

# Early Management of Suspected Bacterial Meningitis and Meningococcal Septicaemia in Immunocompetent Adults\*

## Early Recognition

- Petechial/purpuric non-blanching rash or signs of meningitis
- A rash may be absent or atypical at presentation
- Neck stiffness may be absent in up to 30% of cases of meningitis
- Prior antibiotics may mask the severity of the illness



typical meningococcal rash

Courtesy: Dr A. Renden

## Assess Severity & Immediate Intervention<sup>a</sup>

- Airway
- Breathing - Respiratory Rate & O<sub>2</sub> Saturation
- Circulation - Pulse; Capillary Refill Time (hypotension late); Urine output
- Mental status (deterioration may be a sign of shock or meningitis)
- Neurology – Focal neurological signs; Persistent seizures; Papilloedema

Secure Airway  
High Flow O<sub>2</sub>

Large bore IV Cannula ± fluid resuscitation

## Priority Investigations:

- FBC; U+Es; Blood sugar, LFTs; CRP
- Clotting profile
- Blood gases

## Microbiology:

- Blood culture
- Throat swab
- Clotted blood
- EDTA blood for PCR

## Additional Information

### <sup>a</sup> Warning Signs (see refs)

The following warn of impending/worsening shock, respiratory failure or raised intracranial pressure and require urgent senior review and intervention (see algorithm):

- Rapidly progressive rash
- Poor peripheral perfusion, CRT > 4 secs, oliguria and systolic BP < 90 (hypotension often a late sign)
- RR < 8 or > 30
- Pulse rate < 40 or > 140
- Acidosis pH < 7.3 or BE worse than - 5
- WBC < 4
- Marked depressed conscious level (GCS < 12) or a fluctuating conscious level (fall in GCS > 2)
- Focal neurology
- Persistent seizures
- Bradycardia and hypertension
- Papilloedema

### <sup>b</sup> CT scan and meningitis (see refs)

This investigation should only be used when appropriate:

- A normal CT scan does not exclude raised intracranial pressure
- If there are no clinical contraindications to LP, a CT scan is not necessary beforehand
- Subsequently a CT scan may be useful in identifying dural defects predisposing to meningitis

### <sup>c</sup> Appropriate antibiotics for bacterial meningitis (see refs)

Review with microbiology:

- Ampicillin IV 2g qds should be added for individuals >55 years to cover Listeria
- Vancomycin ± rifampicin if pneumococcal penicillin resistance suspected
- Amend antibiotics on the basis of microbiology results

### <sup>d</sup> Corticosteroids in adult meningitis (see refs)

- Dexamethasone 0.15mg/kg qds for 4 days started with or just before the first dose of antibiotics, particularly where pneumococcal meningitis is suspected
- Do not give unless you are confident you are using the correct antimicrobials
- Stop the dexamethasone if a non-bacterial cause is identified

## Predominantly Meningococcal Septicaemia

- Do not attempt LP
- IV 2g Cefotaxime or Ceftriaxone
- Call critical care team for review

## Predominantly Meningitis<sup>b,c,d</sup>

- Assess patient carefully before performing LP
- Call critical care team if any features of raised intracranial pressure, shock or respiratory failure
- If uncertain ask for senior review
- Monitor and stabilise circulation

### Signs of Shock<sup>a</sup>

YES NO

## Priorities

- Secure airway + High flow O<sub>2</sub>
- Volume resuscitation
- Senior review
- Management in critical care unit

Poor response

Good response

## Further interventions

- Pre-emptive Intubation + Ventilation
- Volume support
- Inotropic/ Vasopressor Support
- Good glycaemic control<sup>12</sup>
- In refractory circulatory failure, physiological replacement corticosteroid therapy may be beneficial<sup>13</sup>

### No Raised ICP No Shock No Respiratory Failure<sup>a,b</sup>

## Lumbar puncture<sup>a,b</sup>

- IV 2g Cefotaxime/ Ceftriaxone immediately after LP
- Consider corticosteroids<sup>d</sup> if LP will be delayed for more than 30 minutes give IV antibiotics first

### Signs of Raised ICP<sup>a,b</sup>

## Priorities

- Secure airway + High flow O<sub>2</sub>
- Defer lumbar puncture
- IV 2g Cefotaxime/Ceftriaxone
- Consider corticosteroids<sup>d</sup>
- Careful volume resuscitation
- 30° head elevation
- Management in critical care unit
- Low threshold for elective Intubation + Ventilation (cerebral protection)

## Careful Monitoring<sup>a</sup> Repeated Review

### Public Health/Infection Control

- Notify CCDC†
- If probable or confirmed meningococcal disease, contact CCDC† urgently regarding prophylaxis to contacts
- Notify microbiology
- Isolate patient for first 24 hours

### References:

1. Begg N, Cartwright KA, Cohen J, Kaczmarek EB, Innes JA, Leen CL, et al. Consensus statement on diagnosis, investigation, treatment and prevention of acute bacterial meningitis in immunocompetent adults. British Infection Society Working Party. J Infect 1999;39:1-15.
2. de Gans J, van de Beek D. Dexamethasone in adults with bacterial meningitis. N Engl J Med 2002; 347:1549-1556.
3. Durand ML, Calderwood SB, Weber DJ, Miller SI, Southwick FS, Caviness VS, Jr., Swartz MN. Acute bacterial meningitis in adults. A review of 493 episodes. N Engl J Med 1993;328:21-28.
4. Heyderman RS, Klein NJ. Emergency management of meningitis. J R Soc Med 2000;93:225-229.
5. Hasbun R, Abrahams J, Jekel J, Quagliarello VJ. Computed tomography of the head before lumbar puncture in adults with suspected meningitis. N Engl J Med 2001;345:1727-1733.
6. Kneen R, Solomon T, Appleton R. The role of lumbar puncture in suspected CNS infection—a disappearing skill? Arch Dis Child 2002;87:181-183.
7. HPA Meningococcus and Haemophilus Forum. Guidance for public health management of meningococcal disease in the UK. Updated March 2012. [http://www.hpa.org.uk/webc/hpaWebFile/HPAweb\\_C/1194947389261](http://www.hpa.org.uk/webc/hpaWebFile/HPAweb_C/1194947389261).
8. Pollard AJ, Britto J, Nadel S, DeMunster C, Habibi P, Levin M. Emergency management of meningococcal disease. Arch Dis Child 1999;80:290-296.
9. Riordan FA, Thomson AP, Sils JA, Hart CA. Who spots the spots? Diagnosis and treatment of early meningococcal disease in children. BMJ 1996;313:1255-1256.
10. Rivers E, Nguyen B, Havstad S, Ressler J, Muzzin A, Knoblich B, Peterson E, Tomlanovich M. Early goal-directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med 2001;345:1368-1377.
11. Sigurdardottir B, Bjornsson OM, Jonsdottir KE, Erlendsdottir H, Gudmundsson S. Acute bacterial meningitis in adults. A 20-year overview. Archives of Internal Medicine 1997;157:425-430.
12. van den Berghe G, Wouters P, Weekers F, Verwaest C, Bruyninckx F, Schetz M, Vlasselaers D, Ferdinande P, Lauwers P, Bouillon R. Intensive insulin therapy in the critically ill patients. N Engl J Med 2001;345:1359-1367.
13. Annane D, Bellissant E, Bollaert PE, Briegel J, Keh D, Kupfer Y. Corticosteroids for severe sepsis and septic shock: a systematic review and meta-analysis. BMJ 2004; 329:480-489.