

Discuss the likely diagnosis and the initial management of an 12 month old infant who presents to the Emergency Medicine Department of a non-specialist hospital with a 24 hour history of fever and choryzal symptoms. The infant was irritable but now appears lethargic and is noted to be developing a petechial rash.

Diagnosis

The most likely diagnosis is meningococcal disease caused by the bacterium *Neisseria meningitidis* (meningococcus) [type B - following the success of type C vaccine. Include for 4].

[Meningococcal disease most commonly presents as bacterial meningitis (15% of cases) or septicaemia (25% of cases), or as a combination of the two syndromes (60% of cases). Include for 4]

It is important that the candidate recognizes the urgency of the situation and should proceed with rapid assessment, initial treatment and stabilization before transfer to a tertiary centre.

Initial assessment should follow ABCDE principles paying particular attention to development of shock. It is important to note the extent and development of the non-blanching petechial rash that may become purpuric and confluent.

Base line monitoring, SaO₂, ECG, NIBP, should be established.

Airway & breathing assessment may reveal tachypnoea. Signs of developing shock include increasing lethargy and decreased responsiveness, tachycardia, delayed capillary refill (>3secs), cold peripheries (skin/core temperature difference) and hypotension. Baseline neurological status should be assessed and recorded.

Initial Management.

The infant should be given 100% oxygen 15 l/min via a facemask.

Intravenous access **MUST** be established, ideally two peripheral cannulae sited. If IV access cannot be established then an intraosseous needle should be inserted (usually inserted into the proximal tibia) and secured.

At the time of IV insertion bloods should be taken for PCR for *N.meningitidis* (to confirm the diagnosis), venous blood gas, FBC, coagulation studies, U&E, blood glucose, CRP, blood cultures.

An initial fluid bolus of isotonic crystalloid solution @ 20mls/kg (estimated wt approx 10kg) either N saline or Hartman's Solution should be given to the infant.

Administration of antibiotics, cefotaxime 50mg/kg or ceftriaxone 80 mg/kg, should not be delayed and should be given IV or IO after initial fluid resuscitation has commenced. [N.B. ceftriaxone cannot be administered with Ca²⁺ containing solutions because of concerns about chelation. Administration of antibiotics can result in release of bacterial endotoxins that may be cardiotoxic resulting in cardiac dysfunction and hypotension. Include these points for 4]

The infant should be reassessed and if not haemodynamically stable a further fluid bolus 20mls/kg should be given. This may be crystalloid as above or colloid, 4.5% human albumin 20mls/kg. A third fluid bolus may be required (N.B. risk of developing pulmonary oedema).

A lumbar puncture should not be undertaken at this time. (Candidates recommending LP at this point should be marked down)

The infant should be frequently reassessed using ABC protocol.

An infant who continues to be unstable, with altered level of consciousness or risk of developing pulmonary oedema will require intubation. Ketamine (2mg/kg) is the induction agent of choice. ETT size 4.5.

Continuing hemodynamic instability will require inotropic support.

When stable the patient should be transferred to a tertiary PICU.

Suggested Marking Scheme

- | | |
|---|---|
| 4 | As 3 below but also includes a discussion of meningococcal disease, concerns with ceftriaxone and calcium containing solutions and possible effects of endotoxin release. |
| 3 | A solid answer that correctly identifies the diagnosis, the deteriorating condition of the infant and the need for urgent treatment and stabilization prior to transfer to a tertiary centre. |
| 2 | Inadequate or inappropriate treatment and stabilization prior to transfer to a tertiary centre. |
| 1 | Incorrect diagnosis, failure to recognize the deteriorating condition of the infant. Inadequate or inappropriate treatment and stabilization prior to transfer to a tertiary centre. |