

Kaplan USMLE Step 2 prep: Which is the appropriate pharmacotherapy?

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If you're preparing for the United States Medical Licensing Examination[®] (USMLE[®]) Step 2 exam, you might want to know which questions are most often missed by test-prep takers. Check out this example from Kaplan Medical, and read an expert explanation of the answer. Also check out all posts in this series.

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This month's stumper

A 65-year-old man is brought to the emergency department because of a two-day history of fever, headache and confusion. He has a history of prostate cancer, type 2 diabetes mellitus, and hypertension. Current medications include lisinopril and metformin. He appears confused. His temperature is 39.7° C (103.5° F), blood pressure is 120/84 mm Hg, and pulse is 102 beats per minute. Examination shows neck stiffness. A lumbar puncture is performed. Gram stain of the cerebrospinal fluid shows lancet-shaped, gram-positive diplococci.

Which of the following is the most appropriate pharmacotherapy?

- A. Ampicillin, ceftriaxone and vancomycin.
- B. Ceftriaxone.
- C. Ceftriaxone and vancomycin.

- D. Penicillin.
- E. Rifampin.
- F. Vancomycin plus ampicillin.

The correct answer is C.

Kaplan Medical explains why

Pneumococcal meningitis in children and adults (age 1–49 years) is empirically treated with ceftriaxone (or cefotaxime) and vancomycin.

Pneumococcal resistance to penicillin is an increasing problem. Higher doses of penicillin or cephalosporins may be adequate for pneumonia or upper respiratory infections caused by penicillin-resistant pneumococci. For life threatening infections such as meningitis caused by *Streptococcus pneumoniae*, however, adding vancomycin to either ceftriaxone or cefotaxime is recommended. If

culture results reveal susceptible pneumococcus, the vancomycin may be discontinued.

Why the other answers are wrong

Choice A: Ampicillin is added to cover *Listeria* for empiric treatment of patients older than age 50 and neonates. This patient, however, has a positive Gram stain suggestive of *S. pneumoniae*. If the Gram stain had failed to show any organism, the addition of ampicillin would have been correct.

Choice B and D: Ceftriaxone alone or high-dose penicillin is the treatment once pneumococcal susceptibility is obtained. Presumed meningococcal meningitis can also be treated with high-dose penicillin or a third-generation cephalosporin.

Choice E: Rifampin is used in patients who are vancomycin-allergic and in close contacts of infected persons who have meningococcal meningitis.

Choice F: Vancomycin plus ampicillin is not a regimen used for empiric treatment of pneumococcal meningitis. Furthermore, vancomycin is not recommended for the treatment of bacterial meningitis caused by isolates that are susceptible to beta-lactams. Even in patients who have meningitis caused by highly penicillin- and cephalosporin-resistant strains, vancomycin should be combined with a third-generation cephalosporin and should not be used as a single agent.

Tips to remember

- | Treat pneumococcal meningitis empirically with a third-generation cephalosporin plus vancomycin.
- | Vancomycin may be discontinued if the gram-positive organism is found to be penicillin-susceptible *Streptococcus*.

For more prep questions on USMLE Steps 1, 2 and 3, view other posts in this series.