

Neck Trauma: Review Questions

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QUESTIONS

Choose the single best answer for each question.

- All of the following principles are applicable when reviewing plain radiographs of the cervical spine EXCEPT:**
 - An adequate lateral cervical spine radiograph demonstrates alignment of the vertebral bodies and laminae from C1 through C7.
 - Most radiographically apparent cervical spine injuries are visualized on the lateral cervical spine view.
 - The heights of the anterior and posterior aspects of the vertebral body are usually within 3 mm of each other.
 - Distention of the retropharyngeal and prevertebral spaces can be subtle clues to cervical spine injuries in both children and adults.
 - Injury to the cervical spine can result in the widening or narrowing of joint space.
- After a patient's airway and breathing have been evaluated and stabilized, the best maneuver to use in the emergency department (ED) to control severe hemorrhage originating from a penetrating neck wound is:**
 - Clamp all suspected bleeders
 - Probe and pack the wound
 - Apply direct pressure to the wound
 - Remove any protruding objects
 - Place the patient in a reverse Trendelenburg position
- While playing a tackle football game with friends, a 23-year-old man sustains a blow to the right side of his neck. The patient's friends bring him to the ED when he complains of blurry vision and weakness in his right arm. His medical history is unremarkable. The physical examination is most notable for ptosis and miosis of the right eye and tenderness over the bifurcation of the right carotid artery. No bruit or hematoma is noted. The right arm demonstrates generalized motor weakness. Cervical spine radiographs and a computed tomography scan of the head are both negative. A duplex scan demonstrates a high-grade stenosis of the right internal carotid artery. Which of the following statements concerning this type of injury is TRUE?**
 - Blunt trauma accounts for approximately 50% of traumatic carotid artery injuries.
 - Blunt trauma can cause carotid artery dissection indirectly by forcing the head into hyperextension and stretching the internal carotid artery over the bony processes (transverse) of the cervical vertebrae.
 - Most patients sustaining blunt trauma to the carotid artery become symptomatic immediately.
 - Magnetic resonance imaging (MRI) is the definitive study for evaluating possible carotid artery dissection.
 - All blunt carotid artery injuries necessitate surgical exploration and repair.
- All of the following statements regarding hanging and strangulation injuries are true EXCEPT:**
 - Usually cervical spine injuries secondary to a hanging occur if the fall is greater than the victim's height.
 - Skin and subconjunctival petechial hemorrhages often characteristically surface following strangulation injuries.
 - Delayed mortality following hanging injuries and strangulation generally results from respiratory complications.
 - The body must be suspended in order for a death to be classified as a hanging.
 - Manual strangulation is more likely to produce fractures of the hyoid and thyroid cartilage than ligature strangulation.

(turn page for answers)

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EXPLANATION OF ANSWERS

1. (A) An adequate lateral cervical spine radiograph demonstrates alignment of the vertebral bodies and laminae from C1 through C7 (FALSE). All seven cervical vertebrae must be seen on the lateral cervical spine radiograph as well as the coupling of C7 on T1. Up to 90% of osseous injuries of the cervical spine are detectable on the lateral view. It is important to check for the ABCs. **A** = Alignment—three smooth lines should form when outlining the anterior and posterior segments of the vertebral bodies and the spinolaminar junctions. **B** = Bone—check the height and width of each cervical vertebra. Any disruption of the bone indicates a fracture. A more subtle clue is a disparity of greater than 3 mm in the heights of the anterior and posterior aspects of the vertebral bodies. **C** = Cartilage disk space—trauma to the cervical spine can cause an increase or a decrease in the width of the cartilage joint space, depending on the mechanism of injury. However, the most common cause of joint space narrowing is degenerative joint disease in adults. **s** = soft tissue—distension of soft tissue spaces suggests possible cervical spine injuries. The prevertebral space, measured from the anterior aspect of the dens to the posterior segment of the anterior arch of the atlas, may widen secondary to injuries of C1 or C2. This distance should normally be less than 3 mm in adults and 5 mm in children. The retropharyngeal space is measured from the anteroinferior part of the body of C2 to the posterior aspect of the air column. This distance should be less than 7 mm in both adults and children.

2. (C) Apply direct pressure to the wound. Bleeding from neck wounds is best controlled by direct digital pressure. Blind attempts at clamping transected vessels may provoke inadvertent injury to adjacent structures or extend damage to previously harmed blood vessels. Likewise, probing an open neck wound in the ED is fraught with risks including exacerbating the patient's condition by possibly dislodging a clot or inducing an air embolus. In the ED, protruding objects are best left in place in the patient because they may be tamponading uncontrolled hemorrhage, and removal should be deferred to the controlled setting of the operating room. Placing the patient in mild Trendelenburg position may lessen the risk of an air embolus.

3. (B) Blunt trauma can cause carotid artery dissection indirectly by forcing the head into hyperextension and stretching the internal carotid artery over the bony processes (transverse) of the cervical vertebra (TRUE). Blunt trauma accounts for approximately 10% of acute traumatic carotid artery injuries. Stretching of the carotid artery during hyperextension can give rise to an intimal

tear that can dissect and occlude the artery or serve as a nidus for thrombus formation and subsequent intracerebral embolization. The presentation of carotid artery dissection is highly variable and nonspecific. Only 10% of patients display immediate symptoms, 55% demonstrate findings within the first 24 hours, and 35% exhibit no symptoms until 24 hours or more after injury. The most common initial symptom is headache on the side of the dissection, usually in the periorbital/orbital area. Horner's syndrome (miotic pupil, ptosis, and facial anhidrosis) occurs in approximately 50% of the reported cases. Carotid artery trauma should be suspected in any alert patient with post-traumatic hemiparesis because other insults causing hemiparesis are usually associated with marked obtundation. Despite its invasiveness, angiography remains the most accurate study and the gold standard for carotid artery dissection. Pathognomonic findings for carotid artery injury include a double lumen and an intimal flap. An MRI can prove carotid dissection by demonstrating a mural thrombus, but limitations include difficulty in grading the degree of stenosis and problems in assessing the amount of longitudinal extension. The goal of treatment is to prevent evolution of a stroke. Debate surrounds optimal therapy. Although some investigators advocate routine surgical exploration and correction of all injuries, other authorities have shown that these injuries may be safely managed nonoperatively. Important factors guiding the best therapeutic approach include the anatomic location of the injury, type of damage, and associated wounds. Antiplatelet and anticoagulant therapy may be indicated.

4. (D) The body must be suspended in order for a death to be classified as a hanging (FALSE). Hanging and strangulation account for nearly 3500 deaths each year in the United States. Strangulation may result from hanging (either complete or partial suspension of the body from the neck), ligature suffocation, manual choking, or postural asphyxiation. Cervical spine and spinal cord injuries are unusual unless the drop is at least equal to the height of the victim (judicial hangings). Tardieu's spots are petechial hemorrhages best seen in the skin and conjunctival tissue cephalic to the ligature and are thought to arise from sudden increases in venous pressure. Respiratory complications, including acute respiratory distress syndrome and aspiration pneumonia, are the most common causes of death in patients who survive the initial insult. Serious injury to the deeper structures of the neck, including fractures of the hyoid bone and thyroid cartilage, is unusual in nonjudicial hangings and ligature strangulation and is more common with manual strangulation.