CHAPTER 21

EMERGENCY MEDICAL CARE PROCEDURES

INTRODUCTION

For a Navy Corpsman, the terms "first aid" and "emergency medical procedures" relate to the professional care of the sick and injured before in-depth medical attention can be obtained. Appropriate care procedures may range from providing an encouraging word to performing a surgical cricothyroidotomy to open a patient’s airway. Always remember, however, that first aid measures are temporary expedients to save life, to prevent further injury, and to preserve resistance and vitality. These measures are not meant to replace proper medical diagnosis and treatment procedures. Hospital Corpsmen (HMs) will be able to provide the competent care that makes the difference between life or death, temporary or permanent injury, and rapid recovery or long-term disability if they:

- Understand the relationship between first aid and proper medical diagnosis and treatment
- Know the limits of professional care that HMs can offer
- Keep current on emergency medicine procedures to include:
  - Conducting routine practical scenarios
  - Attending emergency medical and trauma courses of instruction
  - Keeping abreast of new emergency medical equipment

The intent of this chapter is to provide the user a reference to use in the training and performance of certain emergency situations. It was written to provide a quick overview and step by step assessment guidelines to follow in the most emergent situations HMs routinely encounter. The information is based on current practices, as of the date of publishing, as well as lessons learned from combat operations in Iraq and Afghanistan.

There may be operational limitations and local protocols dictated by the General Medical Officer / Medical Director that may require the HM to alter medications or certain procedures. Remember, the Hospital Corpsman Pledge is always in effect.

LAW OF ARMED CONFLICT

The law of armed conflict encompasses all international law regulating the conduct of nations and individuals engaged in armed conflict. As world tension increases, so does the potential for armed conflict. As members of a force dedicated to prevent such a conflict, HMs as medical personnel must face the reality of becoming involved. A basic understanding of the principles and applications of the law of armed conflict will help enhance efforts in providing the best medical care possible while maintaining our moral and ethical obligation.

A combatant is anyone participating in military operations or activities. Generally, this means members of a military force with certain exceptions, and civilian personnel who are actually engaged in hostilities. Noncombatants include all others including civilians not engaged in hostilities, medical personnel, chaplains, other persons captured or detained, and people who surrender, are captured, shipwrecked, sick, or wounded.

GENERAL FIRST AID RULES

LEARNING OBJECTIVE:

Explain general first aid rules.

There are a few general first aid rules that HMs should follow in any emergency:

- Maintain breathing
- Stop bleeding/maintain circulation
- Prevent or treat for shock
Mental preparation is an often overlooked aspect of emergency care. While it is possible to provide life-like training and scenarios to HMs, there is no substitute for being able to handle a real emergency. The HM can take steps in order to prepare for the stressors encountered as a result of a severe trauma or medical scene.

1. Regular exercise and a healthy lifestyle will allow the HM's body to better handle the physical symptoms it will experience resulting from stress.

2. Keeping abreast of current medical procedures and emergency medicine procedures will keep the HM mentally prepared.

3. Keeping current with the latest and greatest medical equipment and how to operate the equipment at the command is vitally important. As emergency responders, HMs have a large dependence on medical equipment. It is essential that the HM knows the location, function and application of the medical gear to be used. On the way to the scene IS NOT THE TIME to get familiar with the gear.

4. Know the surroundings and the resources available. It is important to think and plan at least three steps ahead. For example: All injured patients are going to be moved to a certain location. What resources will be needed to move the patients; will extra people be needed to help carry the patients or extra gear? These are just a couple of questions to ask before an operation begins or an injury occurs.

These are a few guidelines to keep in mind while reading this chapter. More detail will be provided in the following sections.

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**TRIAGE**

**LEARNING OBJECTIVE:**

*Explain the procedures for tactical and non-tactical triage.*

*Triage*, a French word meaning "to sort", is the process of quickly assessing patients in a multiple-casualty incident and assigning patients a priority (or classification) for receiving treatment according to the severity of the illness or injury. In the military, there are two types of triage, *tactical* and *non-tactical*, and each type uses a different set of prioritizing criteria.

The person in charge is responsible for balancing the human lives at stake against the realities of the tactical situation, the level of medical consumable resources on hand, and the realistic capabilities of medical personnel on the scene. Triage is a dynamic process, and a patient's priority is subject to change as the situation progresses.

**SORTING FOR TREATMENT**

*NON-TACTICAL*

In civilian or non-tactical situations, sorting of casualties from a multiple casualty incident is slightly different from combat situations. There are four basic classes (priorities) of injuries, and the order of treatment of each is different.

**Priority I - Immediate.**

Casualties whose injuries are critical but who will require only minimal time or equipment to manage and who have a good prognosis for survival. An example is the casualty with a compromised airway or massive external hemorrhage.
Priority II - Delayed

Casualties whose injuries are debilitating but who do not require immediate management to salvage life or limb. An example is the casualty with a long bone fracture.

Priority III - Minor

Casualties, often called the "walking wounded" who have minor injuries that can wait for treatment or who may even assist in the interim by comforting other casualties or helping as litter bearers.

Priority IV - Expectant

Casualties whose injuries are so severe that they have only minimal chance of survival. An example is the casualty with a 90% full-thickness burn and thermal pulmonary injury.

Priority V - Dead

Casualties who are unresponsive, pulseless and breathless. In a disaster, resources rarely allow for attempted resuscitation of cardiac arrest casualties.

Next follows a simple non-tactical triage algorithm to assist HMs in non-tactical situations to make objective determinations about a patient’s triage category and subsequent treatment and transportation requirements (Fig 21-1).

Figure 21-1.—START Triage Algorithm (Courtesy Newport Beach Fire Department, Newport Beach, CA)

Triage in the tactical environment is very different due to the environmental and human hazards, i.e. bullets and ordnance.

<table>
<thead>
<tr>
<th>Triage Category</th>
<th>Category Description</th>
<th>Examples</th>
</tr>
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</table>
| Immediate       | This group includes those that require lifesaving surgery. The surgical procedures in this category should not be time-consuming and should concern only patients with high chances of survival. | Upper airway obstruction  
Severe respiratory distress  
Life-threatening bleeding  
Tension pneumothorax  
Extensive 2nd or 3rd degree burns  
Untreated poisoning(chemical agent) with severe symptoms  
Heat stroke  
Decompensated Shock  
Rapidly deteriorating level of consciousness  
Any other rapidly deteriorating life-threatening condition |
| Delayed          | This group includes those wounded who are badly in need of time-consuming surgery, but whose general condition permits delay in surgical treatment without unduly endangering life. Sustaining treatment will be required. | Compensated shock  
Fracture, dislocation, or injury causing circulatory compromise  
Severe bleeding, controlled by a tourniquet or other means  
Penetrating head, neck, chest, back, or abdominal injuries without airway or breathing compromise or decompensated shock  
Severe combat stress symptoms or psychosis |
| Minimal          | These casualties have relatively minor injuries and can effectively care for themselves or can be helped by non-medical personnel. | Uncomplicated closed fractures and dislocations or minor lacerations  
Frostbite  
Strains and sprains  
Minor head injury (loss of consciousness of less than 5 minutes with normal mental status and equal pupils) |
| Expectant        | Casualties in this category have wounds that are so extensive that even if they were the sole casualty and had the benefit of optimal medical resource application, their survival would be unlikely. Using a minimal but competent staff, provide comfort measures for these casualties. | Traumatic cardiac arrest  
Massive Brain Injury  
2nd or 3rd degree burns over 70% of the body surface area (BSA)  
Gunshot wound to the head with Glasgow Coma Scale of 3 |

Table 21-1.—TCCC Triage Categories
Figure 21-2.—Triage Algorithm for Tactical Combat Casualty Care
AIRWAY MANAGEMENT

LEARNING OBJECTIVE:
Perform airway management using simple and advanced airway adjuncts.

OPEN THE AIRWAY

Scenario
The HM is evaluating a casualty who is not breathing.

Objective
Complete all of the steps required to open the casualty's airway without causing unnecessary injury.

Performance Steps
Take Body Substance Isolation (BSI) precautions.

Recovery Position for patients who are unconscious or who have an altered level of consciousness (LOC), i.e. return of spontaneous breathing after rescue breathing:

1. Roll the casualty onto his or her back if necessary.
   a. Kneel beside the casualty.
   b. Raise the near arm and straighten it out above the head.
   c. Adjust the legs so that they are together and straight or nearly straight.
   d. Place one hand on the back of the casualty's head and neck.
   e. Grasp the casualty under the arm with the free hand.
   f. Pull steadily and evenly toward you, keeping the casualty's head and neck in line with the torso.
   g. Roll the casualty as a single unit.
   h. Place the casualty's arms at his or her side.

NOTE:
The following steps are employed when the HM must secure a patent (open) airway and either establish or maintain breathing.

2. Establish the airway using the head-tilt/chin-lift or jaw thrust method.
   a. Head-tilt/chin-lift maneuver.

CAUTION:
Do not use this method if a spinal injury is suspected.

NOTE:
Remove any foreign material or vomit seen in the mouth as quickly as possible.

   i. With the casualty in a supine position, the HM positions beside the casualty's head along one side of the body.
   ii. Place one hand on the casualty's forehead and apply firm, backward pressure with the palm of the hand to tilt the head back.
   iii. Place the tips of the fingers of the other hand under the lower jaw near the boney part of the casualty's chin.
   iv. Lift the chin upward, bringing the entire lower jaw with it, helping to tilt the head back.

CAUTION:
Do not use the thumb to lift the lower jaw.
Do not press deeply into the soft tissue under the chin with the fingers.
Do not completely close the casualty's mouth.

**CAUTION:**
Use this method if a spinal injury is suspected.

**WARNING:**
Do NOT place suspected spinal injury patients in the recovery position.

i. Kneel above the supine casualty's head. Rest elbows on the surface on which the casualty is lying.

ii. Carefully reach forward and gently place one hand on each side of the casualty's lower jaw, at the angles of the jaw below the ears.

iii. Stabilize the casualty's head with the forearms.

iv. Using the index fingers, push the angles of the casualty's lower jaw forward.

v. Use the thumbs to help position the lower jaw to allow breathing through the mouth as well as the nose.

vi. The completed maneuver should open the airway with the mouth slightly open and the jaw jutting forward.

**CAUTION:**
Do not tilt or rotate the casualty's head.

3. Check for breathing within 3 to 5 seconds. While maintaining the open airway position, place an ear over the casualty's mouth and assess the breathing using the "look, listen, and feel" technique.

   a. Look for the chest to rise and fall.

   b. Listen for air escaping during exhalation.

   c. Feel for the flow of air on the side of the face.

4. Take appropriate action.

   a. If the casualty resumes breathing on his or her own, maintain the airway and (if no spinal injury is assessed or suspected) place the casualty in the recovery position.

      i. Roll the casualty as a single unit onto his or her side.

      ii. Place the hand of the upper arm under the chin.

      iii. Flex the upper leg.

**NOTE:**
Continue the initial assessment to check the casualty for other injuries.

b. If the casualty does not resume breathing, perform rescue breathing.

**PERFORM ORAL AND NASOPHARYNGEAL SUCTIONING OF A PATIENT**

**Scenario**

The HM is managing a patient that requires suctioning.

**Objective**

Perform oral or nasopharyngeal suctioning to clear the airway without causing injury to the patient.
Performance Steps

CAUTION:
All body fluids should be considered potentially infectious. Always observe body substance isolation (BSI) precautions by wearing gloves and eye protection as a minimal standard of protection.

1. Position the patient in a semi-Fowler’s (semi-sitting) position or, in the case of severe trauma, roll the patient onto his side to allow gravity to assist in clearing the airway.

NOTE:
In some cases, such as spinal injuries, the patient must remain in whatever position they are initially found or must be managed while they are immobilized on a long spine board.

2. Check the suction unit for proper assembly of all its parts.

3. Turn on the assembled unit and check to see if it is operational.

NOTE:
Inspect the suction unit regularly to ensure it is in working condition. Switch on the suction, clamp the tubing, and make certain the unit generates a vacuum of more than 300 mm Hg. Check that a battery-charged unit has charged batteries.

4. Select the appropriate catheter and attach it to the suction tubing.
   a. Tonsil-tip (Yankauer) catheters are best for suctioning in the field, as they have wide diameter tips and are somewhat rigid.
   b. Flexible (French, or whistle tip) catheters are used in situations where rigid catheters cannot be used, such as a patient with clenched teeth or for use in nasopharyngeal suctioning.

5. Prepare equipment.
   a. Open the basin package.
   b. Pour the saline solution into the basin.
   c. Open the suction catheter package.

6. Explain to the patient the reason for suctioning.

7. Pre-oxygenate the patient with 100% oxygen.
   a. If the patient is receiving oxygen therapy, increase the oxygen to 100% for 1 minute.
   b. Monitor the patient's pulse oximeter reading during the entire procedure.
   c. If the patient is not receiving oxygen therapy, have him take a minimum of five deep breaths or administer the breaths with a bag-valve-mask (BVM) system.

NOTE:
After each suctioning attempt or suctioning period, re-oxygenate the patient.

8. Remove the catheter from the package using the dominant hand.

9. Test the patency of the catheter.
   a. Turn the suction unit on with the non-dominant hand.
   b. Insert the catheter tip into the saline solution using the dominant hand.
   c. Occlude the suction control port with the non-dominant thumb and observe the saline entering the drainage bottle.

NOTE:
If no saline enters the bottle, check the suction unit and or replace the catheter and retest for patency.
10. Suction the patient.
   
a. Oral route.
   
i. Rigid catheter.
   
1. Instruct a conscious patient to cough to help bring secretions up to the back of the throat.
2. If the patient is unconscious, use the cross finger method of opening the airway.
3. Place the convex (outward curving) side of the rigid tip against the roof of the mouth and insert to the base of the tongue.

**NOTE:**
A rigid tip does not need to be measured. Only insert the tip as far as YOU can see it. Be aware that advancing the catheter too far may stimulate the patient's gag reflex and cause vomiting.

4. Apply suction by placing the thumb of the non-dominant hand over the suction control port.

**WARNING:**
Never suction for more than 15 seconds at one time for adults, 10 seconds for children, and 5 seconds for infants.
Longer periods of continuous suctioning may cause oxygen deprivation and subsequent hypoxic injury to the brain.

5. Clear the secretions from the catheter between each suctioning interval by inserting the tip into the saline solution and suction the solution through the catheter until the catheter is clear of secretions.
6. Repeat steps 10-a-i-1 through 10-a-i-5 until all secretions have been removed or until the patient's breathing becomes easier. Noisy, rattling or gurgling sounds should no longer be heard.

ii. Flexible catheter.

1. Measure the catheter from the patient's earlobe to the corner of the mouth or the center of the mouth to the angle of the jaw.
2. Insert the catheter into the patient's mouth to the correct depth, without the suction applied.

**NOTE:**
If an oropharyngeal airway (OPA) is in place, insert the catheter alongside the airway and then back into the pharynx.

3. Place the thumb of the non-dominant hand over the suction control port on the catheter, applying intermittent suction by moving the thumb up and down over the suction control port.
4. Apply suction in a circular motion while withdrawing the catheter.
5. Suction for no longer than 15 seconds removing secretions from the back of the throat, along outer gums, cheeks, and base of tongue.

**WARNING:**
Advancing the catheter too far into the back of the patient's throat may stimulate the gag reflex. This could cause vomiting and the aspiration of stomach contents.

6. Clear the secretions from the catheter between suctioning by inserting the tip into the saline solution and suction the solution through the catheter until the catheter is clear of secretions.
7. Repeat steps 10-a-ii-1 through 10-a-ii-6 until all secretions have been removed or until the patient's breathing becomes easier. Noisy, rattling or gurgling sounds should no longer be heard.
NOTE:
If the patient is uncooperative or oral entry is not possible due to facial trauma, nasopharyngeal suctioning may be required.

b. Nasopharyngeal route.
   i. Measure the flexible catheter from the tip of the earlobe to the nose.
   ii. Lubricate the catheter by dipping the tip into the saline solution.
   iii. Insert the catheter into one nostril without suction applied. If an obstruction is met, try the other nostril.
   iv. Quickly and gently advance the catheter 3 to 5 inches.
   v. Perform steps 10-a-ii-3 through 10-a-ii-5 to suction secretions.
11. Re-oxygenate the patient and or ventilate for at least five assisted ventilations.
12. Observe the patient for hypoxemia.
   a. Color change.
   b. Increased or decreased pulse rate.

WARNING:
Discontinue suctioning immediately if severe changes in color or pulse rate occur.

13. Place the patient in the recovery (lateral recumbent, coma) position, unless contraindicated by a suspected spinal injury.
14. Record the procedure.
15. Evacuate the patient.

INSERT AN OROPHARYNGEAL AIRWAY23 (J TUBE)

Scenario
The HM is assessing an unconscious casualty who requires insertion of an oropharyngeal airway (OPA).

Objective
Insert an OPA without causing further injury to the casualty.

Performance Steps

CAUTION:
All body fluids should be considered potentially infectious. Always observe body substance isolation (BSI) precautions by wearing gloves and eye protection as a minimal standard of protection.

WARNING:
Use an OPA for an unconscious casualty only. Do not use an OPA on a conscious or semiconscious casualty because there may still be an active gag reflex. In such cases, a nasopharyngeal airway (NPA) would be more appropriate. An OPA should not be used in children who may have ingested a caustic or petroleum-based product, as it may induce vomiting.

1. Select the appropriate size of OPA, have three from which to choose.
   a. Place the airway beside the outside of the casualty’s jaw.
   b. Measure from the casualty’s ear lobe to the corner of the mouth.

NOTE:
The measurement from the ear lobe to the corner of the casualty’s mouth is equivalent to the depth of insertion in the airway.

2. Perform the head-tilt/chin-lift or jaw thrust maneuver to open the airway.

WARNING:
If a neck or spinal injury is suspected, use the jaw thrust maneuver to open the airway.
3. Open the casualty's mouth.
   a. Place the crossed thumb and index finger of one hand on the casualty's upper and lower teeth at the corner of the mouth.
   b. Use a scissors motion to pry the casualty's teeth apart.

   **NOTE:**
   If the teeth are clenched, wedge the index finger behind the casualty's back molars to open the mouth.

4. Insert the OPA.
   a. Insert the airway with the tip facing the roof of the mouth.
   b. Slide the OPA along the roof of the mouth. Follow the natural contour of the tongue past the soft palate.
   c. Rotate the airway 180° as the tip reaches the back of the tongue.

   **NOTE:**
   The airway may be difficult to insert. If so, use a gauze pad to pull the tongue forward or a tongue depressor to depress the tongue.

   d. Gently advance the airway and adjust it so the flange rests against the casualty's lips or teeth.

   **NOTES:**
   The tip of the airway should rest just above the epiglottis.
   If the flange of the airway did not seat correctly on the lips or if the casualty gags, the airway may be the wrong size.
   Repeat the procedure using a different size of airway.

   **WARNING:**
   If the casualty starts to regain consciousness and gags or vomits, remove the airway immediately.

5. **Insert the OPA using a tongue depressor.**
   a. Use the tongue depressor to depress the tongue, ensuring the tongue remains forward.
   b. Insert the OPA sideways from the corner of the mouth until the flange reaches the teeth.
   c. Rotate the OPA at a 90° angle, removing the tongue depressor while exerting gentle backward pressure on the OPA until it rests securely in place against the lips or teeth.

6. Monitor the casualty's respirations on a regular basis.
   a. Reassess air exchange and placement every time the casualty is moved.
   b. Assist with respirations if the respiratory rate falls below 8 or rises above 30 per minute or a pulse oximeter reading <90%.

7. Evacuate the casualty.

   **NOTE:**
   The airway may need to be taped or tied in place to avoid dislodgement during evacuation. If so, the casualty must be constantly monitored for the return of consciousness.

**INSERT A NASOPHARYNGEAL AIRWAY**

**Scenario**

The HM is assessing a patient with a reduced level of consciousness who is unable to maintain his airway.

**Objective**

Insert the appropriate size of NPA, without causing further injury to the patient.
Performance Steps

**CAUTION:**
All body fluids should be considered potentially infectious. Always observe body substance isolation (BSI) precautions by wearing gloves and eye protection as a minimal standard of protection.

1. Place the patient supine with the head in a neutral position.

**CAUTION:**
Do not use a NPA if the patient has maxillofacial or head trauma.

2. Select the appropriate size NPA by measuring from the tip of the patient's nose to earlobe.

3. Coat the distal tip (non-flanged end) of the NPA with a water-soluble lubricant.

**CAUTION:**
Do not use a petroleum-based or non-water-based lubricant. These substances can cause damage to the tissues lining the nasal cavity and pharynx thus increasing the risk for infection.

4. **Insert the NPA.**
   a. Push the tip of the nose upward gently.
   b. Position the tube so that the bevel of the airway faces toward the septum.
   c. Gently advance the lubricated NPA into the nostril with the curvature of the device following the curve of the floor of the nose. Advance it until the flange rests against the nostril.

**NOTE:**
Most NPAs are designed to be placed in the right nostril.

**CAUTION:**
Never force the NPA into the patient's nostril. If resistance is met, pull the tube out and attempt to insert it in the other nostril.
If the patient becomes intolerant of the airway, gently withdraw it from the nasal passage.

5. Place the patient in the recovery (lateral recumbent, coma) position to prevent aspiration of blood, mucus, or vomitus.

6. Monitor the casualty's respirations on a regular basis.
   a. Reassess air exchange and placement every time the casualty is moved.
   b. Assist with respirations if the respiratory rate falls below 8 or rises above 30 per minute or a pulse oximeter reading <90%.

7. Record the procedure.

8. Evacuate the patient.

**INSERT A COMBITUBE®**

**Scenario**
An unconscious casualty requires the insertion of an esophageal tracheal Combitube®. An assistant is performing resuscitative measures. No cervical spine injury is present.

**Objective**
Insert the Combitube® and successfully ventilate the casualty without causing further injury.

**Performance Steps**

1. Take Body Substance Isolation (BSI) precautions.
2. Inspect upper airway for visible obstruction.
3. Inspect and test equipment.
4. Lubricate distal end of tube.
5. Perform a tongue-jaw lift.
6. Insert device until casualty's teeth sit between printed black rings, within 3 attempts.

7. Inflate #1 (blue) cuff with appropriate amount of air based on size of tube.

8. Inflate #2 (white) cuff with appropriate amount of air based on size of tube.

9. Direct assistant to ventilate casualty with a BVM through primary tube.

10. Perform steps 5-9 in less than 30 seconds.

11. Watch for rise and fall of the chest, auscultate for breath sounds and over the epigastrium to confirm tube placement.


13. Attach pulse oximeter to casualty, if available.

14. Monitor the casualty's respirations on a regular basis.
   a. Reassess air exchange and placement every time the casualty is moved.
   b. Assist with respirations if the respiratory rate falls below 8 or rises above 30 per minute or a pulse oximeter reading <90%.

15. Secure device to the casualty around casualty's neck.

**INSERT A KING LT® AIRWAY**

**Scenario**

An unconscious casualty requires the insertion of an esophageal airway. An assistant is performing resuscitative measures. No cervical spine injury is present.

**Objective**

Insert the King LT® without causing further injury.

**Performance Steps**

1. Take body substance isolation (BSI) precautions.

2. Inspect the upper airway for visible obstruction.

3. Direct the assistant to pre-oxygenate the casualty for a minimum of 30 seconds.

4. Inspect and test equipment.

5. Lubricate the distal end of the tube with water soluble lubricant.

6. Perform a tongue-jaw lift.

7. Insert the device until the base connector is aligned with the casualty's teeth.

8. Inflate the cuffs with the appropriate amount of air based on the size of the tube.
   a. Use size 3 if the casualty is less than 61 inches in height. Inflate with 60 ml of air.
   b. Use size 4 if the casualty is 61 inches to 71 inches in height. Inflate with 80 ml of air.
   c. Use size 5 if the casualty is taller than 71 inches in height. Inflate with 80 ml of air.

9. Direct the assistant to ventilate the casualty with a BVM.

10. Auscultate the lung fields and epigastrium, and watch for rise and fall of the chest to confirm tube placement.

11. Assess casualty for spontaneous respirations for 10 seconds.

12. Attach pulse oximeter to casualty.

13. Ventilate casualty when respirations are <8 or > 30 or a pulse oximeter reading <90%.

14. Secure the device to the casualty.
15. Monitor the casualty's respirations on a regular basis.
   a. Reassess air exchange and placement every time the casualty is moved.
   b. Assist with respirations if the respiratory rate falls below 8 or rises above 30 per minute or a pulse oximeter reading <90%.

16. Evacuate the casualty.

PERFORM A SURGICAL CRICOHYROIDOTOMY

Scenario

The HM has a casualty requiring a surgical cricothyroidotomy.

Objective

Perform a surgical cricothyroidotomy without causing unnecessary injury to the casualty.

Performance Steps

**CAUTION:**
Casualties with a total upper airway obstruction, inhalation burns, or massive maxillofacial trauma who cannot be ventilated by other means are candidates for a surgical cricothyroidotomy.

1. Gather cricothyroidotomy kit or minimum essential equipment.

   **NOTE:**
   Because of the need for speed, every HM should have an easily accessible cricothyroidotomy kit that contains all required items.

   a. Cutting instrument: number 10 or 15 scalpel or knife blade.

   b. Airway tube: ET tube, tracheotomy tube, or any non-collapsible tube that will allow enough airflow to maintain oxygen saturation.

   **NOTE:**
   In a field setting, an ET tube is preferred because it is easy to secure. Use a size 6.0 to 7.0 ET tube, and ensure the cuff will hold air.

2. Hyperextend the casualty's neck.

   **WARNING:**
   Do not hyperextend the casualty's neck if a cervical injury is suspected.

   a. Place the casualty in the supine position.

   b. Place a blanket or poncho rolled up under the casualty's neck or between the shoulders blades to hyperextend the neck.

3. Put on gloves.

4. Locate the cricothyroid membrane.

   a. Place a finger of the non-dominant hand on the thyroid cartilage (Adam's apple), and slide the finger down to the cricoid cartilage.

   b. Palpate for the soft cricothyroid membrane below the thyroid cartilage and just above the cricoid cartilage.

   c. Slide the index finger down into the depression between the thyroid and cricoid cartilage.

   d. Prepare the skin over the membrane with an alcohol swab.

5. Stabilize the larynx with the non-dominant hand.
6. With the cutting instrument in the dominant hand, make a 1-1/2 inch vertical incision through the skin over the cricothyroid membrane.

**NOTE:**
A vertical incision will allow visualization of the cricothyroid membrane, but keep the scalpel blade away from the lateral aspect of the neck. This is important because of the large blood vessels located there, i.e. carotid artery and jugular vein.

**CAUTION**
Do not cut the cricothyroid membrane with this incision.

7. Maintain the opening of the skin incision by pulling the skin taut with the fingers of the non-dominant hand.

8. Stabilize the larynx with one hand and cut horizontally through the cricothyroid membrane.

9. Insert a commercially designed cricothoridotomy hook or improvise with the tip of an 18-gauge needle formed into a hook through the opening; hook the cricoid cartilage, and lift to stabilize the opening.

10. Insert the end of the ET tube or tracheotomy tube through the opening and towards the lungs. The tube should be in the trachea and directed toward the lungs. Inflate the cuff with 10 cubic centimeters (cc) of air.

11. Assess the casualty for spontaneous respirations (10 seconds).

12. Attach a pulse oximeter to the casualty, if available.

13. Assist with ventilations when respirations are <8 or >30 or a pulse oximeter reading <90% Direct an assistant to ventilate the casualty with a BVM, if necessary.

14. Auscultate lung fields and watch for rise and fall of the chest to confirm tube placement.

15. Secure the tube, using tape, cloth ties, or other measures, and apply a dressing to further protect the tube and incision.

16. Monitor the casualty's respirations on a regular basis.
   a. Reassess air exchange and placement every time the casualty is moved.
   b. Assist with respirations if the respiratory rate falls below 8 or rises above 30 per minute or a pulse oximeter reading <90%.

17. Evacuate casualty.

**PERFORM A NEEDLE CHEST DECOMPRESSION**

**Scenario**

The HM has a breathing casualty with chest trauma who requires needle chest decompression.

**Objective**

Complete all the steps necessary to perform a needle chest decompression without causing unnecessary injury to the casualty.
Performance Steps

NOTE:
Pneumothorax is defined as the presence of air within the chest cavity. Air enters either from the lungs through a rupture, laceration, or from the outside through a sucking chest wound. Trapped air in the chest cavity under pressure, called a tension pneumothorax, compresses the lung beneath it.

NOTE:
Unrelieved pressure will push and compress the contents of the chest in the opposite direction, away from the side of the tension pneumothorax. This, in turn, will prevent the heart from filling with blood and beating correctly and the good lung from providing adequate respirations.

CAUTION:
This procedure should ONLY be performed if the casualty has a chest trauma and progressive respiratory distress.

WARNING:
Proper positioning of the needle is essential to avoid puncturing blood vessels and or nerves. Blood vessels and nerves run along the bottom of each rib.

3. Withdraw the needle while holding the catheter still.

NOTE:
The casualty's respiration should improve.

4. Secure the catheter to the chest wall using tape.

5. Monitor the casualty until medical care arrives or the casualty is evacuated.

ADMINISTER OXYGEN

Scenario

The HM has a patient requiring oxygen administration.

Objective

Administer oxygen therapy using a non-rebreather (NRB) mask or nasal cannula to assist the patient's breathing without causing further harm to the patient. Calculate the duration of flow of the oxygen.

Performance Steps

CAUTION:
All body fluids should be considered potentially infectious. Always observe body substance isolation (BSI) precautions by wearing gloves and eye protection as a minimal standard of protection.

1. Explain the procedure to the patient.
2. Assemble and prepare the equipment.
   a. Inspect the oxygen cylinder and its markings.

   **NOTE:**
   Ensure the cylinder is labeled for medical oxygen; the bottles may be completely green, silver, or chrome with a green area around the valve stem on top.

   b. Attach the regulator/flow meter.
   c. Open the oxygen cylinder.
   d. Check for leaks.
   e. Check oxygen cylinder pressure.

   **NOTE:**
   The safe residual level of the oxygen at which the tank should be replaced has been established to be 200 pounds per square inch (psi).

3. Position the patient in the position of comfort to facilitate breathing unless contraindicated by the mechanism of injury (MOI).

4. Determine the delivery device to use.

   **NOTE:**
   Humidifiers can be connected to flow meters to provide moisture to dry oxygen; oxygen can dry out mucous membranes with prolonged use.

   Humidified oxygen is usually more comfortable to the patient and is particularly helpful for children and for chronic obstructive pulmonary disease (COPD) patients.

   a. A bag-valve-mask (BVM) system is the delivery device of choice for patients with signs of inadequate breathing, i.e. respirations <8 or >30 per minute.
   b. A NRB mask is the delivery device of choice in the pre-hospital setting for patients with signs of inadequate breathing, or who are cyanotic, having chest pain, severe trauma, signs of shock, or an altered mental status.
   c. A nasal cannula is appropriate for patients unable to tolerate the NRB.

5. Apply the NRB mask.
   a. Select the correct size of mask.

   **NOTE:**
   The apex of the mask should fit over the bridge of the patient's nose and extend to rest on the chin, covering the mouth and nose completely. NRB masks come in different sizes for adults, children, and infants.

   **WARNING:**
   The apex of the mask should NOT come into contact or cover the eyes of any patient, especially infants and children. It can cause trauma to the eyes, i.e. corneal abrasion, ruptured globe, or retinal tear.

   b. Attach the extension tubing to the regulator/flow meter.
   c. Initiate the oxygen flow and adjust it to the prescribed rate of 10-15 liters/minute (LPM) to deliver up to 90% oxygen.
   d. Pre-fill the reservoir bag using gloved fingers to cover the connection between the mask and the reservoir, if applicable.
   e. Place the mask on the patient and adjust the straps.
   f. Instruct the patient to breathe normally.

6. Apply the nasal cannula.
   a. Attach the cannula tubing to the regulator/flow meter.
   b. Adjust the oxygen flow to the prescribed rate of 1-4 LPM to deliver 24-44% oxygen.
   c. Position the cannula so the two small, tube-like prongs fit in the patient's nostrils curving naturally along the base of the nostrils.
   d. Adjust the nasal cannula to hold in place.

7. Continue to monitor the patient for signs of confusion, restlessness, level of consciousness, skin color, increased capillary refill, or changes in vital signs.
8. Check the equipment for security of tubing connections and administration device, oxygen flow, and humidified water level as indicated.

**NOTE:**
Change the delivery device and tubing IAW local protocols.

9. **Calculate the duration of flow of the oxygen cylinder.**
   a. Determine the remaining pressure in the tank by reading the regulator gauge.
   b. Determine the safe residual level of the oxygen tank.

**NOTE:**
The safe residual level of the oxygen at which the tank should be replaced has been established to be 200 psi.

c. Determine the available cylinder pressure by subtracting the safe residual level from the remaining pressure. Example: 2000 psi remaining pressure minus 200 psi safe residual level = 1800 psi available pressure.

d. Determine the conversion factor for the oxygen cylinder in use.

**NOTE:**
Each type of oxygen cylinder, depending on its size, employs a specific conversion factor.

   i. D size oxygen cylinder--0.16.
   ii. E size oxygen cylinder--0.28.
   iii. G size oxygen cylinder--2.41.
   vi. M size oxygen cylinder--1.56.

e. Determine the available liters by multiplying the conversion factor by the amount of available pressure. Example: A "D" size cylinder is being used. A 0.16 conversion factor x 1800 psi available pressure = 288 liters of oxygen available for use.

f. Determine the flow rate as prescribed by medical direction.

g. Determine the duration of the oxygen by dividing the available liters by the flow rate. Example: 288 available liters divided by the prescribed flow rate of 10 LPM = 28.8 (29) minutes duration of oxygen flow.

10. Follow safety precautions.
   a. Ensure "OXYGEN" and "NO SMOKING" signs are posted wherever oxygen is used or stored.
   b. Inform the patient and visitors about the restrictions.

**WARNING:**
The principle danger in using oxygen is fire.

The presence of oxygen in increased concentrations makes all materials more combustible.

Materials that burn slowly in ordinary air, burn violently and even explosively in the presence of oxygen.

c. Use only non-sparking wrenches on oxygen cylinders.
   d. Ensure all electrical equipment is properly grounded.
   e. Position oxygen cylinders away from doors and high traffic areas.
   f. Do not use oil or grease around oxygen fittings.
   g. Secure and store oxygen cylinders in an upright position.
SHOCK

LEARNING OBJECTIVES:

Explain the signs and symptoms of shock.

Determine treatment by the type of shock presented.

Shock is a state of inadequate tissue perfusion resulting in a decreased amount of oxygen to vital tissues and organs. There are three major types of shock (Table 21-2):

1. **Hypovolemic** shock is a loss of intravascular volume, which may occur from blood, plasma, or fluid loss. Also known as hemorrhagic shock.

2. **Distributive** (Vasogenic) shock - occurs when the vascular container (blood vessels) dilate (enlarge) without a proportional increase in fluid volume. As a result, the heart’s preload decreases (blood available for pumping out to the body to provide oxygen and nutrients), and thus cardiac output falls leaving the tissues hypoxic and starved for energy.

   a. **Neurogenic** shock is caused by the failure of the nervous system to control the diameter of blood vessels.

   b. **Septic shock** is caused by the presence of severe infection which leads to vasodilation.

   a. **Psychogenic** (vasovagal) shock is typically mediated through the para-sympathetic nervous system. Stimulation of the vagus nerve produces bradycardia which can lead to fainting.

3. **Cardiogenic** shock is caused by the heart failing to pump blood adequately to all vital parts of the body.

<table>
<thead>
<tr>
<th>Vital Sign</th>
<th>Hypovolemic</th>
<th>Distributive</th>
<th>Cardiogenic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cool, Clammy</td>
<td>Warm, Dry</td>
<td>Cool, Clammy</td>
</tr>
<tr>
<td>Skin Temp</td>
<td></td>
<td>Cool, Clammy</td>
<td></td>
</tr>
<tr>
<td>Skin Color</td>
<td>Pale, cyanotic</td>
<td>Pink</td>
<td>Pale, Mottled</td>
</tr>
<tr>
<td>Blood</td>
<td>Drops</td>
<td>Drops</td>
<td>Drops (briefly)</td>
</tr>
<tr>
<td>Pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOC</td>
<td>Altered</td>
<td>Lucid</td>
<td>Altered (briefly)</td>
</tr>
<tr>
<td>Cap Refill</td>
<td>Slowed</td>
<td>Normal</td>
<td>Slowed (briefly)</td>
</tr>
</tbody>
</table>

Table 21-2.—Differentiating Types of Shock
STAGES OF SHOCK

Shock occurs in three successive stages. The HM’s goal is to recognize the signs of the early stages of shock and begin immediate treatment before the permanent damage occurs. The three stages of shock are compensated, decompensated and irreversible.

- Compensated (Nor-progressive) Shock: At this stage, the blood pressure is maintained; however, there is a narrowing of the pulse pressure, which is the difference between the systolic and diastolic pressures. Treatment at this stage will typically result in recovery.

- Decompensated (Progressive) Shock: At this stage, the blood pressure is falling because the blood volume has dropped 15 to 25%. The compensatory mechanisms are beginning to fail, and signs and symptoms are more obvious. At this point, vasoconstriction can have a disastrous effect if allowed to continue. Treatment at this stage will sometimes result in recovery.

- Irreversible Shock: Shock has progressed to a terminal stage. Arterial blood pressure is abnormally low. There are life-threatening reductions in cardiac output, blood pressure, and tissue perfusion. Even aggressive treatment at this stage does not normally result in recovery.

**Hypovolemic Shock** - a state of shock caused by any loss of body fluid volume either by blood loss, dehydration, burns, etc. The container has retained its normal size but the fluid volume has decreased, creating an imbalance. The most common cause of hypovolemic shock on the battlefield is due to massive hemorrhage which causes hemorrhagic shock.

The amount of blood that can be lost before death occurs will vary from individual to individual. The average adult blood volume is 5 to 6 liters. Normally, a loss of approximately 1 liter or 25-40% of the person’s total blood volume will create a life-threatening condition. Massive hemorrhage may be fatal within 60-120 seconds. In a tactical environment, treatment should not be delayed. Controlling major hemorrhage should be the first priority over securing an airway.

Signs and symptoms seen with hemorrhagic shock are normally linked with the amount of blood lost and the casualty’s internal reaction to this blood loss. DO NOT rely on BP as the main indicator of shock! More attention should be paid to the casualty’s mental status, quality of distal pulses, and tachycardia. Hemorrhagic shock, which is hypovolemic shock resulting from blood loss, can be categorized into four classes, depending on the severity of hemorrhage. Remember these parameters are only guidelines and should not be taken as absolute amounts of associated blood loss (Table 21-3).

**What happened to ABC’s?**

The brain can go four to six minutes without oxygen before permanent damage or death. Death from massive hemorrhage may occur within two minutes.
### CLASSIFICATIONS OF HEMORRHAGIC SHOCK

<table>
<thead>
<tr>
<th></th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Blood Loss</td>
<td>&lt;750ml (&lt;15%)</td>
<td>750-1500ml (15%-30%)</td>
<td>1500-2000ml (30%-40%)</td>
<td>&gt;2000ml (&gt;40%)</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Normal or minimally increased</td>
<td>&gt;100</td>
<td>&gt;120</td>
<td>&gt;140</td>
</tr>
<tr>
<td>Pulse (quality)</td>
<td>Normal</td>
<td>Thready</td>
<td>Thready/very weak</td>
<td>No Radial/thready Carotid</td>
</tr>
<tr>
<td>Capillary Refill</td>
<td>Normal</td>
<td>Delayed (3-5 seconds)</td>
<td>Delayed (&gt;5 seconds)</td>
<td>Delayed (&gt;5 seconds)</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>Normal</td>
<td>20-30</td>
<td>30-40</td>
<td>&gt;35</td>
</tr>
<tr>
<td>SBP</td>
<td>Normal</td>
<td>Normal</td>
<td>Decreased (&lt;80 mmHg)</td>
<td>Greatly Decreased (approx. 60 mmHg)</td>
</tr>
<tr>
<td>Skin Color</td>
<td>Pink</td>
<td>Pale</td>
<td>White extremities/Ashen Gray</td>
<td>White extremities/Ashen Gray/Cyanotic</td>
</tr>
<tr>
<td>Skin Temperature</td>
<td>Cool</td>
<td>Cool, Moist</td>
<td>Cool Extremities</td>
<td>Cold Extremities</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Normal</td>
<td>Anxiety</td>
<td>Severe Anxiety/Confused</td>
<td>Lethargic/Unconscious</td>
</tr>
</tbody>
</table>

|                          |                              |                            |                            |                            |
| Table 21-3.—Classes of Hemorrhagic Shock

**Class I Shock**

This stage has few clinical manifestations. The casualty's body is able to compensate to maintain homeostasis. "A tactically relevant definition of shock in a combat trauma casualty is an abnormal radial pulse (weak or absent) and an abnormal mentation (LOC) not attributed to drug therapy or brain injuries."[20]

**Class II Shock**

Although the circulating blood volume is reduced, compensatory mechanisms such as the sympathetic nervous system are able to maintain blood pressure and tissue perfusion at a level sufficient to prevent cellular damage.

**Class III Shock**

At this point, unfavorable signs begin to appear. The body's compensatory systems can no longer maintain adequate perfusion. The classic signs of shock (tachycardia, tachypnea, and confusion) become obvious. HMs must see the importance of catching the casualty in the early stages of shock because by the time the casualty gets to this stage, he or she is in significant trouble.

**Class IV Shock**

This is a severe stage of shock! These casualties truly have only minutes to live. Survival depends on immediate control of hemorrhage (surgery for internal hemorrhage) and aggressive resuscitation.

**Signs and Symptoms**

See Table 21-3.

21-21
Treatment

See soft tissue injury section for Hemorrhage control procedures.

The field care phase will determine the HM’s actions; Care Under Fire phase use a tourniquet for life-threatening extremity hemorrhage and Tactical Field Care phase use direct pressure and or a hemostatic dressing. Once the bleeding is stopped obtain vascular access, give resuscitative fluids, and coordinate Casualty Evacuation (CASEVAC).

**Three Types of Distributive Shock**

- Septic
- Neurogenic
- Psychogenic

**SEPTIC SHOCK**

Shock caused by a systemic infection. In these cases the bacteria multiply rapidly throughout the body releasing toxins into the blood stream. The toxins cause the blood vessels in the periphery (arms and legs) to dilate maldistributing the blood away from critical areas (i.e. brain, heart, and lungs).

**Signs and Symptoms**

See Table 21-3.

**Treatment**

It typically takes between 5-7 days for septic shock to develop. However, HMs may be called on to care for a casualty who sustained an injury and did not promptly seek medical attention. If so, a HM’s primary focus should be to CASEVAC the casualty to a higher echelon of care. Additionally, the casualty will require IV antibiotic therapy with a broad spectrum antibiotic.

**NEUROGENIC SHOCK**

Shock caused by an injury that interrupts the spinal cord’s sympathetic nervous system pathway, resulting in significant dilation of peripheral arteries. Because of the loss of sympathetic control of the vascular system which controls the smooth muscle in the walls of the blood vessels, the peripheral vessels dilate below the level of injury.

**Signs and Symptoms**

See Table 21-3 and below.

1. Injuries consistent with spinal injury.
2. Bradycardia with hypotension (low heart rate with low blood pressure should be a red flag, start suspecting neurogenic shock).
3. The casualty with neurogenic shock, in the absence of traumatic brain injury, is alert, orientated, and lucid (clear in the mind) when in the supine (laying down on back) position.

**Treatment**

1. Maintain ABC’s.
2. Spinal Immobilization (if mechanism of injury causes a high suspicion of spinal injury).
3. Oxygen therapy to keep oxygen saturation >92% (if available).
4. Obtain IV access and give fluids, if necessary.
5. Trendelenburg position (head down, feet elevated).
6. Keep patient warm.
7. CASEVAC.
PSYCHOGENIC (VASOVAGAL) SHOCK

Also known as vasovagal syncope or fainting, this occurs when there is stimulation of the tenth cranial nerve (vagus nerve) which produces bradycardia and hypotension. If the bradycardia and hypotension are severe enough, cardiac output falls, resulting in insufficient blood flow to the brain and the casualty loses consciousness. Typically, normal blood pressure is quickly restored before systemic impairment of perfusion occurs. Common causes are fear, receiving unexpected bad news, or the sight of blood.

Signs and Symptoms

See Table 21-3 and below.

The periods of bradycardia and vasodilation are generally limited to minutes.

Treatment

Because it is a self-limited condition, a vasovagal episode is unlikely to result in true “shock” and normal blood pressure is quickly restored when the casualty is placed in a horizontal position.

CARDIOGENIC SHOCK

Failure of the heart to adequately pump blood throughout the body, resulting from causes that can be categorized as either intrinsic (a result of direct damage to the heart itself, a heart attack, for instance) or extrinsic (related to a problem outside the heart, a tension pneumothorax, for example). In this scenario, the container is the correct size and is filled with the right amount of fluid; it is the pump that is not functioning properly.

Intrinsic Causes

Any injury that weakens the cardiac muscle will affect its output. The damage may result from a myocardial infarction or from a direct bruise to the heart muscle from a blunt cardiac injury that prevents the heart from pumping properly.

Signs and Symptoms

See Table 21-3 and below.

- Abnormal pulse (irregular rate and rhythm)
- Chest pain
- Shortness of breath
- Nausea and vomiting

Treatment

- Maintain ABC’s
- Obtain IV access
- Oxygen therapy to keep oxygen saturation >92% (if available)
- CASEVAC

Extrinsic Causes

External factors that cause the heart not to work properly (i.e., tension pneumothorax and cardiac tamponade)

Why do WE learn something that WE can’t treat?

Answer: Use these signs and symptoms of cardiac tamponade as a way for ruling out tension pneumothorax.

Signs and Symptoms

- Tension Pneumothorax:
- Chest trauma
- Shortness of breath/dyspnea
- Tachycardia
- Cyanosis
- Decreased/absent lung sounds on affected side
- Jugular vein distention and tracheal deviation (away from the side of injury or affected side)
- Cardiac Tamponade:
- Chest Trauma
- Shortness of breath/dyspnea
- Tachycardia
- Cyanosis
- Distant (muffled) heart tones/sounds
- Narrowing pulse pressure

Treatment

- Maintain ABC’s
- Oxygen therapy to keep oxygen saturation >92% (if available)
- CASEVAC

Specific treatment for a tension pneumothorax is needle decompression, which will be discussed in a future lesson.

VOLUME RESUSCITATION

Although volume resuscitation of a trauma casualty in shock makes sense, no research has demonstrated improved survival of critically injured trauma casualties when IV fluid therapy has been administered in the field.

In fact, one researcher found that IV fluids administered in the field were beneficial only when three conditions existed:

- Casualty is bleeding at a rate of 25 to 100 mL/min
- IV fluid administration rate is equal to the bleeding rate
- Scene time and transport time exceed 30 minutes

Therefore, transport of the trauma casualty should never be delayed to start an IV.

HMs will receive training on the type of vascular access (PO, IV, or IO) to start and the type of fluids to give in the lesson on Combat Fluid Resuscitation.

In order to understand the best method for assessing a traumatic injury in the field, it is important to realize some key differences in the environments HMs operate. The scene size up provides critical information pertaining to the surroundings. These are general guidelines which are adaptable to both the non-tactical and tactical environments.

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**CASUALTY ASSESSMENT AND SHOCK CASUALTIES**

<table>
<thead>
<tr>
<th>Care Under Fire Phase:</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are many things that cause shock; the most common is uncontrolled hemorrhage. If the casualty has life-threatening extremity hemorrhage, use a tourniquet. For non-extremity hemorrhage, use direct pressure with a Committee on Tactical Combat Casualty Care (CoTCCC) approved hemostatic dressing.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tactical Field Care Phase:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock is very difficult to treat in a hospital setting let alone in a field or combat environment. Reassess treatment started during Care Under Fire Phase to control the hemorrhage. Assess airway and intervene if necessary. Complete a head to toe assessment using DCAP-BTLS* noting and treating additional injuries. Determine if vascular access is required (see Combat Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.</td>
</tr>
</tbody>
</table>

*DCAP-BTLS: deformities, contusions, abrasions, punctures or penetrations, burns, tenderness, lacerations, and swelling.
Scene Assessment / Scene Size Up

The Scene Assessment is broken down into two stages with the first being Scene Assessment and the second being the Scene Size Up. The Scene Assessment process begins from the moment HMs are notified of the incident. Think of it as a mental exercise or checklist. HMs should “Arm Chair Quarterback” the information received once notified and start brain storming what could potentially be seen once he/she arrives on the actual scene. The size up occurs once HMs can visualize the scene for themselves. The reason for the two step process is simple; as with the communication exercise “Telephone,” what is assessed upon arriving at the scene may be totally different then what was reported through the notification process. The three priorities of the Scene Assessment / Size Up are:

1. Safety.
2. Identification of Patients.

Once on scene, the first priority is always safety. Safety is a relative term when considering a tactical environment. The HM’s responsibility is to place the patient, bystanders, and ultimately him/herself in the safest position relative to the situation.

In the Scene Size Up, consideration should also be paid to the environmental and geographic area that the incident has occurred. For example, a casualty who has been injured in a desert environment may require interventions to treat an environmental injury as well as the physical injuries identified during the patient assessment. An additional example would be arriving on the scene of a patient that has received a gunshot wound and was bleeding onto an absorbent material such as house carpet. This patient may require additional treatment for shock due to the blood loss not readily visible due to the carpet.

The second priority once arriving on scene is identifying the total number of patients. Some of this information may be provided to the HM during the initial notification of incident, but once on the scene it is imperative that the HM visualize each patient and begin a triage process. The third priority in the Scene Assessment / Size Up process is to identify and consider the mechanism of injury (MOI). The MOI will lead to the HM to the index of suspicion (IOS).

The MOI is simply defined as the basic manner in which the casualty was injured. For example, a casualty that was involved in a collision is subject to multiple forces resulting from the collision. Regardless of injury pattern, the MOI is generally described as deceleration trauma (abrupt stopping from being in motion). As an additional example, a casualty that receives a gunshot or stab wound has a MOI of penetrating trauma and conversely a member struck with a bat has a MOI of blunt trauma.

The IOS is derived directly from the MOI and is defined as the injury patterns the casualty will display based on the MOI. Using the examples above, deceleration trauma can result in cervical spine injury, solid organ shear, or musculoskeletal injury. Penetrating trauma can result in hollow organ rupture, sucking chest wounds, and abdominal evisceration. Blunt trauma can result in hollow organ or solid organ rupture. These examples are meant to simply identify potential injury patterns specific to this text. The responder must fully assess and evaluate each patient to positively identify life threatening conditions and treat them accordingly.

Once the Scene Assessment and Size Up are complete the HM will have a better idea of the number of patients and their severity of injury. After completing the patient assessment, he/she will then be able to compose a comprehensive treatment and evacuation plan to deliver the patients to definitive medical care.