Brain biopsy for Herpes simplex encephalitis

Indications for brain biopsy: reserved for questionable cases. May not be necessary for patients with fever, encephalopathy, compatible CSF findings, focal neuro findings (focal seizure, hemiparesis, or cranial nerve palsy), and supporting evidence of at least one of the following: focal EEG, CT, MRI or technetium brain scan abnormality.

Should be performed within ≤48 hrs of starting acyclovir (otherwise false negatives may occur).

Biopsy results: of 432 brain biopsies performed using the technique below, 45% had HSE, 22% had identifiable but non-HSE pathology (e.g. vascular disease, other viral infection, adrenal leukodystrophy, bacterial infection…), and 33% remained without a diagnosis [1)].

Technique

1. anterior inferior temporal lobe is preferred site

a) the side chosen for a biopsy is the one showing maximal involvement based on clinical information (e.g. localizing seizures), EEG and/or imaging studies [2)].

b) 10 ×10 ×5 mm deep specimen obtained from the anterior portion of the inferior temporal gyrus with NO COAGULATION on specimen side (cut surface with #11 blade, then cauterize pial surface on the non-specimen side)

c) 2nd specimen obtained from beneath surface specimen with fenestrated pituitary biopsy forceps

2. virus isolation is the most specific (100%) and sensitive (96–97%) test for HSE. Other findings (less accurate): perivascular cuffing, lymphocytic infiltration, hemorrhagic necrosis, neuronophagia, intranuclear inclusions (present in 50%)

3. if electron microscopy (EM) or immunohistofluorescence is available, 70% may be diagnosed within ≈ 3 hrs of biopsy

4. biopsy tissue handling

a) avoid macerating specimens for histology

b) tissue for EM: placed in glutaraldehyde

c) tissue for permanent histology: placed in formalin

d) tissue for culture:

● handling: the specimen is placed in a sterile specimen container and sent directly to the virology lab. If lab is closed, tissue may be placed in a regular refrigerator for up to 24 hrs or placed in – 70°C freezer for an indefinite time (virus remains viable for up to 5 yrs). DO NOT place the specimen in a regular freezer (destroys virus)

● cultures generally take at least 1 week to become positive

- cultures checked for 3 weeks before being declared negative

1)

Whitley RJ, Cobbs CG, Alford CA, et al. Diseases that Mimic Herpes Simplex Encephalitis: Diagnosis, Presentation, and Outcome. JAMA. 1989; 262:234–239

2)

Schlitt MJ, Morawetz RB, Bonnin JM, Zeiger HE, Whitley RJ. Brain Biopsy for Encephalitis. Clin Neurosurg. 1986; 33:591–602