

# Communicable Disease Control in Emergencies - A Field Manual (WHO - OMS, 2003, 223 p.)

## 5.14 MENINGOCOCCAL MENINGITIS (EPIDEMIC)

### Basic facts

- Meningococcal meningitis is an acute inflammation of the meninges, usually caused by bacteria.
- Large outbreaks of meningitis are mainly due to the meningococcus, *Neisseria meningitidis* (serogroups A, C and, more recently, W135 + C).
- *N. meningitidis* also causes meningococcal septicaemia, a severe disease with signs of acute fever, purpura and shock. It is less common but the case fatality rate is high.
- *N. meningitidis*, *Streptococcus pneumoniae* and *Haemophilus influenzae* account for 80% of all cases of bacterial meningitis.
- Viral meningitis is rarely serious and may be due any of a number of viruses (such as coxsackie virus or enterovirus).
- Displaced populations are at increased risk of meningitis owing to overcrowding, poor hygiene and poor access to health care.
- Epidemics in refugee camps have mainly been due to *N. meningitidis* serogroup A.
- Endemic attack rates in sub-Saharan Africa range from under 10 to over 20 per 100 000 population.
- Epidemic attack rates in Africa can be as high as 1000 per 100 000 population.
- Some 80% of cases of meningococcal meningitis occur in those under 30 years of age.
- Without appropriate treatment, the case fatality rate in meningococcal meningitis can be as high as 50%; with treatment this can be reduced to 5-15%.
- Vaccines are available against meningococcus A, C, Y and W135, and these are very effective in controlling epidemics. When used in rapid mass campaigns, vaccination can contain an outbreak within 2-3 weeks. The vaccine efficacy rate is 90% one week after injection for those over 2 years of age.

## **Clinical features**

The clinical case definition is sudden onset of fever ( $>38.0$  °C axillary) and one of the following: neck stiffness, altered consciousness; other meningeal sign; or petechial or purpurial rash.

In patients under 1 year of age, meningitis is suspected when fever is accompanied by a bulging fontanelle.

## **Diagnosis**

Lumbar puncture is necessary to determine if acute meningitis is bacterial, and to identify the meningococcus (and exclude other causative pathogens, such as pneumococcus and *H. influenzae*). Lumbar puncture should be done as soon as meningitis is suspected prior to starting antimicrobial treatment.

In bacterial meningitis, the cerebrospinal fluid is usually cloudy or purulent (but may be clear or bloody). The basic laboratory examination consists of a white cell count (WCC), protein concentration and Gram's stain.

### **Meningococcal meningitis if:**

WCC:  $>1000$  cells/mm<sup>3</sup> ( $<3$  in normal CSF) with  $>60\%$  polymorphs

Protein concentration:  $>0.80$ g/l ( $<0.60$ g/l in normal CSF)

Gram's stain: Gram negative diplococci (intra- or extracellular) in 80% of cases not previously treated

### *Differential diagnosis*

A lumbar puncture should be performed and the cerebrospinal fluid examined to differentiate viral from bacterial meningitis (see Annex 8).

Thick and thin smears should be made to differentiate meningococcal meningitis from cerebral malaria in malaria-endemic areas.

## **Case management**

- Bacterial meningitis, particularly meningococcal meningitis, is potentially fatal and is a medical emergency:
- Viral meningitis is rarely serious and requires supportive care, but a lumbar puncture is necessary to differentiate it from bacterial meningitis.
- All suspected meningitis patients should be admitted to hospital or a health centre for diagnosis and case management.
- A lumbar puncture should be performed and antimicrobial treatment given immediately without waiting for the results (see Tables 5.14 and 5.15).

- Treatment with antimicrobials should not be delayed if lumbar puncture cannot be performed.
- Intravenous administration of penicillin G, ampicillin, ceftriaxone or cefotaxime is recommended for bacterial meningitis; ceftriaxone and cefotaxime are very expensive, however.
- In patients where the intramuscular or intravenous route is not possible, oral administration is acceptable but higher doses are necessary.
- During large epidemics among refugees or displaced populations, a single-dose regimen of oily chloramphenicol intramuscularly can be used if resources or circumstances do not permit the administration of a full course of standard treatment.

**Table 5.14. Initial empirical antimicrobial therapy for presumed bacterial meningitis**

Age group Epidemic situations	Probable pathogens	Antimicrobial therapy	
		First choice	Alternative
All age groups Non-epidemic situations	<i>N. meningitidis</i>	Penicillin G or oily chloramphenicol	Ampicillin or ceftriaxone or cefotaxime or co-trimoxazole
Adults and children > 5 years	<i>N. meningitidis</i> <i>S. pneumoniae</i>	Penicillin G or oily chloramphenicol	Ampicillin or ceftriaxone or cefotaxime or co-trimoxazole
Children 1 month to 5 years	<i>H. influenzae</i> <i>S. pneumoniae</i> <i>N. meningitidis</i>	Ampicillin or amoxicillin or chloramphenicol	Ceftriaxone or cefotaxime
Neonates	Gram-negative bacteria Group B streptococci <i>Listeria</i> spp.	Ampicillin and gentamycin	Ceftriaxone or cefotaxime or chloramphenicol

- In meningococcal septicaemia with purpura and shock, shock should be treated by restoring blood volume.
- Chemoprophylaxis of contacts is not recommended in emergency situations.
- Supportive therapy should be given to maintain hydration and adequate nutrition.
- Convulsions should be treated with diazepam, intravenously or rectally.
- The patient should be nursed in a shaded and well ventilated area. The unconscious or semi-conscious patient should be nursed on his/her side; turning every 2-3 hours can prevent pressure sores.

**Table 5.15. Antimicrobials to treat bacterial meningitis**

Agent	Route	Daily dose, adults	Daily dose, children	Duration (days)	Cost <sup>a</sup>
Penicillin G	IV	3-4 MU four/six times	400 000 U/kg	> 4	Low
Ampicillin/ amoxicillin	IV	2-3 g twice	250 mg/kg	> 4	Moderate
Amoxicillin	Oral	2-3 g twice	250 mg/kg	> 4	High
Chloramphenicol	IV	1 g twice/three times	100 mg/kg	> 4	Moderate
Chloramphenicol (oily)	IM	3 g single dose	100 mg/kg	1-2	Low
Cefotaxime	IV	2 g twice	250 mg/kg	> 4	Very high
Ceftriaxone	IV	1-2 g once/twice	50-80 mg/kg	> 4	Very high
Ceftriaxone	IM	1-2 g single dose	50-80 mg/kg	1-2	High
Co-trimoxazole	IV/IM	2 g SMZ <sup>b</sup> twice	100 mg/kg	> 4	Moderate
Co-trimoxazole	Oral	2 g SMZ <sup>b</sup> twice	100 mg/kg	> 4	Low
Sulfadiazine	IV	1 g six times	200 mg/kg	> 4	Low

<sup>a</sup> Cost of full treatment: Low: <US \$10; Medium: US \$10-50; High: US \$50-250.

<sup>b</sup> SMZ= sulfamethoxazole

### Prevention and control measures

See Section 4.2.2 for detecting an outbreak of meningococcal meningitis (alert and epidemic thresholds).

See Section 2.6.5 for implementing a mass immunization campaign.

### Further reading

*Conduite à tenir en cas d'épidémie de méningite à méningocoque.* Paris, Médecins sans Frontières, 1996.

*Control of epidemic meningococcal diseases: WHO practical guidelines*, 2nd ed. Geneva, World Health Organization, 1998 (document WHO/EMC/BAC/98.3).

Detecting meningococcal meningitis epidemics in highly-endemic African countries: WHO recommendation. *Weekly epidemiological record*, 2000, 38:306-309.

*Emergence of W135 meningococcal disease. Report of a WHO Consultation, Geneva, 17-18 September 2001.* Geneva, World Health Organization, 2001 (document WHO/CDS/CSR/GAR/2002.1).

*Laboratory methods for the diagnosis of meningitis caused by Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae.* Geneva, World Health Organization, 1999 (document WHO/CDS/CSR/EDC/99.7).