PAEDIATRIC ACUTE CARE GUIDELINE	
Meningococcal Disease	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

This document should be read in conjunction with this DISCLAIMER
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Meningococcal Disease

Background

- Invasive menigococcal disease is a rapidly fatal disease if not recognised
- The mortality rate is 10% depsite appropriate antibiotic therapy

General

- Asymptomatic nasopharyngeal carriage of meningococci is common
- Approximately 10% of the population are carriers at any one time
- Invasive infection with *Neisseria meningitidis* (meningococcus) occurs in endemic and epidemic forms
- Meningococcus presents as bacterial meningitis (15% of cases) or septicaemia (25% of cases), or as a combination of the two presentations (60% of cases)
- The overall mortality risk is high (about 10%) despite appropriate antibiotic therapy
- Meningococcal septicaemia (also known as meningococcaemia) has considerably greater mortality than meningococcal meningitis and is often characterised by a rapidly evolving petechial or purpuric rash that does not blanch under pressure
- Meningococcaemia can have a fulminant and rapidly fatal course
- The early administration of antibiotics on suspicion of meningococcal disease can be life saving
- The disease is transmitted via respiratory droplets, and has an incubation period of between 1 and 10 days, but commonly 3 to 4 days

Epidemiology:

- The average annual notification rate for invasive meningococcal disease in Western Australia for the years 1990 to 2011 was 2.4 cases per 100,000 population
- Meningococcal disease in Australia is an endemic infection with cyclical peaks in incidence, with the majority of cases reported during late winter and early spring
- While meningococcal disease affects all age groups there is a bimodal age distribution, with the highest rates in the 0-5 year age group and a second peak in the 15-24 year age group
- Since the 2003 introduction of routine meningococcal C vaccination and catch-up programs, persons aged 35 years or over now comprise approximately 18% of all notifications, and there is a slight male preponderance

Assessment

- A non blanching purpuric or petechial rash is typical but may not be present, particularly in early disease
- Recognise signs of shock and treat aggressively after antibiotic therapy

History

- Invasive meningococcal infection may result in septicaemia, meningitis or septicaemia with meningitis
- The early symptoms of meningococcal disease may mimic those associated with common viral infections. However, once the infection has become established symptoms can progress very quickly, with occasional deaths occurring only hours from the onset of symptoms.
- Influenza virus or *Mycoplasma pneumoniae* infections may predispose to invasive disease

Meningococcal Meningitis:

- Usually has a sudden onset
- Typically characterised by fever, intense headache, stiff neck, nausea and vomiting, and altered consciousness
- An associated late sign is a petechial rash, but this is not always present
- Infants may not develop signs of meningism. The most common symptoms and signs for infants include fever, tachypnoea, rash, vomiting, poor feeding, irritability, drowsiness, and pallor.

Meningococcal Septicaemia:

- Usually presents with an acute febrile illness, **shock**, profound malaise, myalgia or arthralgia, nausea and vomiting, altered consciousness, and a maculopapular/petechial rash (50% of cases)

- The most characteristic feature is a haemorrhagic (i.e. petechial or purpuric) rash that does not blanch under pressure
- A rash is not always present, especially in the early stages
- In the early stage of development the rash may blanch with pressure thus resembling a viral exanthem
- The rash can appear on any part of the body, including the palms and soles, and progress rapidly
- The petechial rash has discrete 1-2 mm lesions which may evolve to form larger ecchymotic lesions. They commonly appear in clusters in areas where pressure occurs (e.g. underwear elastic bands), and children being examined should always be completely undressed.
- Meningococcal septicaemia is more often misdiagnosed than meningococcal meningitis at first presentation and has a higher fatality rate

Meningococcal Conjunctivitis:

- Rarely, meningococcal disease can present as conjunctivitis
- This can lead to invasive disease and requires systemic therapy

Investigations

- Treatment with antibiotics should **not** be delayed while awaiting laboratory results
- If possible, blood cultures should be obtained prior to antibiotic therapy

All patients should have the following investigations:

Test	Tube
Blood Culture	Culture Bottle
Full Blood Picture	EDTA tube
Meningococcal PCR	EDTA tube (separate tube)
C Reactive Protein	Lithium Heparin
Nasopharyngeal Swab	Charcoal Swab

Other investigations if appropriate:

Venous blood gas	Heparinised blood gas syringe
Coagulation profile: PT/APTT, DIC screen	Sodium citrate
CSF: (if not contraindicated) Microscopy, Culture and PCR	Sodium citrate
Aspirate from skin lesion/joint Microscopy and Culture	Culture bottle, smear

Lumbar Puncture (LP):

In children and young people with suspected meningitis or suspected meningococcal disease, a lumbar puncture should be performed unless any of the following contraindications are present:

- Signs suggesting raised intracranial pressure such as reduced or fluctuating level of consciousness, relative bradycardia and hypertension, focal neurological signs, abnormal posture or posturing, unequal, dilated or poorly responsive pupils, papilloedema, abnormal "doll's eye" movements
- Shock
- Extensive or spreading purpura
- After convulsions - until stabilised
- Coagulation abnormalities
- Platelet count below 100 x 10^9/litre
- Local superficial infection at the lumbar puncture site
- Respiratory insufficiency (lumbar puncture is considered to have a high risk of precipitating respiratory failure in the presence of respiratory insufficiency)

Do **NOT** delay antibiotics for LP if a child has a spreading rash or looks unwell/septic. Antibiotics should be given prior to LP in these patients.

Management

- Early parenteral antibiotics will decrease mortality
- Do not delay antibiotic administration in suspected cases of meningococcal disease

Initial management

- Effective management of meningococcal infection requires early intervention, effective antibiotic therapy and careful attention to associated manifestations such as shock and coagulopathy

Pre Hospital:

- It is imperative that antibiotic therapy be commenced early if deaths from meningococcal septicaemia are to be avoided
- If a general practitioner (GP) suspects a child has invasive meningococcal disease, empiric antibiotics should be given **prior** to transfer to hospital
- Benzylpenicillin or Ceftriaxone should be administered in doses below

Doses of Benzylpenicillin in Suspected Meningococcal Disease

Children <1 year	300mg (1/2 vial)
Children aged 1-9 years	600mg (1 vial)
Adults or children 10 years and above	1.2g (2 vials

Alternatively:
Ceftriaxone 50mg/kg (max 2g) in all agesIntravenous route is preferable but intramuscular (IM) administration may be used if there is a delay in obtaining intravenous access

- Be aware of delayed absorption of IM route if shock is present. IM route can also cause a large haematoma id disseminated intravascular coagulopathy is present.
- Concern by the GP that the empirical use of antibiotics will obscure the diagnosis once the child reaches hospital **must not** prevent their early use
- Meningococci can usually still be identified from a nasopharyngeal swab, or their DNA identified by PCR tests
- GPs should attempt to take blood cultures whenever possible prior to the administration of the first dose of antibiotic. The blood cultures, and any other clinical samples, should be sent with the patient at the time of transfer to hospital. However, taking of cultures should not delay initiation of treatment or transfer to hospital.
- Urgent transfer to hospital should be arranged by ambulance or Royal Flying Doctor Service (RFDS) and if necessary, an experienced medical escort may be required

Management in ED:

- Children referred to ED with suspected meningococcal infection or who present with symptoms and signs suggestive of meningococcal infection should be given a high priority triage category and be assessed by medical staff promptly

Give intravenous Ceftriaxone (or Cefotaxime in neonates) **immediately** to children and young people with a petechial rash if any of the following occur at any point during the assessment (these children are at **high** risk of having meningococcal disease):

- petechiae start to spread
- the rash becomes purpuric
- there are signs of bacterial meningitis
- there are signs of meningococcal septicaemia
- the child or young person appears ill to a healthcare professional

Seek senior medical advice early if the patient is unwell

- Obtain **intravenous access** (intraosseous if not possible)
- Take blood samples (FBC, blood culture, meningococcal PCR, CRP) and a nasopharyngeal swab
- Administer intravenous **Ceftriaxone** 50mg/kg as soon as culture samples are taken
- Do **not** delay treatment
- **If shocked, early and aggressive fluid therapy is critical:** Give IV fluid boluses of 20 mL/kg of normal saline, and repeat fluid boluses until shock is corrected (BP normal and peripheral perfusion restored). If multiple fluid boluses are required, consider changing to a colloid solution after the first 40 mL/kg of normal saline. Up to 100 ml/kg of colloid may be needed in the first 4-6 hours. Contact PICU if >40ml/kg required.
- Assess for and manage signs of cerebral oedema/raised intracranial pressure
- Consider IV steroids if suspected meningitis
- Consider lumbar puncture in patients with possible meningitis. Defer LP if the patient is unstable or has any signs of raised intracranial pressure or coagulopathy
- The patient may require PICU management of septic shock, cerebral oedema, coagulopathy or vascular complications

Medications

Antibiotics

- Parenteral antibiotics should be administered as soon as possible in suspected meningococcal disease
- Intravenous **Ceftriaxone** **50mg/kg** (up to 2g) 12 hourly

In suspected **meningitis**:

- Add Amoxicillin 50mg/kg 6 hourly if < 1 month of age
- Consider Vancomycin 15mg/kg 6 hourly to cover suspected pneumococcus if ≥ 1 mth of age
- Intravenous Dexamethasone 0.2mg/kg 6 hourly

(See Meningitis Guideline)

Penicillin or Cephalosporin Allergy:

- For patients with immediate (type 1) Penicillin or cephalosporin hypersensitivity, use **IV Ciprofloxacin** 10mg/kg (up to 400mg) 12 hourly
- Discuss with PMH on call Clinical Microbiologist if any doubt

Admission criteria

- Admit all patients with meningococcal disease under the General Paediatric Team
- PICU should be aware of any unwell patients with suspected meningococcal disease

Referrals and follow-up

Public Health Notification:

- Meningococcal disease is a notifiable disease
- Because of its public health implications, telephone notification is required for any probable meningococcal infection (do **not** wait for lab confirmation)
- Call (08) 9388 4852 or after hours (08) 9328 0553

Isolation

- All suspected meningococcal disease should be isolated
- Additional precautions (droplet transmission) should be applied for 24 hours after the initiation of antibiotic therapy

References

• Thompson MJ, Ninis N, Perera R, Mayon-White R, Phillips C, Bailey L, Harnden A, Mant D, Levin M. Clinical recognition of meningococcal disease in children and adolescents. Lancet. 2006 367:397-403.
• Cartwright KAV, Jones DM, Smith AJ, et al. Influenza A and meningococcal disease. Lancet 1991;338:554–557.
• Communicable Diseases Network Australia. Guidelines for the early clinical and public health management of meningococcal disease in Australia 2007. http://www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-other-mening-2007.htm
• National Health and Medical Research Council. Australian Immunisation Handbook, 9th Edition 2008. Department of Health and Ageing. www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-meningococcal
• Invasive Meningococcal Disease Guidelines for Public Health Staff — 2012, Operational Directive OD 0370/12, WA Health http://www.health.wa.gov.au/circularsnew/circular.cfm?Circ_ID=12866

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