**Management of Bacterial Meningitis in infants <3 months**

**Suspect of bacterial meningitis?**

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
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<tbody>
<tr>
<td>Fibrous infant?</td>
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<tr>
<td>+1 month of age?</td>
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**NO**

**THINK**

Could this be a case of bacterial meningitis?

**BOX 1** Consider possible risk factors:
- Clinical features in infants <3 months (% of cases):
  - Poor feeding (67%)
  - Lethargy (65%)
  - Irritability (65%)
  - Fever (63%)
  - Respiratory distress including grunting (44%) and need for mechanical ventilation in a term baby
  - Poor perfusion (44%)
  - Temperature instability (36%)
  - Apnoea (30%)
  - Breathing abnormalities (25%)
  - Seizures (25%)
  - Coma (3%)

**BOX 2** Diagnostic tests:
- Blood:
  - limited volume: pronged blood gas, lactate, electrolytes, FBC and clotting
  - Also: Blood culture, CRP, BILEA-FST, White blood (WST) count for POC
- N. Initial CRP may be normal
- CSF:
  - MS, glucose, protein, VDRL (herpes, enterovirus, parvovirus) and bacterial PCR.

**BOX 3** Contraindications to Lumbar Puncture:
- Shock
- Coma
- After consultation until stabilised or consultation
- +30 mins
- Coagulation abnormalities:
  - clotting studies (if indicated) outside normal range
  - Platelet count below 100 x 10⁹/L
  - Anticoagulant therapy
- Local surgical infection at LP site
- Neurological insufficiency
- Other clinical or radiological signs of raised intracranial pressure
- Reduced (GCS ≤5) or fluctuating level of consciousness
- Relative Bradycardia
- Hypertension
- Focal neurological signs
- Abnormal postural response
- Unresponsive pupil
- Papilloedema (late sign)
- Absent b- wave movement

Perform delayed LP in infants with suspected bacterial meningitis when contraindications no longer present.

**BOX 4** Antibiotic doses:
- Cefotaxime: 150mg/kg, 7-27 days every 12hrs, 28-89 days every 6hrs, 1×1 month every 8hrs, Max 125mg/day
- Amoxicillin: 100mg/kg, >7 days every 12hrs, 7-28 days every 6hrs, Max 125mg/day
- Vancomycin: 10mg/kg, adjusted according to plasma concentration, <25 weeks corrected gestational age (CGA) every 24hrs, 25-44 weeks CGA every 12hrs, >45 weeks CGA every 24hrs, Max 25g daily.

**BOX 5** Contraindications to Ceftriaxone:
- Neonates <4 weeks corrected gestational age
- +30 mins
- Jaundice
- Acrocyanosis
- Hypocalcaemia
- Intravenous administration of calcium containing infusions (inc total parenteral nutrition containing calcium)

**BOX 6** Lumbar puncture results suggestive of meningitis:
- In neonates (<39 weeks old), 20 cells µl
- In neonates >39 weeks old, 10 cells µl
- Bacterial LP if CSF blood stained or difficult to interpret as positive for meningitis until result known.

Do not wait for LP results before starting antibiotics.

**BOX 7** Consider herpes simplex infection:
- If HSV is a differential diagnosis give Aciclovir.
- HSV may be suspected in the presence of seizures, abnormal LAFT, abnormal clotting, sepsis, rash, maternal history, negative Gram stain/cultures.
- Send CSF for PCR if CSF Gram stain negative and no growth.

**BOX 8** Repeat LP after starting treatment if:
- Persistent or changing fever, new clinical findings (esp. neurologic) - Determining clinical condition.
- Persistently abnormal inflammatory markers.

**BOX 9** Empirical antibiotics for suspected meningitis:
- Ceftriaxone: 100mg/kg, given i.v., 7-27 days every 12hrs, 28-89 days every 6hrs, 1×1 month every 8hrs, Max 125mg/day
- Amoxicillin: 100mg/kg, >7 days every 12hrs, 7-28 days every 6hrs, Max 125mg/day

**BOX 10** Specific pathogen identified?

No

- Consider antibiotics/revised antibiotics if cerebral ultrasound.
- Consider anthrax meningitis.

Yes

- Review antibiotic sensitivities.
- Consider site of infection.

**Follow up schedule**

**#1**

- Follow up appointment
- Potential long term management

**#2**

- Follow up appointment
- Potential long term management

**#3**

- Follow up appointment
- Potential long term management

**#4**

- Follow up appointment
- Potential long term management

**#5**

- Follow up appointment
- Potential long term management

**#6**

- Follow up appointment
- Potential long term management

**#7**

- Follow up appointment
- Potential long term management

**#8**

- Follow up appointment
- Potential long term management

**#9**

- Follow up appointment
- Potential long term management

**#10**

- Follow up appointment
- Potential long term management