Spinal leptomeningeal metastasis (SLM)

Leptomeningeal metastasis (LM) is characterized by infiltration of malignant cells into the leptomeninges and the spinal subarachnoid space.

Epidemiology

Are well documented at autopsy in patients previously diagnosed of glioblastoma, however, systemic dissemination with symptomatic leptomeningeal metastasis is quite rare. Most of the time it is diagnosed late and misdiagnosis is a common problem.

Patients with ventricular entry during high grade glioma resection demonstrated higher odds of leptomeningeal dissemination (sOR: 3.91 [95% confidence interval (CI): 1.89-8.10]; P = .0002; 86/410 vs 57/847 patients in 9 studies) and hydrocephalus (sOR: 7.78 [95% CI: 3.77-16.05]; P < .00001; 58/431 vs 11/565 patients in 11 studies). They also had decreased survival (median survival: 16.8 vs 19.1 mo; 413 vs 322 patients in 10 studies; hazard ratio: 1.25 [95% CI: 1.05-1.48], P = .01).

The association between ventricular entry during HGG resection and tumor dissemination, hydrocephalus, and decreased survival invites investigations to understand this link. Neurosurgeons and neuro-oncologists must be aware of the consequences of ventricular entry during surgery for HGG [1].

Clinical features

Intracranial hypertension and hydrocephalus are observed in about half of patients with LM. They are responsible for rapidly declining neurological status and eventual poor outcome in many patients with LM.

Glioblastoma

The rate of leptomeningeal metastasis in cases of GBM has been reported variably. In a study involving 600 patients with intracranial GBM, only 2% had symptomatic CSF tumor dissemination [2].

SLM need to be suspected in patients with a past history of intracranial GBM, who present with clinical features that can not been explained by the primary lesion. Awareness of this complication might facilitate more rapid diagnosis and treatment [3].

Treatment

Impediment of CSF circulation is considered the pathophysiological basis of increased intracranial pressure and hydrocephalus related to LM, which makes ventriculoperitoneal shunt (VP shunt) and lumboperitoneal shunt an acceptable palliative approach for LM now.

Treatment options for leptomeningeal metastasis are not very satisfactory. Surgery may be attempted if there is a large metastatic deposit, but usually leptomeningeal metastases are not amenable to surgery due to the diffuse nature of the disease. In both of our patients there was diffuse involvement of the spine, hence surgery was not possible. Intravenous or intrathecal chemotherapy has not found to be very useful. The treatment of leptomeningeal metastasis is mainly palliative.

External beam radiotherapy is the most common modality of palliation used, but it only causes pain relief with no improvement in neurological deficit [4].

Prognosis

Given the overall poor outcomes, improved therapeutic approaches are needed for glioblastoma patients with LMD [5].

The prognosis of patients with leptomeningeal metastasis in cases of glioblastoma multiforme is bleak and nearly always leads to a fatal outcome with 75% of the patients dying almost within 18 months of the diagnosis [6].

Radiotherapy for spinal disease may provide important symptom relief but the prognosis of these patients remains dramatically poor. As the local control of primary glioblastoma multiforme has improved with recent therapeutic advances, distant metastasis from high-grade gliomas is likely to become a more common clinical problem and such patients need to be included in clinical trials to evaluate new therapeutic approaches [7].

Early identification of leptomeningeal spread could enable these patients to benefit from radiation therapy before they develop severe neurological deficits, which might translate into longer acceptable quality of life for these mostly young patients [8].

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