ID Emergencies

BUMC-P
Internal Medicine
Edwin Yu

Learning Objectives

- Bacterial meningitis
  - IDSA guidelines: Clin Infect Dis 2004; 39:1267-84
- HSV encephalitis
  - IDSA guidelines: Clin Infect Dis 2008; 47:303-27
- Necrotizing skin and soft tissue infections
  - IDSA guidelines: Clin Infect Dis 2014; 59:10-52
- Clinical presentation
- Diagnosis
- Management

Bacterial Meningitis – Q1

In patients with acute bacterial meningitis, what percentage of patients will present with the classic triad of symptoms – fever, neck stiffness and altered mental status?

A. 15%

B. 40%

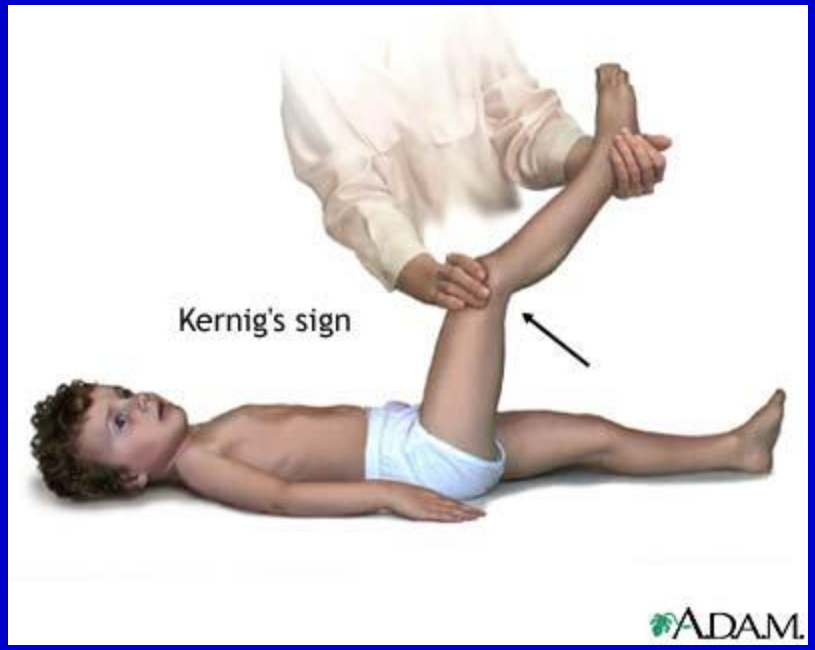
C. 80%

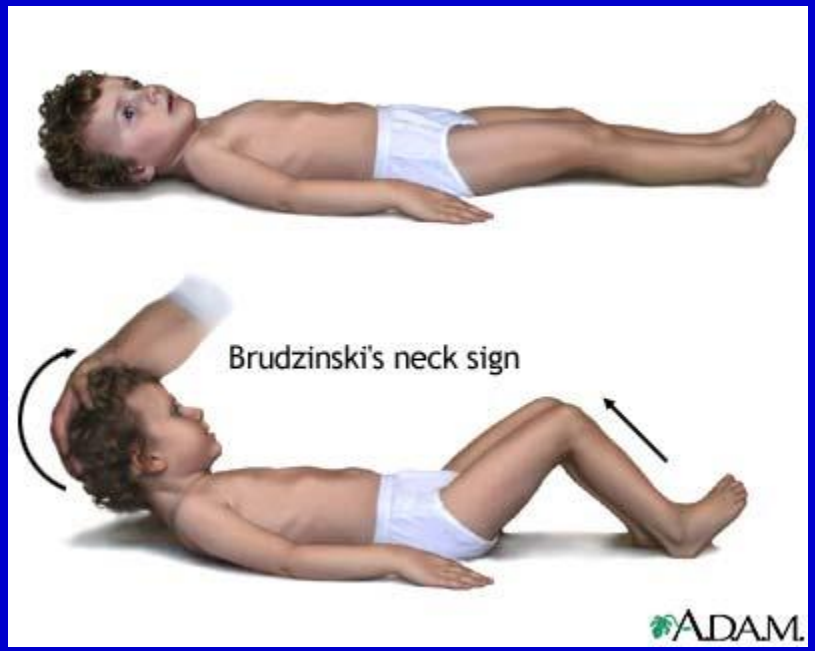
D. 95+%

Bacterial Meningitis
Clinical Manifestations

Classic triad: fever, nuchal rigidity and altered mental status 40%
95% will have 2 of 4: HA, fever, stiff neck, and altered mental status [1]

Sensitivity of nuchal rigidity for identifying meningitis = 30%
Sensitivity of Kernig's or Brudzinski's sign = 5% each [2]





[1] NEJM 2004; 351:1849
[2] CID 2002; 35:46

Bacterial Meningitis – Q2

In patients presenting with suspected acute bacterial meningitis, what is the first diagnostic study that should be performed immediately?

A. Lumbar puncture

B. Head CT

C. Blood cultures

D. Procalcitonin

Bacterial Meningitis Diagnostic Studies

- Blood cultures
  - Obtain 2 sets STAT
  - Positive in 50-90%
- Lumbar puncture
  - Cell count & diff, glucose, protein, GS, culture
  - Do not order CSF (S.pneumo, N.meningitidis) antigen tests
  - Bacterial vs Viral: when in doubt – save CSF
- Head CT
  - Immunocompromise, hx CNS disease, new seizure, papilledema, ALOC, focal neuro deficit [3]

[3] NEJM 2001; 345:1727

Bacterial Meningitis – Q3

50M homeless, hx of EtOH abuse, presents to ED with fevers and altered mental status. Cannot obtain further hx. Exam – T 39 C, stiff neck, obtunded, withdraws to noxious stimuli. Blood cxs obtained.

What is the next best step in management?

A. Start antibiotics

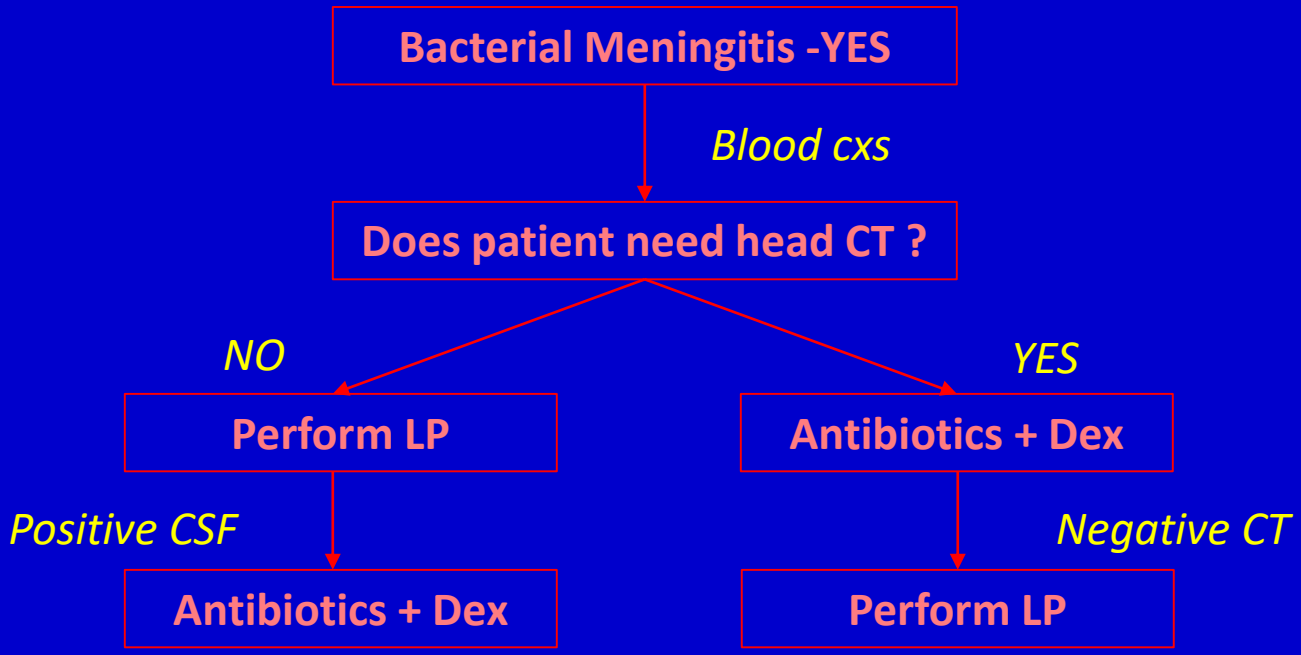
B. Head CT

C. Lumbar puncture

D. Check EtOH level

Bacterial Meningitis

Management Algorithm



Bacterial Meningitis Clinical Microbiology

- *Streptococcus pneumoniae*
  - GPC in pairs
  - Most common cause
- *Neisseria meningitidis*
  - GNC in pairs
  - Epidemics, students. Respiratory droplet isolation.
- *Haemophilus influenzae*
  - GNR
- *Listeria monocytogenes*
  - GPR
  - Neonates, age > 50, immunocompromised host

Clinical Case #1 – Q4

56M presents to ED with 1 day of fevers, generalized myalgias and malaise. PE: T 36.8^{0}C, P67, BP 156/90. Oriented only to name, neck supple, midline abdominal scar. Labs: WBC 17.8 (65%N 23%B), + Howell-Jolly bodies. CSF: 75W 80%N, G 1, P 485, GS GPCs in pairs.

Which of the following is the best treatment for this patient?

A. *Vanco + Ceftriaxone*
B. *Vanco + Ceftriaxone + Dexamethasone*
C. *Vanco + Ceftriaxone + Ampicillin*
D. *Vanco + Ceftriaxone + Amp + Dexamethasone*

Bacterial Meningitis Diagnosis & Management

- **Antibiotics (within 1-2 hours)**

Vancomycin

- 20mg/kg load, 15mg/kg q12, trough 15-20

Ceftriaxone: 2gm q12

*Ampicillin: 2gm q4 (if risk for Listeria)

- **Dexamethasone**

Suspected or proven pneumococcal meningitis

CSF: cloudy/pus, GS - GPC, CSF WBC > 1000 [4]

Dexamethasone 0.15mg/kg PO q6h x2-4 days

Do not give AFTER antibiotics administered

CSF in Bacterial meningitis

CSF WBC > 1000
CSF WBC < 100 (~10%)
Neutrophil % > 80%
Glucose < 40 mg/dL
CSF-serum G ratio 0.4
Protein > 200 mg/dL
CSF lactate > 35mg/dL

High probability if any:
WBC > 2000 or ANC > 1180
Protein > 220
Glucose < 34

[4] NEJM 2002; 347:1549

Bacterial Meningitis Summary

- Clinical: (2 of 4) fever, HA, neck stiffness, AMS
- Microbiology:
  - *S.pneumo, N.meningitidis, H.flu*
  - *Listeria* (Age > 50, immunocompromised host)
- Diagnostics:
  - Blood cultures first
  - Needs Head CT → treat first
  - LP (WBC > 1000, 80%N, G <40 or ratio 0.4, P > 200)
- Treatment:
  - Dexamethasone first (classic presentation or CSF criteria)
  - Vanco + Ceftriaxone (+ Ampicillin if Listeria).

Clinical Case #2 – Q5

47F brought in by family for 3 day history of fevers and chills, then developed aphasia. No significant PMH. PE: T 39.2^{0}C, P112, BP 102/68. Confused, garbled speech. No neck stiffness, moving all extremities. No rash. Suffers a generalized seizure in the ED. LP: 92 WBC (95%L), 156 R, 77 G, 118 P, + xanthrochromia. MR brain: Increased T2 and FLAIR signal intensity bilateral mesial temporal lobes.

Which of the following is the best treatment for this patient?

A. Vanco + Ceftriaxone + Dexamethasone
B. IV acyclovir
C. IV ganciclovir
D. IV amphotericin
E. INH + RIF + PZA + EMB

HSV Encephalitis Summary

- Clinical

Fever (90%). Acute onset (< 1 week)

AMS, temporal lobe symptoms, seizure

- Microbiology

HSV1 >> HSV2

Reactivation >> 1^0 infection

- Diagnostics

CSF HSV PCR 95+% sensitive

PCR can be negative if early

MR > CT sensitivity

90% abnormal, 60% unilateral

- CSF in HSV encephalitis

CSF WBC 5-500

Lymphocyte predominant

Glucose normal

CSF-serum G ratio > 0.5

Protein normal to elevated

- Treatment

IV acyclovir 10mg/kg q8h

Start empiric therapy immediately

Best outcome with trmt within 24 hrs

Mortality 70% → 15% (with trmt)

Clinical Case #3 – Q6

54F presents with 4 day history of HA. Started as left temporal throbbing, progressed to involve her entire head and radiating down spine. Denies fevers. Mosquito bite 1 week ago. Hx of meningitis 2 years ago. Born in Mexico. PE: AF P72 BP 133/57, A&Ox3, neck supple, PERRL, neuro exam normal, no rash. LP: 702 WBC (96%L), G45, P77.

What is the most likely etiology for this patient's meningitis?

A. HSV
B. West Nile Virus
C. Enterovirus
D. Tuberculosis

HSV Meningitis Summary

- Clinical
  - Primary genital HSV
  - Recurrent – lasts 2-7d, recurrence weeks-years
- Diagnosis
  - CSF: 10-1000 WBCs (N→L), nml G, slight elev P
  - HSV PCR, HSV-2 >> HSV-1
- Management
  - Immunocompromised - IV/PO acyclovir
  - Immunocompetent - treatment controversial
  - Primary genital HSV treatment ↓ risk of meningitis
  - Prophylaxis for recurrent meningitis not recommended

Clinical Case #4 – Q7

33M with hx of MVA and bilateral tibial fractures s/p ORIF 4 months ago – recovered, walking. Developed progressive swelling, erythema and pain in the right lower tibial region 3d PTA. Denies antecedent trauma. Pain became so severe he could not walk. PE: T38.8^{0}C P134 BP131/60. Severe distress due to pain. RLE with extensive erythema, black necrotic patch on anterior shin, small area draining pus. Labs: WBC 29 (92% N). What is the next best step in management?

A. Consult Surgery
B. Start antibiotics
C. Obtain CT of the RLE
D. Obtain Venous Duplex of RLE

Necrotizing STI
Clinical Manifestations

- Systemic toxicity
  - SIRS typically with high fever
  - Rapid progression (hours to days)
  - Organ dysfunction: MS changes, ARF
- Cutaneous findings
  - Exquisite pain, pain beyond area of erythema
  - Severe induration, ecchymoses, anesthesia, bullae (hemorrhagic/turbid), gangrene, crepitus

NSTI – Q8

50M homeless man presents to the ED with fever and RLE pain. He is unable to provide any history due to altered mental status. On examination – febrile to 39 C, RLE with erythema and hemorrhagic bullae, tender to palpation. Labs: WBC 30, Na 127. Surgery coming to evaluate the patient.

Which of the following is the best antibiotic regimen for this patient?

A. Vancomycin

B. Vancomycin + Cefazolin

C. Vancomycin + Zosyn

D. Vancomycin + Zosyn + Clindamycin

Necrotizing STI Microbiology

- Monomicrobial (Type 2)
  - Group A Strep
  - Staph aureus
  - Vibrio
- Polymicrobial (Type 1)
  - Bowel / perianal
  - Genital

Necrotizing STI
Diagnosis and Management

- Diagnosis
  - Surgical diagnosis
  - Laboratory: blood cultures
    - Laboratory risk indicator for necrotizing STI [1]
    - WBC, Hb, Na, Cr, Glucose, CRP – sensitive but not specific
  - Imaging (*optional*): CT to evaluate for gas/abscess
- Management
  - Surgical debridement
  - Empiric: Vanco → MRSA
    Zosyn → GNRs & anaerobes

[1] Crit Care Med 2004; 32:1535-41

Necrotizing STI Summary

- Clinical
  - SIRS parameters
  - Pain / toxicity out of proportion to exam findings
- Microbiology
  - Monomicrobial: GAS, Staph aureus
  - Polymicrobial: GNRs & anaerobes
- Diagnostics
  - Clinical suspicion → consult Surgery
- Treatment
  - Surgical debridement
  - Empiric: Vanco + Zosyn, then de-escalate to specific therapy