

Kaplan USMLE Step 3 prep: Potential complications from broken ribs

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If you're preparing for the United States Medical Licensing Examination[®] (USMLE[®]) Step 3 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 31-year-old man is admitted to the hospital after a motorcycle accident. He was fully alert and oriented upon arrival, and a primary survey revealed a left pneumothorax and small hemothorax with multiple rib fractures bilaterally. Other than some abrasions and lacerations requiring sutures, the patient was otherwise unremarkable.

Initial laboratory results and electrocardiograms were unremarkable. After a chest tube was placed, the patient had reinflation of his left lung, as demonstrated by a chest radiograph. The patient is now concerned about future complications.

Which of the following is an appropriate response at this time?

A. "Due to the extent of debilitation and pain from your injuries, you are at a greater risk of acquiring pneumonia owing to a possibly decreased respiratory drive; a nerve block and chest physiotherapy can decrease this risk."

- B.** "You are at a greater risk of developing pus in your lung due to the great degree of contamination of your wounds, and you need to be evaluated by a pleurocentesis."
- C.** "You are at risk of rupturing a blood vessel in your brain due to the high-impact trauma; you will need serial CT scans to determine if you are bleeding into your brain to detect it early enough to stop it."
- D.** "You are in the age group whose greatest cause of mortality is a myocardial infarction; to prevent mortality, a stress test should be done as soon as you recover."
- E.** "You will need serial chest X-rays to check for an interruption in the aorta due to the high-impact trauma you have experienced."

The correct answer is A.

Kaplan Medical explains why

Rib fractures are exquisitely painful. The magnitude of the pain forces people to halt their inspiratory efforts after small tidal volumes and prohibits them from effectively coughing and clearing secretions. This pattern of rapid, shallow breathing with no coughing predisposes patients to profound atelectasis of the lungs and infection due to residual secretions. Therefore, this man is at greatest risk for developing pneumonia.

Often, these patients will receive rib blocks or thoracic epidural catheters for pain management. Opiates are not very effective since they produce somnolence, often worsening the respiratory problems. Pulmonary toilet, a form of chest physiotherapy, is very effective in clearing secretions from the airways in order to prevent a buildup and subsequent infection of the lower respiratory tract.

Why the other answers are wrong

Choice B: An empyema is an infection of the pleural space. Even though this patient's hemothorax has been drained, his risk of subsequent infection is essentially the same as the general population. His chest tube confers only a minimal increased risk of empyema.

Choice C: One of the causes of subarachnoid hemorrhage (SAH) is trauma. The presentation of SAH, however, is often after the trauma. Most often, head trauma is the precipitating event. It is very rare for SAH to have a delayed manifestation of hours or days after the trauma was suffered. Serial CT scans of the head are not indicated several hours after trauma.

Choice D: This man is not in the age group with the highest mortality secondary to myocardial infarction. It is possible, however, that with major myocardial contusions from blunt chest trauma, both direct myocardial injury and coronary dissection can result in infarction. This patient has a normal EKG, no symptoms of chest pain, and no evidence of major blunt chest trauma in the form of a hematoma or bruise across the sternum. For these reasons, his risk of infarction is quite low.

Choice E: All major chest trauma carries the possibility of aortic dissection, which is why chest radiographs are obtained to rule out a widened mediastinum. Although the negative predictive value of such films is not 100%, the fact that this patient has no chest or back pain coupled with a normal chest radiograph puts him at especially low risk for this complication.

Tip to remember

Patients with rib fractures can develop a pattern of rapid, shallow breathing with no coughing due to the pain from injuries. This predisposes to profound atelectasis of the lungs and infection due to residual secretions. The best way to prevent this is with a nerve block to facilitate deep breathing and chest physiotherapy to clear airway secretions.

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