Kaplan USMLE Step 2 prep: Which culprit behind man’s symptoms?

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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.

This month’s stumper

A 52-year-old man with a history of chronic low back pain complains of three days of a cough productive of purulent sputum, fever, and left-sided subcostal pain worsened by breathing. A single episode of shaking chills accompanied the onset of the illness. He has no gastrointestinal complaints.

His temperature is 40 °C (104 °F), blood pressure is 160/80 mm Hg, pulse is 100 beats per minute, and respirations are 38 per minute with nasal flaring and splinting. The cardiac and abdominal examinations are within normal limits. There are moist crackles and egophony at the left lung base. A chest radiograph shows a left lower lobe infiltrate. Gram stain of the sputum shows multiple polymorphonuclear leukocytes and occasional epithelial cells.

Which of the following is the most likely pathogen?

A. Gram-negative diplococci.
B. Gram-negative rods.
C. Gram-positive cocci in clusters.
D. Gram-positive diplococci in chains.
E. Gram-positive rods.

The correct answer is D.

Kaplan Medical explains why

This patient is demonstrating the classic picture of pneumococcal pneumonia. *Streptococcus pneumoniae* is the most common cause of community-acquired pneumonia in this age group. The usual presentation is sudden onset of shaking chills, with rigors, high fever, and difficulty breathing. Pleuritic chest pain is often present and signifies bacterial infection.

A white blood cell count, not provided in this case, most often is significantly elevated with a left shift (predominantly bands and polymorphonuclear cells). Chest radiographs usually reveal a lobar distribution of the pneumonia. Pleural effusions are present in up to 30 percent of the cases. Gram stain of the sputum commonly reveals Gram-positive diplococci in chains.
Why the other answers are wrong

Choice A: Gram-negative diplococci would be present in pneumonia due to *Moraxella catarrhalis*. This pathogen may produce acute pneumonia and usually occurs in the elderly or in those with a history of chronic bronchitis or obstructive lung disease. It is much less common than *S. pneumoniae*.

Choice B: Gram-negative rods are not a usual cause of pneumonia in this population of patients. Gram-negative rods causing pneumonia include *Klebsiella*, *Enterobacter*, *Serratia* and *Proteus*, which occur more commonly in patients who are debilitated, alcoholics or residing in nursing homes or similar institutions. These bacteria are often responsible for nosocomial pneumonias and, infrequently, community-acquired pneumonia.

Choice C: Gram-positive cocci in clusters that cause pneumonia are usually *Staphylococcus aureus*. *S. aureus* is an uncommon cause of community-acquired pneumonia. When it does cause disease, it is usually during or just following an epidemic of viral influenza. *S. aureus* may be seen year-round in the hospital, because it is a common cause of nosocomial pneumonia.

Choice E: Gram-positive rods would likely be *Corynebacterium diphtheriae* (diphtheria). This patient presents with pneumonia, not diphtheria (an infection that occurs in the pharynx, middle ear, larynx, skin or bronchi).

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

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