CNS infections - 1

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CNS infections

CNS infections

- meningitis
- encephalitis
- cerebral abscess
- cerebral malaria

Presentation

Presentation

- fever
- headache, vomiting
- photophobia
- alteration/ loss of consciousness
- fits
- alteration of mental state, behaviour, cognitive function
- myalgia, arthralgia – (viral)

Examination

Examination

- ABC
- level of consciousness – GCS
- fundi - papilloedema
- neck stiffness, Kernig's
- focal signs
- ↑ ICP
- rash – meningococcus
- septicaemia – other organ functions
- source of sepsis – ear infection, skull fractures, parameningeal, systemic

Meningitis

- fever, headache, vomiting
- photophobia
- meningeal irritation

Encephalitis

- altered consciousness
- disorientation
- behavioural changes
- seizures
- focal deficits

* Usually, a meningo-encephalitis

Investigations

Investigations

- FBC, ESR, CRP, glucose, U & E, chest X-ray
- Blood culture
- MP
- EEG
- Lumbar puncture - CSF analysis
- Viral serology
- CT scan, MRI scan

CSF- normal values

- Pressure:
- Appearance:
- CSF total protein:
- CSF glucose:
- Cells:

CSF- normal values

- Pressure: 60-150 mm H_20.
- Appearance: clear, colorless.
- CSF total protein: 0.2-0.4 g/L.
- CSF glucose: 2/3 to ½ of blood glucose level
- Cells <5/$mm^{3,}$ mononuclear cells only

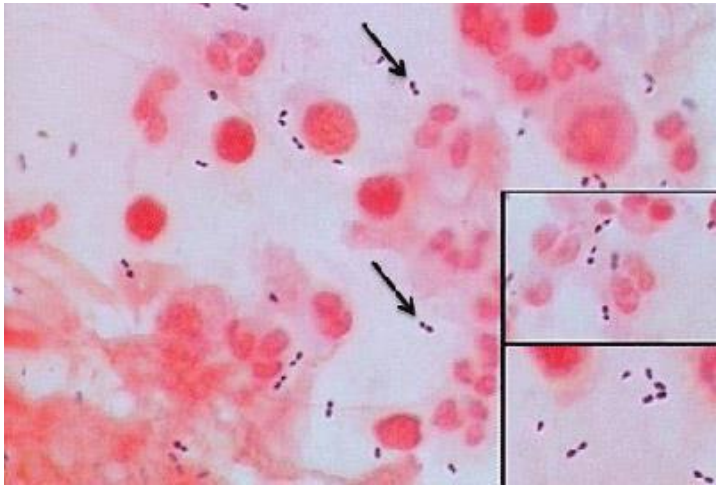
Investigations - CSF analysis

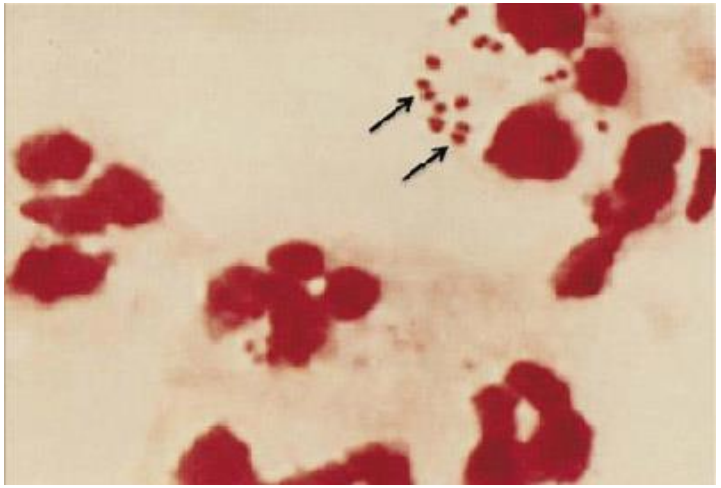
	appearance	protein	cells	glucose
bacterial	turbid	↑	↑ PMN (or L)	↓↓
viral	clear	N or ↑	↑ L	N
TB	xanthochromic, coagulum	↑↑	↑↑ L (or PMN)	↓
fungal	turbid	↑↑	↑ L	↓

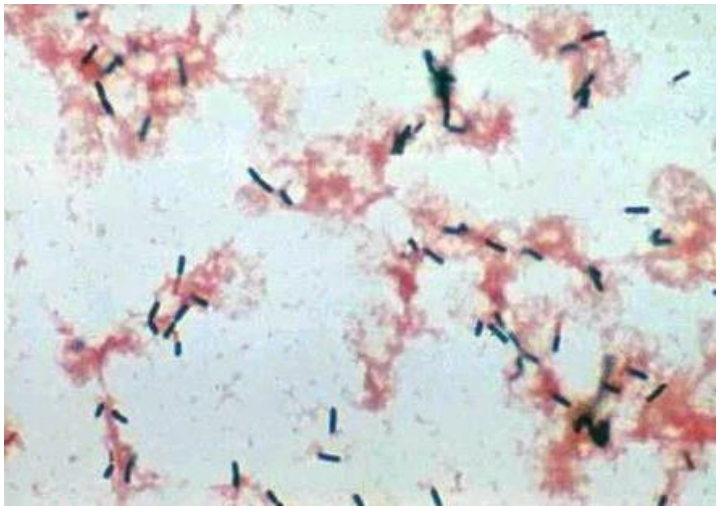
CSF analysis - microbiology

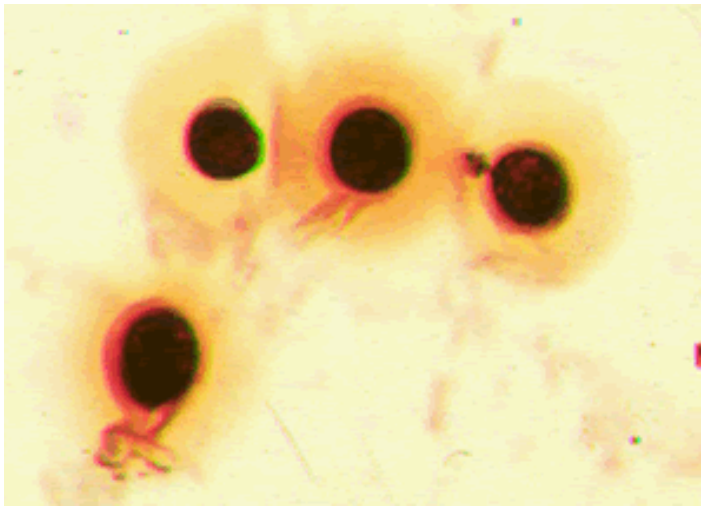
- bacterial - Gram stain, culture, antigens , PCR
- TB - AFB, PCR, culture
- viral - PCR - HSV, JE, entero
- fungal - India ink staining, culture

CSF microscopy

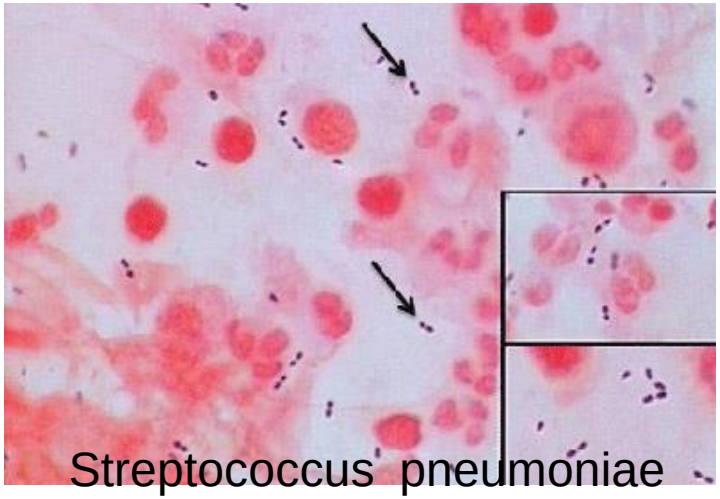




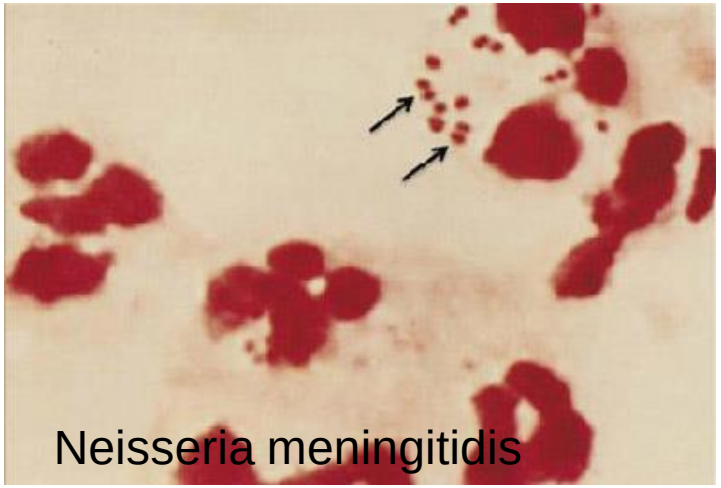




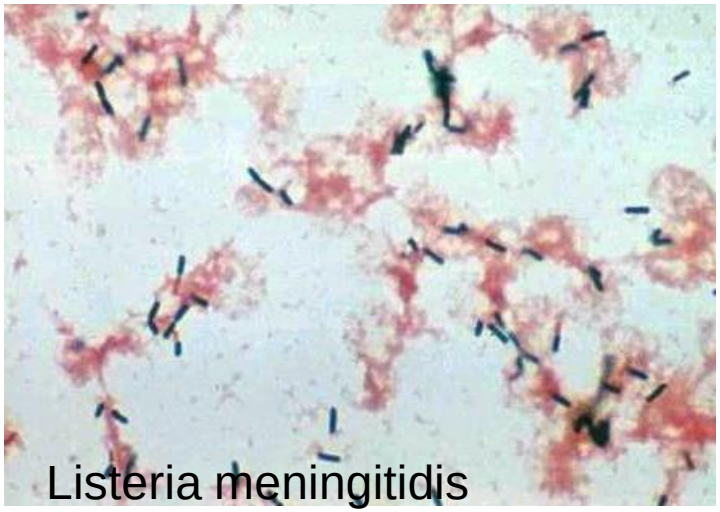
CSF microscopy



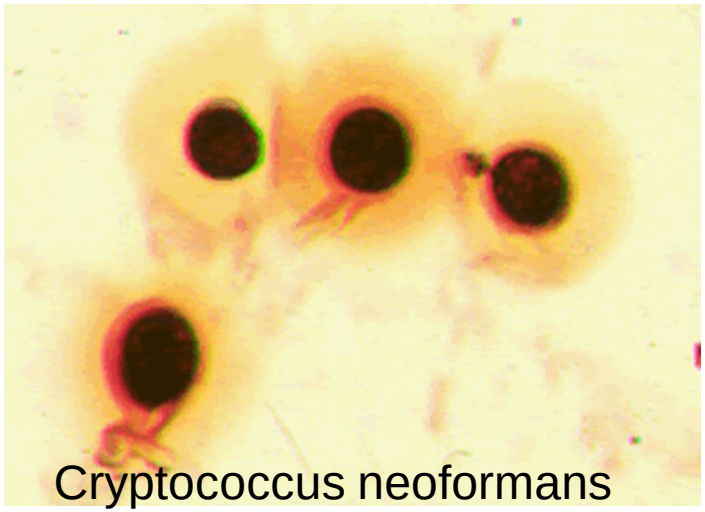
Streptococcus pneumoniae



Neisseria meningitidis



Listeria meningitidis



Cryptococcus neoformans

When to do CT before LP?

- focal neurological signs
- loss of consciousness
- signs of raised ICP - papilloedema
- seizures
- elderly
- immuno-compromised

CNS infections -2

CNS infections

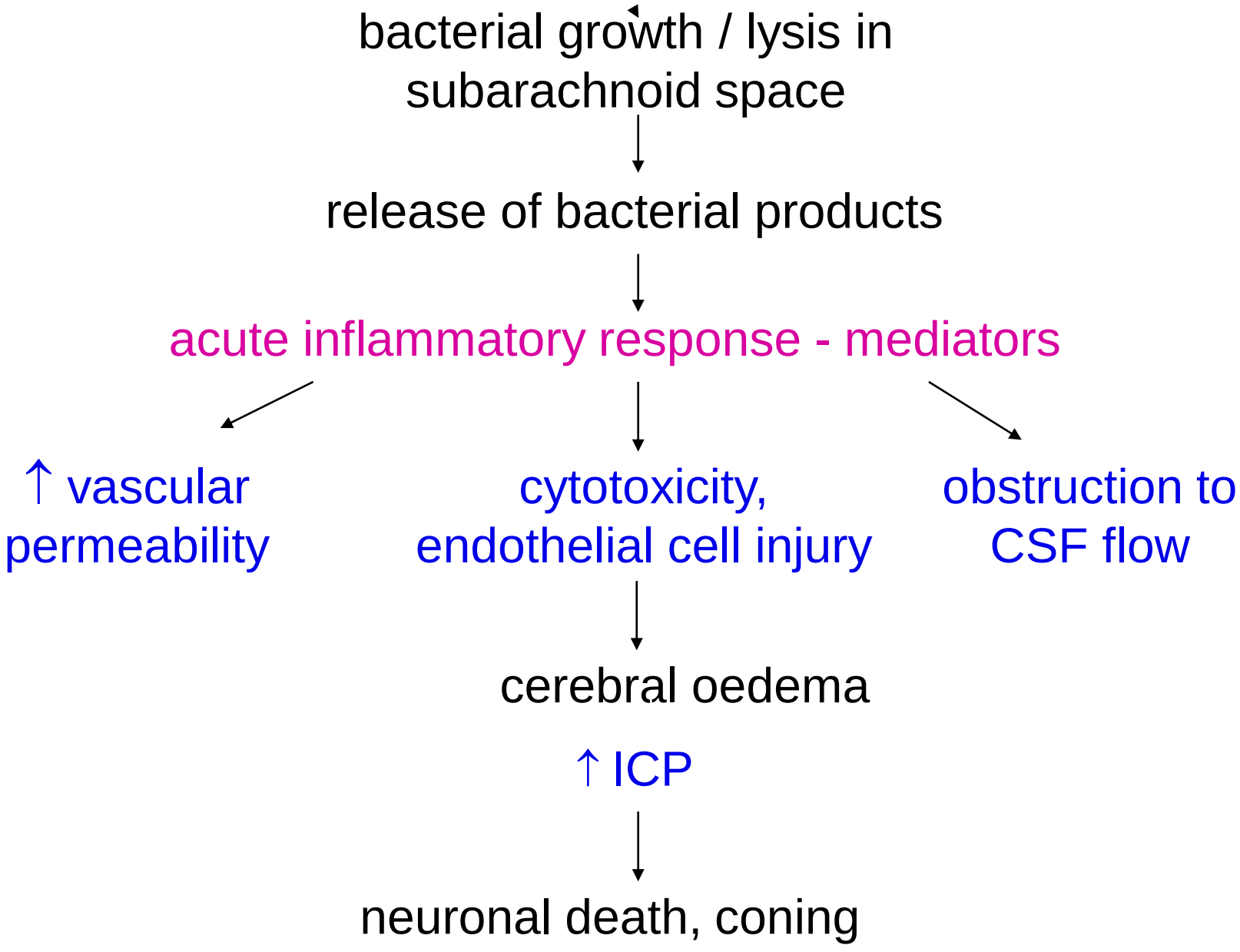
- meningitis
- encephalitis
- cerebral abscess
- cerebral malaria

Causes

- Infectious -
  - Bacterial –
    - Streptococcus pneumoniae
    - Neisseria meningitidis
    - Listeria monocytogenes – old age, immune deficient
    - H. influenzae
    - Mycobacterium tuberculosis
  - Viral –
    - Enteroviruses – ECHO, Coxsackie
    - Mumps,
    - HSV-2, CMV, EBV, VZV
    - HIV
  - Fungal – Cryptococcus neoformans
  - Spirochaetal – syphilis, leptospira

- Non-infectious - malignant, chemical, drugs

Pathophysiology



Management

Management

- emergency - cannot wait for lab reports
- blood culture x 2-3
- empiric antibiotics iv -
  - ceftriaxone/ cefotaxime ± vancomycin OR
  - penicillin + chloramphenicol
  - add ampicillin - old age, immuno-compromised
- iv dexamethasone -
  - 0.15 mg/kg 6h for 4d (adults -usu 8mg 6h)
  - given before or with the first antibiotic dose
- lumbar puncture

Complications

Complications

Local

↑ ICP

abscess

cranial n. palsies- VI, VIII

seizures

hydrocephalus

subdural empyema

venous thrombosis

arteritis - infarcts

Systemic

septicaemia

DIC

Hyponatraemia, SIADH

adrenal crisis

endocarditis

TB Meningitis

TB Meningitis

- acute/ subacute onset
- prodromal illness - vague ill health, LOA, LOW, low grade fever, behavioural change
- evidence of TB elsewhere – only in ~ 30%
- choroidal tubercles on retina

- tuberculoma – act as focal lesion
- TB arteritis – infarcts, rarely haemorrhages

- treatment – anti-TB Rx for 6-9 months

CNS infections

Meningitis

Encephalitis

cerebral abscess

cerebral malaria

Encephalitis

- Infectious – Viral
- Autoimmune
  - antibody mediated
  - some - paraneoplastic

Viral encephalitis

- Arboviral -JE
- Herpes simplex - HSV - type I
- VZV, EBV, CMV
- Mumps

- Rabies

Presentation

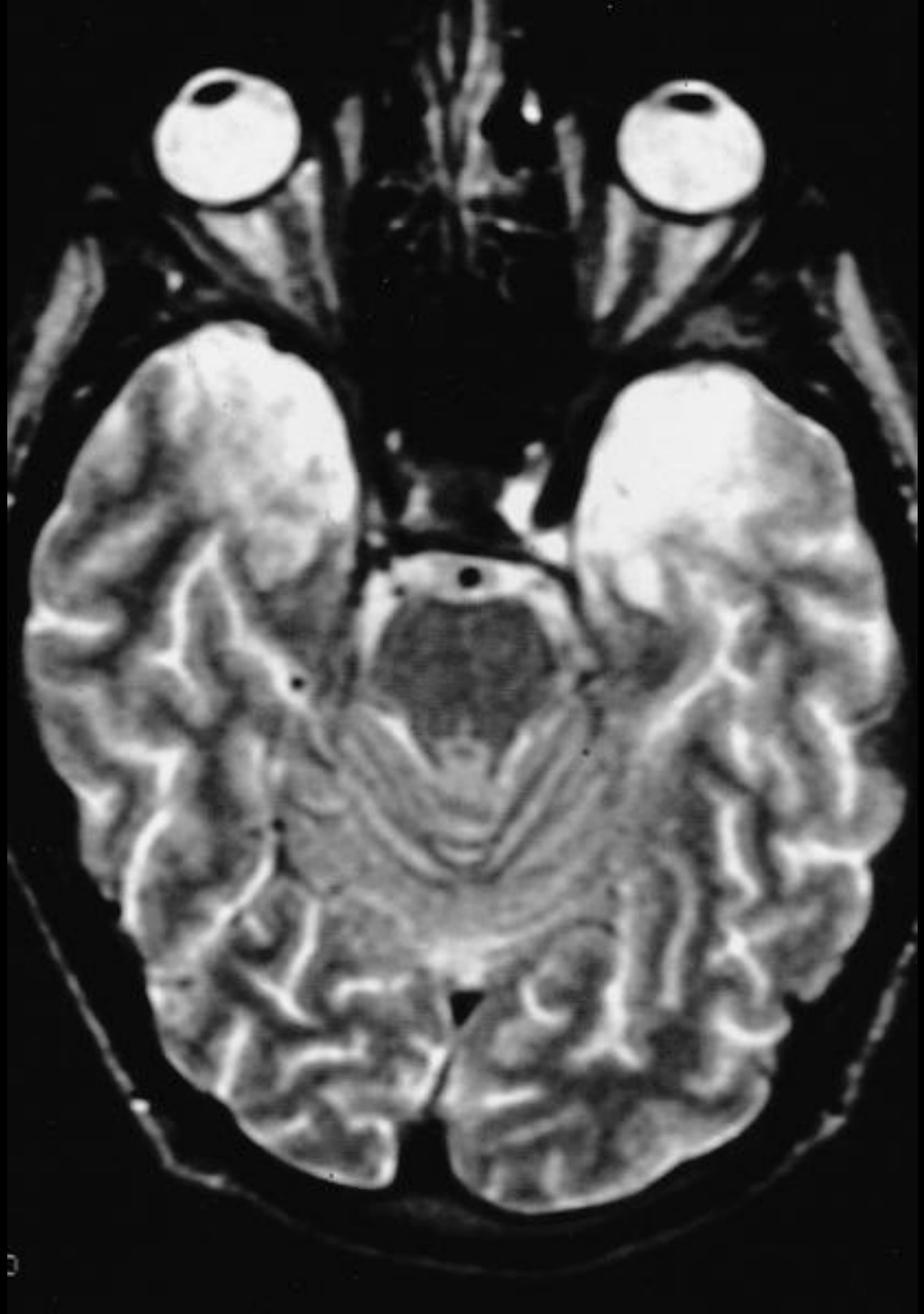
- fever
- headache, vomiting
- alteration/ loss of consciousness
- fits
- alteration of mental state, behaviour, cognitive function
- meningeal irritation - ?
- focal deficits
- extrapyramidal features - esp JE
- ataxia - cerebellitis in VZV

suggest viral -

- myalgia, arthralgia
- rash
- lymphadenopathy
- hepatosplenomegaly
- parotid enlargement

HSV encephalitis

- mainly type 1
- temporal and inferior frontal lobes predominantly affected -
  - seen on EEG, MRI
- CSF - viral pattern + RBC
  PCR
- treatment - iv acyclovir - 14-21 days



CNS infections

meningitis

encephalitis

cerebral abscess

cerebral malaria

Brain abscess - pathogenesis

Brain abscess - pathogenesis

- local spread - contiguous suppurative foci
  - otitis media, sinusitis, mastoiditis, dental sepsis
- haematogenous spread - distant septic focus
- penetrating head injury, neurosurgery

- 20% - no apparent source

- common organisms
  - staphylococci - S. aureus, coagulase -ve, MRSA
  - streptococci - pneumo, S. viridans
  - anaerobes
  - Gram negative
  - pseudomonas

- polymicrobial infection common

Presentation

Presentation

- acts as a space occupying lesion
  - focal deficits
  - seizures
  - ↑ ICP - headache, vomiting, papilloedema
  - altered consciousness
- subacute onset
- fever - low grade
- meningeal irritation - mild

Diagnosis

- imaging - MRI, CT - negative early
- EEG
- microbiology -
  - blood culture
  - aspirate from abscess
- look for primary source
- avoid LP - if abscess suspected

Treatment

- iv antibiotics - start empiric treatment
  continue for 6-8 weeks
  - cephalosporin OR penicillin/ chloramphenicol
  - + metronidazole
  - ± vancomycin
- surgery
- supportive care - iv dexamethasone, seizures
- treat primary focus