreta M, Echeveste JI, Argueta A, Cacho-Asenjo E, Martinez-Simon A, Bejarano B, Fernández-Seara MA. Cerebrovascular Reactivity Mapping in Brain Tumors Based on a Breath-Hold Task Using Arterial Spin Labeling. NMR Biomed. 2025 Mar;38(3):e5317. doi: 10.1002/nbm.5317. PMID: 39844376.