

Patient Assessment Scenario “B”

Comprehensive Guide



SCENARIO SETTING AND PATIENT INFORMATION

Setting

Community hospital without surgical services. The nearest referral center is 45 miles (70 km) away. Ground transportation is available. Air transport is unavailable due to dense fog and high winds.

Personnel

- ATLS Learner is the only advanced care clinician available
- Emergency Department Registered Nurse
- Inpatient Registered Nurses (4)

Incident History

M	A 24-year-old unhelmeted male motorcycle driver collided into the side of a truck and then slid approximately 40 ft (12 m) on the road.
I	Open left femoral fracture with profuse bleeding, left wrist deformity, and left temporal laceration with arterial bleeding.
S	BP 80/50, HR 150, RR 40, shallow and very noisy. Responds only to painful stimuli. Lips are cyanotic.
T	Oral airway inserted, oxygen at 6 to 8 L/min via mask, pressure dressings on the left thigh and head wound (both soaked with blood), spinal motion restriction with a semirigid cervical collar and a long spine board (change to region appropriate terms), and splint on the left wrist. Estimated time of arrival is 20 minutes.

INJURIES AND INJURY MANIFESTATIONS

PHYSICAL FINDINGS	INJURIES	SKILLS
Upper airway obstruction with severe respiratory distress due to facial distortion and blood in nose and mouth	Multiple facial fractures, abrasions and contusions; cannot intubate / cannot ventilate situation	Surgical / Incisional Airway
Tenderness on palpation of occiput and cervical spine	C1 fracture	Spinal Motion Restriction
Responds only to painful stimuli	Left temporal depressed skull fracture, scalp laceration with arterial bleeding, TBI	GCS Score
Tenderness and crepitus over the left chest wall	Multiple left rib fractures, pulmonary contusion, left pneumothorax	Thoracostomy (Finger and Tube)
Exsanguinating left thigh wound; deformity left femur; nonpalpable left pedal pulses; left foot cool and pale	Left femoral neck fracture, left open distal femur fracture	Staged Bleeding Control, Tourniquet Application; Splint Application
Deformity and swelling of the left wrist	Left wrist fracture	Splint Application
Multiple abrasions	Multiple abrasions along left trunk and lower extremity	

Imaging

- Slide 1: Chest x-ray - definitive airway in appropriate position, multiple left rib fractures, potential left pulmonary contusion, left chest thoracostomy tube, and an obscured left hemidiaphragm with a dislocated gastric tube (consistent with a ruptured diaphragm)
- Slide 2: Pelvic x-ray - left femoral neck fracture; metallic object removed on repeat x-ray and no pelvic fracture present
- Slide 3: FAST – no intra-abdominal fluid
- Slide 4: Left femur x-ray - distal displaced fracture
- eFAST: (if requested, report only, no image) - equivocal for absent left lung sliding as a technically difficult study



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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, then assign roles and responsibilities.

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

The Learner should anticipate that transfer will be indicated and may prompt the administrative support technician to initiate contact with the referral center prior to patient arrival.

Primary Survey

x-ABCDE

The Learner will perform the initial assessment and should instruct other personnel to assist with procedures such as airway manipulation, intravenous access, placement of physiologic monitors, clothing removal, and application of warm blankets.

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

X: eXsanguinating eXternal Hemorrhage

-  The left thigh dressing is completely saturated with blood and blood is pooling on the stretcher and the floor. The Learner should unwrap the dressing to assess the bleeding. As the dressing is removed, the open fracture site bleeds profusely with arterial hemorrhage. The Learner must manage by application of direct pressure. The wound does not have a cavity that is suitable for packing. A nurse reports that the left leg distal pulses are absent, and that the lower leg is pale and blue. Bleeding continues despite appropriate direct pressure. The Learner must direct that a tourniquet be applied and properly describe the procedure.
- Bleeding is controlled with application of a tourniquet.
-  The Learner should examine the scalp dressing. The dressing is bloody, but blood is not pooling from the wound on the stretcher. The Learner may elect to re-enforce the dressing by applying a pressure dressing. The pressure dressing is effective. Alternatively, the Learner may remove the dressing. Arterial hemorrhage is present from the wound. The Learner should order application of direct pressure to the wound. Direct pressure stops the bleeding. The Learner then directs team members to apply a pressure wrap/dressing to the scalp wound.

A: Airway

-  The Learner assesses the airway. An oral airway has been inserted, but respirations are noisy and rapid. The face is distorted and has palpable instability, multiple contusions, and blood from the mouth and nose. The Learner should recognize that the upper airway is obstructed.
-  The Learner should open the airway with the chin-lift maneuver. This procedure does not alleviate airway obstruction.
-  The Learner must not hyperextend the neck to open the airway. If the Learner hyperextends the neck, the patient no longer moves the extremities.
-  The Learner should suction the airway. Blood continues to pool in the mouth and nose. There is no cough or gag response with suctioning.

-  The lips are cyanotic. High-flow oxygen should be administered and/or continued.
-  Respirations remain noisy, and the airway remains obstructed.
-  The Learner may initiate bag-valve mask assisted ventilation. However, this is not effective due to obstructing blood and anatomic distortion preventing mask seal.
-  The Learner must state that a definitive airway is indicated. The Learner may attempt to insert a Laryngeal Mask Airway (LMA) while preparing for an intubation attempt or cricothyroidotomy. If an LMA is attempted, the seal is not adequate, and ventilation is not adequate. The Learner should indicate that orotracheal intubation with restriction of cervical motion is indicated and that volume (blood or crystalloid) is administered if RSI medications are used. However, intubation may be attempted without RSI medications in this scenario. When the Learner attempts orotracheal intubation, the Instructor should state that the vocal cords cannot be visualized, and the pharynx continually fills with blood despite suctioning. With failure of intubation and an obstructed airway, the Learner should recognize a cannot intubate / cannot ventilate situation and state that a surgical / incisional airway (cricothyroidotomy) is indicated. The Learner should remove the cervical motion restriction device while an assistant restricts motion of the head and neck. The Learner should identify the anatomic landmarks and describe the technique of surgical / incisional airway (cricothyroidotomy). The Learner should mention confirmation of end tidal CO₂ for seven breaths following tube insertion.
-  After performing the surgical / incisional airway, the Learner should institute ventilatory support via a mechanical ventilator or a bag-valve mask device with supplemental oxygen. If asked, ventilation is not difficult to perform.
-  The Learner should mention to continue restriction of spinal motion.
-  The Learner may elect to connect a pulse oximeter if not performed previously. If requested, SpO₂ is 90% with 100% supplemental oxygen.

B: Breathing

- The Learner should indicate that ventilatory assistance with 100% supplemental O₂ is indicated, if not mentioned after the surgical / incisional airway.
- Nurse reports that the lips are not as blue.
-  The Learner should auscultate the chest. Breath sounds are present on the right but not on the left. The tracheal tube balloon is at the skin level.
-  The Learner should palpate the chest wall. The Instructor relays that subcutaneous emphysema is present in the left chest wall.
-  The Learner should indicate that left tube / finger / needle thoracostomy is indicated, describe the appropriate landmarks, and accurately describe the procedure. Following either finger or tube thoracostomy, a small amount of blood and air is evacuated. If a needle thoracostomy is performed, a small amount of air is released but the needle catheter kinks and continues to not function if the procedure is repeated. The Learner should then perform a finger or tube thoracostomy, describe the appropriate landmarks, and accurately describe the procedure. Following tube insertion, the Learner should connect the thoracostomy tube to an underwater seal drainage system.



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- The pulse oximeter should be connected to the patient, if not done previously. SpO₂ is 90% with 100% supplemental oxygen. Blood gas determination may be requested. To provide a more realistic scenario, the Instructor may delay reporting the result until assessment of Circulation is completed. For Instructor reference, the values at this point in assessment are pH 7.25, PaO₂ 64 mm Hg (8.5 kPa), PaCO₂ 36 mm Hg (4.8 kPa), SpO₂ 90%, and Base Deficit 10.5 mEq/L.

C: Circulation

- The Learner should indicate that a cardiac rhythm monitor is connected, if not already done. Sinus tachycardia is present on the monitor, with a HR of 150. The Learner should request a new blood pressure which remains 80/50.
- CTD • The Learner must recognize the presence of hemorrhagic shock and indicate that two large-caliber IVs be inserted, while simultaneously obtaining blood for type and crossmatch and routine laboratory determinations. If the Learner asks for the results, the Instructor should indicate that the results will be available in 20 minutes.
- CTD • The Learner should transfuse warmed type O blood (whole blood or PRBCs). In utilizing blood components, the Learner should indicate the need for balanced blood product resuscitation at a 1:1:1 ratio of PRBCs:FFP:Platelets. The Learner should initiate a massive transfusion/hemorrhage protocol, if present in the facility. The Learner should indicate that crossmatched blood will be transfused as soon as it is available. If blood products are not routinely available in the practice environment, the Learner may administer warmed crystalloid solution. However, the Learner must report that blood would be the optimal product if available.
- CTD • The Learner should request new vital signs after administration of blood or crystalloid. The BP increases to 100/65, HR decreases to 116, and SpO₂ increases to 96% with respirations manually controlled and 100% supplemental oxygen. If requested earlier, the ABG results are: pH 7.25, PaO₂ 64 mm Hg (8.5 kPa), PaCO₂ 36 mm Hg (4.8 kPa), SpO₂ 90%, and Base Deficit 10.5 mEq/L.
- CTD • The Learner should assess five locations for a source of uncontrolled hemorrhage.
 - **External (the floor)** - The Learner should re-assess bleeding control by examining the left leg wound and the scalp dressing. Bleeding is controlled at both locations.
 - **Thoracic cavity** - The Learner should evaluate thoracostomy tube output and request a chest x-ray (if not previously requested). There is no further output. Chest x-ray image is ordered. The Instructor will present the image later in the scenario.
 - **Peritoneal cavity** - The Learner should request either FAST, eFAST, or DPL. If FAST, no pericardial, intra-abdominal, or pelvic fluid is present. The included FAST image (Slide #3) of the right upper quadrant may be shown to the Learner to interpret. If eFAST, the same result as FAST and equivocal for absent left lung sliding as a technically difficult study. If DPL, there is no blood on aspiration and lavage fluid returns clear.
 - **Retroperitoneal Space** - The Learner should assess the pelvis for ecchymosis, displacement, external rotation of the femurs, and pain. A test for mechanical stability is not performed. There are no contusions on the pelvis. There appears to be pain with left hip motion and the left leg is deformed at the location of the open distal femur fracture. The right hip and leg are not painful or displaced. A pelvic binder / compression device is not indicated. A pelvis x-ray should be requested. The image will be presented by the Instructor later in the scenario.

- **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 is swelling at the left hip. There is deformity of the left wrist without muscular compartment swelling. There are extensive skin abrasions along the left chest, flank, and lower extremity without bleeding and without swelling.

- CTD • The Learner should conclude that the major sources of hemorrhage were the open left distal femur fracture wound and the scalp. Both sources are currently adequately controlled.

D: Disability

- CTD • The Learner should mention progression to Disability evaluation. The Learner should perform a neurologic exam by requesting results of GCS evaluation, pupil reactivity, and sensory exam. If RSI medications were administered, these results are not available. However, the Instructor may ask what information would be beneficial if RSI medications had not been administered and may report the results below as information provided by the ambulance personnel.
 - The eyes are swollen but partially open in response to painful stimuli. E = 2.
 - A surgical / incisional airway prevents speaking. V = 1T. Prior to airway insertion, gurgling and moaning noises were present, V = 2.
 - Normal flexion (withdraw) occurs from painful stimuli. M = 4.
 - The GCS score is 7T (E2, V1T, M4).
 - Both pupils are moderately dilated and react slowly to light.
- The Learner should indicate that these responses represent a severe TBI and that neurosurgical consultation is indicated. The Learner should indicate that neurologic status should be reevaluated frequently. The Learner should initiate transfer to a medical facility with neurosurgical capabilities, if not mentioned earlier.

E: Environment/Exposure

- CTD • If not done previously, the Learner should direct removal of all clothing to permit a complete inspection. A logroll should be performed to remove the backboard, examine the back, and perform a rectal examination. No new life-threatening injuries are diagnosed. Rectal tone is present. Rectal blood is not present.
- CTD • During examination and logroll, the Learner should mention measures to preserve patient privacy and to prevent hypothermia, such as covering with warm blankets, increasing the room temperature, and providing warmed IV fluids. Spinal motion must continue to be restricted.

ADJUNCTS TO THE PRIMARY SURVEY

Monitoring Devices

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

Chest and Pelvic X-rays, FAST and eFAST Exams

The chest and pelvic x-rays are adjuncts to the Primary Survey. The Learner should have previously requested these x-rays during Circulation assessment. The x-rays are obtained and being developed. The Instructor may present the images just before or after either the secondary survey or the transfer report. The Learner should indicate that restriction of spinal motion is continued and may elect to obtain a cross-table lateral c-spine x-ray (though for this scenario, the x-ray



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image and result will not be available). If not mentioned during Circulation assessment, the FAST exam is normal (no intra-abdominal, pelvic, or pericardial fluid). If not shown previously, the included FAST image of the right upper quadrant may be shown to the Learner to interpret. If requested, eFAST is equivocal for absent left lung sliding but is a technically difficult study due to subcutaneous air.

Urinary Bladder Catheter

The Learner should indicate that an indwelling urinary catheter should be inserted after examination for blood at the meatus or perineal ecchymosis. There is no urethral meatus blood and there is no perineal ecchymosis. Clear yellow fluid (50 mL) returns from the bladder catheter.

Gastric Decompression

Gastric decompression should be accomplished. The insertion of a nasogastric tube is contraindicated because of the head and facial trauma and a possible cribriform plate fracture. However, an orogastric tube may be inserted.

Arterial Blood Gas

Arterial blood gases (or repeat) may be obtained. Results after the xABCDEs and resuscitation are pH 7.34, PaO₂ 85 mm Hg (11.3 kPa), PaCO₂ 36 mm Hg (4.8 kPa), SpO₂ 96%, and Base Deficit 6 mEq/L. These are improved from the ABGs which may have been requested during Breathing assessment, which were pH 7.25, PaO₂ 64 mm Hg (8.5 kPa), PaCO₂ 36 mm Hg (4.8 kPa), SpO₂ 90%, and Base Deficit 10.5 mEq/L.

Blood Tests

Blood should have been sent to the laboratory for type and crossmatch, coagulation profile, electrolytes, renal function, and other determinations.

Case Status after Primary Survey and Adjunct

- The Learner should perform a tactical pause and reevaluate the xABCDEs before proceeding to the secondary survey. Instructor reports vital signs: BP 90/60, HR 100, Respirations 24 with ventilatory assistance, and SpO₂ 90% with 80% supplemental oxygen. There are no changes on xABCDE re-assessment. The infusion of warmed blood and blood products should be continued, and the pulse oximeter and ECG monitored. The vital signs should be monitored during the secondary survey. If not mentioned earlier, the Learner may state that transfer to another facility capable of managing the injuries is indicated.
- The x-ray images are available. The Instructor shows these to the Learner, who should identify these findings:
 - Chest x-ray - definitive airway in appropriate position, multiple left rib fractures, potential left pulmonary contusion, left chest thoracostomy tube, and an obscured left hemidiaphragm with a dislocated gastric tube (consistent with a ruptured diaphragm).
 - The pelvic x-ray shows a left femoral neck fracture. Metallic object removed on repeat x-ray and no pelvic fracture present.
 - If not shown previously, the included FAST image of the right upper quadrant may be shown to the Learner to interpret.

SECONDARY SURVEY

-  • The Learner should begin a head-to-toe exam.

Head

- The Learner should remove the dressing and examine the scalp wound. Bleeding was controlled by the pressure dressing. The Learner should palpate the head but not probe the wound. A left frontal/ temporal depressed skull fracture is identified. The dressing should be re-applied.
- The GCS score should be reevaluated. The GCS score remains 7.
- The Learner must indicate the importance of maintaining adequate ventilation, oxygenation, and cerebral perfusion to reduce the risk of neuroworsening and secondary brain injury.
- The face is contused and swollen. The left maxilla is unstable. Blood is draining from both nares. Drainage from the ears is not present. The right tympanic membrane is normal. There is a left hemotympanum.

Neck

- The Learner should palpate the neck. The patient demonstrates pain when the upper neck and suboccipital regions are palpated. The Learner must maintain restriction of spinal motion. Imaging is not mandatory as transfer is planned. If requested, the cervical spine lateral x-ray shows a C1 fracture. This report is mentioned verbally as an image is not available and the x-ray is not mandatory for this scenario. The Learner should indicate that other cervical spine fractures cannot be excluded on a single image lateral cervical spine x-ray. Resuscitation and transfer should not be delayed to obtain further spine imaging.

Chest

- Respirations are supported by mechanical or manual methods. Abrasions and contusions are present on the skin of the left chest. Crepitus is present in the left chest wall and the patient exhibits a painful response with palpation. Left breath sounds are decreased.
- The Learner should examine the left tube thoracostomy and collection chamber for drainage. The tube is functioning adequately, and no further blood has drained.
- A chest x-ray should be ordered, if not obtained previously.

Abdomen

- There are abrasions along the left abdomen and flank. The abdomen is not tender and is not distended. Bowel sounds are diminished.

Pelvis/Perineum

- The pelvic bones are not tender, and contusions are not present. The left hip is tender. Contusions, hematomas, swelling, and urethral meatal blood are not present. A rectal examination to assess rectal tone should have been performed previously during logroll maneuver of the Exposure portion of Primary Survey. Rectal tone is present. Rectal blood is not present.
- A pelvic x-ray should be ordered, if not requested previously.



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Musculoskeletal System

- The Learner should examine the extremities. The open left distal femur fracture is unchanged. The wound dressing is removed and the wound inspected. Bleeding remains controlled with a tourniquet. The Learner should reassess the peripheral pulses which are weak but present on the right and absent distal to the tourniquet on the left. The Learner should maintain the tourniquet as transfer is planned. The Instructor may ask about tourniquet management if transfer will be delayed for several hours. A left wrist deformity is present. Upper extremity pulses are present and of good quality. Both fractures should be splinted.
- Left lower and upper extremity x-rays can be ordered if transfer will not be delayed.
- If not previously performed during the Exposure portion of Primary Survey, the Learner should examine the back utilizing a logroll technique to minimize movement. If protection is not maintained, the patient is no longer able to move the lower extremities. A rectal examination can be performed at this time, if not previously performed. No abnormal findings are present.
- The Learner should indicate the need to administer tetanus toxoid and broad-spectrum antibiotics.

Additional X-rays

The Instructor may show the image to the Learner. A comminuted distal left femur fracture is present. The left wrist x-ray demonstrates displaced distal radial and ulnar fractures (image not available for this x-ray).

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. Assessment is unchanged. The patient has received 4 units of blood and additional products to maintain a balanced resuscitation. Vital signs are BP 110/60, HR 100, Respirations 20 and assisted (manually or ventilator), and SpO₂ 96% with 50% supplemental oxygen. GCS score remains 7T. The Learner should initiate transfer to a hospital capable of providing a higher level of trauma care, and the receiving clinician should be contacted directly.

Pretransfer Management

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

- Appropriate handover to the receiving clinician
- Provision of continuous monitoring and pain/anxiety relief
- Ensure bleeding is controlled from scalp
- Ensure adequate tourniquet fixation
- Adequately secure the cricothyroidotomy and thoracostomy tubes
- Plans for assisted ventilation
- Motion restriction of the spine, including a cervical motion restriction device
- Administration of tetanus prophylaxis and antibiotics
- Ensure splints are applied to left lower extremity and left wrist
- Adequate fixation of urinary catheter and gastric tube
- Copies of all test results and images are prepared to accompany the patient

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 recurrence of extremity or scalp bleeding, hypoxia and ventilation abnormalities, decrease in blood pressure, and deterioration of the GCS score.

The Learner should use the S-xABCDE-BAR tool to provide a handover. For this scenario, the Learner should relate the following:

- Motorcycle crash, no helmet, unconscious at scene
- Open left femur fracture with bleeding controlled by a tourniquet (mention tourniquet application time).
- Scalp bleeding controlled with pressure dressing.
- Surgical / incisional airway performed due to facial injuries and GCS score of 7.
- Tube thoracostomy for pneumothorax. Multiple rib fractures.
- Probable diaphragm injury.
- Hemorrhagic shock due to external bleeding. Received 4 units of blood and additional products to maintain a balanced resuscitation.
- Open skull fracture and left hemotympanum.

Communicating Serious News

The patient's family have arrived. The clinician should indicate that communication with the family will occur in a quiet room with ample chairs, tissue and water available, and additional support personnel (such as a translator, social worker, spiritual counselor). Following the meeting, the Learner will debrief the team and relay family meeting information to the receiving hospital. The meeting will follow the principles discussed in the Communicating Serious News chapter and Skills Station. The ABCDE's of meeting communication are:

- A. Ask what the family has been told.
- B. Begin with the warning.
- C. Concise summary.
- D. Do allow for silence. Don't speak too much. Listen!
- E. Elicit questions. End Encounter with a plan for next steps.

Injury Prevention

If time permits, the Instructor may ask what opportunities exist for injury prevention. The Learner should discuss potential education on protective equipment such as a helmet and clothing, assessment of crash location for engineering improvements, and legislative and policy efforts.



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DIRECTIONS FOR MOULAGE

- Apply makeup to simulate shock and central cyanosis.
- Apply makeup and moulage to the left temporal area to simulate an open, depressed skull fracture. Apply simulated blood and mat it into the hair. Grass, gravel, and/or dirt can be sprinkled in the hair and in and around the wound. IV tubing connected to a hand-operated blood pump may be added to simulate arterial hemorrhage. Apply 4 × 4 gauze pads and/or a roll bandage to the head wound and saturate the dressing and bedclothes with the simulated blood.
- Apply makeup to simulate left chest and abdomen / flank bruises and abrasions.
- Apply makeup to simulate multiple maxillofacial injuries. Slightly moistened dental sponges or small, folded pieces of gauze may be placed in the model's mouth to simulate distortion. They may be soaked in an edible form of simulated blood, which aids in the oozing of blood from the mouth. To reduce the risk of actor aspiration during the scenario, do not oversaturate the sponges with blood. The sponges should not be easily visible.
- Apply an open femoral fracture moulage piece to the distal left thigh and connect a blood-pumping apparatus. Pump the apparatus a few times to soak the clothing and bed with artificial blood. Dress the simulated wound with 4 × 4 gauze pads and/or a roll bandage and pump the blood apparatus to soak the dressing. An open femoral fracture can be simulated with bones, putty, makeup, a blood-pumping apparatus, and artificial blood.
- Apply makeup to the left foot and ankle to simulate poor distal circulation (pallor).
- Apply makeup and moulage to simulate swelling, discoloration, and deformity of the left wrist.
- Apply dirt and multiple abrasions over the left shoulders, elbows, and knuckles.
- Apply a splint to the left wrist.
- Upon completion of the above, carefully apply simulated perspiration, a semirigid cervical motion restriction device, and an oxygen mask.

Notes:

DIRECTIONS FOR THE PATIENT MODEL

You respond only to painful stimuli by slightly withdrawing and softly moaning whenever the doctor or nurse touches your chest, left leg, left hip, head, or left wrist. Initially, you are in acute respiratory distress due to severe maxillofacial trauma. Simulate this by rapid, noisy, and gurgling respirations. After the Learner establishes a surgical / incisional airway (cricothyroidotomy), your respiratory rate is normal and your breathing is quiet. If at any time the doctor hyperextends your neck or rolls you without providing appropriate protection of your spine, you are no longer able to move your extremities. Once the surgical / incisional airway has been performed, you cannot make sounds.

