

Diagnosis of malignant glioma: role of neuropathology

Daniel J. Brat · Richard A. Prayson ·
Timothy C. Ryken · Jeffrey J. Olson

Received: 10 January 2008 / Accepted: 19 May 2008
© Springer Science+Business Media, LLC. 2008

Recommendations

Level I: The diagnosis of malignant glioma should be based on the histopathologic review of tissue.

Level II: Both frozen section and cytopathologic evaluation are recommended for the intra-operative diagnosis of malignant glioma.

Consultation from a neuropathologist specialized in brain tumor diagnosis is recommended for problematic cases.

Level III: Incorporation of clinical and radiographic information with the final pathologic diagnosis is recommended.

The criteria of the WHO classification of brain tumors are internationally recognized and can be utilized for establishing the diagnosis of malignant gliomas.

Proliferation studies, such as those based on Ki-67/MIB-1 staining, and molecular genetic tests are recommended as adjuvant studies for classification and prognostication of malignant gliomas.

Rationale

Patients with malignant gliomas require a tissue diagnosis in order to guide further clinical management. Although clinical and neuro-imaging features of malignant glioma can be highly suggestive, the gold standard for diagnosis is based on the histologic examination of appropriately sampled tissue. In order to ensure greatest accuracy, pathologic studies should be performed in a multidisciplinary setting, in conjunction with a patient's clinical history, the neuro-surgical impression, and the neuroradiologic findings [1–3]. Neuroradiologic features are of particular importance for establishing a diagnosis of a central nervous system disease because they highlight neuro-anatomic locations, generate diagnostic possibilities, direct attention to the most likely entities, and point out discrepancies between clinical and radiologic findings and pathologic assessment [2, 3]. Strong lines of communication across clinical and diagnostic disciplines are recommended both for the most accurate appraisal of disease and to ensure that any diagnostic discrepancies are resolved prior to definitive therapy. Numerous textbooks contain detailed descriptions of the pathologic criteria used for classifying and grading glial neoplasms [4–8]. The purpose here is to evaluate the current literature addressing the diagnosis of malignant glioma focusing on advances in classification and grading, variability and reliability of histopathologic analysis, accuracy of frozen sections and cytopathology, and the roles of immunohistochemistry and molecular diagnostic techniques. This review will address the following questions:

- (1) What are the most appropriate diagnostic criteria for establishing a diagnosis of malignant glioma?
- (2) What is the best technique for establishing the diagnosis of malignant glioma when a suspicious

D. J. Brat (✉)
Department of Pathology and Laboratory Medicine, Emory
University Hospital, G-169, 1364 Clifton Rd. NE,
Atlanta, GA 30322, USA
e-mail: dbrat@emory.edu

R. A. Prayson
Department of Anatomic Pathology, Cleveland Clinic
Foundation, Cleveland, OH, USA

T. C. Ryken
Department of Neurosurgery, University of Iowa College
of Medicine, Iowa City, IA, USA

J. J. Olson
Department of Neurosurgery, Emory University School
of Medicine, Atlanta, GA, USA