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ELSEVIER FULL-TEXT ARTICLE

Diagnostic tools for neoplastic meningitis: detecting disease, identifying patient risk, and determining benefit of treatment.

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Three methods are routinely used to diagnose neoplastic meningitis (NM): clinical signs and symptoms, cerebrospinal fluid (CSF) cytology, and magnetic resonance imaging (MRI) of the brain and spine. Clinical manifestations are often subtle or may be ascribed to other cancer complications, eg, treatment-related disorders or brain parenchymal metastases. CSF cytology has a high specificity (>95%), but its sensitivity is generally less than 50%. MRI sensitivity and specificity vary with the type of primary cancer; overall, MRI findings consistent with leptomeningeal disease are detected in fewer than 50% of NM patients. While most clinicians evaluate CSF cytology along with MRI and the clinical examination, underdiagnosis is a major problem, since many patients are both cytologically and radiographically negative. Failure to consider NM in the differential diagnosis magnifies the problem of underdiagnosis. CSF flow cytometry is particularly promising for evaluating NM from hematologic cancers, with a diagnostic sensitivity many fold greater than conventional cytology. Research has focused on identifying biochemical markers of tumor cells in the CSF. For example, molecules involved in CNS penetration (eg, matrix metalloproteinases and cathepsins), tumor cell tropism (eg, chemokines CXCL8 and CCL18), and angiogenesis (eg, vascular endothelial growth factor) are elevated in the CSF of patients with NM. Evidence that some tumor types are more likely to infiltrate the CNS also has stimulated research into primary tumor markers predictive of CNS metastases. At present, there is no tumor marker or patient characteristic that reliably predicts the development of NM, and diagnosis still relies on suggestive signs and symptoms, positive CSF cytology, or a consistent MRI-all late manifestations of NM. Until techniques capable of detecting NM early are developed, increased awareness of the disease and standardized evaluation are likely to have the greatest impact on improving diagnosis and implementing earlier treatment.

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