Management of Viral Encephalitis in Adults and Children

Patient Information Leaflet

Summary document produced on behalf of the National Encephalitis Guidelines Developments Group and The Encephalitis Society

Association of British Neurologists, British Infection Association and British Paediatric Allergy Immunology and Infection Group National Guidelines
Management of Viral Encephalitis in Adults and Children

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‘Encephalitis’ is a term doctors use to describe inflammation or swelling of the brain.

There is a wide range of causes, but the most common is infection. This can either be infection of the brain, which is often due to viruses; or the inflammation can occur after an infection outside of the brain, when the body’s immune system over-reacts to the infection and starts to attack the brain.

Another, but more rare, cause is when the body’s immune-system starts to attack the brain without any infection being involved.

The most commonly identified viral infection is Herpes Simplex Virus. This is a virus that the vast majority of us are infected with; but for most of us there are no symptoms; the virus rests in the nerves and when it wakes up we pass the virus on in our saliva droplets without having any symptoms or occasionally develop a cold sore.

Very occasionally the virus can wake up and travel to the brain and cause the inflammation of ‘Encephalitis’. Despite anti-virus treatment some patients will still die and many will be left with significant difficulties, such as memory problems and epilepsy.

“Research has shown that it is important that doctors make the diagnosis and start treatment in good time so that patients have a better outcome.”

Professor Tom Solomon, Institute of Infection and Global Health
National guidelines to help professionals know what tests to do and what treatments to give have been developed by a group of doctors who first met in Liverpool in collaboration with The Encephalitis Society and members from professional bodies including the Association of British Neurologists, British Infection Association and British Paediatric Allergy Immunology and Infection Group.

These national guidelines were published in 2012 and are made up of two separate documents, one for the management of adults and one for children.

These guidelines firstly explain to doctors what symptoms and examination findings should raise a suspicion that the patient may have Encephalitis; secondly the guidelines explain what tests to perform and when to start treatment.

The guidelines also detail the follow-up that patients should receive and they also include information of the additional tests patients who have come from travelling abroad should have.

Most patients will need a lumbar puncture (spinal tap) to look for inflammation cells and infections in the spinal fluid.

Patients will also need to have a brain scan and some will need stickers placed on the outside of the head to measure the brain waves electroencephalography (EEG). The treatment for viral infections is an antivirus medication. As it can take 1-2 days to find the virus in the spinal fluid most patients will have the antivirus medication started before the virus is confirmed.

When the patient is on the antivirus medication the doctors will check their kidney function as the medication can sometimes cause kidney problems; but this should be reversible for most patients if caught early.

The guidelines recommend that all patients should be given a definite or probable diagnosis before they are sent home; also all patients should have access to neurological rehabilitation services if needed; and all patients should have at least one outpatient follow-up appointment.

“The guidelines also stress the importance of all patients and their carers being made aware of patient-sector support partners such as The Encephalitis Society (www.encephalitis.info).

Ava Easton, CEO, The Encephalitis Society
The Management of suspected viral Encephalitis

Clinical features suspicious of Encephalitis

Assess ABCD and check glucose (+/-involve ICU)

Clinical contraindication to immediate LP?*

No

Yes

If delay (>6 hours) expected: Start IV Aciclovir whilst results pending

Radiological contraindication to immediate LP?**

No

Yes

Urgent CT

Repeat LP after 24-48 hours

CSF findings suggest Encephalitis?****

Yes

IV Aciclovir

No

No ***

Review every 24 hours: ?LP

HSV/VZV Encephalitis confirmed

Alternative diagnosis

Immunosuppressed? Or age 3 months-12 years?

Yes

Involves Neurology and Infectious Disease Teams

No

14 days IV Aciclovir

21 days IV Aciclovir

Repeat LP

PCR positive?

Yes

No

Stop Aciclovir

7 days IV Aciclovir

For more information contact: www.encephalitis.info

Additional Investigations

Consider swab
- Throat
- Rectal
- Vesicle (if present)

Sputum (if symptoms)

Urine (if mumps)

If travel consider
- 3x thick/thin malaria films
- Rapid malaria antigen test
- CSF flavivirus igM

HIV (all patients)

If positive:
- CSF PCR for EBV + CMV
- CSF TB staining + culture
- CSF + blood culture for Listeria monocytogenes
- CSF india ink staining +/or cryptococcal antigen for Cryptococcus neoformans
- CSF PCR + serology for Toxoplasma gondii
- CSF + serum antibody for syphils

Consider:
- CSF PCR for HHV6 + 7
- CSF PCR for JC/BK virus
- CSF for Coccidioides + Histoplasma

If CSF HSV PCR not sent (on first LP)

- Repeat CSF PCR on 2nd LP
- Consider HSV CSF IgG at 10-14 days

EEG Indications

- If subtle motor status epilepticus suspected
- If unclear if psychiatric cause or encephalopathy

Involve

- Microbiology
- Virology
- Infectious Diseases
- Neurology

Aciclovir Dose:

(adjust for renal failure)

Given 8 hourly:
- Neonate-3 months: 20mg/kg
- 3 months-12 years: 500mg/m²
- >12 years: 10mg/kg

104x801 | The Management of suspected viral Encephalitis

CT (Computed tomography [brain scan])
CSF (Cerebrospinal fluid)
PCR (Polymerase chain reaction [virus detection])
GCS (Glasgow coma score)
ABCD (Airways, Breathing, Circulation and Disability)
ICU (Intensive Care Unit)
LP (Lumbar Puncture)
IV (Intravenous)
MC&S (Microscopy, Culture and Sensitivity)
MRI (Magnetic Resonance Imaging)
HSV (Herpes Simplex Virus)
VZV (Varicella Zoster Virus)
EBV (Epstein Barr Virus)
CMV (Cytomegalovirus)
TB (Tuberculosis)

Reference:
Journal of Infection 2012; 64(4):347-73

Patients (when conscious level permits) and their next-of-kin should be made aware of the support provided by voluntary sector partners such as The Encephalitis Society (www.encephalitis.info)

Tables associated with this algorithm are on the next page.
**Tables associated with the algorithm from the previous page**

*Clinical contraindications to lumbar puncture without neuro-imaging*
- Moderate-severe impairment of consciousness: Reduced of fluctuating GCS<13 or fall >2
- Focal neurological signs (e.g. unequal, dilated or poorly responsive pupils)
- Abnormal posture or posturing
- Papilloedema
- After seizures until stabalised
- Relative bradycardia with hypertension
- Abnormal ‘doll’s eye’ movements
- Immunocompromise
- Systemic shock
- Coagulation abnormalities:
  - Results (if obtained) outside the normal range
  - Platelet count <100x10^9 /L
  - Anticoagulant therapy
- Local infection at lumbar puncture site
- Respiratory insufficiency
- Suspected meningoccal septicaemia

**Radiological Contraindications to LP**
- Significant brain shift/swelling
- Tight basal cisterns
- Alternative diagnosis made

*** Many patients will need a CT before a LP, because of their clinical contraindications to an immediate LP; such patients should have a CT, and then ideally a LP should be considered on a case by case basis (if still indicated and no radiological contraindications are identified) within 6 hours.

**** CSF Interpretation

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Normal</th>
<th>Bacterial</th>
<th>Viral</th>
<th>Tuberculous</th>
<th>Fungal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening pressure</td>
<td>10-20cm</td>
<td>Highly Cloudy</td>
<td>Normal/high</td>
<td>High</td>
<td>High/very high</td>
</tr>
<tr>
<td>Colour</td>
<td>Clear</td>
<td>Cloudy</td>
<td>“Gin” clear</td>
<td>Cloudy/yellow</td>
<td>Clear/cloudy</td>
</tr>
<tr>
<td>Cells</td>
<td>&lt;5</td>
<td>High/very high 100-50000</td>
<td>Slightly increased 5-1000</td>
<td>Slightly increased &lt;500</td>
<td>Normal-high 0-1000</td>
</tr>
<tr>
<td>Differential</td>
<td>Lymphocytes</td>
<td>Neutrophilis</td>
<td>Lymphocytes</td>
<td>Lymphocytes</td>
<td>Lymphocytes</td>
</tr>
<tr>
<td>CSF/Plasma Glucose</td>
<td>50-66%</td>
<td>Low&lt;40%</td>
<td>Normal</td>
<td>Low-very low (30%)</td>
<td>Normal-low</td>
</tr>
<tr>
<td>Protein (g/l)</td>
<td>&lt;0.45</td>
<td>High &gt;1</td>
<td>Normal-high 0.5-1</td>
<td>High-very high 1.0-5.0</td>
<td>Normal-high 0.2-5.0</td>
</tr>
</tbody>
</table>

References:

If you would like to read the article in full, it is available on the following website:
www.journalofinfection.com/article/S0163-4453(11)00563-9/fulltext


If you would like to read the article in full, it is available on the following website:
www.journalofinfection.com/article/S0163-4453(11)00562-7/fulltext