The investigation and management of CNS infections

Dr Asha Patel

with Dr Michael O'Donoghue

Learning Objectives

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1. Outline the clinical presentation of bacterial meningitis and describe the appearance of the typical rash of meningococcal se pticaemia
2. Describe the common bacterial and viral organisms causing meningitis in adult life
3. Discuss the investigation of a patient with suspected meningitis including indications and contraindications for lumbar punct ure. Describe the normal CSF constituents and CSF dynamics.
4. List the complications that may arise from meningitis
5. Outline the clinical features of encephalitis and list the common causes
6. Discuss the aetiology, diagnosis and management of herpes simplex encephalitis.
7. Consider brain/cerebral abscess as part of differential diagnosis in CNS infections

Case

24F

Normally fit and well

Presented with a headache over past 24 hours

Dull, global, nausea, photophobia, neck stiffness

Felt warm

Has become slightly confused over past few hours

OE – No CNS/PNS deficit, neck stiff, temp 38.1

MENINGITIS

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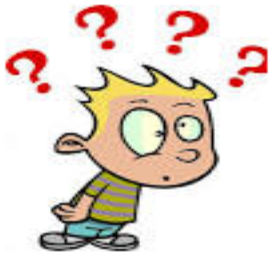
Fever

Nuchal rigidity

Altered mental state

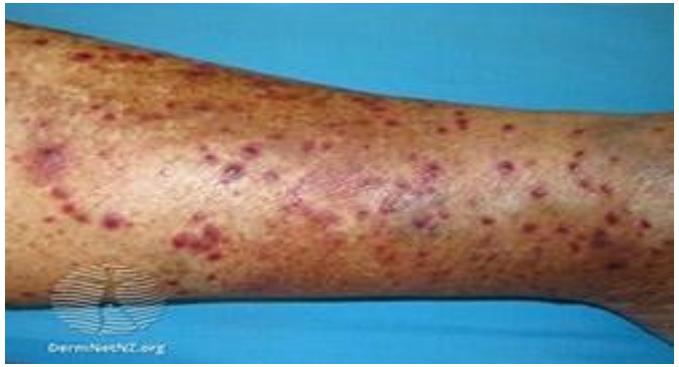


1. Headache

Nausea

Focal neurological deficit

Meningococcal rash



CAUSES of meningitis

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BACTERIAL

- Streptococcus pneumoniae
- Neisseria meningitidis
- Haemophilus influenzae
- Listeria monocytogenes (immunosuppressed, pregnancy, age extremes)

VIRAL

- Enteroviruses
- HSV
- VZV
- EBV
- Mumps

INVESTIGATING MENINGITIS

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ABCDE	**Keep the patient alive!**	
BEDSIDE	FBC, UE, LFT, CRP, Clotting, **Blood cultures**, **Meningococcal/pneumococcal PCR**, Lactate, Glucose, Throat swab, ?Stool sample, ?HIV	
IMAGING	CT, MRI	DO NOT DELAY LP UNLESS SIGNS OF RAISED ICP
INVASIVE INVESTIGATIONS	LP… **OPENING PRESSURE** Protein, Cell count, MCS, Glucose **+ SERUM GLUCOSE**, vPCR, Meningo/pneumococcal PCR **Not if** **GCS<12** **Seizures** **Papilloedema** **Focal neurological signs**	

WHEN NOT TO DO AN LP

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1. Signs of raised ICP
2. Signs of meningococcal septicaemia
3. Evidence of potential bleeding risk (platelets <50, INR >1.2)
4. History of clotting disorder (haemophilia)

What the LP can tell you

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	Bacterial	Viral	Fungal	TB
Opening pressure	↑	Normal	Variable	Variable
WCC	↑ ↑	↑	Variable	Variable
Cell differential	**Polymorphs**	Lymphocytes	Lymphocytes	Lymphocytes
Protein	↑ ↑	↑	↑	↑
CSF Glucose	↓ ↓	Normal	↓	↓

So what now?

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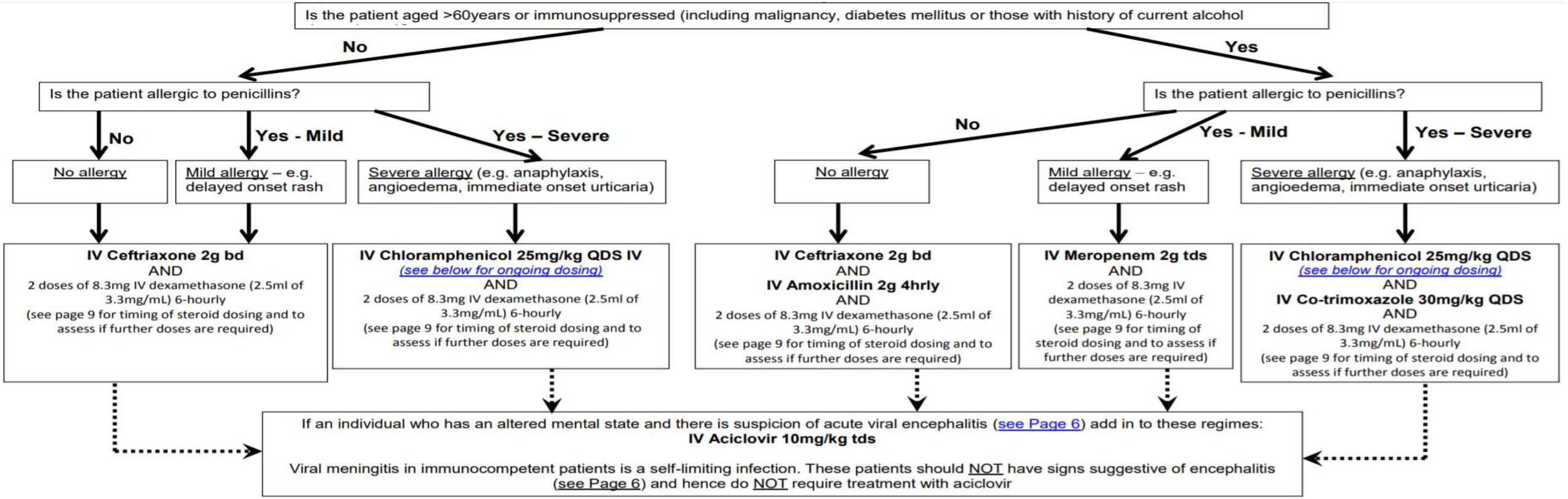
1. **CHECK YOUR LOCAL GUIDELINES**



2. **AND DON'T FORGET PUBLIC HEALTH!**

Viral Encephalitis

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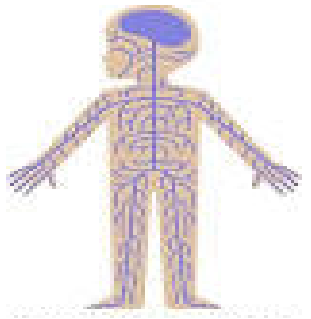
Fever

Seizure

Altered mental state

Headache

Focal neurological deficit



INVESTIGATING Viral encephalitis

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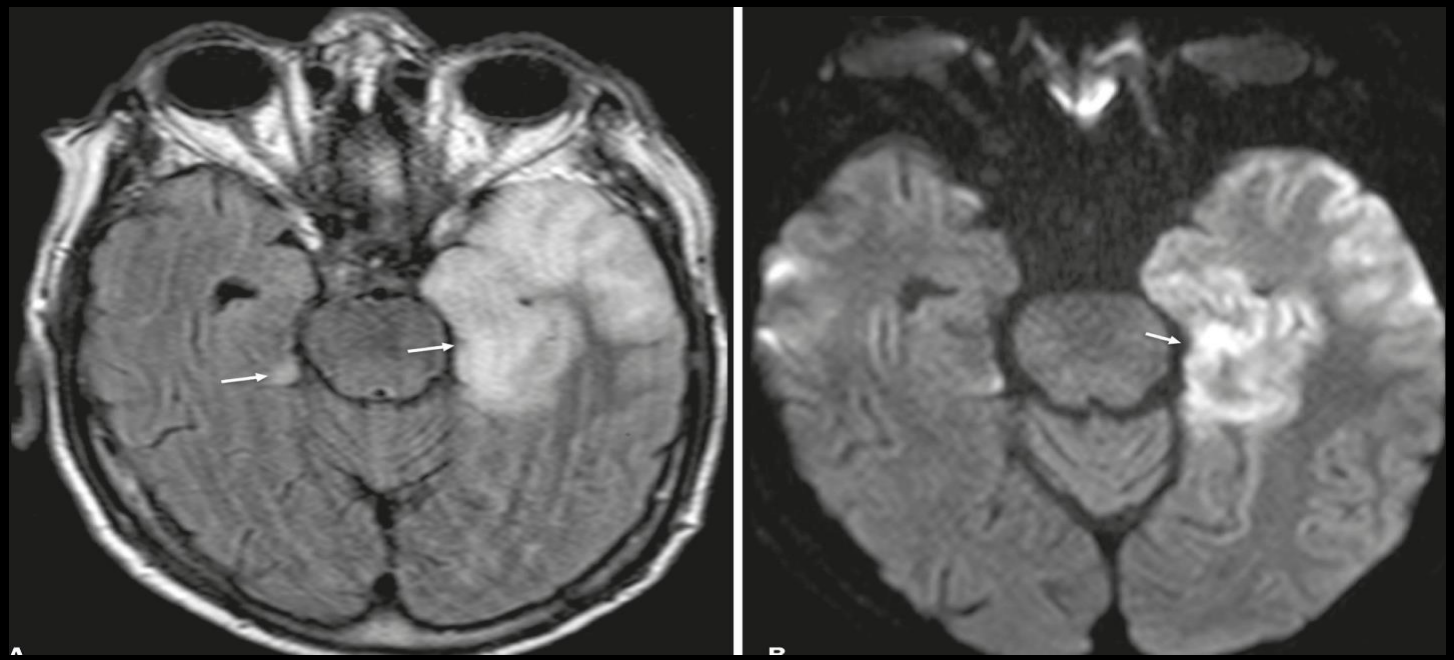
ABCDE	**Keep the patient alive!** **Manage the unconscious patient** **Treat Seizures**	
BEDSIDE	FBC, UE, LFT, CRP, Clotting, **Blood cultures**, **Meningococcal/pneumococcal PCR**, Lactate, Glucose, Throat swab, ?Stool sample, ?HIV	
IMAGING	CT, MRI	DO NOT DELAY LP UNLESS SIGNS OF RAISED ICP
INVASIVE INVESTIGATIONS	LP… **OPENING PRESSURE** **OPENING PRESSURE** Protein, Cell count, MCS, Glucose **+ SERUM GLUCOSE**, **Viral PCR**, Meningo/pneumococcal PCR **Not if** **GCS<12** **Seizures** **Papilloedema** **Focal neurological signs**	

MRI in encephalitis



So what now?

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1. CHECK YOUR LOCAL GUIDELINES

- IV Aciclovir 10mg/kg TDS for 14-21 days
- If HSV or VZV, repeat LP and if still positive CONTINUE TREATMENT
- Oral therapy is NOT acceptable
- The clinical picture is the most important factor
- Aggressive management of seizures

SPECIAL CIRCUMSTANCES

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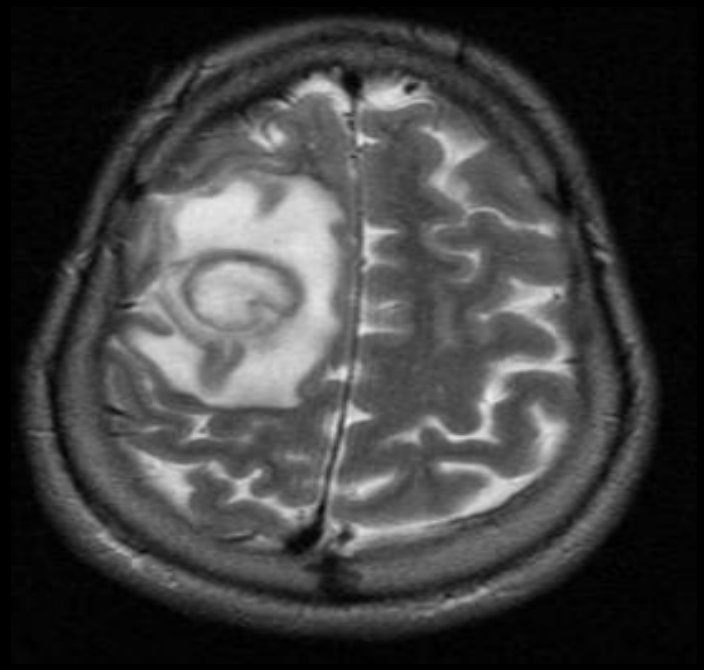
Cerebral abscess

Headache, fever, altered mental status, focal signs and seizures

Typically spread from sinuses or via blood



SPECIAL CIRCUMSTANCES

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Immunocompromised

- More susceptible to less common organisms
- Toxoplasmosis, Cryptococcus, TB, Aspergillus
- They may not respond to usual meningitis treatment
- TAKE A GOOD HISTORY!!!

Summary

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1. Common presentations of meningoencephalitis can include headache, fever, nuchal rigidity, focal neurological deficit, altered mental state and seizure
2. Management includes stabilising the patients, obtaining relevant investigations (safely) and administration of antimicrobials
3. Taking a good history and reviewing the clinical state of the patient is of paramount importance
4. Certain circumstances can be difficult to recognise, but still need to be thought of
5. Discuss with Infection Diseases and/or Neurology if unsure

Thank you

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