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Multidisciplinary Management of Adult Low Grade Gliomas

D. Mariș[1], D. Nica[2], D. Mohan[3], H. Moisa[4], A.V. Ciurea[4,5]
[1]Department of Neurosurgery, "Dr. Carol Davila" Emergency Military Hospital Bucharest, Romania
[2]Department of Neurosurgery, "St. Pantelimon" Emergency Teaching Hospital, Bucharest, Romania
[3]Department of Neurosurgery, Bihor County Emergency Teaching Hospital, Oradea, Romania
[4]Carol Davila University of Medicine, Bucharest, Romania
[5]Department of Neurosurgery, "Sanador Medical Center" Hospital, Bucharest, Romania

Abstract

Background: Adult hemispheric low grade gliomas (LGG) cover a pathologic spectrum which has specific clinical, histological and molecular characteristics. The optimal management of these tumors is still a controversial topic in international literature.

Methods: We evaluated scientific papers from the literature (Medline and Cochrane Library to date) and we compared the results found there with our experience, trying to create a pattern of treatment of our own.

Results and conclusions: The advances in microsurgical and neuromonitoring techniques, as well as in neuroimaging, allow for a more aggressive resection of LGG with a significant improvement in overall survival and quality of life. The potential risks of the "wait and see" policy and the neurotoxicity of radiotherapy are challenged by the benefits of careful surgical resection and up-front chemotherapy. The present day treatment strategy, based on recent evidence, should include a maximal surgical resection when possible, with the full preservation of the patients' ability, and delayed radiotherapy. The role of temozolomide in the management of LGG and the identification of the therapeutic modality with the best quality of life profile will be determined by ongoing trials. The further characterization of prognostic relevance of molecular markers and data from advanced imaging techniques needs an intensification of research and validation efforts.

Abbreviations: LGG: low grade gliomas, WHO: World Health Organization, OS: overall survival, PFS: progression-free survival, MRI: Magnetic resonance imaging, MRS: Magnetic resonance spectroscopy, MPFS: malignant progression-free survival, rCBV: Relative Cerebral Blood Volume, QOL: quality of life, FLAIR: Fluid attenuated inversion recovery, MGMT: O6-methylguanine DNA methyltransferase enzyme, DSC MR imaging: Dynamic Susceptibility Contrast Perfusion MR imaging, 1H-MRS: Proton Magnetic Resonance Spectroscopy, IDH1: isocitrate dehydrogenase 1 gene, SPECT: Single-photon emission computed tomography, PET: Positron emission tomography, DTI-FT: Diffuse Tensor Imaging-fiber tracking technique, DES: direct electrical stimulation, EEG: Electroencephalography, EcoG: Electrocorticography, MEP: motor evoked potentials, EMG: Electromyography, AED: anti-epileptic drugs, TMZ: Temozolomide, EORTC: European Organization for Research and Treatment of Cancer, NCCTG: North Central Cancer Treatment Group, RTOG: Radiation Therapy Oncology Group, ECOG: Eastern Cooperative Oncology Group, EOR: extent of resection, Gy: Gray (unit), GyE: gray equivalent, RT: radiation therapy, IMRT: image-guided intensity modulated radiotherapy, FSRT: fractionated stereotactic radiotherapy, SRS: proton therapy or stereotactic radiosurgery, LET: high-linear energy transfer beams, RBE: relative biological effectiveness, CTCAE: Common Terminology Criteria for Adverse Events, PCV: procarbazine, lomustine, and vincristine chemotherapy

Key words: low-grade glioma, astrocytoma, oligodendroglioma, oligoastrocytoma, mixed glioma, molecular cytogenetics, chemotherapy, temozolomide, neuroimaging, health-related quality of life, cognitive functioning

Corresponding author: Daniel Mariș, MD

Department of Neurosurgery "Dr. Carol Davila" Emergency Military Hospital Bucharest, Romania
E-mail: daniel_maris@hotmail.com