NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

Meningococcal Disease

An update for Health Care Workers

Centre for Respiratory Disease and Meningitis
National Institute for Communicable Diseases
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Meningococcal disease is a severe but uncommon infection that occurs when meningococcal bacteria (*Neisseria meningitidis*) invade the blood or cerebrospinal fluid from the throat or nose. Disease onset is rapid and severe and all cases require urgent medical attention. Even with access to the best medical care 17% of cases are fatal with a similar proportion of survivors suffering lifelong complications, such as loss of limb(s), deafness, nervous system problems, or brain damage.
Meningococcal disease is endemic to South Africa, occurring all year round with a peak from June to October. In 2017, the annual incidence was 0.2 cases per 100,000 population. The majority of disease in South Africa is caused by serogroups B and W, followed by C and Y. Infants are the most affected followed by a second peak in the 15-24 year age category.

Although more than one clinical syndrome can occur simultaneously, invasive meningococcal disease occurs in two main forms:

- **meningococcal meningitis** - when the bacteria infect the lining around the brain and spinal cord
- **meningococcal septicaemia** - when the bacteria invade the bloodstream.

Signs and symptoms

Persons with meningococcal meningitis or septicaemia may start out with flu-like symptoms which rapidly progress (sometimes within hours) causing severe illness or even death. Health care workers should consider meningococcal disease when persons present with a non-specific illness that is rapidly deteriorating.

Common symptoms occurring in children and adults could include: sudden onset of a high fever, severe headache, neck stiffness, dislike of bright lights (photophobia), vomiting and/or severe diarrhoea or stomach pains, painful joints, pale and blotchy skin, very cold hands and feet, seizures, and/or drowsiness that can deteriorate into a coma.

Symptoms in infants are harder to detect and could include: a fever with cold peripheries, high pitched moaning or whimpering, blank staring, inactivity, drowsiness, poor feeding, opisthotonus (neck retraction with arching of the back), and/or a pale and blotchy complexion.

A late symptom of septicaemia is the characteristic purpuric rash. It begins as a cluster of pinprick blood spots under the skin, spreading to form bruises. The rash can appear anywhere on the body and does not fade when pressed under the bottom of a glass (tumbler test). Development of this rash is a medical emergency.

Treatment

Suspected meningococcal disease is a medical emergency and treatment should not be delayed (even whilst awaiting transfer, lumbar puncture, imaging, or laboratory confirmation).

Intravenous ceftriaxone (adults: 2g 12 hourly or infants/children: 50mg/kg/dose 12 hourly) or cefotaxime (adults: 2g 6 hourly or infants/children: 50mg/kg/dose 6 hourly) should always be used for empiric therapy for suspected bacterial meningitis. Once confirmed meningococcal septicaemia/meningitis, the recommended drug of choice is high dose IV benzyl penicillin (adults: 5 MU 6 hourly or infants/children: 100,000 U/kg/dose 6 hourly) for 5-7 days.

Patients with known or suspected meningitis should ideally be isolated at the time of admission in a single bedded ward with respiratory droplet precautions, and can be transferred to a general ward after receiving 24 hours of treatment with a drug that will eliminate nasopharyngeal carriage (ceftriaxone/ cefotaxime). Patients on penicillin alone should receive chemoprophylaxis to eradicate nasopharyngeal carriage.

Laboratory Diagnosis

Confirmation of disease requires either:

- isolation of the organism from a normally sterile body site (i.e. cerebrospinal fluid (CSF) or blood) or

- DNA detection by PCR assay (from CSF, EDTA-coagulated whole blood, serum, plasma, , or joint fluids)

Blood cultures should be collected using strict aseptic technique and transported at room temperature to the laboratory within 3-4 hours.

Lumbar puncture should only be performed where NO contraindications exist (i.e. hypotension, bleeding tendency, focal neurological impairment and severe brain swelling on imaging). If meningococcal disease is suspected in a primary care setting lumbar puncture should be delayed until arrival in hospital.

CSF should be sent for protein, glucose, direct microscopy (cell count and Gram stain), culture and antibiotic susceptibility. Rapid bacterial antigen detection tests should not be used routinely as they are not always reliable.

Disease Transmission

Neisseria meningitidis is carried asymptomatically in the oropharynx by approximately 5-10% of the population. It is spread person to person through aerosolised respiratory droplets during close personal contact. Carriage prevalence generally peaks in young adults. Meningococcal disease occurs when an invasive strain of the organism invades the mucosa and enters the bloodstream causing septicaemia and/or meningitis. Meningococcal disease usually occurs 3-7 days after exposure to an invasive organism. Meningococcal disease rarely spreads from person to person, rather it is obtained through contact with an asymptomatic carrier.

Prevention

Certain strains of meningococcal disease can be prevented through vaccination. South Africa currently has two quadrivalent (targeting serogroups A, C, W and Y) formulations of vaccine registered: a polysaccharide vaccine (suitable only for those > 2 years of age) and a conjugate vaccine (suitable for use from age 9 months). Where possible in persons who remain at high-risk of meningococcal disease, conjugate vaccine is preferred as hypo-immunity has been associated with repeated doses of the plain polysaccharide vaccine.

Currently there are no vaccines targeting meningococcus serogroup B registered in South Africa. Although vaccine is recommended for certain high risk groups, meningococcal vaccine is not part of the national immunisation programme in South Africa.

Chemoprophylaxis should be offered to close contacts of confirmed/probable cases. Close contacts include those who have had prolonged close contact with the case in the 7 days preceding the illness. Examples of such would be those living and sleeping in the same household/ army barracks/ hostel/ dormitory. Transient close contacts only require prophylaxis if they have been exposed to large droplets or secretions from the respiratory tract, for example, intimate kissing/sexual partners and ambulance/emergency personnel. Prophylaxis is NOT routinely indicated following a single case for all work/school contacts (unless crèche setting where close respiratory contact may have occurred); all passengers on a plane/train/bus; all health care personnel or all persons attending the same social function – unless they have already been identified as a close contact above.

A single dose of oral ciprofloxacin or intramuscular ceftriaxone should adequately clear carriage. Alternatively two days of oral rifampicin can be given.

Notification and surveillance

Meningococcal disease is a category 1 notifiable medical condition (NMC). All clinically suspected cases must be notified immediately using the NMC electronic App or telephonically to the local or district health department to facilitate urgent contact tracing. National, active and passive, laboratory-confirmed invasive meningococcal disease surveillance has been ongoing since 2003 through the GERMS-SA surveillance programme of the National Institute for Communicable Diseases.

Additional resources

- NICD webpage: www.nicd.ac.za "Diseases A-Z index"
- www.doh.gov.za Guidelines for the management, prevention and control of meningococcal disease in South Africa, 2011
- www.nicd.ac.za Recommendations for meningococcal vaccination in South Africa, SAJID 2017
- Health care workers can call the NICD Hotline for after hours and emergency medical advice and assistance 082-883-9920