Chapter 24 - Trauma Overview

1. 

2. **National EMS Education Standard Competencies (1 of 3)**
   Trauma
   Applies fundamental knowledge to provide basic emergency care and transportation based on assessment findings for an acutely injured patient.

3. **National EMS Education Standard Competencies (2 of 3)**
   Trauma Overview
   • Pathophysiology, assessment, and management of the trauma patient
     – Trauma scoring
     – Rapid transport and destination issues
     – Transport mode

4. **National EMS Education Standard Competencies (3 of 3)**
   Multisystem Trauma
   • Recognition and management of
     – Multisystem trauma
   • Pathophysiology, assessment, and management of
     – Multisystem trauma
     – Blast injuries

5. **Introduction (1 of 2)**
   • For people younger than age 44, traumatic injuries are the leading cause of death in the United States.
     – Traumatic emergencies occur as result of physical forces applied to the body.
     – Medical emergencies occur from an illness or condition not caused by an outside force.

6. **Introduction (2 of 2)**
   • Traumatic injuries may be caused by underlying medical conditions or medical illnesses may result from traumatic injuries.
   • Index of suspicion is your awareness and concern for potentially serious underlying and unseen injuries.

7. **Energy and Trauma (1 of 4)**
   • Traumatic injury occurs when the body’s tissues are exposed to energy levels beyond their tolerance.
   • The mechanism of injury is the way traumatic injuries occur.
     – Describes the forces acting on the body that cause injury

8. **Energy and Trauma (2 of 4)**
   • Three concepts of energy
     – Potential energy
     – Kinetic energy
     – Energy of work
   • Energy can be neither created nor destroyed, but can only be converted or transformed.

9. **Energy and Trauma (3 of 4)**
   • Work is force acting over a distance.
   • Forces that bend, pull, or compress tissues beyond their inherent limits result in the work that causes injury.
   •
Energy and Trauma (4 of 4)

- Kinetic energy is the energy of a moving object.
  - KE = \( \frac{1}{2} \text{mass} \times \text{velocity}^2 \)
- Potential energy is the product of mass, force of gravity, and height.
  - Mostly associated with the energy of falling objects

Mechanism of Injury Profiles (1 of 2)

- Different MOIs produce many types of injuries.
- Nonsignificant injuries
  - Injury to an isolated body part
  - Fall without the loss of consciousness

Mechanism of Injury Profiles (2 of 2)

- Significant injuries:
  - Injury to more than one body system (multisystem trauma)
  - Falls from heights
  - Motor vehicle and motorcycle crashes
  - Car versus pedestrian (or bicycle)
  - Gunshot wounds
  - Stabbings

Blunt and Penetrating Trauma

- Blunt trauma is the result of force to the body that causes injury without penetrating the soft tissues.
- Penetrating trauma causes injury by objects that pierce and penetrate the surface of the body.
- Either type may occur from a variety of MOIs.

Blunt Trauma

- Results from an object making contact with the body
- Motor vehicle crashes and falls are the most common MOIs.
- Be alert to skin discoloration and pain.
- Maintain a high index of suspicion for hidden injuries.

Vehicular Crashes (1 of 5)

- Motor vehicle crashes are classified as:
  - Frontal
  - Rear-end
  - Lateral
  - Rollovers
  - Rotational
- The principal difference is the direction of the force of impact.

Vehicular Crashes (2 of 5)

- A crash consists of three collisions
- Car against another car, tree, or object
  - By assessing the vehicle, you can often determine the MOI.
17 **Vehicular Crashes (3 of 5)**
- Passenger against the interior of the car
  - Common passenger injuries include lower extremity fractures, flail chest, and head trauma.

18 **Vehicular Crashes (4 of 5)**
- Passenger's internal organs against solid structures of the body
  - Internal injuries may not be as obvious as external injuries, but are often the most life threatening.

19 **Vehicular Crashes (5 of 5)**
- Significant MOIs include the following findings:
  - Death of an occupant in the vehicle
  - Severe deformity of vehicle or intrusion into vehicle
  - Severe damage from the rear
  - Crashes in which rotation is involved
  - Ejection from the vehicle

20 **Frontal Crashes (1 of 5)**
- Evaluate supplemental restraint system
  - Determine whether the passenger was restrained and whether the air bags deployed.
  - Seatbelts and air bags are effective in preventing a second collision inside the motor vehicle.
  - Air bags decrease the severity of deceleration injuries and decrease injury to the chest, face, and head.

21 **Frontal Crashes (2 of 5)**
- Despite air bags, suspect injuries to:
  - Extremities (resulting from the second collision)
  - Internal organs (resulting from the third collision)

22 **Frontal Crashes (3 of 5)**
- Children shorter than 4'9" should ride in the rear seat.
  - In a pickup truck or single-seated vehicle, the air bag should be turned off.
  - Remember that if the air bag did not inflate during the accident, it may deploy during extrication.

23 **Frontal Crashes (4 of 5)**
- Remember that supplemental restraint systems can cause harm whether they are used properly or improperly.

24 **Frontal Crashes (5 of 5)**
- Look for contact points between the patient and the vehicle as you perform a simple, quick evaluation of the interior of the vehicle.

25 **Rear-End Crashes (1 of 2)**
- Known to cause whiplash-type injuries
  - Particularly in absence of a headrest

26 **Rear-End Crashes (2 of 2)**
- As the body is propelled forward, the head and neck are left behind.
- Acceleration-type injury to the brain is possible.
  - Third collision of the brain within the skull
Lateral Crashes (1 of 3)
- Side impacts
- Very common cause of death associated with motor vehicle crashes

Lateral Crashes (2 of 3)
- A vehicle struck from the side is usually struck above its center of gravity.
  - Begins to rock away from the side of impact
  - Results in the passenger sustaining a lateral whiplash injury

Lateral Crashes (3 of 3)
- If substantial intrusion into the passenger compartment, suspect:
  - Lateral chest and abdomen injuries on the side of the impact
  - Possible fractures of the lower extremities, pelvis, and ribs
  - Organ damage from the third collision

Rollover Crashes
- Large trucks and sport utility vehicles are prone to rollovers.
- Injuries depend on whether the passenger was restrained.
- Most common life-threatening event is ejection or partial ejection of the passenger from the vehicle.

Rotational Crashes
- Spins are conceptually similar to rollovers.
- Rotation of the vehicle provides opportunities for the vehicle to strike objects such as utility poles

Car Versus Pedestrian (1 of 2)
- Injuries are often graphic and apparent.
- Can also be serious unseen injuries
- You should determine:
  - Speed of the vehicle
  - Whether the patient was thrown through the air
  - Whether the patient was struck and pulled under the vehicle

Car Versus Pedestrian (2 of 2)
- Evaluate the vehicle that struck the patient for structural damage.
- ALS backup should be summoned for any patients who have sustained a significant MOI.

Car Versus Bicycle (1 of 2)

Car Versus Bicycle (2 of 2)
- Presume that the patient has sustained an injury to the spinal column, or spinal cord, until proven otherwise at the hospital.
- Spinal stabilization must be initiated and maintained during the encounter.

Car Versus Motorcycle (1 of 4)
- Protection is from:
  - Helmet
  - Leather or abrasion-resistant clothing
  - Boots
- Collisions usually occur against larger vehicles or stationary objects.
Car Versus Motorcycle (2 of 4)
- When assessing the scene, look for:
  - Deformity of the motorcycle
  - Side of most damage
  - Distance of skid in the road
  - Deformity of stationary objects or other vehicles
  - Extent and location of deformity in the helmet

Car Versus Motorcycle (3 of 4)
- Head-on crash
  - Motorcycle strikes another object and stops its forward motion while the rider continues moving forward
- Angular crash
  - Motorcycle strikes an object at an angle so that the rider sustains direct crushing injuries to the lower extremity

Car Versus Motorcycle (4 of 4)
- Ejection
  - Rider will travel at high speed until stopped by a stationary object, another vehicle, or road drag.
  - Severe abrasions can occur
- Controlled crash
  - Technique used to separate the rider from the body of the motorcycle

Falls (1 of 3)
- Injury potential depends on the height from which the patient fell.
  - More than 20 ft (6m) is considered significant.
- Internal injuries pose the greatest threat to life.

Falls (2 of 3)
- Patients who fall and land on their feet may have less-severe internal injuries.
  - Their legs may have absorbed much of the energy of the fall.

Falls (3 of 3)
- Take the following factors into account:
  - The height of the fall
  - The type of surface struck
  - The part of the body that hit first, followed by the path of energy displacement

Penetrating Trauma (1 of 6)
- Second-leading cause of trauma death after blunt trauma
  - Accidentally by impalement
  - Intentionally by a knife, ice pick, or other weapon

Penetrating Trauma (2 of 6)
- With low-energy penetrations, injuries are caused by the sharp edges of the object moving through the body.
- Knives may have been deliberately moved around internally, causing more damage than the external wounds suggest.

Penetrating Trauma (3 of 6)
- Path of the projectile may not be easy to predict.
– Bullet may ricochet within the body before exiting.
– Path the projectile takes is its trajectory.
– Fragmentation will increase damage.
– Bullet’s speed is another factor.

46 Penetrating Trauma (4 of 6)
• Cavitation results from rapid changes in tissue and fluid pressure that occur with the passage of the projectile.
• Can result in serious injury to internal organs

47 Penetrating Trauma (5 of 6)
• Relationship between distance and severity of injury varies depending on the type of weapon involved.
  – Air resistance (drag) slows the projectile.
  – Area damaged by projectiles is typically larger than the diameter of the projectile.
  – Energy available for a bullet to cause damage is more a function of its speed than its mass.

48 Penetrating Trauma (6 of 6)

49 Blast Injuries (1 of 7)
• Most common in military conflict
• Also seen in:
  – Mines
  – Shipyards
  – Chemical plants
  – Terrorist attacks

50 Blast Injuries (2 of 7)

51 Blast Injuries (3 of 7)
• Primary blast injuries
  – Due entirely to the blast itself
  – Damage to the body by pressure wave
• Secondary blast injuries
  – Damage to the body results from being struck by flying debris.
• Tertiary blast injuries
  – Victim is hurled by the force of the explosion.

52 Blast Injuries (4 of 7)
• Quaternary (miscellaneous) blast injuries
  – Burns from hot gases or fires started by the blast
  – Respiratory injury from inhaling toxic gases
  – Crush injury from the collapse of buildings
• Most patients will have some combination of the four types of injury.

53 Blast Injuries (5 of 7)
• Organs that contain air are most susceptible to pressure changes.
  – Middle ear
  – Lung
– Gastrointestinal tract
• The ear is most sensitive to blast injuries.

54 Blast Injuries (6 of 7)
• Pulmonary blast injuries result from short-range exposure to the detonation of explosives.
• Arterial air embolisms can produce:
  – Disturbances in vision
  – Changes in behavior and state of consciousness
  – Variety of other neurologic signs

55 Blast Injuries (7 of 7)
• Solid organs are relatively protected from shock wave injury.
  – May be injured by secondary missiles or a hurled body
• Neurologic injuries and head trauma are the most common causes of death.
• Traumatic amputations are common.

56 Multisystem Trauma
• Involves more than one body system
  – Head and spinal trauma
  – Chest and abdominal trauma
  – Chest and multiple extremity trauma
• Alert medical control and transport rapidly.

57 Golden Principles of Prehospital Trauma Care (1 of 3)
• Your main priority is to ensure:
  – Your safety
  – Safety of your crew
  – Safety of the patient
• Determine the need for additional personnel or equipment.
• Evaluate the MOI.

58 Golden Principles of Prehospital Trauma Care (2 of 3)
• Identify and manage life threats.
• Then focus on patient care.
  – ABCs
  – Shock therapy
  – Spinal immobilization
• Transport immediately to the appropriate facility.

59 Golden Principles of Prehospital Trauma Care (3 of 3)
• Definitive care requires surgical intervention.
  – On-scene time should be limited to 10 minutes or less.
• Obtain a SAMPLE history and complete a secondary assessment.
• Consider ALS intercept or air medical transportation.

60 Patient Assessment
• When a patient has experienced a significant MOI and is critical condition, rapidly perform a physical examination.
• When a patient has experienced a nonsignificant MOI, focus on the chief complaint.

61 Injuries to the Head
• Disability and unseen injury to the brain may occur.
• Bleeding or swelling inside the skull is often life threatening.
• Include frequent neurologic examinations in your assessment.
• Some patients will not have obvious signs or symptoms.

62 Injuries to the Neck and Throat (1 of 2)
• Area of serious or deadly injuries.
• Airway problems may result.
• Look for DCAP-BTLS in the neck region.
• Swelling may prevent blood flow to the brain.

63 Injuries to the Neck and Throat (2 of 2)
• Penetrating injury may result in air embolism.
• Crushing injury may cause the cartilages of the upper airway and larynx to fracture.

64 Injuries to the Chest (1 of 2)
• Chest contains heart, lungs, and large blood vessels.
• Many life-threatening injuries may occur.
  – Broken ribs may hinder breathing.
  – Heart may be bruised.
  – Large vessels may be torn.

65 Injuries to the Chest (2 of 2)
• A penetration or perforation of the integrity of the chest is called an open chest wound.
  – If untreated, shock and/or death will result.
  – Assess the chest region every 5 minutes.
  – Assessment should include DCAP-BTLS, lung sounds, and chest rise and fall.

66 Injuries to the Abdomen (1 of 2)
• Abdomen contains vital organs that require a very high amount of blood flow
• Solid organs include the liver, spleen, pancreas, and kidneys.
• Hollow organs include the stomach, large and small intestines, and urinary bladder.

67 Injuries to the Abdomen (2 of 2)
• Solid organs may tear, lacerate, or fracture.
• Hollow organs may rupture and leak toxic digestive chemicals.
• The rupture of large blood vessels can cause serious unseen bleeding.

68 Management: Transport and Destination (1 of 8)
• Scene time
  – Survival of critically injured trauma patients is time dependent.
  – Limit on-scene time to less than 10 minutes.
  – Critically injured patient:
    • Dangerous MOI
    • Decreased level of consciousness
    • Threats to airway, breathing, or circulation

69 Management: Transport and Destination (2 of 8)
• Type of transport
  – Ground EMS units are staffed by EMTs and paramedics.
  – Air EMS units or critical care transport units are staffed by critical care nurses and paramedics.
Management: Transport and Destination (3 of 8)
- AAMS & MedEvac Foundation International identify criteria for emergency air medical services for trauma patients.
  - Extended period required to access or extricate a remote or trapped patient
  - Patient needs ALS care and no ALS-level ground ambulance service is available
  - Multiple trauma patients
  - Mass-casualty incident

Management: Transport and Destination (4 of 8)
- Destination selection
  - Level I facility
    - Serves large cities or heavily populated areas
    - Provides every aspect of trauma care
    - Usually university-based hospitals
  - Level II facility
    - Located in less population-dense areas
    - Provides initial definitive care

Management: Transport and Destination (5 of 8)
- Destination selection (cont’d)
  - Level III facility
    - Provides assessment, resuscitation, emergency care, and stabilization
    - Transfers patients to Level I or Level II facility when necessary
  - Level IV facility
    - Found in remote outlying areas
    - Provides advanced trauma life support

Management: Transport and Destination (6 of 8)
- Trauma centers are categorized as either adult trauma centers or pediatric trauma centers.
- Do not transport a pediatric patient to an adult trauma center when a pediatric trauma center is available.

Management: Transport and Destination (7 of 8)
- Special considerations
  - Remain calm.
  - Complete an organized assessment.
  - Correct life-threatening injuries.
  - Do no harm.
  - Never hesitate to contact ALS backup or medical control for guidance.

Management: Transport and Destination (8 of 8)
- Review
  1. Kinetic energy is a calculation of:
     A. weight and size.
     B. weight and speed.
     C. mass and weight.
     D. speed and force.

Review
Answer: B
Rationale: Kinetic energy is a calculation of mass (weight) and velocity (speed). Energy
cannot be destroyed, only converted.

Review (1 of 2)
1. Kinetic energy is a calculation of:
   A. weight and size.
      Rationale: Weight is part of the formula, but size would also mean weight.
   B. weight and speed.
      Rationale: Correct answer

Review (2 of 2)
1. Kinetic energy is a calculation of:
   C. mass and weight.
      Rationale: Mass and weight are the same.
   D. speed and force.
      Rationale: Force is the product of mass times acceleration, all part of Newton’s second
      law.

Review
2. A 20-year-old man has major open facial injuries after his vehicle struck a tree head-on.
   Which of the following findings within the car would MOST likely explain his injury
   pattern?
   A. Deployed airbag
   B. Bent steering wheel
   C. Nonintact windshield
   D. Crushed instrument panel

Review
Answer: C
Rationale: The mechanism of injury and condition of the vehicle’s interior suggest likely areas
of injury. Head and neck injuries are likely to result when the head and face impact the
windshield.

Review (1 of 2)
2. A 20-year-old man has major open facial injuries after his vehicle struck a tree head-on.
   Which of the following findings within the car would MOST likely explain his injury
   pattern?
   A. Deployed airbag
      Rationale: This typically results in abrasions of the face, head, and arms.
   B. Bent steering wheel
      Rationale: This typically indicates the presence of chest injuries.

Review (2 of 2)
2. A 20-year-old man has major open facial injuries after his vehicle struck a tree head-on.
   Which of the following findings within the car would MOST likely explain his injury
   pattern?
   C. Nonintact windshield
      Rationale: Correct answer
   D. Crushed instrument panel
      Rationale: This typically indicates the presence of leg and hip injuries.
3. Which of the following would MOST likely result from the third collision in the “three-collision” effect that occurs during a high-speed, frontal impact motor vehicle crash?

A. Extensive damage to the automobile
B. Flail chest and lower extremity fractures
C. Massive external trauma with severe bleeding
D. Aortic rupture or compression injury to the brain

**Review**

**Answer:** D

**Rationale:** During the third collision, the body’s internal organs collide with the inside of the body. These injuries are usually not as obvious, but are often the most life-threatening. Injuries that may result from this include internal injuries of the brain (compression injuries) and aortic tears, resulting in massive internal bleeding.

**Review (1 of 2)**

3. Which of the following would MOST likely result from the third collision in the “three-collision” effect that occurs during a high-speed, frontal impact motor vehicle crash?

A. Extensive damage to the automobile
   - **Rationale:** This would occur in the first collision.
B. Flail chest and lower extremity fractures
   - **Rationale:** This would occur in the second collision.

**Review (2 of 2)**

3. Which of the following would MOST likely result from the third collision in the “three-collision” effect that occurs during a high-speed, frontal impact motor vehicle crash?

C. Massive external trauma with severe bleeding
   - **Rationale:** This would occur in the second collision.
D. Aortic rupture or compression injury to the brain
   - **Rationale:** Correct answer

**Review**

4. A young male experienced severe blunt chest trauma when his passenger car struck another vehicle head-on. During your inspection of the interior of his vehicle, you would MOST likely find:

A. deployed airbags.
B. steering wheel deformity.
C. starring of the windshield.
D. a crushed instrument panel.

**Review**

**Answer:** B

**Rationale:** Blunt chest injuries during a motor vehicle crash typically occur when the chest impacts the steering wheel. Therefore, your inspection of the vehicle’s interior will most likely reveal a deformed steering wheel.

**Review (1 of 2)**

4. A young male experienced severe blunt chest trauma when his passenger car struck another vehicle head-on. During your inspection of the interior of his vehicle, you would MOST likely find:

A. deployed airbags.
   - **Rationale:** Typically, this will cause abrasions to the face, head, and arms.
B. steering wheel deformity.
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Rationale: Correct answer

Review (2 of 2)

4. A young male experienced severe blunt chest trauma when his passenger car struck another vehicle head-on. During your inspection of the interior of his vehicle, you would MOST likely find:
   C. staring of the windshield.
       Rationale: Typically, this indicates the presence of head, face, and neck injuries.
   D. a crushed instrument panel.
       Rationale: Typically, this indicates the presence of leg and hip injuries.

Review

5. An unrestrained driver collided with a bridge pillar. Upon inspection of the interior of his vehicle, you note that the lower dashboard is crushed. During your assessment of the patient, you will MOST likely encounter:
   A. trauma to the pelvis.
   B. blunt abdominal trauma.
   C. a severe closed head injury.
   D. penetrating thoracic trauma.

Rationale: Correct answer

B. blunt abdominal trauma.
   Rationale: This is usually a result of striking the steering wheel.

Review (1 of 2)

5. An unrestrained driver collided with a bridge pillar. Upon inspection of the interior of his vehicle, you note that the lower dashboard is crushed. During your assessment of the patient, you will MOST likely encounter:
   A. trauma to the pelvis.
       Rationale: Correct answer
   B. blunt abdominal trauma.
       Rationale: This is usually a result of striking the windshield.

Review (2 of 2)

5. An unrestrained driver collided with a bridge pillar. Upon inspection of the interior of his vehicle, you note that the lower dashboard is crushed. During your assessment of the patient, you will MOST likely encounter:
   C. a severe closed head injury.
   D. penetrating thoracic trauma.
       Rationale: This is usually caused by flying debris, collision with parts of the vehicle, or other movable objects.

Review

6. Whiplash injuries are MOST common following _________ impacts.
   A. rear-end
   B. rollover
   C. frontal
   D. lateral
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Review
Answer: A
Rationale: Whiplash injuries of the neck are a common occurrence following rear-end collisions. As the vehicle is suddenly thrust forward, the occupant's head is thrust backward. Properly positioned headrests can minimize the severity of whiplash injuries.

Review (1 of 2)
6. Whiplash injuries are MOST common following _________ impacts.
   A. rear-end
       Rationale: Correct answer
   B. rollover
       Rationale: This typically causes life-threatening injuries.

Review (2 of 2)
6. Whiplash injuries are MOST common following _________ impacts.
   C. frontal
       Rationale: This typically causes chest, head, abdominal, and extremity injuries.
   D. lateral
       Rationale: You should suspect lateral chest and abdominal injuries on the side of impact, as well as pelvic injuries.

Review
7. Death from a rollover motor vehicle crash is MOST often secondary to:
   A. crushing injuries.
   B. airbag-related trauma.
   C. multiple collisions to the interior of the car.
   D. ejection of the patient from the motor vehicle.

Review
Answer: D
Rationale: Rollover crashes are the most unpredictable with regard to injuries sustained by the patient. An unrestrained passenger may have struck multiple points within the vehicle. However, the most life-threatening event in a rollover is ejection or partial ejection of the patient from the vehicle.

Review (1 of 2)
7. Death from a rollover motor vehicle crash is MOST often secondary to:
   A. crushing injuries.
       Rationale: These injuries occur during ejection or partial ejection.
   B. airbag-related trauma.
       Rationale: Airbags significantly reduce the risk of death in motor vehicle crashes.

Review (2 of 2)
7. Death from a rollover motor vehicle crash is MOST often secondary to:
   C. multiple collisions to the interior of the car.
       Rationale: This makes the prediction of injury patterns difficult, but is not the most common life-threatening event in a rollover.
   D. ejection of the patient from the motor vehicle.
       Rationale: Correct answer

Review
8. Severe abrasion injuries can occur when motorcycle riders are slowed after a collision by
road drag. Road drag is most often associated with which type of motorcycle impact?
A. Head-on collision
B. Angular collision
C. Ejection
D. Controlled crash

Review
Answer: C
Rationale: During an ejection, the rider will travel at high speed until stopped by a stationary object, another vehicle, or road drag. Severe abrasion injuries (road rash) down to bone can occur with drag.

Review (1 of 2)
8. Severe abrasion injuries can occur when motorcycle riders are slowed after a collision by road drag. Road drag is most often associated with which type of motorcycle impact?
A. Head-on collision
   Rationale: Road drag can occur in a head-on collision, but is more often associated with an ejection.
B. Angular collision
   Rationale: Road drag can occur in an angular collision, but is more often associated with an ejection.

Review (2 of 2)
8. Severe abrasion injuries can occur when motorcycle riders are slowed after a collision by road drag. Road drag is most often associated with which type of motorcycle impact?
C. Ejection
   Rationale: Correct answer
D. Controlled crash
   Rationale: Road drag can occur in a controlled crash, but is more often associated with an ejection.

Review
9. When assessing a stab wound, it is important for the EMT to remember that:
A. stabbings to an extremity are rarely associated with an exit wound.
B. the majority of the internal trauma will be near the path of the knife.
C. most stabbings are unintentional and cause less severe internal injury.
D. more internal damage may be present than the external wound suggests.

Review
Answer: D
Rationale: With low-velocity penetrations, injuries are caused by sharp edges of the object moving through the body and are therefore close to the object’s path. Weapons such as knives, however, may have been deliberately moved around internally, causing more internal damage than the external wound suggests.

Review (1 of 2)
9. When assessing a stab wound, it is important for the EMT to remember that:
A. stabbings to an extremity are rarely associated with an exit wound.
   Rationale: The question did not state that the wound was to an extremity.
B. the majority of the internal trauma will be near the path of the knife.
   Rationale: This is true, but EMS providers must have a high index of suspicion for extended injuries due to movement.
9. When assessing a stab wound, it is important for the EMT to remember that:
   C. most stabbings are unintentional and cause less severe internal injury.
      Rationale: Any stabbing that penetrates an individual’s skin must be considered severe
      until ruled out by a hospital physician.
   D. more internal damage may be present than the external wound suggests.
      Rationale: Correct answer

10. A 40-year-old man was standing near a building when it exploded. He has multiple
    injuries, including a depressed skull fracture, severe burns, and an impaled object in his
    abdomen. His head injury was MOST likely caused by ___________ blast injuries.
    A. primary
    B. secondary
    C. tertiary
    D. quaternary

   Answer: C
   Rationale: Primary blast injuries are caused by the pressure wave and include ruptured
   eardrums and hollow organ rupture. Secondary blast injuries are caused by flying debris and
   include impaled objects and shrapnel injuries. Tertiary blast injuries occur when the victim is
   thrown into a solid object, resulting in blunt trauma to virtually any part of the body.
   Quaternary blast injuries include other miscellaneous injuries.

11. Review (1 of 2)
    10. A 40-year-old man was standing near a building when it exploded. He has multiple
        injuries, including a depressed skull fracture, severe burns, and an impaled object in his
        abdomen. His head injury was MOST likely caused by ___________ blast injuries.
        A. primary
        Rationale: These injuries include damage eardrums, lungs, and hollow organs.
        A. secondary
        Rationale: These injuries are caused by flying debris and usually involve impalement.

12. Review (2 of 2)
    10. A 40-year-old man was standing near a building when it exploded. He has multiple
        injuries, including a depressed skull fracture, severe burns, and an impaled object in his
        abdomen. His head injury was MOST likely caused by ___________ blast injuries.
        C. tertiary
        Rationale: Correct answer
        D. quaternary
        Rationale: These injuries include burns, respiratory injuries and crush injuries.