Herpes simplex encephalitis diagnosis

Diagnosis can often be made on the basis of history, CSF, and MRI.

1. CSF: leukocytosis (mostly monos), RBCs 500–1000/mm3, (NB: 3%have no pleocytosis), protein rises markedly as the disease progresses. HSV antibodies may appear in the CSF but takes at least ≈ 14 days and is thus not useful for early diagnosis

Polymerase chain reaction (PCR) analysis of cerebrospinal fluid (CSF) has revolutionized the diagnosis of nervous system viral infections, particularly those caused by human herpesviruses (HHV). The PCR technique allows the detection of minute quantities of DNA or RNA in body fluids and tissues. Both fresh-frozen and formalin-fixed tissues may be utilized for PCR assays, with the latter making archival studies possible. CSF PCR has now replaced brain biopsy as the gold standard for the diagnosis of herpes simplex virus (HSV) encephalitis. PCR analysis of both CSF and nervous system tissues has also broadened our understanding of the spectrum of disease caused by HSV-1 and -2, cytomegalovirus (CMV), Epstein-Barr virus (EBV), varicella zoster virus (VZV) and HHV-6. PCR results obtained from tissue specimens must be interpreted cautiously, since this highly sensitive technique may detect portions of viral genomic material that may be present even in the absence of active viral infection. Tissue PCR results in particular must be corroborated with clinical and neuropathologic evidence of central nervous system (CNS) infection. In several neurological diseases, negative PCR results have provided evidence against a role for herpesviruses as the causative agents [1].

2. EEG: periodic lateralizing epileptiform discharges (PLEDs) (triphasic high-voltage discharges every few seconds) usually from the temporal lobe. EEG may vary rapidly over a few days (unusual in conditions mimicking HSE)

3. CT: edema predominantly localized in temporal lobes (poorer prognosis once hemorrhagic lesions visible). In one review, 38% of initial CTs were normal [2] (many were on early generation CT scanners or were done within 3 days of onset). Hemorrhages were apparent in only 12%of the initially abnormal CTs

4. MRI: more sensitive than CT [3], demonstrates edema as high signal on T2WI, primarily within the temporal lobe, with some extension across sylvian fissure (“Transylvanian sign”) [4] , especially suggestive of HSE if bilateral. Differentiate from MCA infarct (which may also span sylvian fissure) by typical arterial distribution of the latter. Enhancement doesn’t occur until the 2nd week

5. technetium brain scan: process localized to temporal lobes

6. brain biopsy: see Brain biopsy for Herpes simplex encephalitis.

False negatives may occur [5].

1)
DeBiasi RL, Kleinschmidt-DeMasters BK, Weinberg A, Tyler KL. Use of PCR for the diagnosis of herpesvirus infections of the central nervous system. J Clin Virol. 2002 Jul;25 Suppl 1:S5-11. Review. PubMed PMID: 12091076.
2) , 4)
Neils EW, Lukin R, Tomsick TA, Tew JM. Magnetic Resonance Imaging and Computerized Tomography Scanning of Herpes Simplex Encephalitis. J Neurosurg. 1987; 67:592–594
3)
Schroth G, Gawehn J, Thron A, et al. The Early Diag- nosis of Herpes Simplex Encephalitis by MRI.

Neurology. 1987; 37:179–183
5)
Whitley RJ, Soong S-J, Dolin R, et al. Adenosine Arabinoside Therapy of Biopsy-Proved Herpes Simplex Encephalitis: National Institute of Allergy and Infec- tious Diseases Collaborative Antiviral Study. N Engl J Med. 1977; 297:289–294