QUESTION 45 ID CNS infections

Which of the following is the most important reason for not recommending gentamicin for the treatment of coliform central nervous system (CNS) infections?

A. It is not active in an acidic environment.
B. It is not active in a low oxygen tension environment.
C. It has poor CNS penetration.
D. It may precipitate seizures.
E. Ototoxicity risk is accentuated.

1 What is Coliform infections
Gram-ve rods and the most famous one would be Escherichia, Enterobacter, Klebsiella and Citrobacter

2 Epidemiology
Rare causes of community-acquired meningitis in adults
Common cause of nosocomial infections – neurosurgical device, CSF leak
Mortality rates of 40-80%

Diagnosis
1. CSF
   • Not always diagnostic but remains mainstay of diagnosis
   • Pts who have undergone neurosurgical procedures, CSF protein, glucose, leukocyte counts and Gram Stain do not reliably distinguish bacterial meningitis from nonbacterial processes

2. CSF analysis
   • Protein
     - Variable, usually markedly elevated
     - range from 17 – 19000mg/dL

3. Glucose
   • Low

4. Cell Count
   • Elevated leukocyte counts
   • Polymorphonuclear leukocytes account for > 50% of these cells in 90% of cases

5. Gram’s stain
   • +ve for gram –ve bacilli in >50% of adult patients
   • But a –ve or positive Gram stain should not be the sole basis for starting empiric therapy

6. Culture
7. PCR
   • Sensitivity of 86% and specificity of 97% compared to culture
   • May be diagnostic method of choice when antimicrobial therapy has already started or when cultures remain –ve

8. Lactate
   • Help to support a diagnosis of bacterial meningitis
   • Not affected by the presence of rbc in CSF and can be helpful when CSF is bloody
   • Higher sensitivity and specificity compared to CSF to blood glucose ratios
   • Mean CSF lactate level of 7.8mmol/L

9. Blood cultures

1 Wikipedia – Coliform bacteria
2 Up to date Diagnosis and Treatment of Gram –ve bacilliary meningitis
Bacteremia detectable in app 50% of adult patients with Gram-ve bacillary meningitis
Bacteremia is an important prognostic feature of Gram-ve meningitis – 5X higher mortality rates

**Antibiotics**

**Directed treatment:**

Ceftriaxone 2g IV bd or Cefotaxime (2g IV tds)
If organism is known to have inducible beta-lactamase production or it produces an ESBL, use:

Meropenem (1g IV tds) or Bactrim (15 – 20mg/kg per day divided every 6 - 8 hrs)
If Pseudomonous,
Ceftazidime plus aminoglycosides

**Aminoglycosides**

- Penetrate blood-brain barrier poorly
- Do not achieve sufficient concentrations in the CSF to kill meningeal pathogens when administered parenterally
- Useful only when given with another bactericidal drug that penetrates the CSF well
- Usually combined with a 3rd generation cephalosporin

2 drugs should be administered for persistently +ve CSF cultures
Intrathecal or intraventricular therapy with gentamicin is a last resort for organisms resistant to the above agents

**Dexamethasone**

not recommended in patients with Gram-ve bacillary meningitis

Answer: C (Poor CSF penetration)