Patient Assessment Scenario "O"

Comprehensive Guide

SCENARIO SETTING AND PATIENT INFORMATION

Setting

Community hospital without surgical services. Portable x-rays and bedside ultrasound are available. CT scans are not available. There are 4 units of O negative blood available. There are no other blood products available.

The nearest referral center is 50 miles (80 km) away. Ground transportation is available. Air transport is unavailable.

Personnel

- ATLS Learner is the only advanced care clinician available in the Emergency Area
- Emergency Department Registered Nurses (2)
- Emergency Technician (1)

Incident History

Scenario gender is female as images are of female patient.

M	A 30-year-old woman was the driver involved in a single vehicle crash. The car was impaled into a tree and 40 ft (12 m) down a hillside. The patient was wearing lap and shoulder belts. There was significant damage to the vehicle's front. It took 1 hour to extricate the patient from the vehicle.
I	During transport, the patient complains of severe left chest pain and is slightly confused. Breathing is rapid and shallow.
S	Five minutes prior to arrival the vital signs are BP 90/60, HR 120, RR 36, and SpO_2 88% with 6 L/min face mask oxygen.
T	Interventions performed include oxygen via mask at 6 L/min, application of a cervical motion restriction device (cervical collar), restriction of spinal motion on a long spine board, one large-caliber intravenous catheter, and 1 L of isotonic crystalloid fluid intravenously. ETA is 30 minutes.

INJURIES AND INJURY MANIFESTATIONS

CTD The Learner should identify the injuries in proper sequence based on physical and imaging findings, and institute resuscitative measures.

PHYSICAL FINDINGS	INJURIES	SKILLS
Rapid shallow respirations Seat belt sign over chest Abnormal left chest movement, left chest tenderness with palpation and movement, decreased left breath sounds	Left rib fractures with flail segment Left hemopneu-mothorax	Left tube thoracostomy, chest x-ray interpretation
Tachycardia and hypotension	Bleeding and hemorrhagic shock due to chest injury	Volume resuscitation, evaluation for source of hemorrhage, FAST/eFAST and pelvic x-ray interpretation
Confusion, history of diabetes	Concussion versus hypoglycemia	Neurologic exam, injury prevention

Imaging

- Slide 1: Chest x-ray - left rib fractures, flail segment, and hemopneumothorax
- Slide 2: Chest x-ray - left thoracostomy tube
- Slide 3: FAST (right upper quadrant) – no fluid
- Slide 4: FAST (left upper quadrant) - no fluid
- Slide 5: Pelvic x-ray – no abnormality

INITIAL ASSESSMENT

Pre-arrival Huddle

The Learner should mention they would assemble personnel to the Emergency Department (based on the hospital's trauma activation system if present), then assign roles and responsibilities.

Personal protective equipment should be worn by all responders. Hypothermia treatment measures should be described.

The Learner should anticipate that transfer will be indicated and may prompt a technician to initiate contact with the referral center prior to patient arrival. The Learner should oversee a systematic handover of the patient at the time of arrival.

Primary Survey

CTD The Learner should identify injuries and subsequent physical and imaging results in proper sequence and institute resuscitative measures.

The Learner should indicate that the primary survey and resuscitation should begin using the xABCDE approach and indicate that ECG rhythm, blood pressure, and oxygen saturation monitors be applied. The Learner should direct that all clothing is removed while measures are taken to protect patient privacy and avoid hypothermia, such as providing warm blankets, using warm intravenous fluids and increasing the room temperature.

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The Learner may request new vital signs. Vital signs obtained by prehospital providers upon arrival are BP 85/60, HR 130, RR 50, and SpO_2 87% with 12 Lpm oxygen by facemask.

x-ABCDE

x: eXsanguinating eXternal Hemorrhage

- The Learner should examine for blood accumulating on the stretcher, floor, or clothing. There is no massive external blood loss.

A: Airway

- The Learner should assess the airway by talking with the patient. The patient speaks clearly, but in short, 1-2 word segments, reporting severe left chest pain, difficulty breathing, and feeling cold. The Learner should recognize that the airway is unobstructed. If the Learner removes the cervical motion restriction device (collar), the Instructor may report that the trachea is midline and the neck veins are flat. The Learner should proceed to Breathing assessment.
- If the Learner tries to insert an oral airway, the patient coughs and gags. If the Learner performs RSI, the patient develops cardiac arrest with administration of medications.

B: Breathing

- The Learner should assess Breathing and examine the chest. Breathing is rapid and shallow. Severe pain occurs with palpation of the left chest. Left chest subcutaneous emphysema is present. The lateral left chest wall moves into the chest with inspiration (paradoxical motion). Left breath sounds are decreased.
- The pulse oximeter should be placed if not done already. SpO_2 is 86%. Hypoxia persists despite all increases in supplemental oxygen.
- The Learner should recognize the presence of a pneumothorax and flail chest. Severe hypoxia is an indication for emergent left tube thoracostomy. The Learner must correctly identify the anatomic landmarks and describe the steps of the procedure. The Learner should inform the patient of the procedure and expected pain. The Learner should connect the thoracostomy tube to a water seal drainage system and order a chest x-ray following the procedure. 900cc of blood drains from the chest cavity. The Learner should reassess Breathing.
- Breathing improves after tube thoracostomy. Respiratory rate decreases to 28 and SpO_2 increases to 96% with 100% oxygen by face mask. Left lung sounds are improved. Left lung eFAST image is of too poor quality to evaluate.
- If the Learner orders a chest x-ray before performing thoracostomy, that may be permitted (the image is on Slide #1). However, the image is not available until thoracostomy is completed. If the Learner delays thoracostomy, progressive hypoxia causes cardiac arrest which is only improved by thoracostomy.
- The Learner may perform eFAST before thoracostomy. If so, images are poor quality due to subcutaneous air. However, anterior left lung sliding is absent and fluid is present in the left lateral thorax. There is normal lung sliding on the right chest, no fluid within the right pleural cavity, and no fluid around the heart or within the abdomen. The Learner must progress to thoracostomy and not delay treatment to continue eFAST exam. The Instructor may choose to report progressive hypoxia and bradycardia before the Learner progress to the abdominal portion of the eFAST.
- The Learner may perform needle of finger thoracostomy. This is permitted if the Learner immediately progresses to tube insertion. If tube insertion is delayed, hypoxia returns due to failure of needle or finger thoracostomy.
- Pre-procedure chest x-ray, if requested, is now available (Slide #1). Post-procedure chest x-ray (Slide #2) reveals a left thoracostomy tube in appropriate position and a small residual hemothorax. The Instructor may show the chest x-ray image(s) to the Learner and discuss interpretation.
- If the Learner requests arterial blood gas analysis, the values prior to blood product administration are: pH 7.32, $PaCO_2$ 30 mm Hg (4.0 kPa), PaO_2 85 mm Hg (11.3 kPa), SaO_2 96%, and BD 9.9 mmol/L.

C: Circulation

- The Learner should assess the function of the IV placed by the prehospital personnel and indicate that a second large-caliber IV should be inserted. The Learner should indicate that blood should be obtained for type and crossmatch and laboratory studies.
- The Learner should evaluate and recognize the presence of shock. Skin is cool, sweaty, and has a capillary refill of > 4 seconds. The Learner should check pulses in all four extremities. Pulses are present and equal in all extremities, although they are weak. The Learner should connect an ECG rhythm monitor if not done previously. The tracing shows sinus tachycardia with a heart rate of 120. The Learner should request other vital signs which are BP 85/60, RR 28, and SpO_2 96% with 100% oxygen by face mask.
- One L of crystalloid was administered by prehospital personnel. The Learner should proceed with blood product administration. All fluids should be warmed.
- The Learner should assess the five locations for hemorrhagic shock.
  - **External** – There is no external bleeding.
  - **Thoracic cavity** – Thoracostomy tube output is now at 1000cc. Chest x-ray after tube insertion (Slide #2) demonstrated residual hemothorax. Therefore, this is a potential source.
  - **Peritoneal cavity** – The Learner should examine the abdominal cavity. The abdomen is soft, not distended, and not tender. FAST/eFAST should be performed. There is no intra-abdominal, pelvic, or pericardial fluid. The Instructor may show the images on Slides #3 and #4. If DPL is performed in the Learner's practice environment, there is no fluid on aspiration and lavage drainage is clear.
  - **Pelvic / Retroperitoneal space** - The pelvis is not tender to palpation. There are no pelvic contusions. The Learner should obtain a pelvic x-ray. The pelvic x-ray is without injury (Slide #5).
  - **Long Bone / Soft Tissue compartments** – The Learner should examine the extremities for long bone fractures, muscle compartment swelling, and extensive soft tissue contusions / swelling. There are no deformities. The muscle compartments are not swollen.
- The Learner should conclude that shock is likely due to thoracic hemorrhage and continue blood product volume resuscitation. After transfusion of 3 units of blood, BP is 100/75, HR is 100, RR is 20, and SpO_2 is 97%.

D: Disability

- The Learner should progress to assessment of the brain and spinal cord. Pupils are equal, round, and react briskly to light. For GCS score determination, the total score is 14 (E4, V4, M6): eyes open spontaneously (E = 4), the patient follows verbal instructions by moving all extremities appropriately (M = 6), and the patient is slightly confused but otherwise appropriate (V = 4).
- Motor and sensory function are intact.

E: Environment/Exposure

- If not already performed, the Learner should indicate that all clothing is removed for complete examination. A log roll should be performed to examine the back. No spine deformity is present. However, tenderness of the lower cervical and upper thoracic spine is present. A rectal exam is not indicated. The Learner should continue measures to prevent hypothermia.

ADJUNCTS TO THE PRIMARY SURVEY

Monitoring Devices
The Learner should monitor parameters such as pulse rate, blood pressure, pulse pressure, respiratory rate, pulse oximetry, capnography, and temperature.

Blood Tests
Blood should be sent for type and crossmatch and laboratory tests.

Chest and Pelvic X-rays, FAST and eFAST Exams
Chest x-ray, pelvic x-ray, and FAST/eFAST are part of the Primary Survey and should have been requested previously. If not, the Learner should indicate when they would obtain these images. The results are as noted above. CT scans and other further imaging are not indicated prior to transfer.

Gastric Decompression
Placement of gastric tube is not necessary.

Urinary Bladder Catheter
The Learner should consider placement of a urinary bladder catheter for accurate measurement of urinary output. The Learner should evaluate the urethra and perineum prior to insertion of a urinary catheter. There is no injury, no blood at the urethral meatus, and no ecchymosis of the perineum.

Arterial Blood Gas
Arterial blood gases, if obtained following tube thoracostomy and administration of 3 units of blood, are: pH 7.35, $PaCO_2$ 36 mm Hg (4.8 kPa), PaO_2 90 mm Hg (12 kPa), SaO_2 97%, and BD 5.5 mmol/L.

Case Status after Primary Survey and Adjuncts
Before proceeding to the Secondary Survey, the Learner should request new vital signs, reevaluate xABCDE, and perform a tactical pause to ensure team situational awareness and shared mental models.

There continues to be no external bleeding. The patient is speaking clearly and more comfortably. Breath sounds are present bilaterally. Thoracostomy tube drainage is at 1200cc (increased from 1000cc at Circulation assessment). BP is 100/75, HR is 100, RR is 20, and SpO_2 is 97% with 50% oxygen by face mask. The fourthw, and last available, unit of blood is being transfused. Mental status has not declined. All extremities move spontaneously.

The Learner should indicate that surgical consultation is indicated due to traumatic thoracic hemorrhage and a flail chest. Transfer should be initiated to a facility able to provide surgical, critical care, and further transfusion. If transfer will not be delayed, the Learner may proceed with the Secondary Survey.

SECONDARY SURVEY

History
Patient reports no allergies. She uses insulin for diabetes. She has no other illnesses and last ate 6 hours ago. She remembers feeling sleepy prior to the crash and thinks she had low blood glucose. Learner should request blood glucose level determination.

Head
No external trauma is present. There is no drainage from the ears, nose, or mouth. Pupils are equal, rounds, and briskly reactive to light. The patient is more alert. The GCS score is 15.

Neck
Cervical spinal motion should be restricted while the Learner removes the cervical motion restriction device (collar) to assess the neck. The lower cervical spine is tender. No deformity, crepitus, or swelling are present. Cervical spine motion should continue to be restricted.

Chest
There is a contusion across the chest at the expected location of a shoulder harness. The output from the thoracostomy tube is now 1300 mL. There is no air leak. Auscultation of the chest reveals bilateral breath sounds with unchanged decreased breath sounds at the left base.

Abdomen
The abdomen is inspected and palpated. There is no external abdominal injury. The abdomen is soft and nondistended. No tenderness is present with palpation.

Pelvis/Perineum
There is no tenderness on palpation. No abnormalities are present. External inspection of the urethral meatus and perineum should be performed if not done previously during Circulation assessment.

Musculoskeletal System
If not performed previously, a logroll should be performed to examine the back. There is tenderness at the upper back. There are no deformities or wounds. The Learner should visually examine and assess range of motion of all extremities for soft tissue or bony injury.

Additional Imaging and Other Diagnostic Studies
The Learner should indicate that CT imaging of the head and spine is indicated. The Learner should not delay transfer to obtain imaging studies.

TRANSFER TO DEFINITIVE CARE

At completion of the Primary and Secondary Surveys of the Initial Assessment, the Learner should request current vital signs and review the xABCDE's as part of a tactical pause. Airway and Breathing assessments are unchanged. The patient has received 4 units of blood. Vital signs are BP 110/70, HR 100, RR is 20, and SpO_2 98% with 50% supplemental oxygen. GCS score remains 15. The blood glucose level is 85 mg/dl (4.722 mmol/L). The Learner should direct that crystalloid fluids contain glucose. The Learner should initiate transfer to a facility able to provide surgical, critical care, and further transfusion, and the receiving clinician should be contacted directly.

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Pretransfer Management

The Learner should describe the aspects of management before and during transfer:

- Appropriate handover to the receiving clinician
- Continuous cardiac rhythm and oxygen saturation monitoring with frequent BP monitoring
- Adequate and proper restriction of spinal motion
- Administration of supplemental oxygen with continued reassessment of pulmonary status
- Monitoring of thoracostomy tube function and output
- Assessment of effectiveness of resuscitation
- As no further blood products are available, plans for volume resuscitation
- Adequate pain control
- Monitoring of blood glucose levels
- Appropriate transmission of all laboratory and imaging data

Transfer Specifics

The Learner should indicate the specifics of the transfer to another hospital, including the personnel and equipment / supplies. If time permits, question the Learner about plans for managing changes in patient status that may occur during the transport process, such as airway obstruction and indications for advanced airway procedures, thoracostomy tube dislodgement, increased tube output, hypoxia, decrease in blood pressure, hypoglycemia, and deterioration of the GCS score.

The Learner should use a systemic method of communication, such as the S-xABCDE-BAR method, for handover to the receiving facility. For this scenario, the Learner should relate the following:

- Woman involved in an MVC as a restrained driver with prolonged extrication
- There were no external bleeding wounds and the airway was unobstructed
- Multiple left rib fractures, flail chest, and left hemopneumothorax treated with tube thoracostomy
- Post-procedure chest x-ray showing left thoracostomy tube in adequate position with residual hemopneumothorax and probable pulmonary contusion
- Hemorrhagic shock with likely thoracic source treated with transfusion of 4 units of blood
- Thoracostomy tube output 1300 mL
- FAST/eFAST without pericardial fluid and without intra-abdominal fluid
- Pelvic x-ray without fracture
- Possible traumatic brain injury based on initial confusion and GCS score 14 that improved to 15 following resuscitation
- Possible spine injury based on cervical and upper thoracic spine tenderness without abnormalities in neurologic exam
- No abnormalities on extremity exam
- Patient reports no allergies. She uses insulin for diabetes. She has no other illnesses and last ate 6 hours ago. She remembers feeling sleepy prior to the crash and thinks she had low blood glucose. Blood glucose level 85 mg/dl (4.722 mmol/L) and patient is receiving glucose.
- Recommend surgical evaluation for possible thoracotomy, further blood product resuscitation, CT scan imaging, and pain control for multiple left rib fractures with possible surgical fixation.
- Following management of acute injuries, reassessment of diabetes management to reduce the risk of hypoglycemia.

After transfer is completed, the Learner should lead an event debrief for the team.

DIRECTIONS FOR MOULAGE

- Apply makeup to the anterior chest to simulate a chest wall seat belt contusion.
- Apply makeup to the left anterolateral chest to simulate ecchymosis.
- Apply moulage to simulate subcutaneous emphysema.
- Tape an IV and IV tubing to the right arm.
- Apply glycerin spray to simulate perspiration and apply a semi-rigid cervical motion restriction device (cervical collar).

DIRECTIONS FOR THE PATIENT MODEL

You were in a motor vehicle collision and have sustained severe left chest wall trauma. You are awake and confused. You respond to painful stimuli by grimacing and saying "ouch" when the Learner palpates your left chest. You cannot take a deep breath. You are breathing rapidly and shallow before the chest tube is placed. After the chest tube is placed, your respirations are more normal, however you still complain of left chest pain and difficulty breathing. If asked by the Learner, you report no allergies. You use insulin for diabetes, have no other illnesses, and last ate 6 hours ago. You remember feeling sleepy prior to the crash and think you had low blood sugar.

Notes: