

Management of Trauma Patients: Review Questions

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The “golden hour” is the critical period from time of injury to definitive care. Because of the anxiety that trauma provokes, it is essential that health care workers concerned with trauma commit to memory a systematic plan that is straightforward, logical, and easily reproducible. The following questions are based on the approach established by the American College of Surgeons in the Advanced Trauma Life Support Course.

QUESTIONS

Choose the single best answer for each question.

- 1. A 61-year-old woman, a front-seat restrained passenger, is brought to the emergency department (ED) by paramedics after a motor vehicle crash. Her vital signs in the field were as follows: blood pressure, 180/104 mm Hg; heart rate, 60 bpm; and respiratory rate, 10 breaths/min and irregular. She is non-verbal and unresponsive to painful stimuli. There are obvious head wounds. Which of the following is the most appropriate first step in her treatment?**

 - Secure the patient’s airway
 - Obtain a lateral radiographic film of the cervical spine
 - Lower the patient’s blood pressure
 - Determine the patient’s Glasgow Coma Scale (GCS) score
 - Order an immediate computed tomographic scan of the head
- 2. A 15-year-old boy is brought to the ED after sustaining a deep, actively bleeding, 9-cm laceration to his medial left thigh from a power saw. Which one of the following should be performed in the immediate management of the wound?**

 - Apply a tourniquet
 - Apply direct pressure to the wound
 - Apply a hemostat to bleeding blood vessels
 - Provide fluid resuscitation to restore blood pressure to normotension prior to addressing the bleeding site
 - Perform wound exploration and repair with vertical mattress sutures to tamponade bleeding
- 3. Paramedics transport to the ED a 44-year-old man, the victim of a single-car, front-end collision into a telephone pole. The medics found an empty fifth of vodka in the front seat of the car. The patient’s airway is clear, and his respiratory rate is 28 breaths/min, with equal but poor air entry (a diaphragmatic breathing pattern is noted). His other vital signs are as follows: blood pressure, 70/30 mm Hg; heart rate, 130 bpm and regular; and GCS score, 15. However, there is no movement below the C5 spinal level, and priapism is noted. Which one of the following types of shock is the patient most likely experiencing?**

 - Cardiogenic shock
 - Distributive shock secondary to alcohol ingestion
 - Hypovolemic shock
 - Neurogenic shock
 - Spinal shock
- 4. A 35-year-old woman is brought to the ED after receiving a stab wound to the right side of the chest at the third intercostal space in the midclavicular line. She is acutely dyspneic but can say her name. Her vital signs are as follows: blood pressure, 80/40 mm Hg; heart rate, 130 bpm; and respiratory rate, 60 breaths/min. Breath sounds are markedly diminished on the right side of the chest, neck veins are flat, and there is tracheal deviation to the left. Which of the following is the most appropriate first step in managing this patient’s injury?**

 - Order immediate radiography of the chest
 - Obtain an arterial blood gas measurement
 - Administer a bolus dose of lactated Ringer’s solution, intravenously
 - Intubate the patient
 - Perform needle decompression of the right pleural space

(turn page for answers)

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EXPLANATION OF ANSWERS

1. **(A) Secure the patient's airway.** Gaining control of the airway is always the first priority in trauma management and should not be delayed to obtain radiologic studies or even to perform a brief neurological assessment. Early intubation is crucial for this patient with a severe head injury to protect her airway because of a reduced level of consciousness and loss of pharyngeal muscle tone. Intubation is also essential for providing a reliable route for supplying high oxygen concentrations to limit secondary brain injury and to hyperventilate the patient when necessary to lower elevated partial pressures of carbon dioxide.¹ The patient's hypertension is a physiologic response to brain injury and raised intracranial pressure (Cushing's reflex). Normal findings on lateral radiography of the cervical spine do not rule out an unstable cervical spine injury and therefore should not delay intubation. Although this patient undoubtedly requires a computed tomographic (CT) scan of her brain, her airway must be protected and secondary brain injury minimized before progressing to CT scanning.²
2. **(B) Apply direct pressure to the wound.** The priority in the treatment of injuries that threaten circulation is to arrest external hemorrhage. Blood that spills on the floor is forever lost to the patient. Consequently, bleeding wounds should be managed even before venous access is obtained. Active hemorrhage is best controlled by direct digital pressure. Tourniquets should not be used except in the unusual circumstance of an amputated extremity because they crush tissue, may provoke venous thrombosis, and cause distal ischemia.³ Use of hemostats is not only time-consuming, but the blind clamping of vessels risks damage to adjacent nerves and unaffected vessels. The approach of delaying fluid resuscitation (hypotensive resuscitation) has been suggested.⁴ A tenuous clot forms in injured arteries, preventing further blood loss. Factors that would tend to prevent clot formation and permit renewed bleeding include increased volume, increased blood pressure, vasodilation, and decreased blood viscosity secondary to hemodilution—all factors associated with fluid resuscitation. Wound exploration can exacerbate blood loss. Additionally, satisfactory hemostasis is critical prior to wound repair, because hematoma formation is associated with wound dehiscence and infection.
3. **(C) Hypovolemic shock.** Hemorrhage is by far the leading trigger of shock in trauma patients. Despite apparent signs of a spinal cord transection in this

patient, primary management of shock is aimed at correction of hypovolemia.⁵ Additionally, hypovolemia may coexist with a spinal cord injury. It is much safer to treat shock presumptively as hypovolemic shock first, because premature use of vasopressors exacerbates ischemia and subsequent morbidity and mortality.⁶ Neurogenic shock is the loss of vascular tone that occurs when the sympathetic nervous system is interrupted by a high-level spinal cord injury, causing peripheral venous pooling and subsequent hypotension. Spinal shock is a temporary loss of tone and spinal reflexes below the level of the injury. A trauma patient's symptoms should never be attributed to alcohol or drug use until other etiologies are excluded.⁵

4. **(E) Perform needle decompression of the right pleural space.** A tension pneumothorax is an immediate life-threatening emergency. Because the patient can speak, a patent airway can be assumed. Because a clinical diagnosis can be made, it is unacceptable to wait for chest radiography or other studies. Tension pneumothorax requires urgent decompression, which is accomplished by rapid insertion of a large-bore needle into the second intercostal space in the midclavicular line of the affected hemithorax.⁵ This simple maneuver has few serious consequences, even in the absence of a tension pneumothorax. Definitive treatment of such an injury will mandate a formal tube thoracostomy. All airway and breathing problems should be addressed before focusing on managing the patient's circulation.⁵

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