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TO: ALL LUCAS COUNTY PARAMEDICS

FROM: Brent Parquette, NREMT-P
Lucas County EMS Continuing Education Program Administrator

DATE: April 17, 2012

SUBJECT: **Continuing Education – May 2012**

In the month of May we will review critical trauma assessment and treatment skills. Lecture will be dedicated to **“Chest and Abdominal Injuries.”** Weather permitting, mock trauma scenarios will be held outside. I ask that you review the following LCEMS protocols related to:

- Trauma Triage / Trauma Diversion
- Multi-System Trauma
- Chest trauma assessment / treatment
- Head trauma assessment / treatment
- Abdominal trauma assessment / treatment
- Advanced Airway Techniques

The attached pre-test will help better prepare you for the topics and skills to be covered during the month of May. Answers have been provided for your own self-assessment.

I look forward to seeing you in the coming month. If you have any questions or comments please feel free to contact me thru e-mail or by phone.

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May 2012 – Trauma Pre-Test

1. During scene assessment of a motor vehicle crash, you learn that the driver wore a lap belt only. Based upon this information, what types of injuries would you expect?
 - a. Head and neck
 - b. Chest
 - c. Intra-abdominal or lower spine
 - d. Pelvic and femur fractures

2. Which of the following impaled objects should be removed?
 - a. Lodged in the cheek, causing airway obstruction
 - b. Lodged in the trachea, causing airway obstruction
 - c. Lodged in such a way as to prevent CPR
 - d. All of the above

3. Which of the following statements is true regarding a bullet's entrance wound?
 - a. It matches the size of the bullet's profile
 - b. It will often have a "blown out" appearance
 - c. If the bullet is fired at close range, subcutaneous emphysema will be present
 - d. It accurately portrays the potential for damage

4. Tachycardia; cool, clammy, and pale skin; and a stable blood pressure describe a patient in:
 - a. Compensated shock
 - b. Decompensated shock
 - c. Irreversible shock
 - d. None of the above

5. Rebound tenderness is a classic sign that suggests:
 - a. Diaphragmatic tear
 - b. Hypovolemic shock
 - c. Peritoneal irritation
 - d. Aortic aneurysm

6. Traction splinting is indicated in which of the following conditions?
 - a. Isolated midshaft femur fracture
 - b. Disease-induced proximal femur fracture
 - c. Bilateral femur fractures with profound shock
 - d. All of the above

Questions 7-12 refer to the following scenario:

Your patient is a 25-year-old male patient who was knocked out during a bar fight when he took a hit to the side of the head and now sits in a chair fully awake. His initial vital signs are BP 130/80, pulse 80, respirations 18, and pupils equal and reactive to light. En route to the hospital, he begins to lose consciousness and complains of being sleepy. His breathing becomes erratic, his pulse slows to 60, and his blood pressure rises to 180/90. His left pupil is larger than the right and is slow to react to light.

7. This patient is probably suffering from a/an:
 - a. Epidural hematoma
 - b. Subdural hematoma
 - c. Basilar skull fracture
 - d. Concussion

8. The rapid onset of signs and symptoms is most likely due to:
 - a. Fracture of the cribriform plate
 - b. Rupture of the middle meningeal artery
 - c. Leakage of CSF into soft tissues
 - d. Jarring of the reticular activating system

9. This patient also shows the classic signs and symptoms of:
 - a. Increasing intracranial pressure
 - b. Decreasing cerebral blood volume
 - c. Basilar skull fracture
 - d. Contrecoup injury

10. These signs and symptoms are caused by:
 - a. Brain shrinkage
 - b. Cerebral blood flow interruption
 - c. Brainstem herniation
 - d. Abnormally low carbon dioxide levels

11. This patient may hyperventilate in an attempt to:
 - a. Vasodilate the brain vasculature
 - b. Vasoconstrict the brain vasculature
 - c. Increase carbon dioxide levels
 - d. Cause a metabolic alkalosis

12. This patient may vomit without accompanying nausea due to:
 - a. High levels of carbon dioxide
 - b. Brain hypoxia
 - c. Cushing's reflex
 - d. Pressure on the medulla

Questions 13-15 refer to the following scenario:

Your patient is a 26-year-old female who was shot with a small-caliber handgun in the right chest. She presents with dyspnea, distended neck veins, absent breath sounds on the right side, diminished breath sounds on the left side, hyperresonance on both sides, and tracheal deviation toward the left side. Her vital signs are BP 70/30, pulse 120 and weak, and respirations 30 and shallow.

13. Your field diagnosis is:
 - a. Simple pneumothorax
 - b. Tension pneumothorax
 - c. Pericardial tamponade
 - d. Massive hemothorax

14. Her hypotension could be caused by:
 - a. Decreased venous return
 - b. Tamponade effect on the heart
 - c. Blood loss
 - d. All of the above

15. Emergency field management of this patient includes:
 - a. Pneumatic antishock garment
 - b. Needle chest decompression
 - c. Pericardiocentesis
 - d. None of the above

Questions 16-17 refer to the following scenario:

Your patient is a 70-year-old male who was struck by a car and lies on the ground. He presents with dyspnea, pain to the right chest, dull percussion on the right side, and diminished breath sounds on the right side. His vital signs are BP 80/60, pulse 110, respirations 30, skin cool and clammy, and flat neck veins.

16. Your field diagnosis is:
 - a. Tension pneumothorax
 - b. Hemothorax
 - c. Pericardial tamponade
 - d. Traumatic asphyxia

17. Emergency field management of this patient includes:
 - a. Rapid IV fluid replacement
 - b. Pericardiocentesis
 - c. Needle decompression
 - d. Pneumatic antishock garment

Questions 18-23 refer to the following scenario:

You are awakened in the middle of the night for response to a motor vehicle crash. Your patient was the unrestrained driver in a one-car, high-speed auto accident involving frontal impact with a telephone pole. He is a 19-year-old male who presents unconscious and partially trapped in the severely deformed vehicle. Upon initial examination, you immediately hear gurgling respirations. Vital signs are: weak carotid pulse of 120; BP 70/40; respirations 36 and shallow; skin cool, pale, and clammy; and capillary refill time 4 seconds. Pulse oximetry reads 70%. Upon physical exam, you discover a bruise to the front chest wall with a loose flail segment and some abdominal guarding. Lung sounds are diminished on the right side with some hyperresonance in that area.

18. Your initial management of this patient should be to:
 - a. Perform immediate nasotracheal intubation
 - b. Start two large-bore IVs
 - c. Manually stabilize his head and neck
 - d. Place an oxygen mask on him

19. The gurgling noise that accompanies his breathing calls for immediate:
 - a. Suctioning
 - b. Intubation
 - c. Head-tilt/chin-lift procedure
 - d. Chest decompression

20. You are concerned about the right-sided flail segment because:
 - a. It indicates lung tissue damage beneath the injury
 - b. It severely inhibits ventilation and oxygenation
 - c. It is usually accompanied by pericardial tamponade
 - d. Underlying damage to the heart is expected

21. His respiratory situation indicates the need for immediate:
 - a. Chest decompression
 - b. Trendelenburg positioning
 - c. Intubation
 - d. Positive pressure ventilation

22. Your patient's pulse and blood pressure indicate which stage of shock?
 - a. Compensated
 - b. Irreversible
 - c. Decompensated
 - d. None of the above

23. The most likely cause of your patient's shock is:
- Loss of alveolar function
 - Internal blood loss
 - Massive vasodilation
 - Acute myocardial infarction
24. The most commonly seen injury associated with rear-impact accidents is:
- Kidney laceration
 - Lumbar spine fractures
 - Cervical spine injuries
 - Cardiac contusion
25. Which of the following is NOT a part of Cushing's Response?
- Hypertension
 - Bradycardia
 - Altered respirations
 - Hypothermia
26. According to LCEMS protocol, which of the following statements regarding surgical cricothyrotomy is true?
- A surgical incision is made in the thyroid cartilage
 - A surgical airway should be attempted any time placement of an advanced airway fails
 - A surgical airway should only be attempted when total airway obstruction is present and other airway maneuvers have failed.
 - A surgical airway intervention is NOT a reportable skill to the LCEMS Medical Director.
27. First responders are caring for a 44-year-old male patient following a motor vehicle crash. With no obvious external injuries noted, first responders state that the patient "blacked-out" during their initial exam for a period of 2-3 minutes. The patient is now awake and responsive. Vital signs are P-132; RR-30; BP-140/90; BS-124. This patient would be classified as a(n):
- Geriatric Intermediate Trauma
 - Adult Intermediate Trauma
 - Adult Major Trauma
 - Does not meet Trauma Protocol
28. Based upon Trauma Triage Guidelines, the patient from Question #27 could be transported to which of the following hospitals:
- Flower, St. Luke's, Toledo
 - UTMC, Flower, Toledo
 - St. Charles, St. Luke's, St. Vincent's
 - Bay Park, St. Anne's, Flower

29. A 15-year-old female was involved in an ATV accident causing her injury. She presents alert and oriented with no reported loss of consciousness. Upon 2° examination, her pelvic region appears unstable causing considerable pain to palpation. Vital signs are: P – 124; RR – 24; BP – 136/76; BS – 110. This patient would be classified as a(n):

- a. Adult Intermediate Trauma
- b. Pediatric Intermediate Trauma
- c. Adult Major Trauma
- d. Pediatric Major Trauma
- e. Does not meet Trauma Protocol

30. Based upon Trauma Triage Guidelines, the patient from Question #29 could be transported to which of the following hospitals:

- a. Toledo, St. Vincent's, St. Charles
- b. Flower, UTMC, Toledo
- c. St. Luke's, St. Vincent's, Toledo
- d. St. Vincent's, Toledo

Answers & Rationales

1. **C.** When the lap belt is worn without the shoulder straps, the victim suffers a sudden folding of the body at the waist, resulting in intra-abdominal and lower spine injuries.
2. **D.** In general, you want to immobilize an impaled object to prevent further injury, except in the following cases: an object lodged in the cheek or trachea, causing an airway obstruction, or one preventing you from performing CPR.
3. **A.** Entrance wounds are generally the size of the bullet's profile and quickly close due to the skin's natural elasticity.
4. **A.** Following the onset of inadequate tissue perfusion, various compensatory mechanisms of the body are stimulated. The heart rate and strength of cardiac contractions increase. There will be an increase in systemic vascular resistance to assist in maintaining the blood pressure. These compensatory changes will continue until the body is unable to maintain blood pressure and tissue perfusion. Your patient in compensatory shock will exhibit tachycardia, cool, clammy, and pale skin with a stable blood pressure.
5. **C.** Rebound tenderness is pain upon the release of your hand during deep palpation, allowing the patient's abdominal wall to return to its normal position. It is a classic sign of peritoneal irritation and suggests a bacterial or chemical irritation caused by intra-abdominal bleeding or hollow organ rupture.
6. **A.** Traction splinting is indicated for an isolated midshaft femur fracture when there are no other life-threats or concerns for a compromised patient.
7. **A.** An epidural hematoma is an accumulation of blood between the dura mater and the cranium.
8. **B.** The rapid onset of signs and symptoms following an epidural hematoma occurs because the bleeding involves arterial vessels, often the middle meningeal artery. The condition progresses rapidly while the patient moves quickly toward unconsciousness. Since the bleeding is arterial, intracranial pressure builds rapidly, compressing the cerebrum and increasing the pressure within the skull.
9. **A.** This patient shows the classic signs and symptoms of increasing intracranial pressure: an altered respiratory pattern, bradycardia, hypertension, unequal pupils, and a decreasing level of consciousness.
10. **C.** These signs and symptoms are caused by brainstem herniation. As the pressure in the cranium increases, the brain is pushed downward through the tentorium toward the brain stem. Because the brain stem houses our cardiac and respiratory centers, these vital signs are affected.

11. **B.** High levels of carbon dioxide cause the brain vasculature to dilate. This results in increased blood volume, which, in turn, increases the pressure within the skull. In an attempt to vasoconstrict these vessels and reverse the process, the body may begin to hyperventilate.
12. **D.** The vomit center is located in the medulla oblongata. Pressure on this center will cause immediate vomiting without accompanying nausea. The vomiting is usually forceful and known as “projectile vomiting.”
13. **B.** This patient who presents with absent lung sounds on one side and decreased sounds on the other, with hyperresonance, jugular venous distention, and a deviated trachea, has a tension pneumothorax.
14. **D.** Her hypotension could be the result of a combination of factors. The high intrathoracic pressures caused by the injury may decrease venous return. The tension could produce a tamponade effect on the heart, severely decreasing cardiac output. She may have blood loss from bleeding within the chest or other injuries.
15. **B.** Emergency management of this patient includes immediate and rapid evacuation of the air trapped in the pleural space. Needle decompression is done by placing a large-bore IV catheter into the chest at the second intercostal space, midclavicular line. Then relieve any built up trapped air with the use of a syringe.
16. **B.** This patient’s presentation of dyspnea, pain to the right chest, diminished breath sounds on the right side, dull to percussion on the right side, and shock indicates hemothorax. A hemothorax is caused by bleeding into the pleural space.
17. **A.** Emergency field management of this patient includes treating for shock by replacing blood fluid volume rapidly.
18. **C.** Always stabilize a cervical spine if the mechanism of injury strongly suggests an injury in this area. Assign one of your crew to stabilize the head manually while you continue your primary assessment. Release manual stabilization only after you secure the head to a long spine board.
19. **A.** Always ensure a patent airway immediately. Examine it for fluids, obstruction, or signs of trauma and apply suction as necessary. A noisy airway is an obstructive airway.
20. **B.** Always be concerned about a flail segment because it may severely inhibit ventilation and oxygenation. Your patient may become hypoxic and hypercarbic.
21. **D.** This patient’s respiratory situation indicates the need for positive pressure ventilation with a bag-valve-mask and supplemental oxygen.
22. **C.** Your patient’s blood pressure and pulse indicate that he is in decompensated shock. It is during this stage that the body’s normal defense mechanisms are failing.

23. **B.** The most probable cause of this patient's shock is internal blood loss, probably in the abdomen.
24. **C.** The most common injury associated with rear-impact accidents is cervical spine injury due to the whiplash motion affecting the head and neck.
25. **D.** The triad of symptoms to look for in a Cushing's or "herniation" syndrome are hypertension, bradycardia and ataxic respirations.
26. **C.** A surgical airway should only be attempted when total airway obstruction is present and other airway maneuvers have failed.
27. **B.** Following the Trauma Triage Guidelines, the 44-year-old patient in this scenario has anatomic and physiologic criteria for an Adult Intermediate Trauma.
28. **B.** An Adult Intermediate Trauma patient can be transferred to the closest Level I or Level III Trauma facility. UTMC, St. Vincent's, and Toledo hold Level I status. Flower and St. Charles hold Level III status. St. Luke's, Bay Park, and St. Anne's do not hold any Trauma verification status.
29. **B.** Following the Trauma Triage Guidelines, the 15-year-old patient in this scenario has anatomic and physiologic criteria for a Pediatric Major Trauma.
30. **D.** A Pediatric Major Trauma patient should be transferred to the closest Level I Trauma facility capable of handling pediatric cases. St. Vincent's and Toledo hold Level I status for pediatrics. UTMC holds Level I status only for adult cases.