

## CASE FIVE

**Short case number: 3\_22\_5**

**Category: Neurology**

**Discipline: Medicine**

**Setting: Emergency Department**

**Topic: Meningitis [SDL]**

### Case

Andrew Gandhi, aged 23 years, presents to the emergency department complaining of a severe headache and fever. He tells you he has felt unwell for three days with an upper respiratory tract infection but the headache only became bad today. On examination you elicit clinical features of meningism.

### Questions

1. Outline your management of Andrew in terms of additional history, examination and investigations.
2. In a table, outline the key features of the cerebrospinal fluid indices in meningitis in terms of predominant cell type and count, glucose, protein and gram stain.
3. List three common viral and bacterial causes of meningitis.
4. List the common complications of meningococcal septicaemia.
5. In a flow chart, outline the management of a patient with meningitis.
6. Outline the antibiotic management of a patient with a typical meningococcal rash.
7. How does tuberculous meningitis present clinically.

### Suggested reading:

- Colledge NR, Walker BR, Ralston SH, Penman ID, editors. Davidson's Principles and Practice of Medicine. 22nd edition. Edinburgh: Churchill Livingstone; 2014. Chapter 26.

## ANSWERS

### 1. Outline your management of Andrew in terms of additional history, examination and investigations.

History needs to include questions regarding the onset of fever, headache, neck stiffness, photophobia, nausea, vomiting, lethargy, confusion and drowsiness. Other problems that need to be asked about include a rash, contact with anyone with a recent history of illness or any predisposing factors to infections (eg immunocompromised, recent surgery, recent travel).

Physical examination needs to include assessment of cognition, signs of meningeal irritation (Kerning's sign, nuchal rigidity), and full neurological examination including retinal examination for papilloedema, skin examination for any rashes, sinus tenderness or CSP leak, organomegaly secondary to systemic viral infections.

Investigations include:

- Blood tests (FBC, EUC, LFT, ESR, blood glucose, blood cultures)
- Cerebral CT scan
- Lumbar puncture for CSF examination

1. In a table, outline the key features of the cerebrospinal fluid indices in meningitis in terms of predominant cell type and count, glucose, protein and gram stain.

Condition	Cell type	Cell count	Glucose	Protein	Gram stain
Normal	lymphocytes	$4 \times 10^6/L$	>60% of blood glucose	up to 0.45 g/l	-
Viral	lymphocytes	10-2000	normal	normal	-
Bacterial	polymorphs	1000-5000	low	normal-elevated	+
Tuberculous	polymorphs/lymphocytes/mixed	50-5000	low	elevated	often +
Fungal	lymphocytes	50-500	low	elevated	+/-
Malignant	lymphocytes	0-100	low	normal-elevated	-

### 2. List three common viral and bacterial causes of meningitis.

#### Viral

Enteroviruses (echo, Coxsackie, polio)  
Mumps  
Influenza  
Herpes simplex  
Varicella zoster  
Epstein-Barr  
HIV

#### Bacterial

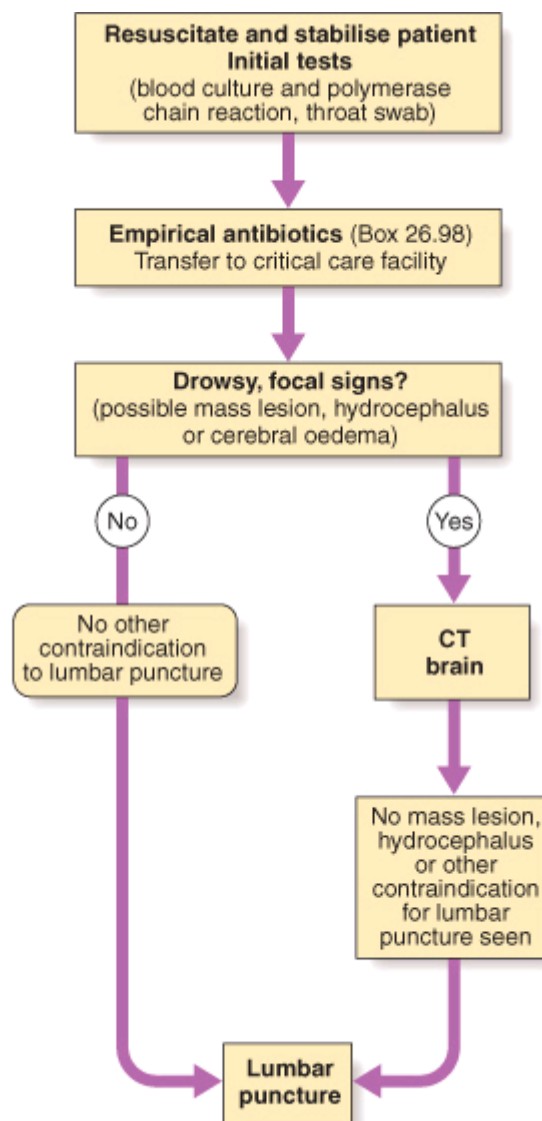
*Haemophilus influenzae*  
*Neisseria meningitidis*  
*Streptococcus pneumoniae*

**3. List the common complications of meningococcal septicaemia.**

**Meningitis**

- Rash (morbilliform, petechial or purpuric)
- Shock
- Intravascular coagulation
- Renal failure
- Peripheral gangrene
- Arthritis (septic or reactive)
- Pericarditis (septic or reactive)

**4. In a flow chart, outline the management of a patient with meningitis.**



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## **5. Outline the antibiotic management of a patient with a typical meningococcal rash.**

If meningococcal or other bacterial meningitis is suspected, the patient should be given parenteral benzylpenicillin immediately (intravenous is preferable to intramuscular) and prompt admission to hospital should be arranged. The only contraindication is a history of penicillin anaphylaxis. Recommended empirical therapy before the cause of meningitis is known is given. The antibiotic regimen may be modified after CSF examination.

## **6. How does tuberculous meningitis present clinically**

### Symptoms

- Headache
- Vomiting
- Low-grade fever
- Lassitude
- Depression
- Confusion
- Behaviour changes

### Signs

- Meningism (may be absent)
- Oculomotor palsies
- Papilloedema
- Focal hemisphere signs
- Depression of conscious level