

Patient Assessment Scenario “E”

Comprehensive Guide



Course Director/Course Coordinator: Management of this scenario includes placement of a definitive airway in the ED of a community hospital with surgical capabilities. If ED clinicians do not perform orotracheal intubation in the local practice environments, the details of the scenario may be altered to permit arrival of an airway team from the operating area.

SCENARIO SETTING AND PATIENT INFORMATION

Setting

Community hospital with abdominal surgical services, but not specialist services. The hospital is not a trauma center. Blood products are available. The nearest referral center is 25 miles (40 Km) away. Ground and air transport are available.

Personnel

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

Incident History

M	A 42-year-old male presents to the Emergency Area after being shot. A friend transported the patient by a private vehicle.
I	The friend reports the patient has multiple bullet wounds and that injury occurred approximately 20 minutes before arrival.
S	The friend reports the patient has become more “sleepy”; the patient was able to walk to the car and was talking.
T	No treatments.

INJURIES AND INJURY MANIFESTATIONS

PHYSICAL FINDINGS	INJURIES	SKILLS
Bullet wound anterior to the right sternocleidomastoid muscle with moderate hematoma; hoarseness	Possible vascular injury, possible laryngeal injury	Bleeding assessment, Airway management
Bleeding from an upper thigh bullet wound (lower thigh wound is not bleeding)	Possible vascular injury	Bleeding assessment and control, Assessment of distal pulses
Single right chest bullet wound at the sixth intercostal space at the midclavicular line, decreased right breath sounds	Right pneumo-hemothorax	Tube thoracostomy, chest x-ray interpretation
Slightly distended abdomen with right upper quadrant tenderness	Penetrating injury to the right diaphragm and intraabdominal injuries	Recognition hemorrhagic shock, blood product resuscitation

Imaging

- Slide 1: Chest x-ray – endotracheal and right thoracostomy tubes are in appropriate positions; no metallic foreign body; residual right hemothorax
- Slide 2: FAST image (right upper quadrant) – fluid is present between the liver and kidney
- Slide 3: FAST image (pelvis) – fluid in pelvis
- Slide 4: FAST image (pericardium) – no pericardial fluid
- Slide 5: AP cervical x-ray – metallic foreign body to left of C5 body
- Slide 6: Lateral cervical x-ray – metallic foreign body anterior to C5/6
- Slide 7: AP abdominal x-ray – metallic foreign body in left midabdomen
- Slide 8: Pelvis x-ray – no abnormality
- Slide 9: Right femur x-ray – two metallic foreign bodies without fracture

INITIAL ASSESSMENT

Pre-arrival Huddle

There is no opportunity for a pre-arrival huddle. The Learner should request activation of a trauma response team if a protocol is available at the hospital. The Learner may request notification of the operating area, blood bank, radiology, and other services. The Learner should indicate that appropriate personal protective equipment must be worn.



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Primary Survey

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

x-ABCDE

Indicate that all clothing should be removed and measures taken to prevent hypothermia. Continuous EKG and pulse oximetry should be connected. BP should be measured and cycled every 5 minutes.

X: eXsanguinating eXternal Hemorrhage

- The Learner should assess for external hemorrhage. The Learner should locate a moderate hematoma in the right neck without active uncontrolled bleeding. There is blood briskly pooling around the right thigh. If not performed previously, the Learner should cut the clothes from the wound. Two bullet wounds of the thigh are present, one in the anteromedial upper thigh and one in the posterolateral lower thigh. The anteromedial wound is actively bleeding; the posterolateral wound is not bleeding.
- The Learner should direct a staged approach to control bleeding. Direct pressure does not adequately control the bleeding.
- CTD** The Learner should apply a tourniquet to control the thigh bleeding.
- The Learner should communicate the need for tourniquet placement with the patient, relating that the tourniquet will be painful but is necessary to prevent life threatening blood loss. The Learner should accurately describe tourniquet application. The tourniquet should be placed 2-3 inches proximal to the wound and tightened until bleeding stops and the distal pulse is no longer palpated. The date and time of application is recorded.
- The Learner may ask for a vital signs which are not available until Airway assessment commences.

A: Airway

- The nurse reports vital signs: BP 70/50, HR 130, RR 35, SpO₂ 86%. Respirations are rapid, shallow, and noisy. The Learner should direct insertion of two large bore IVs and collection of blood for tests, including type and crossmatch. The Learner may indicate that allowing the systolic blood pressure to remain 90 – 100 may limit blood loss.
- The Learner should administer high-flow O₂ via a face mask.
- If the Learner speaks to the patient, the patient's voice is raspy and weak, with frequent coughing of small amounts of blood. The Learner should recognize the presence of airway obstruction and perform a jaw-thrust maneuver and suction to unobstruct the airway. The stridorous respirations do not improve. The oxygen saturation increases to 90% with supplemental oxygen.
- If the Learner visually examines the oropharynx, blood is present in the upper airway.
- The Learner should locate a moderate nonexpanding hematoma on the right neck associated with the bullet wound. The Learner should recognize that the hematoma can cause airway obstruction or a direct injury to the airway may be present.
- The Learner may indicate that transfer to a facility capable of treating a laryngeal injury will eventually be performed.

- CTD** The Learner should recognize failure of basic airway interventions and progress to intubation. The Learner must recognize hemorrhagic shock and administer blood products prior to administration of RSI medications. If blood is not available, crystalloid may be administered. If intubation is performed by emergency clinicians in the local practice environment, the Learner should accurately describe the procedure of RSI including confirmation of tube location by measuring exhaled CO₂. Intubation is successful on the first attempt.
- If the Learner delays intubation, a respiratory arrest occurs. If the Learner fails to administer volume before RSI, the blood pressure drops.
- The Learner may perform a brief neurological assessment prior to intubation. The eyes open to voice, questions are answered slowly but appropriately, and all four extremities move as instructed. GCS score is 14 (E3, V5, M6). Pupils are equal and reactive to light. Sensation is normal except for distal to the tourniquet.
- The Learner may report that penetrating injuries to the neck may cause significant challenges with intubation. The anesthesiologist may be requested. The Learner may be informed that the anesthesiologist is unavailable for 20 minutes.
- After intubation, the Learner should direct that 100% oxygen is administered, and manual or mechanical ventilation is initiated. A chest x-ray should be requested. The Instructor should not show the image until after Breathing assessment. Following intubation, the SpO₂ increases to 92%.

B: Breathing

- The Learner should examine the chest. A bullet wound is located at the sixth right intercostal space in the midclavicular line. No other wound can be seen.
- No breath sounds are heard on the right. The Learner should recognize the presence of a right pneumothorax.
- CTD** The Learner should state that right thoracostomy is indicated. The Learner may elect to perform a needle or finger thoracostomy followed by insertion of a tube. The Learner should correctly relate the procedure(s) including anatomic landmarks and specific steps. If a needle or finger thoracostomy is not followed by tube placement, pneumothorax and/or tension physiology recur. The Learner should connect the thoracostomy tube to an underwater seal drainage system. A total of 300 mL of blood is drained. The Learner should re-examine the chest. Breath sounds are improved on the right. A x-ray of the chest should be ordered. The Instructor may show the chest x-ray on Slide #1.
- If thoracostomy is omitted, a tension pneumothorax develops.
- Blood gas determination may be requested at this time. If requested, the values will not be available until after Circulation assessment and management. For reference, the values are pH 7.25, PaO₂ 80 mmHg (10.7 kPa), PaCO₂ 36 mmHg (4.8 kPa), SaO₂ 94%, and BD 10.5 mmol/L.

C: Circulation

- CTD** The Learner should recognize hemorrhagic shock. If not done previously, the Learner should initiate two large-caliber IVs, while simultaneously obtaining a blood sample for type and crossmatch and laboratory determinations. If the Learner asks for the results, the Instructor should indicate that the results will be available in 30 minutes. Activation of a massive transfusion / hemorrhage protocol may be requested if not already done.



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- The Learner should request new vital signs. After administration of 2 units of PRBCs, BP is 90/60, HR is 110, respirations are controlled at 18, and SpO₂ is 94% with 100% oxygen. The ECG tracing shows sinus tachycardia.
- The Learner should assess heart tones, indices of peripheral perfusion, and adequacy of the tourniquet in controlling hemorrhage from the leg. The Learner should continue balanced blood product resuscitation.
- The Learner should evaluate for an external, thoracic, abdominal, retroperitoneal / pelvic, or soft tissue / muscular compartment source of continued hemorrhage. The tourniquet is effective. There is no external bleeding. The chest x-ray is on Slide #1. There is no further thoracostomy output. A FAST/eFAST or DPL may be requested. The FAST images are on Slides #2, #3, and #4. These demonstrate right upper quadrant and pelvic fluid. The pericardial view, Slide #4, demonstrates no fluid. If DPL is performed, more than 20cc of blood are withdrawn on initial aspiration. The soft tissue and muscular compartments are soft.
- CTD • The Learner may desire further evaluation for cardiac tamponade. The Learner should be told that the heart sounds are normal and easily heard. There is no fluid within the pericardium on FAST.
- The Learner should state that an abdominal operation and operative evaluation of the leg wound are indicated and contact both the surgeon and the operating area.
- If requested earlier, arterial blood gas results are now available, the values are pH 7.25, PaO₂ 80 mmHg (10.7 kPa), PaCO₂ 36 mmHg (4.8 kPa), SaO₂ 94%, and BD 10.5 mmol/L.

D: Disability

- As RSI was performed, GCS score is 3T. The Instructor may choose to report the pre-RSI neurologic assessment as described in Airway. The eyes opened to voice, questions were answered slowly but appropriately, and all four extremities moved as instructed. GCS score was 14 (E3, V5, M6). Pupils were equal and reactive to light. Sensation was normal except for distal to the tourniquet.

E: Environment/Exposure

- The Learner should indicate that all clothing should be removed for a complete evaluation (if not already done). The skin folds should be examined for other wounds. A back examination should be performed. No other external injuries are present.
- A rectal exam may be performed but is not mandatory. There is normal rectal tone and no discontinuity of the rectal wall. There is no gross blood. The Learner should indicate that measures should be taken to prevent hypothermia, such as providing warm blankets, increasing the room temperature, and providing warmed IV fluids.
- All wounds should be marked with radio-opaque markers and x-rays to look for foreign bodies should be requested. X-rays of the neck, chest, abdomen and pelvis are indicated. The Instructor may show Slides #5 - #9 now or later. The combined total of bullet wounds and foreign bodies should equal an even number. In this case there are 4 bullet wounds and 4 foreign bodies.

ADJUNCTS TO THE PRIMARY SURVEY

Monitoring Devices

Monitoring devices, including an ECG monitor and a pulse oximeter, should be applied, if not done already.

Chest and Pelvic X-rays, FAST and eFAST Exams

During assessment of penetrating trauma, x-rays of the head, neck, chest, abdomen, pelvis and extremities may be indicated to identify retained foreign bodies. The Learner should indicate that these x-rays are obtained, and images are on Slides #5 through #9.

As there is not a second wound associated with the chest wound and there is a metallic foreign body on abdominal x-ray, the Learner should relate the possible trajectory of the bullet and potential structures that may be injured. For this scenario, the bullet has traversed the right diaphragm and injured the liver, small bowel, and colon.

Urinary Bladder Catheter

A urinary bladder catheter may be inserted as long as transfer to the operating area is not delayed. If asked, there is no blood at the urethral meatus and the perineum is not ecchymotic. If rectal exam results are requested, there is no gross blood in the rectum. Clear yellow fluid returns with an initial output of 200 mL.

Gastric Decompression

Gastric decompression is contraindicated due to the neck wound. The Learner should relate the potential risks of hemorrhage from perforation of the hypopharynx and the esophagus.

Arterial Blood Gases

Arterial blood gas analysis should be obtained. If performed earlier, new results may be requested. The values following a total of 4 units PRBCs, 4 units plasma, and 2 units of platelets are: pH of 7.32, PaO₂ 88 mm Hg (11.7 kPa), PaCO₂ 38 mm Hg (5.1 kPa), SaO₂ 96%, and BE 6.2 mmol/L.

Blood Tests

Blood should have been sent previously to the laboratory for type and crossmatch and other laboratory determinations.

Case Status after Primary Survey and Adjuncts

The Learner should perform a tactical pause and review the xABCDEs before proceeding to the secondary survey. The Instructor reports new vital signs consistent with a decline in status: BP 70/50, HR 124, and SpO₂ 92% with an inconsistent waveform. The Learner should recognize continued hemorrhagic shock, notify the surgical team, and proceed to evaluate resuscitation.

During xABCDE reevaluation, these findings are present:

- Recurrent bleeding is present from the right thigh wound. The tourniquet is tight. The Learner should identify the indication to place a second tourniquet proximal to the first tourniquet. The bleeding stops.
- The neck hematoma is unchanged.
- Thoracostomy output is 350 cc and there is a small air leak.
- End tidal CO₂ is detected on monitoring and bilateral breath sounds are present.
- A repeat chest x-ray may be requested. If so, there are no changes from the image on Slide #1.
- FAST exam demonstrates more intra-abdominal fluid.



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The Learner should continue blood replacement. The vital signs improve with the additional infusion of 2 uPRBCs, 2 u plasma, and a unit of platelets and application of a second tourniquet: BP 95/60, HR 110, and SpO₂ 95%.

The Learner should indicate that emergent transfer to the operating area is indicated for definitive treatment of an arterial injury to the leg and for intraabdominal injuries from a transdiaphragmatic bullet trajectory. Exploration of the neck for aerodigestive or vascular injuries is indicated. The Instructor should relate the operating team will be ready to receive the patient in 15 minutes. In the interim, the Learner should proceed with the secondary survey.

SECONDARY SURVEY

Head

No injury is present.

The effects of RSI medications are decreasing. The GCS score should be repeated:

- The eyes open slowly in response to voice. E = 3.
- The pupils are equal and reactive.
- Although the patient is sedated, he moves all extremities when asked. M = 6.
- Due to intubation, the patient cannot speak. V = 1T.
- GCS score = 10T (E3, V1T, M6).

Neck

The Learner should reexamine the hematoma on the right neck.

The neck wound is not actively bleeding, nor is there expansion of the hematoma.

Chest

The Learner should reexamine the chest. No new abnormalities are present. The Learner should indicate that drainage from the chest tube should be monitored. The nurse or Instructor should indicate that minimal bubbling of the collection device is present and that 50 mL of additional blood has been evacuated.

Abdomen

The Learner should examine the abdomen by inspection, auscultation, and palpation. The abdomen is slightly distended, and bowel sounds are absent. The patient grimaces and attempts to move away when the abdomen is palpated.

Pelvis/Perineum

An examination of the pelvis reveals no abnormal findings. A rectal examination, if not previously performed, reveals no rectal blood.

Musculoskeletal System

The Learner should examine the extremities for bony and soft-tissue injury and the presence of pulses. A tourniquet is on the right thigh. No pulses are palpated distal to the tourniquet and there is no bleeding from the wound. No further abnormal findings are present. There are two bullet wounds: one in the upper anteromedial thigh and one in the posterolateral thigh.

The Learner should assess for other bullet wounds. The Learner should examine the back. No other wounds are present. The Learner should administer broad-spectrum antibiotics and tetanus immunization before transport.

TRANSFER TO DEFINITIVE CARE

Following the Secondary Survey, the Instructor should indicate that the transport team (operating area team) arrives to transport. The Learner should speak with the receiving surgeon. Initial exploration of the abdomen, neck, and extremity may be done at this hospital. Transfer to another hospital may be indicated to treat other injuries.

Pretransfer Management

The Learner should describe management for transfer:

- Appropriate handover to the receiving surgeon
- Provision of continuous monitoring and pain/anxiety relief
- Ensure adequate fixation of both tourniquets and relay applications times
- Adequately secure the endotracheal and thoracostomy tubes
- Plans for assisted ventilation
- Administration of tetanus prophylaxis and antibiotics
- Adequate fixation of urinary catheter (if inserted)
- Copies of all test results and images should be available within the same hospital

Transfer Specifics

The Learner should review specifics of transfer, 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 a decrease in the blood pressure or dislodgement of the endotracheal or thoracostomy tubes.

The Learner should use the S-xABCDE-BAR tool to provide a handover to the surgeon. The Learner should relay these specifics:

- Arrived by private vehicle after multiple gunshot wounds
- Wounds present in the neck, chest, and right leg
- Two tourniquets placed on right thigh to control bleeding
- Intubation performed due to airway obstruction from neck wound, neck hematoma, and potential laryngeal injury
- Right tube thoracostomy performed with total 350cc of blood drained
- Hemorrhagic shock treated with a total of 6 uPRBCs, 6 units of plasma, and 3 units of platelets
- FAST demonstrated intra-abdominal fluid
- GCS score was 14, pupils were reactive, and both motor and sensory exams were intact before RSI
- No other wounds detected
- X-rays demonstrate foreign bodies in left neck, abdomen, and right leg
- No medical history available
- Recommend urgent operation for abdomen, leg, and neck wounds with possible transfer after operation



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DIRECTIONS FOR MOULAGE

- Apply makeup to simulate shock.
- Using makeup and moulage, create a small entrance GSW anterior to the right sternocleidomastoid muscle, with a moderate hematoma approximately 2 cm (0.79 in.) thick and 4 cm (1.57 in.) in circumference. The entrance wound is not actively bleeding, but prior bleeding should be evident.
- Using makeup and moulage, create a small entrance GSW to the right chest at the sixth intercostal space, midaxillary line. Apply makeup around the wound to simulate a bruise and hematoma, approximately 2 × 2 cm in size. The wound is not actively bleeding, but prior bleeding should be evident.
- Using moulage and makeup create an anteromedial thigh wound with active pooling of blood on the stretcher. Create a second wound on the posterior lower thigh without active bleeding but prior bleeding should be evident.
- Using an atomizer with water and glycerin, spray the face, arms, and chest to simulate diaphoresis, and apply an oxygen mask.

DIRECTIONS FOR THE PATIENT MODEL

You were caught in crossfire of an altercation. Your friend brought you to the hospital in their car. You are very frightened but do not speak unless the clinician asks you direct questions. When you respond, your voice is weak, slightly gurgling, and hoarse. After the Learner simulates orotracheal intubation, you respond to pain by grimacing. You can slowly follow instructions. You have tenderness in the right upper abdominal quadrant and respond in pain when this area is examined. You are bleeding heavily from the right leg. When the Learner places the tourniquet, scream in pain in a hoarse voice.

Notes:

