CNS Infections

G. Blackburn DO, MACOI

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Las Vegas, Nevada

Meningitis

	Bacterial	Viral	Fungal/TB
Cell count	>1000	<1000	<1000
Differential	PMN's (usually > 90%)	mononuclear/mixed	mononuclear/mixed
Glucose	low (< 40% of bld)	Near normal	low
Protein	high	sl. elevated	high

Indications for CT BEFORE LP when acute bacterial meningitis is suspected:

- immunocompromised host
- prior CNS dx
- papilledema
- new-onset seizure
- focal neurologic deficit
- abnormal level of consciousness

Johns Hopkins I.M. Board Review 5th Ed.

Mortality associated w/ Meningitis

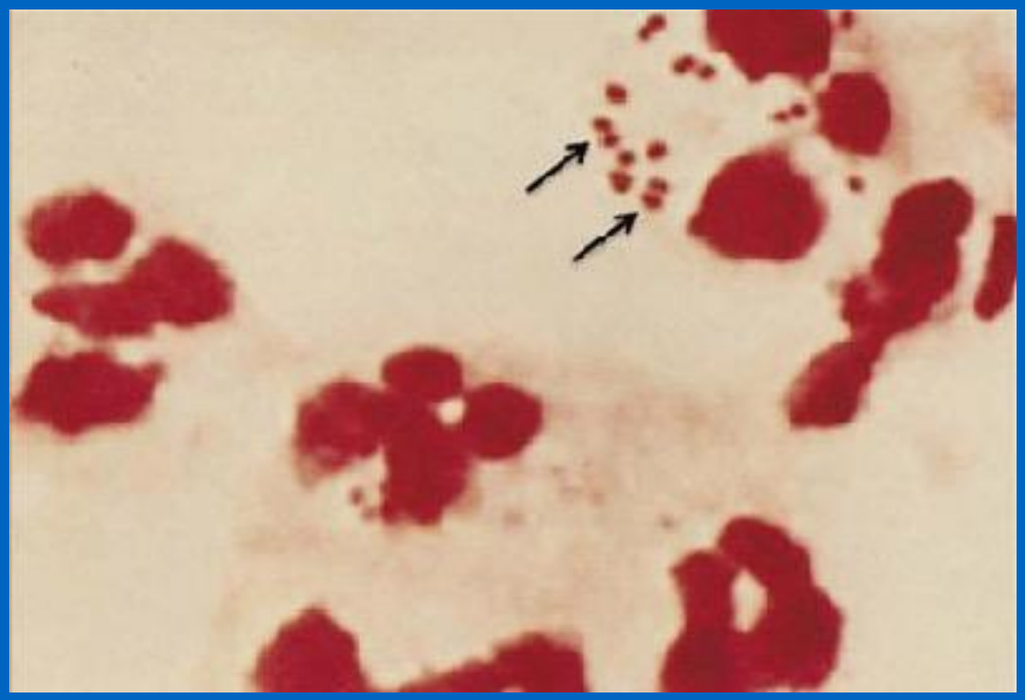
- N. meningitidis: 3%
- Listeria: 15%
- Strep. pneumoniae: 21%

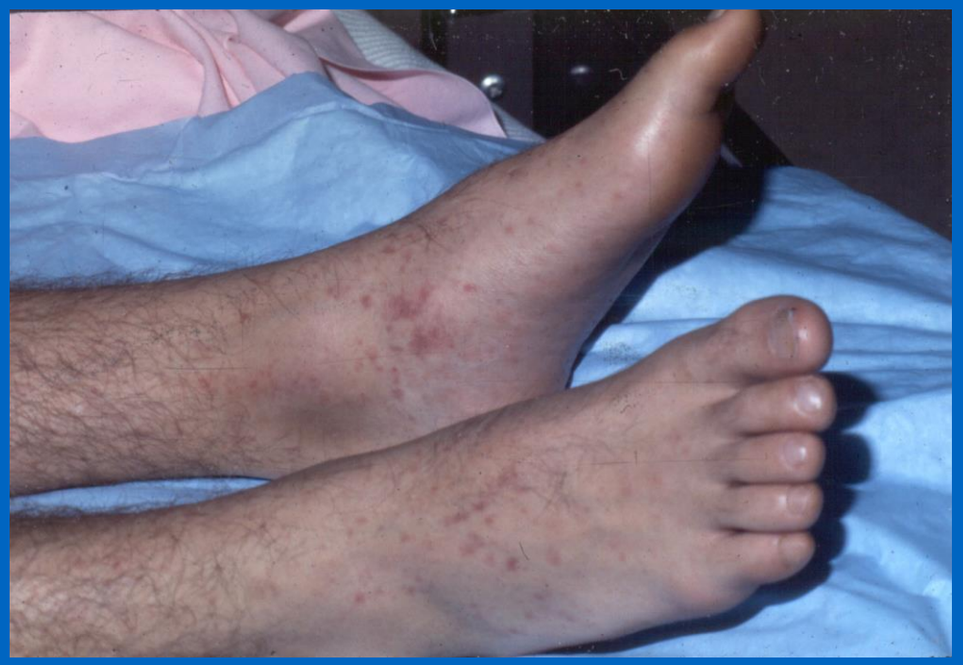
Schuchal et al. NEJM 1997

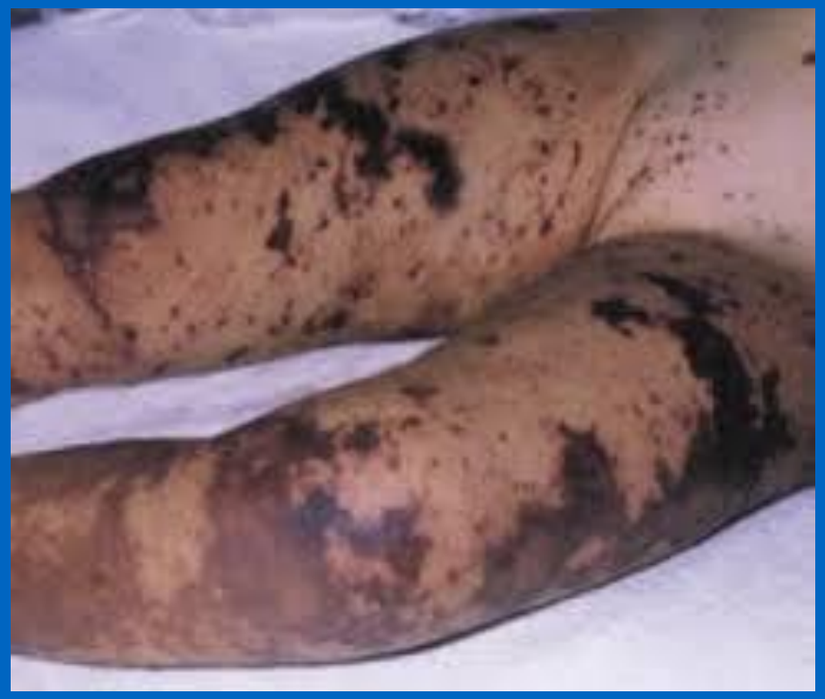
Meningococcal Bacteremia and/or Meningitis

- Gm neg diplococci
- Petechial / purpuric rash
- Properidin or terminal compliment deficiency, e.g. C-3, C-5 thru C-9
- Asplenia
- Waterhouse - Friedrichsen Syndrome

Meningococcemia







Meningococcal Meningitis

- Young adults - military recruits, college students
- Certain travelers (Nepal, to the Hajj)
- Tobacco exposure
- Tx: Pen G, 3rd generation cephalosporin; steroids
- Prophylaxis: Rifampin
  10 mg/kg x 2 days, or.. Cipro 500 mg
  x 1, or… Ceftriaxone 250 mg
  I.M. x 1
- Vaccines - now recommended for all young adults before starting high school

Pneumococcal Meningitis

- Gm positive diplococci
- Most common bacterial agent of meningitis in adults; if + blood culture, consider HIV
- highest mortality of all bacterial meningitides
- No rash, though purpura fulminans in overwhelming sepsis
- Associated with:
  extremes of age, CSF leaks, sinusitis/otitis, alcoholism, splenectomy , multiple myeloma

Tx of Pneumococcal Meningitis

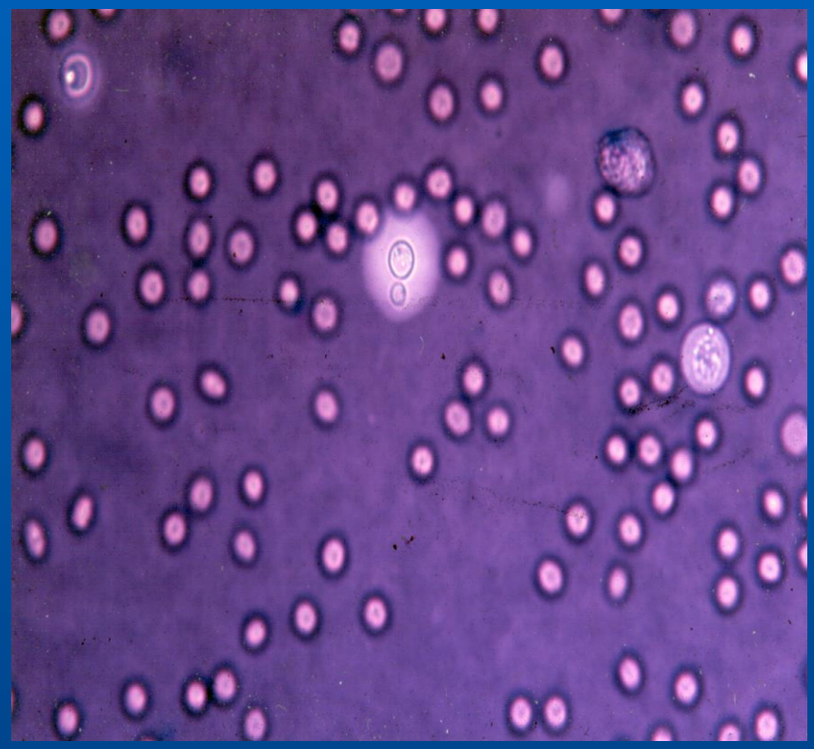
- Pen G ONLY if known to be susceptible (MIC < 0.1 ug/ml)
- Ceftriaxone or cefotaxime if MIC's < 0.5 ug/ml
- Vancomycin - at least 4 gms/day until susceptibility available
- Steroids give BEFORE (or at time of) antibiotics

Listeria Meningitis

- Gm positive rods
- Extremes of age, cell mediated immunosuppression e.g. Hodgkin's Dx, pregnancy, HIV
- Tx: ampicillin; trimethoprim / sulfa
  Note: Cephalosporins NOT effective

Cryptococcal Meningitis

- Subacute headache in HIV+ patient
- Pigeon droppings; construction
- Few lymphocytes in CSF
- + India ink
- + Ag in CSF, serum, urine
- Tx: Ampho B, +/- flucytosine; fluconazole



Shunt-Assoc. Meningitis

- Skin flora not uncommon - don’t ignore “contaminants”:
-coag-neg. staphylococcus
-propionbacter sp.
-corynebacterium sp.

Gram Negative Meningitis

- Neurosurgery, including pressure monitors/drains
- Head trauma
- Remote focus
- Extremes of age
- Following prophylaxis for CSF leak

Recurrent Meningitis

- Parameningeal focus - infection, epidermoid cyst, craniopharyngioma
- CSF leak, often following (even remote hx) trauma - pneumococcus most common
- Mollaret’s - HSV 1?, HSV 2?, epidermoid cyst?
- Compliment deficiencies -> meningococcus
- SLE, migraine
- Vogt-Koyanagi-Harada syndrome

“Aseptic” Meningitis

- Viral, difficult to culture organisms
  - R/O primary HIV infection (“acute retroviral syndrome”)
  - R/O primary genital herpes
- Non-infectious etiologies
  - Non-infectious diseases
  - Meds: e.g. NSAID’s, trimethoprim/sulfa, carbamazine, OKT3, azathioprine

Acute Retroviral Syndrome

- Fever, chills, myalgia
- Lymphadenopathy
- Rash - maculopapular
- Pharyngitis
- N/V, diarrhea
- Headache (if LP -> mild pleocytosis)
- Elevated LFT's

  Note: HIV Ab may be negative or indeterminate

“Classic” Neurologic WNV Dx

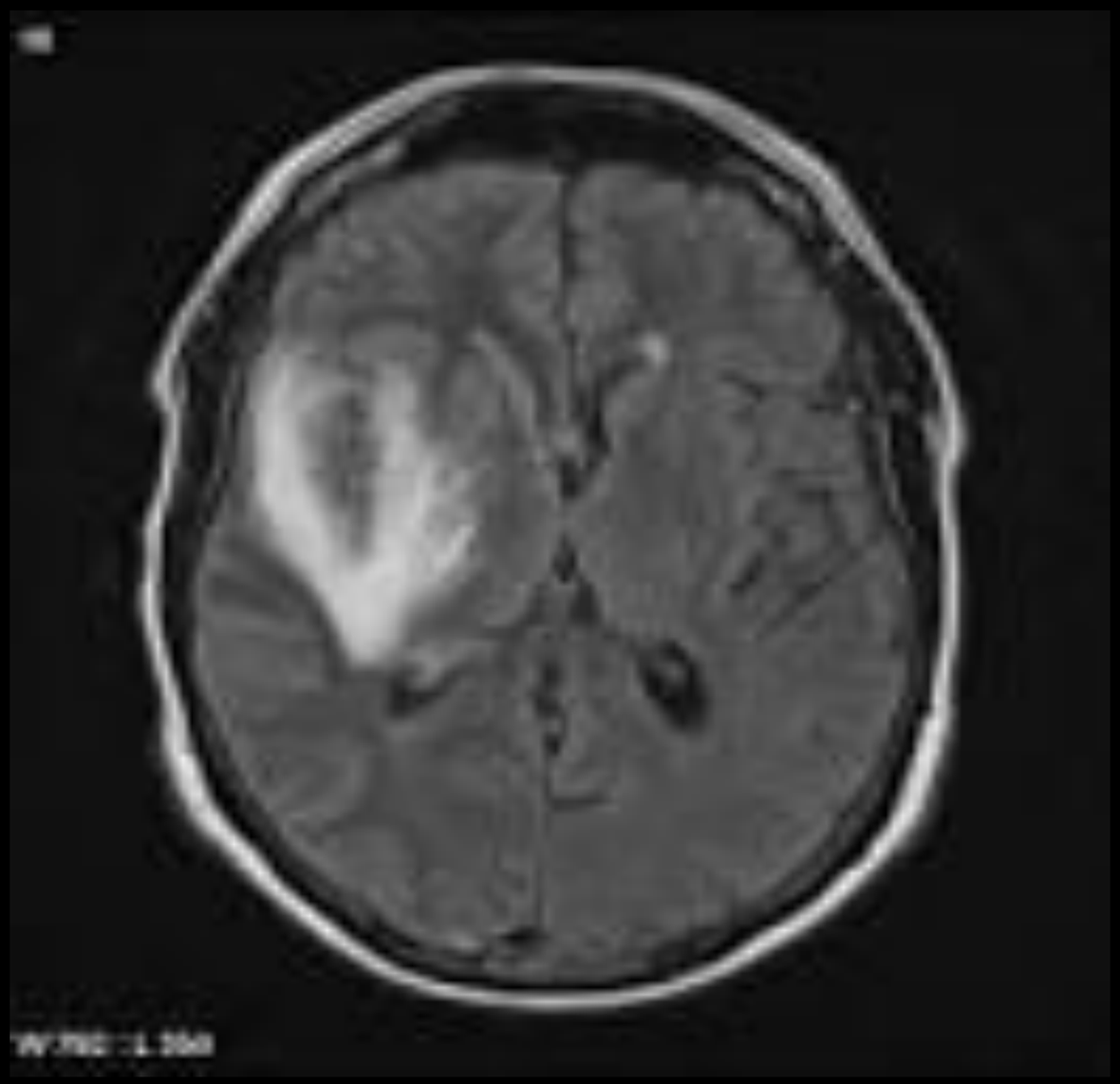
- Meningitis: -
  fever, nuchal rigidity, CSF pleocytosis
- Encephalitis:
  - mental status changes
- Meningo-encephalitis
- Acute flaccid paralysis (“polio”), seizures, other neurologic syndromes
- CNS involvement almost always occurs w/in 24-48 hrs of onset of fever
- Greatest predictor of severe dx is advanced age; mortality much higher if over 75 y.o.
- Dx: CSF IgM antibody for WNV

Chronic meningitis

- TB
- fungal
- Lyme Dx
- syphilis

HSV Encephalitis

- HSV 1
- Immunocompetent host; non-seasonal
- Fever, bizarre behavior, followed by focal, temporal lobe findings including seizure
- LP may be initially normal; classically associated w/ necrotizing component (rbc's)
- Diagnosis by PCR; culture of CSF almost always negative
- Neurologic status at time tx begun correlates w/ prognosis
- Tx: acyclovir 10mg/kg q. 8 hrs x 3 weeks - or longer



Brain Abscess

- “viridans” streptococci
- Anaerobes
- S. aureus w/ trauma, IVDA
- Fungal w/ DM, IVDA, neutropenia: mucormycoses or aspergillosis

“Brain - Lung” Syndromes

- Anaerobes
- Nocardia
- TB
- Fungal
- endocarditis

Epidural Abscess

- Fever
- Back pain
- Neurological deficit (w/o -> vert. osteo.)
- S. aureus most common
- High ESR/CRP
- At surgery, granulation tissue common

Primary Amebic Meningoencephalitis (PAM)

- Naegleria fowleri
- Following swimming in warm, fresh water
- Migration via olfactory nerve -> change in taste or smell
- Tx: Amphotericin B (+ azithromycin?); however, prognosis is terrible

Prion Disease / Transmissible Spongiform Encephalopathy (TSE) ("Slow Virus")

- Transmissible agent is a prion devoid of nucleic acid
- Creutzfeldt-Jacob Disease
  - classical: familial
  - sporadic (14-3-3 protein found in CSF)
  - new variant: BSE - "Mad Cow Dx" or "vCJD"
  - Tx: quinacrine??; chlorpromazine??
- Kuru
- Scrapie
- Fatal Familial Insomnia
- Gerstman-Straussler Syndrome

Focal CNS Dx in HIV
(see section on HIV)

- Toxoplasmosis
  acute onset, fever, + serology
  multiple, contrast + lesions w/ mass effect
- Lymphoma (+ PCR for EBV)
  subacute onset, no fever
  single, contrast + lesion w/ mass effect
- PML (JC virus -> + PCR)
  indolent, no fever
  multiple, contrast neg lesions of white matter w/o mass effect

Additional Dx / Syndromes

- Botulism: diploplia, descending paralysis
  - use of “black tar” heroin
  - Home-canned foods; toxin is heat labile
- Polio - mutant strains of oral vaccine
- Bell’s palsy: assoc. w/ HSV 1
- Tick paralysis

- Rabies: Negri bodies; “trivial” or unrecognized exposure to bats (silver haired and eastern pipistrelle bats most common). Dx: Bx nape of neck -> Viral ag
- Bannwarth’s syndrome: chronic meningitis w/ cranial neuritis assoc. w/ Lyme dx
- LCM: meningitis assoc. w/ field mice, guinea pigs
- Cysticercosis: pork tapeworm -> Taenia solium