Outcome in AIDS-Related Systemic Non-Hodgkin Lymphoma and Leptomeningeal Disease Is Not Predicted by a CT Brain Scan

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BACKGROUND AND PURPOSE: AIDS-related systemic non-Hodgkin lymphoma (ARL) remains a significant cause of morbidity in patients infected with the human immunodeficiency virus (HIV-1), and leptomeningeal disease in this setting has a dismal prognosis. We investigated the utility of brain CT in determining the outcome of leptomeningeal disease, despite MR imaging being the gold standard.

MATERIALS AND METHODS: From a cohort of 9621 HIV-1-seropositive individuals, we identified those diagnosed with ARL in the highly active antiretroviral therapy (HAART) era who had both a lumbar puncture and central nervous system imaging using a CT brain scan at the time of initial diagnosis, and we compared survival parameters between those with and without leptomeningeal disease.

RESULTS: In a cohort of 82 individuals with ARL treated in the era of HAART, we found that the survival of individuals with leptomeningeal disease defined as the presence of cells in the CSF was worse compared with that of other patients (P = .0026). However, when defined by the presence of abnormal enhancement or parenchymal lesions on a CT scan, the outcome was not significantly different.

CONCLUSION: A CT brain scan appears not to offer additional prognostic information following a lumbar puncture in patients with ARL.
Individuals with ARL have a poor prognosis, regardless of the histologic type. We found that individuals with meningeal ARL (leptomeningeal disease), defined as the presence of malignant cells in a diagnostic lumbar puncture at the time of diagnosis, had a worse outcome compared with those individuals without meningeal ARL (logrank \( P = .0026 \), Fig 1). However, measured overall survival was not affected by meningeal disease, defined by abnormal CT enhancement (logrank \( P = .126 \)) or by parenchymal lesions demonstrated on CT (logrank \( P = .073 \)). Both parenchymal lesions on CT scan and/or abnormal meningeal enhancement did, however, correlate with meningeal disease (defined by CSF cytology; \( P = .3 \) and \( P = .05 \), respectively).

Although the numbers of individuals with CNS pathology are small, it appears that a CT brain scan does not add prognostic information over CSF protein and cell count in the diagnosis of meningeal involvement. This disease has become an increasingly important late complication in oncology and HIV medicine, as patients survive longer and develop more CNS involvement and newer chemotherapies fail to penetrate the blood-brain barrier. As such, leptomeningeal lymphoma can be considered an emerging tumor entity, as well as a variant of CNS metastases. The hallmark of clinical presentation is a patient with cancer who has focal neurologic dysfunction and is found to have multifocal signs on neurologic examination. The clinical course is relentlessly progressive, and treatment is limited. This study confirms the poor prognosis and suggests that a CT brain scan does not provide additional prognostic information over and above CSF protein and cytospin, in the diagnosis of leptomeningeal ARL. Although this is not surprising because CT cannot exclude leptomeningeal disease, a CT brain scan may, however, be useful to exclude a space-occupying lesion as a cause of raised intracranial pressure, in addition to a lumbar puncture.

References