

Foreword

Tactical Combat Casualty Care (TCCC) has saved hundreds of lives during our nation's conflicts in Iraq and Afghanistan. Nearly 90 percent of combat fatalities occur before a casualty reaches a medical treatment facility. Therefore, the prehospital phase of care is needed to focus on reducing the number of combat deaths. However, few military physicians have had training in this area and, at the onset of hostilities, most combat medics, corpsmen, and pararescue personnel in the U.S. military have been trained to perform battlefield trauma care through civilian-based trauma courses. These courses are not designed for the prehospital combat environment and do not reflect current practices in the area of prehospital care. TCCC was created to train Soldiers and medical personnel on current best practices for medical treatment from the point of injury to evacuation to Role 3 facilities.

The challenge of meeting training needs was met by the voting members of the Committee on Tactical Combat Casualty Care (CoTCCC) and its many liaison members who collectively make up the TCCC Working Group. This group includes trauma surgeons; emergency medicine physicians; internists; family medicine physicians; operational physicians and physician assistants; combat medical educators; trauma researchers; pathologists; combat medical doctrine developers; medical equipment specialists; and combat medics, corpsmen, and pararescue personnel. All the U.S. Armed Services are well-represented in the TCCC Working Group's committee membership, and 100 percent of the CoTCCC voting members have been to war. The CoTCCC and the TCCC Working Group represent different Services, disciplines, and military experiences, all of which contribute to the single goal of reducing preventable deaths on the battlefield.

This type of working group did not exist when the Twin Towers fell. The U.S. Special Operations Command funded the initial group as a research effort. Ownership of the group was then successively assumed by the Naval Operational Medicine Institute, Defense Health Board, and, now, the Joint Trauma System, which is part of the U.S. Army Institute of Surgical Research.

This group took the TCCC guidelines established in 2001 and continually updated them. These updates were based on input from the Joint Trauma System performance improvement trauma teleconferences, published case reports and case series from war zones, breakthroughs in military medical research, and new publications from civilian medical literature on combat trauma. The group processed a continual stream of input from the battlefield throughout the war years and ensured that battlefield trauma care lessons were not only noted, but acted upon. So, they became lessons learned.

Through the efforts of this dedicated group of individuals, U.S. forces have had prehospital trauma care guidelines customized for the battlefield and updated continuously based on real-time evaluation of outcomes from ongoing combat operations. This is the first time in the nation's history this has occurred.

The success of the TCCC effort has been well-documented and is a great tribute to all members of the CoTCCC and the TCCC Working Group. The TCCC efforts transcend Service and medical specialty differences; expertly process new information; and develop evidence-based, best-practice guidelines that have completely transformed battlefield trauma care.

This TCCC Handbook is dedicated to the CoTCCC and all the valued colleagues in the TCCC Working Group. Our country and its casualties owe you all a profound measure of thanks.



Frank Butler, MD
CAPT (Retired), MC, USN
Chairman, Committee on
Tactical Combat Casualty Care

Tactical Combat Casualty Care Handbook	
Table of Contents	
Chapter 1. Tactical Combat Casualty Care Overview	1
Hemorrhage Control	4
Airway Management	8
Breathing Management	19
Vascular Access	24
Hypothermia Prevention	40
Tactical Field Care Basic Management Plan	42
Chapter 2. Tactical Combat Casualty Care Phases of Care	45
Chapter 3. Tactical Combat Casualty Care Medical Equipment	53
Chapter 4. MARCH/PAWS Treatment Algorithms	63
Chapter 5. Tactical Combat Casualty Care-All Combatants	71
Chapter 6. Tactical Combat Casualty Care-Medical Provider	79
Appendix A. Tactical Combat Casualty Care Card	93
Appendix B. Tactical Combat Casualty Care After Action Report	97
Appendix C. Medical Triage Categories	101
Appendix D. Medical Evacuation Precedence Categories	105
Appendix E. 9-Line Request With MIST Report	107
Appendix F. Prolonged Field Care	109
Appendix G. Drug Reference Guide	111
Appendix H. Medical Transition Guidelines in a Tactical Environment	113
Appendix I. Medical Planning Functions	115
Appendix J. Tactical Combat Casualty Care Background	119
Appendix K. References	121

Center For Army Lessons Learned	
CALL Director	COL Michael F. Pappal
CALL Analyst	CPT Ryan St. Jean
Contributing Authors	MAJ Walter Engle Jonathan C. Fruendt, M.D.

The Secretary of the Army has determined that the publication of this periodical is necessary in the transaction of the public business as required by law of the Department.

Unless otherwise stated, whenever the masculine or feminine gender is used, both are intended.

Note: Any publications (other than CALL publications) referenced in this product, such as ARs, ADPs, ADRPs, ATPs, FMs, and TMs, must be obtained through your pinpoint distribution system.

Chapter 1

Tactical Combat Casualty Care Overview

Introduction

The Tactical Combat Casualty Care (TCCC) concept was developed in 1996 by special operations forces. Tactical Combat Casualty Care guidelines are evidence-based and battlefield-proven to reduce deaths at the point of injury (POI). Department of Defense (DOD) and NATO allies require TCCC training for deploying forces because it combines effective tactics and medicine.

TCCC-Medical Provider (TCCC-MP) is training for medical personnel. TCCC-All Combatants (TCCC-AC) is training for first responders and non-medical personnel. TCCC training is performed in three phases: Care under fire (CUF), tactical field care (TFC), and tactical evacuation care (TEC) (for more information, see Chapter 2, Tactical Combat Casualty Care Phases of Care).

TCCC teaches first responders to treat casualties in the proper order, treating the most critical situations first. This is done using the acronyms MARCH and PAWS (see below).

MARCH Acronym

MARCH (massive hemorrhage, airway, respirations, circulation, head injury/hypothermia) is an acronym used by TCCC-trained individuals to help remember the proper order of treatment.

Massive hemorrhage. The number one potentially survivable cause of death at the POI is hemorrhage from a compressible wound or any life-threatening extremity bleed. More than 90 percent of 4,596 combat deaths post 11 September 2001 died of hemorrhage-associated injuries. The hasty application of a Committee on Tactical Combat Casualty Care (CoTCCC)-approved tourniquet is the recommended management for all life-threatening extremity hemorrhages during care under fire (see page 4). It is initially placed over clothing, high and tight. The deliberate application of a tourniquet is addressed when behind cover and during tactical field care to ensure proper hemorrhage control. The tourniquet is placed under clothing 2 to 3 inches above the wound. The application time is written on the tourniquet. Combat gauze is the hemostatic dressing of choice.

Airway. A second survivable cause of death at the POI is a non-patent (closed) airway. Airway injuries typically occur from maxillofacial trauma or inhalation burns. A conscious and speaking casualty has a patent open airway. An unconscious casualty who is breathing can benefit from the nasopharyngeal airway (NPA) (see page 8). An unconscious casualty who is not breathing may require a definitive airway such as a surgical cricothyroidotomy (see page 11). In a combat setting, endotracheal intubation is highly difficult, if not impossible.

Respirations. The third potentially survivable cause of death on the battlefield is the development of a tension pneumothorax (PTX). Air trapped in the chest cavity begins to displace functional lung tissue and places pressure on the heart, resulting in cardiac arrest. Seal open chest wounds with a vented chest seal, decompress a suspected PTX, and support ventilation/oxygenation, as required. Treat a PTX via needle chest decompression (NCD) using a 14-gauge, 3.25-inch-long needle with a catheter (see page 20).

Circulation. Control of bleeding takes precedence over infusing fluids. Only individuals in shock or those who need intravenous (IV) medications need to have IV access established. Use an 18-gauge catheter and saline lock in a field setting. Give tranexamic acid (TXA) as soon as feasible to casualties in or at risk of hemorrhagic shock. Once a saline lock is established, secure it with transparent wound-dressing film. Administer fluids by a second needle and a catheter through the film dressing. When the infusion is complete, withdraw the needle, leaving the saline lock in place. An intraosseous (IO) device is an alternative route for administering fluids when fluid resuscitation is required and an IV access cannot be obtained. Clinical signs of shock on the battlefield are: 1) unconsciousness or altered mental status not due to coexisting traumatic brain injury (TBI) or drug therapy; and/or 2) abnormal radial pulse.

Head injury/hypothermia. Hypotension (systolic blood pressure [SBP] under 90) and hypoxia (peripheral capillary oxygen saturation [SpO₂] under 90) worsen secondary brain injury. Medical personnel identify mild traumatic brain injury (mTBI) using the Military Acute Concussion Evaluation (MACE) (more information on MACE is available online at <https://dvbic.dcoe.mil/material/military-acute-concussion-evaluation-mace-pocket-cards>). Non-medical personnel utilize the alert, verbal, pain, unresponsive (AVPU) scale. Hypothermia is a survivable cause of further injury and is defined as a whole body temperature below 95 F (35 C). Hypothermia, acidosis, and coagulopathy constitute the lethal triad in trauma patients. Hypothermia can occur secondary to blood loss, regardless of the ambient temperature. The Hypothermia Prevention and Management Kit (HPMK) is recommended by the CoTCCC for all casualties.

PAWS Acronym

PAWS (pain, antibiotics, wounds, splinting) is an acronym used by TCCC-trained individuals to help remember additional casualty care issues. As noted in the U.S. Central Command Joint Theater Trauma System publication, *Saving Lives on the Battlefield, Part I*, 30 January 2013, and *Saving Lives on the Battlefield, Part II*, 30 May 2014, a survey of military personnel deployed showed that pain management, antibiotics, splinting, and reassessing interventions and additional wounds were often not performed. The PAWS acronym allows personnel to recall these interventions while under duress.

Pain. Management of a casualty's pain helps reduce stress on the mind and body. By managing pain from the POI onward, casualties have reduced incidents of post-traumatic stress disorder (PTSD) at Role 4 care (rehabilitation) and beyond. Pain management reduces patient movement, improves compliance and cooperation, and allows for better casualty transport and outcomes.

Antibiotics. The recommended parenteral antibiotics for POI care are ertapenem, 1 gram (gm); or cefotetan, 2 gm. These antibiotics are used to treat multidrug-resistant bacteria. Ertapenem has been designed to be effective against Gram-negative and Gram-positive bacteria. Cefotetan is a second-generation cephalosporin and has a broad spectrum of activity; it has been used to treat bacterial infections of the bone, skin, urinary tract, and lower respiratory tract. Moxifloxacin is a broad-spectrum quinolone antibiotic that can be administered orally. If the casualty can tolerate oral fluids, moxifloxacin, 400 milligrams (mg), can be given instead of ertapenem or cefotetan. All battlefield wounds are considered contaminated. All wounded casualties with penetrating injuries should receive antibiotics.

Wounds. Assessing and treating casualties with additional wounds improves morbidity and mortality. Minor scalp lacerations can be the cause of excessive hemorrhage. First responders must address burns, open fractures, facial trauma, amputation dressings, and security of tourniquets. Reassessment of wounds and interventions prior to movement is critical. When preparing the patient for transport, casualties with penetrating trauma to the chest or abdomen should be evacuated on an emergent basis, due to the possibility of internal hemorrhage. Responders should give TXA as soon as feasible to casualties in or at risk of hemorrhagic shock.

Splinting. Medical personnel should address pelvic disruptions and eye injuries. The energy required to cause a lower extremity traumatic amputation (from an improvised explosive device [IED], land mine, etc.) moves upward through the body, potentially causing further bone disruption, hollow organ collapse, or internal bleeding. Responders should use the Combat Ready Clamp (CRoC), the Junctional Emergency Treatment Tool (JETT), or the SAM Junctional Tourniquet to control junctional hemorrhage and stabilize the pelvis. Splinting of fractures can result in significant pain relief and minimize bleeding.

In cases of suspected penetrating eye trauma, responders should: 1) perform a rapid field test of visual acuity; 2) tape a rigid shield over the eye to prevent further trauma to the eye; and 3) give moxifloxacin, 400 mg, by mouth as soon as possible to prevent infection inside the eye. Never apply a pressure dressing to an eye with a suspected penetrating injury.

Tactical Field Care

Tactical field care is the backbone of TCCC. It is the how-to for utilizing MARCH and PAWS to treat combat casualties. The following information details how to properly execute tasks commonly associated with tactical field care basic management. The tasks are organized in the appropriate order based on MARCH and PAWS.

Hemorrhage Control

*(Addressed During Care Under Fire and Tactical Field Care Phases.
See Chapter 2, Tactical Combat Casualty Care Phases of Care, Page 45.)*

Combat Application Tourniquet



Figure 1-1. Combat application tourniquet

Step 1. During the care under fire phase, place the tourniquet as high on the extremity as possible and over the uniform. This is a hasty tourniquet. (This will be transitioned to a deliberate tourniquet on the skin, 2 inches above the injury in the tactical field care phase.)



Figure 1-2. Step 1

Step 2. Route the self-adhering band through the friction adapter buckle. Pull the band tight, removing all slack.

NOTE: Current TCCC doctrine says utilizing the single slot on a routing buckle is effective. The Combat Application Tourniquet (CAT) Generation 7 (not yet widely fielded) was redesigned with this feature.



Figure 1-3. Step 2

Step 3. Feed the self-adhering band tight around the extremity and securely fasten it back on itself. No more than three fingers should fit between the band and the injured extremity.



Figure 1-4. Step 3

Step 4. Twist the windlass rod until the bleeding stops and the distal pulse has been eliminated.



Figure 1-5. Step 4

Step 5. Lock the windlass rod in place with the windlass clip.



Figure 1-6. Step 5

Step 6. Grasp the windlass strap, pull tight, and adhere it to the windlass clip.



Figure 1-7. Step 6

Step 7. If the tactical situation permits, check for a distal pulse. If a distal pulse is still present, apply a second tourniquet side by side and proximal to the first. Tighten this tourniquet and recheck the distal pulse.

Combat Gauze

1. Place the end of the combat gauze over the dominant hand, index finger. Using this finger, place the combat gauze into the wound, directly at the pulsating artery. Then, begin to pack the wound until it is full of the combat gauze. (See Figure 1-8.) Place any excess combat gauze directly over the wound and apply direct pressure for 3 minutes.

NOTE: More than one combat gauze may be required to completely fill the wound. If bleeding continues after 3 minutes of pressure, first remove the combat gauze and repeat step 1.

NOTE: Attempt to visualize the bleeding during dressing transition. Look for flowing blood from veins or spurting blood from arteries. Attempt to place the second combat gauze on the source of the bleeding.

2. Once bleeding is controlled, apply an outer bandage (Ace wrap or emergency dressing) to secure the dressing to the wound.

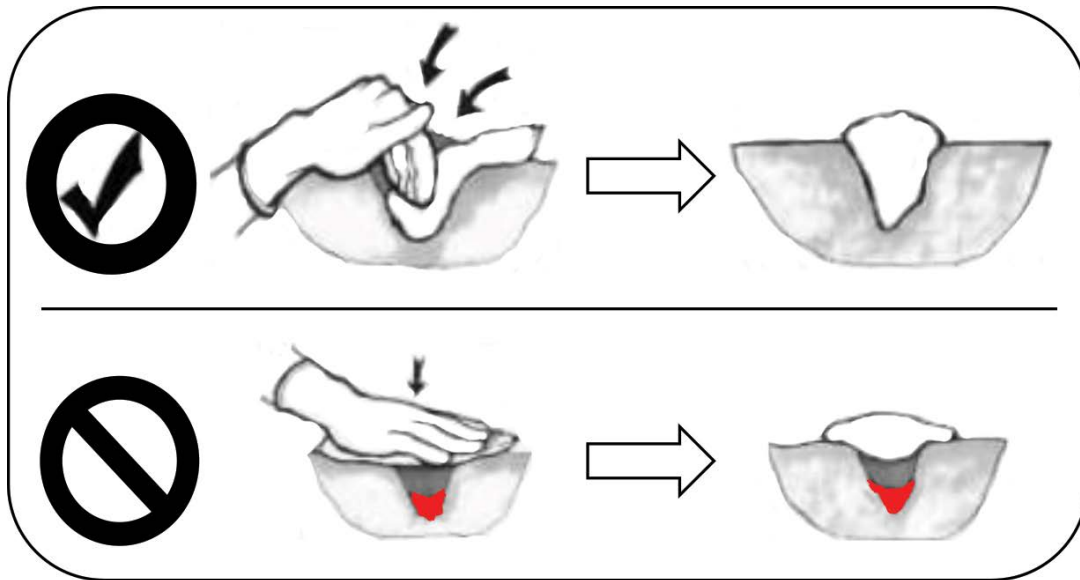


Figure 1-8

Airway Management

(Addressed During Tactical Field Care and Tactical Evacuation Care Phases. See Chapter 2, Tactical Combat Casualty Care Phases of Care, Pages 45 and 46.)

Nasopharyngeal Airway (NPA)

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

Caution: Do not use the NPA if there is clear fluid (cerebrospinal fluid) coming from the ears or nose. This may indicate a skull fracture.

2. Lubricate the tube with a water-based 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, increasing the risk for infection.

3. Insert the NPA:

- Push the tip of the nose upward gently.
- Position the tube so the bevel of the airway faces toward the septum.
- Insert the airway into the nostril and advance it until the flange rests against the nostril.

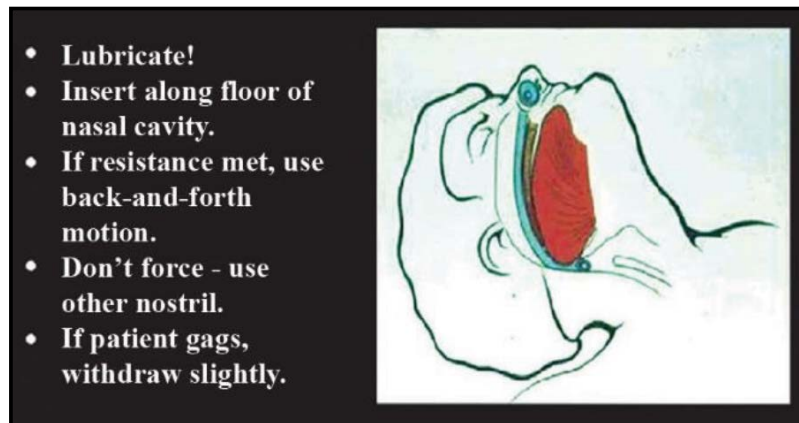


Figure 1-9

Caution: Never force the NPA into the casualty's nostril. If resistance is met, pull the tube out and attempt to insert it in the other nostril. Most attempts to insert the NPA should be in the right nostril. If unable to insert into the right nostril, try the left. If inserting in the left nostril, the bevel will not be against the septum.

Nasopharyngeal Airway Training Skill Sheet

Objective: To demonstrate the recommended procedure for insertion of an NPA.

References:

- *Prehospital Trauma Life Support*, Military Eighth Edition, Jones and Bartlett Learning, November 2014
- *Advanced Trauma Life Support Manual*, Ninth Edition, American College of Surgeons, Chicago, IL, September 2012

Evaluation: Students are evaluated as either pass or fail. The instructor verifies the accuracy of the student's ability to insert an NPA on an airway trainer by means of observing the student's procedures and technique.

Materials:

- Student checklist
- Airway simulator
- NPA
- Surgical lubricant

Instructor guidelines:

- Provide each instructor with a student checklist.
- Ensure the student has all student-required materials.
- Read the learning objective and the evaluation method to the student.
- Explain the grading of the exercise.
- Allow students time to extract the information required from the instructor-provided scenario.

Performance steps:

- Assemble and test on all necessary equipment.
- Assess the upper airway for visible obstruction.
- Open the airway with a chin lift/jaw thrust maneuver.
- Verbalize the indications for an NPA (unconscious patient).
- Lubricate the NPA with a surgical lubricant.
- Insert the airway into the nose at a 90-degree angle to the face. Avoid aiming upwards toward the top of the head. Insert the airway all the way to the flange.
- Use a rotary and/or back-and-forth motion to facilitate insertion.
- If unable to insert on one side of the nasal passage, take it out and try the other side.

Table 1-1. NPA Evaluation

Task	Evaluation Completed		
	1st	2nd	3rd
Assessed the upper airway for visible obstruction.	pass/ fail	pass/ fail	pass/ fail
Opened the airway with a chin lift/jaw thrust maneuver.	pass/ fail	pass/ fail	pass/ fail
Lubricated the NPA with a surgical lubricant.	pass/ fail	pass/ fail	pass/ fail
Inserted the airway into the nose at a 90-degree angle to the face. Avoided aiming upwards toward the top of the head. Inserted all the way to the flange.	pass/ fail	pass/ fail	pass/ fail
Used a rotary and/or back-and-forth motion to facilitate insertion.	pass/ fail	pass/ fail	pass/ fail
If unable to insert on one side of the nasal passage, took the NPA out and inserted it on the other side.	pass/ fail	pass/ fail	pass/ fail

Critical criteria:

- Aimed the NPA toward the top of the head during insertion.
- Performed the procedure in a manner that was dangerous to the casualty.

Surgical Cricothyroidotomy

Necessary equipment: Prefabricated cricothyroidotomy kit. In the event kits are unavailable, an improvised kit should include a cutting instrument (for example, scalpel No. 10 or 15), forceps or tracheal hook, povidone-iodine, endotracheal tube (ETT), 6 millimeter (mm) gloves, 4- by 4-inch gauze, tape, local anesthetic, and materials to inject.

NOTE: Cricothyroidotomy sets should be prepared prior to the mission. All essential pieces of equipment should be prepared before deployment and packed into a Ziploc bag. Cut the ETT to just above the cuff inflation tube so that the ETT is not protruding 6 inches out of the casualty's neck.

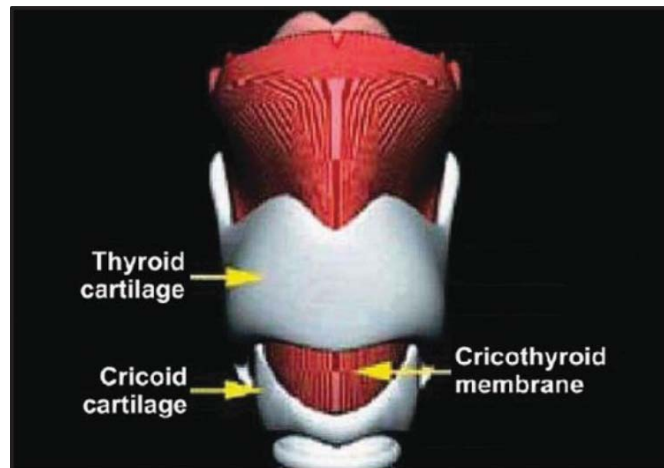


Figure 1-10. Surgical cricothyroidotomy

1. Hyperextend the casualty's neck.

- Place the casualty in the supine position.
- Place a rolled blanket or poncho under the casualty's neck or between the shoulder blades so that the airway is straight.

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

2. Put on medical gloves, available in the patient's individual first aid kit.

3. Locate the cricothyroid membrane.

- Place a finger of the nondominant hand on the thyroid cartilage (Adam's apple), and slide the finger down to the cricoid cartilage.
- Palpate for the "V" notch of the thyroid cartilage.
- Slide the index finger down into the depression between the thyroid and cricoid cartilage.

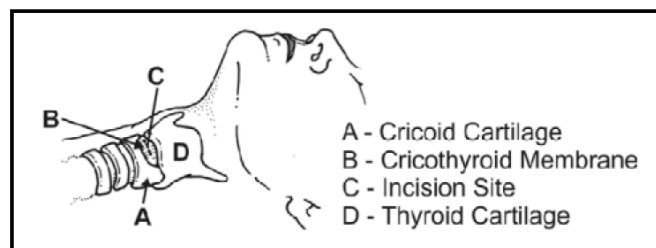


Figure 1-11. Cricothyroid membrane anatomy

4. Prepare the incision site:

- Administer local anesthesia to the incision site if the casualty is conscious.
- Prepare the skin over the membrane with an alcohol pad or povidone-iodine.

5. With a cutting instrument in the dominant hand, make a 1.5-inch vertical incision through the skin over the cricothyroid membrane.

Caution: Do not cut the cricothyroid membrane with this incision. Also, ensure not to perform a horizontal incision.

6. Relocate the cricothyroid membrane by touch and sight.

7. Stabilize the larynx with one hand and make a 1/2-inch transverse incision through the elastic tissue of the cricothyroid membrane.

NOTE: A rush of air may be felt through the opening.

8. Dilate the opening with a hemostat or scalpel handle. Hook the cricothyroid membrane with a prefabricated cricothyroid hook or bent 18-gauge needle.

9. Grasp and stabilize the cricoid cartilage.

10. Insert the ETT through the opening and toward the lungs. Only advance the ETT 2 to 3 inches into the trachea to prevent right main stem bronchus intubation. Inflate the cuff to prevent aspiration.

11. Secure the tube circumferentially around the patient's neck to prevent accidental extubation. This can be achieved with tape, tubing, or a prefabricated device in some kits.

12. Check for air exchange and tube placement:

- Air exchange: Listen and feel for air passage through the tube; look for fogging in the tube.
- Tube placement: Bilateral chest sounds/rise and fall of the chest confirm proper tube placement.
- Unilateral breath sounds/rise and fall of the chest indicate a right main stem bronchus intubation. Withdraw the ETT 1 to 2 inches and reconfirm placement. Ensure not to completely remove the ETT from the casualty's trachea.

- Air from the casualty's mouth indicates the tube is directed toward the mouth. Remove the tube, reinsert, and recheck for air exchange and placement.
- Any other problem indicates the tube is not placed correctly. Remove the tube, reinsert, and recheck for air exchange.

13. Once the tube is correctly placed, begin rescue breathing, if necessary and tactically appropriate:

- Connect the tube to a bag valve mask and ventilate the casualty at the rate of 20 breaths per minute.
- If a bag valve mask is not available, begin mouth-to-tube resuscitation at 20 breaths per minute.

14. If the patient is breathing spontaneously, ensure the tube is not obstructed and continually assess the need for assisted breathing.

15. Apply a sterile dressing. Use either of the following methods:

- Make a V-shaped fold in a 4- by 4-inch gauze pad and place it under the edge of the ETT to prevent irritation to the casualty. Tape securely.
- Cut two 4- by 4-inch gauze pads half way through and place on opposite sides of the tube. Tape securely.

Emergency Surgical Airway Using the Cric-Key Training Skill Sheet

Objective: Demonstrate the procedure for a surgical airway (cricothyroidotomy) using the Cric-Key.

Reference: No. 0102PP03A Tactical Combat Casualty Care-Military Personnel Tactical Field Care No. 1, PowerPoint Presentation from Tactical Combat Casualty Care-Military Personnel Curriculum Update No. 150603.

Evaluation: Students will be evaluated as either pass or fail. The instructor will verify the accuracy of the student's ability to perform an emergency surgical cricothyroidotomy using the Cric-Key on an airway trainer by means of observing the student's procedures and technique.

Materials:

- Student checklist
- Surgical cricothyroidotomy simulator
- Betadine/alcohol prep pads
- No. 10 or No. 15 scalpel

- Cric-Key
- 5.0 cuffed Melker cricothyroidotomy airway cannula
- 10 cubic centimeter (cc) syringe
- Gauze pads (4 by 4 inches)
- Circumferential tie
- Ambu bag

Instructor guidelines:

- Provide each instructor with a student checklist.
- Ensure the student has all student-required materials.
- Read the learning objectives and the evaluation method to the student.
- Explain the grading of the exercise.

Performance steps:

- Assemble and test all necessary equipment.
- Verbalize that body substance isolation precautions were considered.
- Assess the upper airway for visible obstruction.
- Identify the cricothyroid membrane between the thyroid and cricoid cartilages. On a buddy, identify to the instructor the location of the top of the thyroid cartilage, the thyroid prominence (on males), the bottom of the thyroid cartilage, the top of the cricoid cartilage, and the cricothyroid membrane.
- Identify the site of the skin incision. On a buddy, draw a dotted midline from the bottom of the thyroid cartilage to the top of the cricoid cartilage that overlies and bisects the cricothyroid membrane where the skin incision would be made for an actual cricothyrotomy.
- Palpate the cricothyroid membrane and (while stabilizing the cartilage) make a vertical incision through the skin (simulate for training) directly over the cricothyroid membrane.
- While continuing to stabilize the larynx, use the scalpel to dissect the tissues to expose the cricothyroid membrane.
- While continuing to stabilize the larynx, use the scalpel to make a horizontal incision through the cricothyroid membrane.

- Insert the Cric-Key with the Melker airway cannula into the trachea, directed towards the lungs, until the flange contacts the skin of the neck. Verbalize feeling the tracheal rings with the tip of the Cric-Key during the insertion.
- Remove the Cric-Key, leaving the Melker cannula in place.
- Inflate the cuff with 10 milliliters (ml) of air.
- Check for air exchange and verify placement of the Melker cannula by listening and feeling for air passing in and out of the tube, causing the tube to mist. Look for a bilateral rise and fall of the chest. If the casualty does not breathe spontaneously, connect the Ambu bag to the cuff of the Melker cannula and ventilate. Check for breathing sounds bilaterally.
- If the position is correct, secure the tube with cotton tape.
- Apply a dressing to further protect the tube and incision site.
- Monitor the casualty's respirations. Ventilate if required.

Table 1-2. Emergency surgical airway (cricothyroidotomy) using the Cric-Key evaluation

Task	Evaluation Completed		
	1st	2nd	3rd
Assessed the upper airway for visible obstruction.	pass/ fail	pass/ fail	pass/ fail
Correctly identified key surface landmarks on the anterior neck and the cricothyroid membrane on a buddy.	pass/ fail	pass/ fail	pass/ fail
Correctly marked the site for the skin incision over the cricothyroid membrane on a buddy.	pass/ fail	pass/ fail	pass/ fail
Palpated the cricothyroid membrane and, while stabilizing the cartilage, made a vertical incision through the skin directly over the cricothyroid membrane.	pass/ fail	pass/ fail	pass/ fail

Table 1-2. Emergency surgical airway (cricothyroidotomy) using the Cric-Key evaluation (continued)

Task	Evaluation Completed		
	1st	2nd	3rd
While continuing to stabilize the larynx, used the scalpel to dissect the tissues to expose the cricothyroid membrane.	pass/ fail	pass/ fail	pass/ fail
Used the scalpel to make a horizontal incision through the cricothyroid membrane.	pass/ fail	pass/ fail	pass/ fail
Inserted the Cric-Key and Melker cannula through the cricothyroid membrane directed distally toward the lungs until the flange contacted the skin of the neck.	pass/ fail	pass/ fail	pass/ fail
Verbalized feeling for tracheal rings while inserting the Cric-Key and Melker cannula.	pass/ fail	pass/ fail	pass/ fail
Removed the Cric-Key, leaving the Melker cannula in place.	pass/ fail	pass/ fail	pass/ fail
Inflated the cuff of the Melker cannula with 10 ml of air.	pass/ fail	pass/ fail	pass/ fail
If the air exchange was adequate, secured the Melker cannula in place.	pass/ fail	pass/ fail	pass/ fail
Applied a dressing to further protect the tube and incision site.	pass/ fail	pass/ fail	pass/ fail
Monitored the casualty's respirations.	pass/ fail	pass/ fail	pass/ fail

Critical criteria:

- Did not obtain a patent airway with the emergency surgical airway.
- Did not correctly identify the location of the cricothyroid membrane.
- Performed the procedure in a manner that was dangerous to the casualty.

King Laryngeal Tube (LT) Insertion

Necessary equipment: King LT, water-based lubricant, and a syringe.

1. Prepare the casualty:

- Place the casualty's head in the "sniffing" position.
- Preoxygenate the casualty, if equipment is available.

2. Prepare the King LT:

- Choose the appropriately sized tube.
- Test cuff inflation by injecting the proper volume of air into the cuff. Deflate the cuff prior to inserting the tube.
- Lubricate the tube with a water-based 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, increasing the risk for infection.

3. Insert the King LT.

- Hold the tube in the dominant hand. With the nondominant hand, open the casualty's mouth, and apply a chin lift.
- With the King LT rotated laterally 45 to 90 degrees, place the tip into the mouth and advance the tube behind the base of the tongue.

NOTE: A lateral approach with the chin lift facilitates proper insertion. The tip must remain midline as it enters the posterior pharynx.

- Rotate the tube to midline as the tip reaches the posterior pharynx.
- Advance the tube until the base of the connector is aligned with the teeth or gums.
- Using either an attached pressure gauge or syringe, inflate the cuff to the minimum volume necessary to seal the airway.

4. Confirm proper placement of the tube.

- Reference marks for the tube are at the proximal end of the tube and should be aligned with the upper teeth.
- Confirm proper placement by listening for equal breath sounds during ventilation.
- While gently ventilating the casualty, withdraw the tube until ventilation is easy and free flowing, with minimal airway pressure needed.

NOTE: Initially placing the tube deeper than required and then withdrawing slightly increases the chance of proper insertion, helps ensure a patent airway, and decreases the risk of airway obstruction if the casualty spontaneously ventilates.

5. Secure the tube with tape.

Breathing Management

*(Addressed During Tactical Field Care and Tactical Evacuation Care Phases.
See Chapter 2, Tactical Combat Casualty Care Phases of Care, Pages 45 and 46.)*

Penetrating Chest Wounds

Necessary equipment: Prefabricated chest seal or any airtight material (plastic wrap).

1. Expose the wound(s):

- Cut or unfasten the clothing that covers the wound and expose the casualty's torso from the umbilicus to the Adam's apple circumferentially.
- Wipe blood/sweat from skin surrounding the wound to increase the occlusive seal's effectiveness.
- Disrupt the wound as little as possible.
- Apply an occlusive seal to any penetrating injuries on the torso.

NOTE: Do not remove clothing stuck to the wound.

2. Check for an exit wound.

- Logroll the casualty and look at the back.
- Remove the casualty's clothing, if necessary.

3. Seal the wound(s), treating each wound as you go. When not using a prefabricated chest seal, cut the dressing's plastic wrapper on one long and two short sides and remove the dressing.

- Apply the inner surface of the wrapper to the wound when the casualty exhales.
- Ensure that the covering extends at least 2 inches beyond the edges of the wound.
- Seal by applying overlapping strips of tape to all edges of occlusive dressing, forming a complete seal.
- Cover all wounds in the same manner, as applicable.

NOTE: All penetrating chest wounds should be treated as if they are penetrating chest wounds.

NOTE: In an emergency, any airtight material can be used. The material must be large and durable enough so it is not sucked into the chest cavity.

4. Place the casualty on the injured side or sitting up.

5. Monitor the casualty for increasing respiratory difficulty:

- Monitor breathing and the wound seal for continued effectiveness.
- Check vital signs.
- Observe for signs of shock.

Needle Chest Decompression

Necessary equipment: Large-bore needle with catheter (10- to 14-gauge, at least 3.25 inches in length) and tape.

1. Locate the second intercostal space (between the second and third ribs) at the midclavicular line (approximately in line with the nipple) on the affected side of the casualty's chest (see Figure 1-12). (An acceptable alternative site is located at the fourth or fifth rib space at the anterior axillary line [refer to Figure 1-13]).

2. Insert a large-bore (10- to 14-gauge) needle/catheter unit.

- Place the needle tip on the insertion site (between the second and third intercostal space, midclavicular line).
- Lower the proximal end of the needle to permit the tip to enter the skin just above the third rib margin.

- Firmly insert the needle into the skin over the third rib at a 90-degree angle to the chest wall until the pleura has been penetrated, as evidenced by feeling a “pop” as the needle enters the pleural space and a hiss of air escapes from the chest.

Warning: Proper positioning of the needle is essential to avoid puncturing blood vessels and/or nerves. The needle should not be inserted medial to the nipple line, as this will increase the risk of the needle entering the cardiac box.

NOTE: If you are using a catheter-over-needle, the catheter should be inserted to the hub. Withdraw the needle along the angle of insertion while holding the catheter still.

3. Secure the catheter to the chest with tape and monitor the casualty for possible return of symptoms.

NOTE: Do not occlude the end of the catheter with the tape. Air needs to flow freely through the catheter.

4. Monitor the patient for signs and symptoms of a recurring tension pneumothorax:

- If a tension pneumothorax returns, reassess all interventions (chest seals and needle chest decompressions).
- If a chest seal becomes dislodged, replace it.
- If a needle chest decompression catheter has become occluded, insert a second catheter in accordance with step 2 of the instructions directly laterally of the first catheter on the mid-clavicular line (primary site) or directly superior of the first catheter on the anterior axillary line (alternate site).

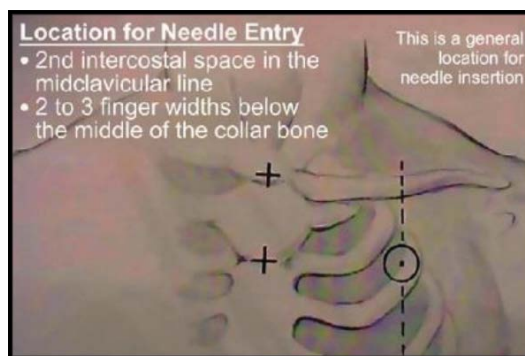


Figure 1-12. Needle chest compression, needle insertion site

Chest Tube Insertion

Necessary equipment: Chest tube (catheter 16 to 35 Fr), gloves, one-way valve, scalpel handle with blades (No. 10 or No. 15), Kelly forceps, large hemostat, povidone-iodine, suture material, lidocaine with 1 percent epinephrine for injection, needle, and syringe.

1. Assess the casualty:

- If necessary, open the airway.
- Ensure adequate respiration and assist as necessary.
- Provide supplemental oxygen, if available.
- Connect the casualty to a pulse oximeter, if available.

2. Prepare the casualty.

- Place the casualty in the supine position.
- Raise the arm on the affected side above the casualty's head.
- Select the insertion site at the anterior axillary line over the fourth or fifth intercostal space.
- Clean the site with povidone-iodine solution.
- Put on sterile gloves.
- Drape the area.
- Liberally infiltrate the area with the 1 or 2 percent lidocaine solution and allow time for medication to take effect if patient symptoms permit.

3. Insert the tube:

- Make a 2 to 3 centimeter (cm) transverse incision over the selected site and extend it down to the intercostal muscles.

NOTE: The skin incision should be 1 to 2 cm below the intercostal space through which the tube will be placed.

- Insert the large forceps through the intercostal muscles in the next intercostal space above the skin incision.
- Puncture the parietal pleura with the tip of the forceps and slightly enlarge the hole by opening the clamp 1.5 to 2 cm.

Caution: *Avoid puncturing the lung. Always use the superior margin of the rib to avoid the intercostal nerves and vessels.*

- Immediately insert a gloved finger in the incision to clear any adhesions, clots, etc.
 - Grasp the tip of the chest tube with forceps. Insert the tip of the tube into the incision as you withdraw your finger.
 - Advance the tube until the last side hole is 2.5 to 5 cm inside the chest wall.
 - Connect the end of the tube to a one-way drainage valve (e.g., Heimlich valve or improvised).
 - Secure the tube using the suture materials.
 - Apply an occlusive dressing over the incision site.
 - Radiograph the chest to confirm placement, if available.
4. Reassess the casualty.
- Check for bilateral breath sounds.
 - Monitor and record vital signs every 15 minutes.
5. Document the procedure.

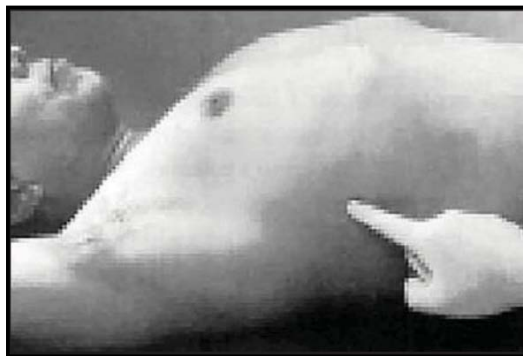


Figure 1-13. Chest tube insertion site

Vascular Access

*(Addressed During Tactical Field Care and Tactical Evacuation Care Phases.
See Chapter 2, Tactical Combat Casualty Care Phases of Care, Pages 45 and 46.)*

Intraosseous Placement: First Access for Shock and Trauma (FAST1) System

Necessary equipment: FAST1 System device, 10 cc syringe with normal saline for flush, saline lock, and tape.

1. Positioning and preparing the site:

- Providers should position themselves above the head of the casualty to avoid improper insertion of the device.
- Expose the sternum.
- Identify the sternal notch (not the xyphoid process).

2. Place the target patch.

- Remove the top half of the backing (“Remove 1”) from the patch.
- Place the index finger on the sternal notch, perpendicular to the skin.
- Align the locating notch in the target patch with the sternal notch.
- Verify that the target zone (circular hole) of the patch is directly over the casualty’s midline, and press firmly on the patch to engage the adhesive and secure the patch.
- Remove the remaining backing (“Remove 2”) and secure the patch to the casualty.



Figure 1-14. FAST1 target patch

3. Insert the introducer:

- Position yourself over the head of the patient facing toward the patient's feet.
- Remove the cap from the introducer.
- Place the bone probe cluster needles in the target zone of the target patch.
- Hold the introducer perpendicular to the skin of the casualty.
- Pressing straight along the introducer axis, with hand and elbow in line, push with a firm, constant force until a release is heard and felt.
- Expose the infusion tube by gently withdrawing the introducer. The stylet supports will fall away.



Figure 1-15. FAST1 introducer insertion

Warning: Avoid extreme force or twisting motions.

4. Connect the infusion tube.

- Connect the infusion tube to the right-angle female connector (blue tip).
- Flush the catheter with 10 ml of sterile IV solution.
- Also may add 2 to 3 ml of 2 percent lidocaine to reduce pain during the infusion.
- Attach a saline lock to the remaining Luer lock connector.



Figure 1-16. Secure with protector dome

5. Place the protector dome directly over the target patch and press firmly to engage the Velcro fastening.
6. Reinforce with tape.

FASTResponder

Precautions:

- The FASTResponder is designed to penetrate 6 mm into the manubrium. Qualified professionals should determine any appropriate or necessary exceptions, either inclusions or exclusions, to the criterion for patients 12 years and older.
- The proximal tip of the infusion tube contains metal.
- The function of the device may be affected by:
 - Compromised skin over the insertion site such as trauma, infection, or burns
 - Fracture of the sternum or vascular injury, which may compromise the integrity of the manubrium or its vascularization
 - Midline sternotomy scars

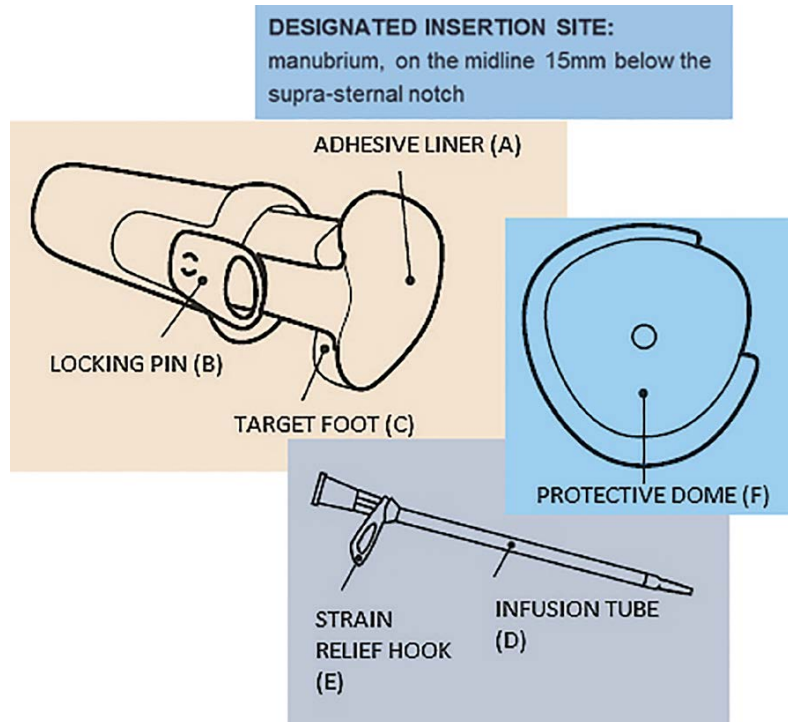


Figure 1-17. FASTResponder device

Warnings:

- Safety in patients with very severe osteoporosis has not been proven.
- Insertion in sites other than the manubrium may result in ineffective infusion and/or serious injury to the patient.
- Reuse of FASTResponder is not recommended due to the potential of cross-contamination, which may lead to serious injury or death. The FASTResponder is unlikely to function after use.
- Do not insert finger(s) in the open end of the device due to the potential of a needle stick.

1. Expose the sternum and clean the infusion site.

NOTE: Maintain aseptic technique throughout the procedure.

NOTE: Administer local anesthetic if the patient is conscious and alert.

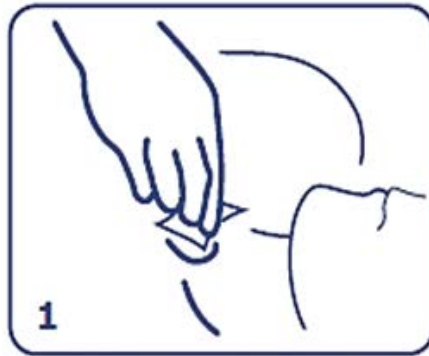


Figure 1-18

2. Remove the adhesive liner with the locking pin.

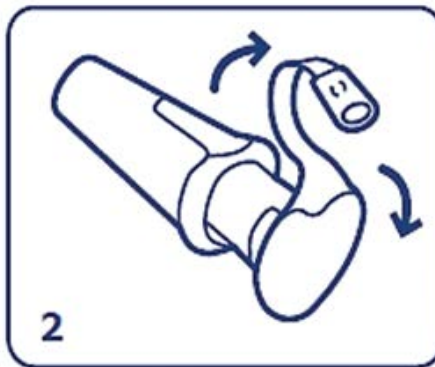


Figure 1-19

3. Align the target foot notch with the patient's sternal notch, over the midline, and perpendicular to the manubrium.



Figure 1-20

4. Push the FASTResponder down completely to deploy the infusion tube.



Figure 1-21

5. Withdraw the FASTResponder straight back while holding down the target foot. The support comes out with the infusion tube. Discard the FASTResponder following local contaminated sharps protocols.

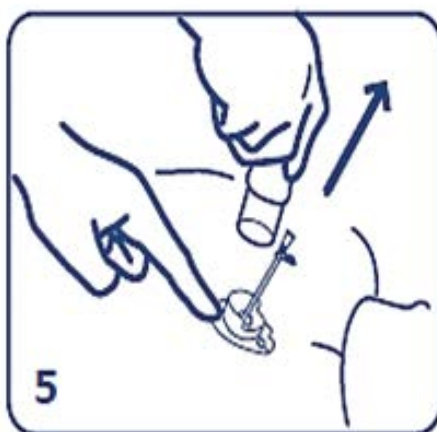


Figure 1-22

6. Connect the IV line directly to the Luer, and clip the strain relief hook to the target foot. Optional: Confirm placement by aspiration, and flush with fluid to clear.



Figure 1-23

7. Optional: Remove the liner from the protective dome and apply the dome over the target foot infusion site.

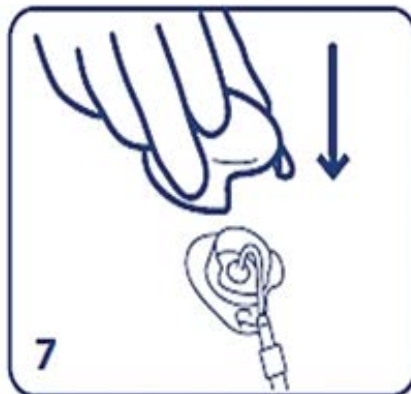


Figure 1-24

8. FASTResponder removal:

- Turn off the source of fluid and disconnect. Pull on the infusion tube to remove it from the patient. Peel off the target foot and dress the site per standard protocol.
- Discard the infusion tube and target foot following local contaminated sharps protocols.

NOTE: Removal should only be performed by a physician or nurse.

NOTE: Pull the infusion tube using one continuous motion (do not start/stop) until removal. Pull on the tube, not the Luer connection. It is normal for the tubing to stretch.

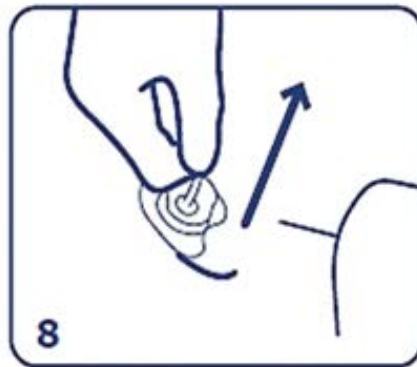


Figure 1-25

Intraosseous Access with the Sternal EZ-IO Needle Set

The Sternal EZ-IO is used to obtain IO vascular access in adults in whom rapid fluid resuscitation or pharmacological treatment is needed emergently, and standard IV access is not readily accessible.

The sternal EZ-IO needle/driver set is green, and comes in green packaging. It is designed for insertion into the manubrium of the sternum, and should not be used for IO access at any other site. Conversely, the manual EZ-IO needle/driver intended for use on the humerus or tibia is blue, and this needle should never be used on the sternum. The sternal needle also has a depth-limiting “collar” on the catheter, which is not present on the catheter of the limb device.



Figure 1-26

If the manubrium is fractured, IO access through it should not be attempted. Fluid follows the path of least resistance. If an IO device is placed in a fractured bone, the fluid would simply extravasate into the surrounding tissue through the fracture site.

Contraindications consist of:

- Fracture of the manubrium
- Previous surgical procedure
- Manubrial IO within the past 24 to 48 hours
- Infection at the insertion site
- Inability to locate landmarks or excessive tissue over the target site

1. With proper insertion, the needle tip should lie in the marrow cavity of the manubrium.

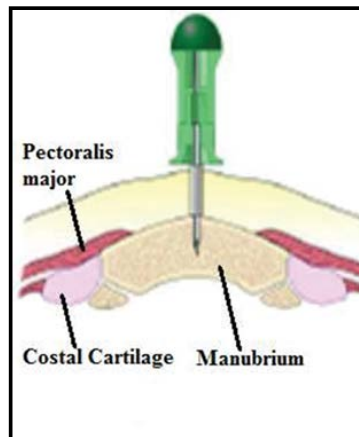


Figure 1-27

2. Expose the chest and identify the insertion site by palpation. The sternal insertion site is located midline, approximately 1 to 2 cm below the sternal notch. Once the insertion site is identified, clean the area with alcohol or povidone-iodine.

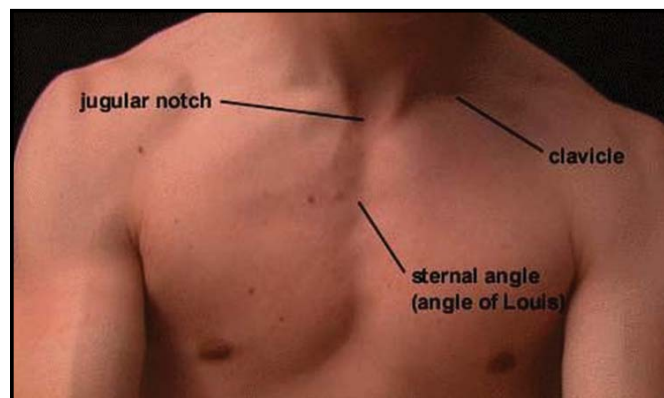


Figure 1-28

3. Remove tab 1 from the sternal locator. Align the curve at the top of the sternal locator with the suprasternal notch, and adhere the top half of the sternal locator to the patient. Holding the sternal locator in place, pull tab 2 to expose the adhesive on the bottom half of the sternal locator. Press the sternal locator down on the chest to ensure it adheres to the casualty's skin.

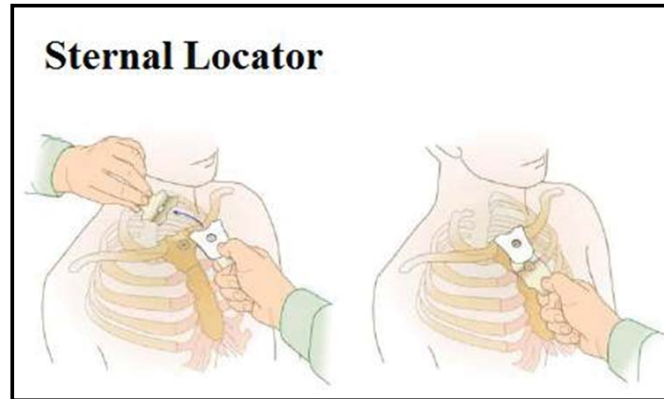


Figure 1-29

4. Carefully nick the skin over the insertion site with the provided lancet through the sternal locator. The length of the nick should not exceed 3 mm, which is the width of the finger lancet and the opening in the sternal locator.

NOTE: It is imperative that the nick reaches all the way down to the sternal bone at the insertion site. Failure to do so could lead to improper or failed placement.

5. Keep the casualty still while inserting the needle. Position the sternal needle set at the insertion site with the needle perpendicular to the plane of the manubrium. Gently insert the needle set into the incision until the needle touches bone. Penetrate the bone cortex by rotating clockwise and counterclockwise while applying gentle, steady, downward pressure. Stop insertion when a sudden lack of resistance is felt upon entry into the medullary space. Do not rock or bend the needle set while it is being inserted. Maintain the 90-degree angle.

NOTE: Use gentle, steady pressure, not excessive force. Allow the catheter tip rotation and gentle downward pressure to provide the penetrating action.

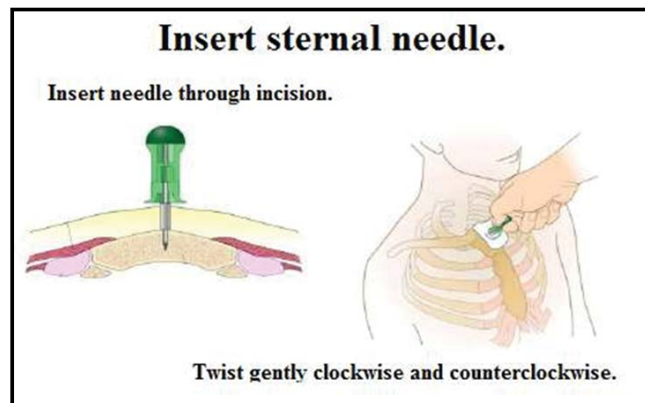


Figure 1-30

6. Remove the stylet:

- Manually stabilize the hub.
- Rotate the stylet counterclockwise, then pull it out.

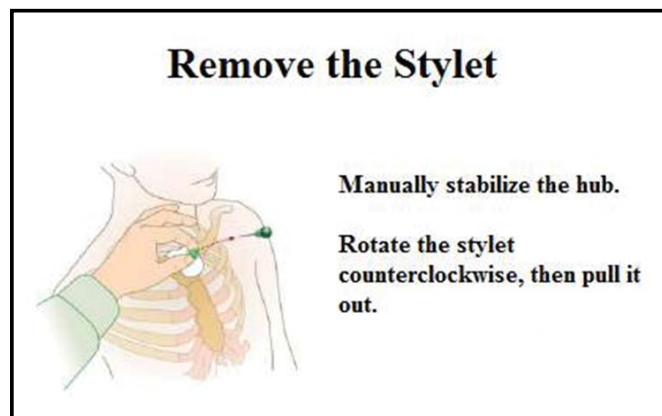


Figure 1-31

7. Apply the stabilizer to the catheter hub without removing the sternal locator. Once the stabilizer is in position, prime the EZ-Connect Extension Set with normal saline, attach it to the catheter hub and tighten it firmly. Tightening of the EZ-Connect sets the catheter/stabilizer height into a fixed position. To secure the stabilizer, hold the catheter still while pulling away each of the numbered tabs.

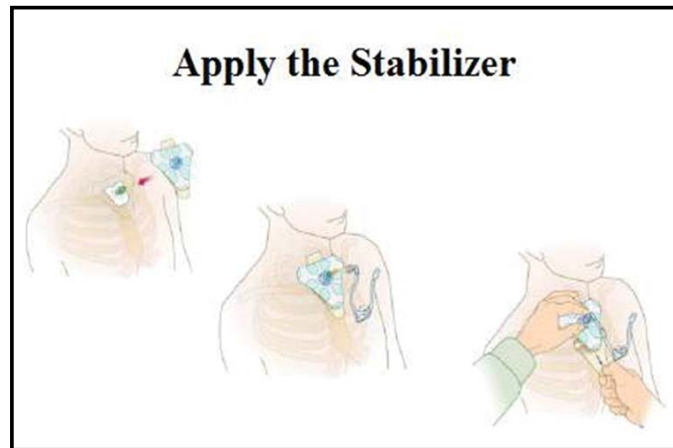


Figure 1-32

8. A firmly seated catheter, the ability to administer pressurized fluids without difficulty, and noting the pharmacologic effects of any fluids or medications given are indicators of successful cannulation of the medullary space.

Confirm catheter placement:

- Firmly seated catheter
- Flash of blood or blood on aspiration (may or may not be able to aspirate blood)
- Pressurized fluids flow freely
- Pharmacologic effects

Confirmation of catheter placement can be achieved by aspiration. Attach a syringe to the primed extension set, and slowly retract the plunger to withdraw marrow. If marrow is present, the needle has been successfully placed in the medullary space. Blood may also be noted in the hub of the needle when you remove the stylet. Absence of blood or inability to withdraw aspirate at the catheter hub does not mean the insertion was unsuccessful.

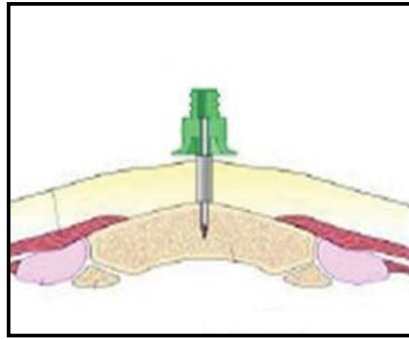


Figure 1-33

9. Once the catheter placement has been confirmed, the site should be continually re-evaluated for signs of extravasation, fluid leakage, or any other signs that indicate the needle tip is no longer in the medullary space.

Flush the catheter:

- Connect the syringe to primed extension set
- Flush with 10 ml normal saline
- Multiple flushes may be needed
- No flush equals no flow

10. The intraosseous space is occupied by bone marrow held in place by a thick fibrin network. In order to obtain maximum flow rates, this fibrin mesh must be displaced. This is achieved with a rapid 10 ml flush with normal saline. The initial flush will be met with inherent resistance as the fibrin mesh is being displaced. After the first vigorous flush of normal saline, fluid flow through the IO device should be easy and rapid. Occasionally, more than one flush may be required to obtain maximum flow rates.

NOTE: No flush, no flow. If this step is omitted, optimal flow rates will not be achieved.

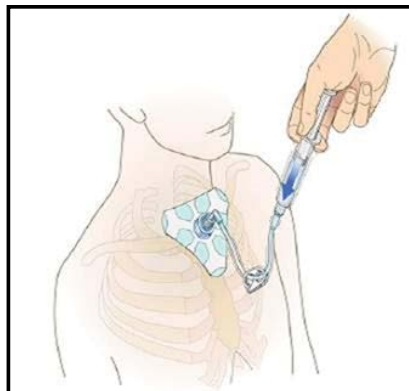


Figure 1-34

11. Infuse fluids with pressure:

- The pressure in the medullary space is about one-third of the casualty's arterial pressure.
- Pressurizing fluids for infusion is required to achieve maximum flow rates.



Figure 1-35

12. Sternal EZ-IO removal:

- Remove the EZ-Connect extension set and stabilizer.
- Attach a Luer lock syringe directly to the hub.
- Rotate the syringe clockwise while slowly and gently pulling straight back.
- Maintain axial alignment. Do not rock the syringe.
- Remove the sternal locator.

Peripheral Intravascular Access

Necessary equipment: IV tubing, IV fluids, 18-gauge or larger IV needle with catheter, saline lock, constricting band, antiseptic wipes, gloves, tape, and 2- by 2-inch gauze sponges.

1. Put on gloves.
2. Select an appropriate access site on an extremity:
 - Avoid sites over joints.
 - Avoid injured extremities.
 - Avoid extremities with significant wounds proximal to the IV insertion site.
3. Prepare the site:
 - Apply the constriction band around the limb, about 2 inches above the puncture site.
 - Clean the site with antiseptic solution.
5. Puncture the vein:
 - Stabilize the skin at the puncture site with the nondominant thumb, pulling the skin downward until taut. Avoid placing the thumb directly over the vein to avoid collapsing.
 - Position the needle point, bevel up, parallel to the vein, 1/2 inch below the venipuncture site.
 - Hold the needle at a 20- to 30-degree angle and insert it through the skin.
 - Move the needle forward about 1/2 inch into the vein.
 - Confirm the puncture by observing blood in the flash chamber.

NOTE: A faint give may be felt as the needle enters the vein.

6. Advance the catheter.
 - Grasp the hub and advance the needle into the vein up to the hub. (**NOTE:** This prevents back flow of blood from the hub.)
 - While holding the hub, press lightly on the skin with the fingers of the other hand.

- Remove the needle from the catheter and secure it in a safe place to avoid accidental needle sticks.
- Attach a saline lock, preferably needleless.

7. Connect the catheter to the IV infusion tubing. An 18-gauge needle will be required, if not using a needleless saline lock.

- Begin the infusion.
- Observe the site for infiltration of fluids into the surrounding soft tissue.

8. Secure the catheter and tubing to the skin and dress the site.

Hypothermia Prevention

(Addressed During Tactical Field Care and Tactical Evacuation Care Phases. See Chapter 2, Tactical Combat Casualty Care Phases of Care, Pages 45 and 46.)

1. Stop bleeding and resuscitate appropriately. Use warm fluids, if available.
2. Remove any wet clothes and replace with dry clothes, if possible.
3. Use the Hypothermia Prevention and Management Kit (HPMK).
 - Place the casualty on a Blizzard Survival Blanket or heat-reflective shell to maintain body temperature.
 - Place a Ready-Heat blanket on the casualty's torso to aid in increasing body temperature. Do not place the Ready-Heat blanket directly on the casualty's skin, which may cause a burn.
 - Wrap the Blizzard Survival Blanket or heat-reflective shell around the casualty. If a survival blanket of any kind is not available, then find dry blankets, poncho liners, space blankets, sleeping bags, body bags, or anything that will retain heat and keep the casualty dry.



Figure 1-37. Heat reflective shell

Tactical evacuation care phase:

1. The casualty should remain wrapped in the Blizzard Survival Blanket or Heat-Reflective Shell with Ready-Heat blanket while awaiting evacuation; en route care should be provided.
2. If these items were not available in the other phases of care, check with evacuation personnel to see if they have them or any other items that can be used to prevent heat loss.
3. Wrap the casualty in dry blankets and, during helicopter transport, try to keep the wind from open doors from blowing over or under the casualty.
4. Use a portable fluid warmer on all IO/IV sites and for all liquid medication administered (Hextend, Lactated Ringers, TXA, blood, etc.). Administering cold fluids contributes to the likelihood of the casualty developing hypothermia.

Tactical Field Care Basic Management Plan

NOTE: Casualties with an altered mental status should be disarmed immediately.

- Massive hemorrhage:
 - Assess for an unrecognized hemorrhage and control all sources of bleeding.
 - Use one or more CoTCCC-recommended limb tourniquets, if necessary.
 - Use a CoTCCC-approved hemostatic dressing for compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal.
 - Immediately apply a CoTCCC-recommended junctional tourniquet if the bleeding site is amenable to use of a junctional tourniquet.
 - Reassess the prior tourniquet application:
 - * Expose the wound and determine if a tourniquet is needed.
 - * Replace any limb tourniquet placed over the uniform with one applied directly to the skin, 2 to 3 inches above the wound.
 - Expose and use an indelible marker to clearly mark all tourniquet sites with the time of tourniquet application.
- Airway management:
 - Conduct the following for an unconscious casualty without an airway obstruction:
 - * Chin lift/jaw thrust maneuver.
 - * NPA.
 - * Place the casualty in the recovery position (see Figure 1-38).

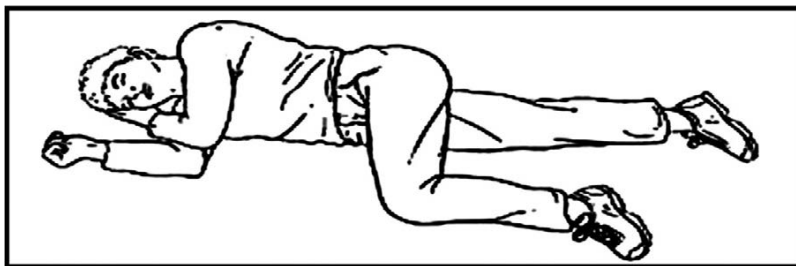


Figure 1-38. Recovery position

- Conduct the following for a casualty with an airway obstruction or impending airway obstruction:
 - * Chin lift/jaw thrust maneuver.
 - * NPA.
 - * Allow a conscious casualty to assume any position that best protects the airway to include sitting up.
 - * Place an unconscious casualty in the recovery position.
 - * If these measures are unsuccessful, refer to a medic immediately. Perform a surgical cricothyroidotomy using one of the following:
 - ◆ CricKey technique.
 - ◆ Bougie-aided open surgical technique.
 - ◆ Standard open surgical technique.
 - ◆ Lidocaine, if the casualty is conscious.
- Respirations:
 - For a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax.
 - All open and/or sucking chest wounds should be treated by:
 - * Immediately applying a vented chest seal to cover the defect.
 - * If a vented chest seal is not available, use a non-vented chest seal.
 - * Burping or temporarily removing the dressing. If this does not relieve the respiratory distress, refer to a medic.
- Circulation:
 - Assess the casualty for hemorrhagic shock. If the casualty is not in shock, oral fluids are permissible if the casualty is conscious and can swallow.
 - If the casualty is in shock, refer to a medic.

- Hypothermia prevention:
 - Minimize casualty environmental exposure and promote heat retention.
 - Keep personal protective gear on, if feasible. Replace wet clothing, if possible. Get the casualty onto an insulated surface as soon as possible.
 - Use CoTCCC-approved hypothermia prevention kit, if available.
 - If a hypothermia prevention kit is not available, then use dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty warm and dry.
- Pain management:
 - Analgesia on the battlefield should generally be achieved by one of following options:
 - * If there is mild to moderate pain and/or the casualty is able to fight, give the casualty a TCCC combat wound pill pack (CWPP).
 - * If there is moderate to severe pain and the casualty is not in shock, refer to a medic.
- Antibiotics (recommended for all open combat wounds):
 - If the casualty can swallow, administer 400 mg of moxifloxacin from the CWPP.
 - If the casualty cannot swallow (shock or unconsciousness), refer to a medic.
- Wounds:
 - Inspect and dress known wounds.
 - Check for additional wounds (for example, scalp lacerations).
- Splinting:
 - If a penetrating eye injury is noted or suspected, conduct the following:
 - * Cover the eye with a rigid eye shield and not a pressure patch.
 - * Administer 400 mg moxifloxacin from the CWPP.
 - Splint fractures.

Chapter 2

Tactical Combat Casualty Care Phases of Care

Understanding phases of care is important for proper application of Tactical Combat Casualty Care (TCCC) principles. Properly balancing winning the fight, accomplishing the mission, and treating casualties is essential for success tactically as well as medically. This chapter discusses the proper tactics and medicine for each phase of care.

Phase 1: Care Under Fire (CUF)— Return Fire

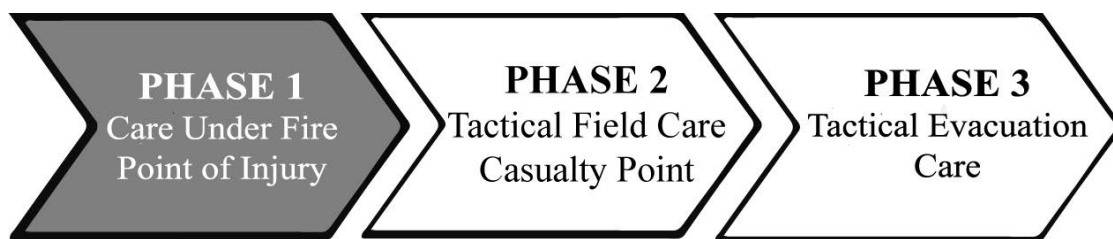


Figure 2-1. Phase 1: CUF

- **Good tactics:** CUF is conducted while tactically engaged. The most effective way to reduce morbidity and mortality is the precise application of combat fires by all personnel. Continue the tactical mission, gain fire superiority, then treat casualties.
- **Good medicine: Massive hemorrhage.** The control of extremity hemorrhage with direct pressure while applying a hasty tourniquet is the primary medical goal during CUF. A tourniquet is the single most important medical intervention rendered at the point of injury (POI).

Phase 2: Tactical Field Care (TFC)— Move Casualty to Cover

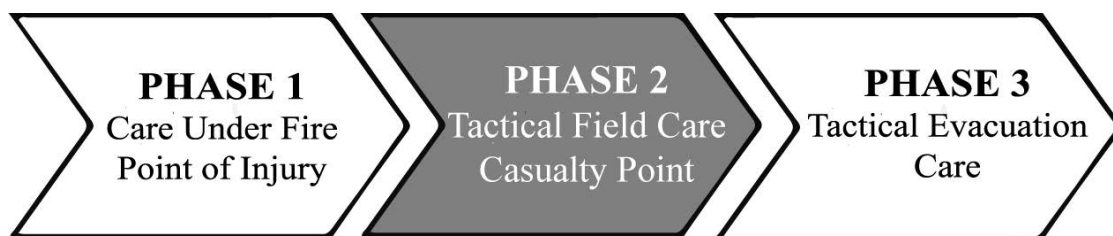


Figure 2-2. Phase 2: TFC

- **Good tactics:** When no longer receiving effective enemy fire, the TFC phase is entered, allowing more medical intervention. Disarm the casualty, if the casualty's mental status is altered or if receiving ketamine or fentanyl. Medical personnel are responsible for activity inside the casualty collection point (CCP) and leadership is responsible for activity outside the CCP. Basic life support (cardiopulmonary resuscitation [CPR]) is typically not performed in combat.
- **Good medicine:**
 - **Massive hemorrhage.** Convert hasty tourniquets to deliberate tourniquets. Pack wounds with combat gauze. Apply a junctional tourniquet.
 - **Airway.** Check the airway for patency. Apply a nasopharyngeal airway (NPA) and ventilate with a bag-valve mask (BVM), such as a Cyclone BVM. If the airway shows resistance or evidence of facial trauma, perform a cricothyrotomy.
 - **Respirations.** Apply a vented chest seal to open entry and exit chest wounds. Treat a tension pneumothorax (PTX) by decompressing the chest at the mid-clavicular line at the second and third intercostal space using a 3.25-inch, 14-gauge angiocatheter and needle chest decompression (NCD).
 - **Circulation.** Resuscitate with hypovolemic fluid resuscitation through intravenous (IV) access. Intraosseous (IO) access is recommended for rapid fluid delivery and resuscitation.
 - **Head injury/hypothermia.** Perform a Military Acute Concussion Evaluation (MACE) exam or the alert, verbal, pain, unresponsive (AVPU) assessment, and document the findings. Cover the casualty in an HPMK, body bag, or sleeping bag for warmth.

Phase 3: Tactical Evacuation Care

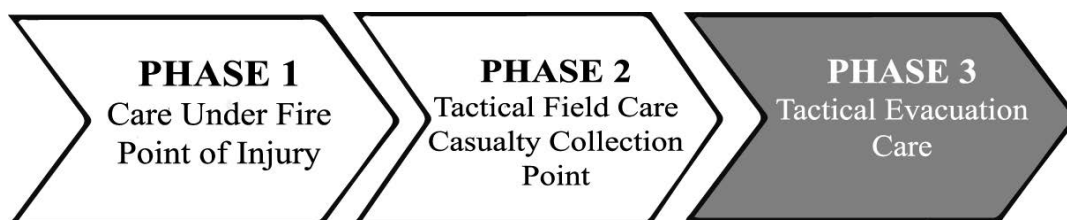


Figure 2-3. Phase 3: TEC

- **Good tactics:** Move the casualty. The term tactical evacuation (TACEVAC), as defined in Joint Publication (JP) 4-02, *Health Service Support*, 26 July 2012, is medical evacuation (MEDEVAC) (MEDEVAC-dedicated vehicle) and casualty evacuation (CASEVAC) (non-medical vehicle). This phase involves initiating air evacuation with a 9-Line MEDEVAC request and establishing ground ambulance exchange points.
- **Good medicine:** Re-evaluate the casualty and all interventions. Affix a pelvic binder if the injuries are caused by a blast, vehicle rollover, or building collapse. Document all care provided on Department of Defense (DD) Form 1380, *Tactical Combat Casualty Care (TCCC) Card*, June 2014. The TCCC Card format matches the MIST (mechanism of injury, injuries, signs/symptoms, and treatment) Report for each casualty on the 9-Line MEDEVAC request.

Continuum of Care

It is important for TCCC-trained individuals to understand the continuum of care. Having an understanding of different facilities in the immediate area can factor into MEDEVAC plans. In accordance with JP 4-02, the following facilities provide higher medical care once the casualty is tactically evacuated. These facilities are referred to as roles, not levels or echelons.

Role 1

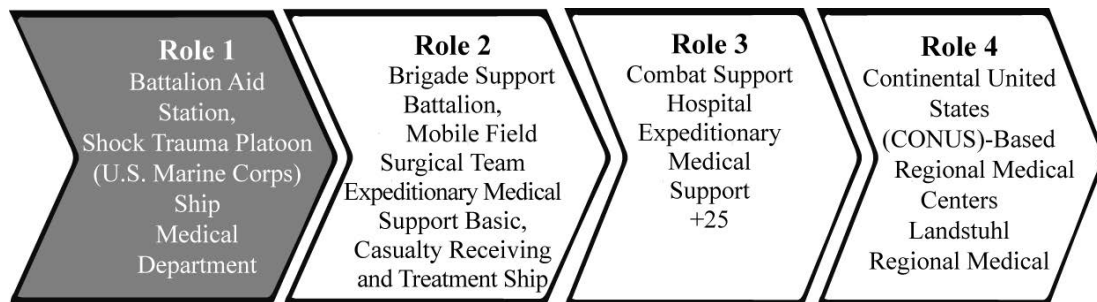


Figure 2-4. Role 1 facilities

Role 1 care consists of prehospital medical care to include self-aid, buddy aid, and care provided by a combat medic. The battalion aid station or unit-level medical care facility is a Role 1 facility and provides medical treatment supervised by a physician assistant or physician. Role 1 facilities provide advanced trauma management (damage control resuscitation) and routine sick call. Documentation is completed using the TCCC Card and MIST Report.

- Advanced trauma management is provided at Role 1 facilities (damage control resuscitation).
- Routine sick call is provided in accordance with the U.S. Army Health Services Command Pamphlet 40-7-21, *Algorithm-Directed Troop Medical Care (ADTMC)*, June 1992. ADTMC presents every combat medic, corpsman, or medical technician an algorithm for common ailments and for diseases and non-battle injuries (DNBIs).

Role 2

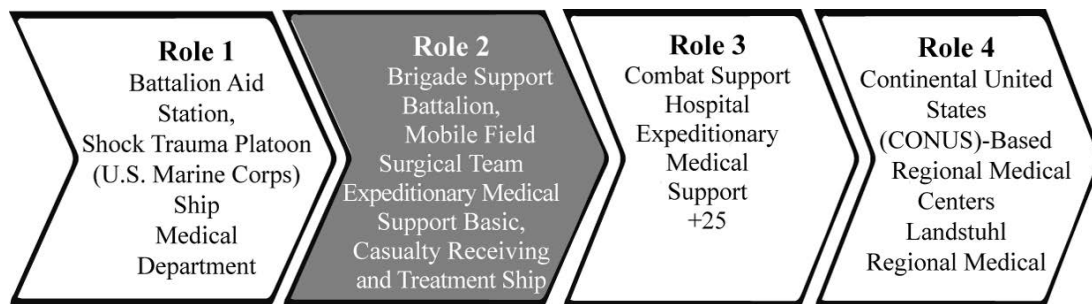


Figure 2-5. Role 2 facilities

In accordance with JP 4-02, a Role 2 facility provides advanced trauma management and emergency medical treatment, including continuation of resuscitation started at Role 1 care. Capabilities of a Role 2 facility include blood products, limited X-ray, limited laboratory, dental support, combat and operational stress control, preventive medicine, and limited patient hold for 72 hours.

- Role 2 NATO care includes damage control surgery. U.S. Armed Forces subscribe to the Role 2 medical treatment facility, providing greater resuscitative capability than what is available at a Role 1 facility. Surgical capability is not mandatory. The Role 2 facility is the transition point from MARCH (massive hemorrhage, airway, respirations, circulation, head injury/hypothermia) treatment and the TCCC Card to the airway, breathing, circulation, disability, exposure (ABCDE) method and DD Form 3019, *Resuscitation Record*, October 2015.
- Role 2 Army facilities have medical assets located in the treatment platoons of medical companies and troops, and include basic and emergency treatment (advanced trauma management). These facilities have the capability to deliver packed red blood cells (liquid), limited X-ray, clinical laboratory, dental support, combat and operational stress control, and preventive medicine.

- The medical company brigade support battalion is assigned to modular brigade combat teams, which include the airborne brigade combat team (ABCT), infantry brigade combat team (IBCT), Stryker brigade combat team (SBCT), and the medical troop in the armored cavalry regiment.
 - The medical company area support medical battalion provides direct support to the modular division and support to echelons above brigade units.
 - The forward resuscitative and surgical team (FRST) is assigned to the medical command or medical brigade and attached to the combat support hospital when not operationally employed forward with a medical company. The FRST provides damage control surgery support in the brigade combat team area. This 20-person team provides a rapidly deployable, immediate damage control surgery capability utilizing two orthopedic surgeons, two general surgeons, two nurse anesthetists, two emergency physicians, and emergency room and critical care nurses and technicians. The FRST includes two operating tables for a maximum of 10 cases per day and a total of 30 operations. The supporting medical company must provide logistical support (additional electricity, water, and fuel); security; and X-ray, laboratory, and patient administration support. The FRST is designed to be split, providing maximum flexibility to support operations.
- Role 2 Air Force
 - The mobile field surgical team (MFST) consists of a five-person team: general surgeon, orthopedist, anesthetist, emergency medicine physician, and operating room nurse or technician. MFST provides 10 lifesaving or limb-saving procedures in 24 to 48 hours from five backpacks (350-pound total gear), which are designed to augment a Role I facility.
 - The small portable expeditionary aeromedical rapid response (SPEAR) team consists of a 10-person team (includes a five-person MFST and three-person critical care air transportation team), designed to provide surgical support, basic primary care, postoperative critical care, and preventive medicine for the early phase of deployment. The SPEAR team is highly mobile, being able to fit all equipment in a one-palletized trailer.

- The expeditionary medical support (EMEDS) health response team (HRT) is the basic EMEDS capability consisting of 40 personnel. The HRT can stabilize and hold four patients for 24 hours. It provides medical and surgical support for an airbase, providing sick-call, resuscitative surgery, dental care, and limited laboratory and X-ray capabilities. The 25-member staff includes a SPEARR team and can provide for 10 operating room cases with two beds in 24 to 48 hours and four intensive care unit beds and tents transportable on three pallets.
- EMEDS+10 is the second increment of the EMEDS capability and builds on EMEDS HRT, adding six beds to EMEDS basic. EMEDS+10 provides medical, surgical, and critical care augmentation; laboratory service; additional bioenvironmental engineering; public health; administration; and medical logistics support with a 56-person staff consisting of six tents transported on 14 pallets.
- Role 2 Navy
 - A casualty receiving and treatment ship (CRTS) is part of an amphibious ready group (ARG). An ARG typically comprises three ships with surgical capability only on the CRTS. Ships have 176 medical personnel supporting 45 ward beds, four operating rooms (one surgeon, one certified registered nurse anesthetist, one critical-care nurse, one operating room nurse, one general medical officer, and 12 support staff), and 17 intensive care unit beds. A CRTS and fleet surgical team can be augmented with 84 additional personnel to increase capability from one operating room to four. Ships have laboratory, X-ray, frozen blood capabilities, and triage areas for 50 casualties. Doctrinal holding capability is limited to three days.
 - The aircraft carrier battle group includes one operating room, 52 ward beds, and 3 intensive care beds. The staff includes one surgeon and five additional medical officers. Medical assets aboard aircraft carriers are intended for use by the aircraft carrier and its task force. Aircraft carriers are not casualty receiving ships and are not included in medical assets for support to ground forces.

- A surgical company (SC) provides surgical care for the Marine Expeditionary Force. The SC provides stabilizing surgical procedures (damage control surgery) with four forward resuscitative surgical systems, four shock trauma platoons, and four en route care teams. An SC has a 20-bed capability for 72 hours, portable digital X-ray, and minimal laboratory and blood-banking capabilities.
- The forward resuscitative surgical system (FRSS) is an 8-person team (two surgeons, anesthesia, critical care nurse, two operating room technicians, and two corpsmen). The FRSS provides a high mobility resuscitative surgery asset for 18 patients within 48 hours without resupply. The en-route care team is a two-person team consisting of a critical care registered nurse and a corpsman.

Role 3

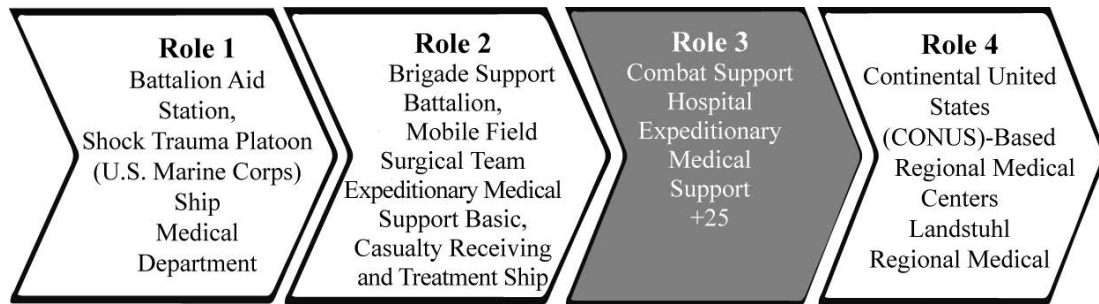


Figure 2-6. Role 3 facilities

A Role 3 facility (combat support hospital or EMEDS+25) is a medical treatment facility or veterinary facility (for working animals) staffed and equipped to provide care to all categories of patients. Capabilities of a Role 3 facility include burn management; optometry and ophthalmology; pediatrics, obstetrics, and gynecology; dental; preventive medicine; internal medicine and cardiology; maxillofacial surgery and neurosurgery; intensive care beds and nursing; blood-banking service; pathology; infectious disease services; medical nutrition therapy; behavioral health; occupational health; medical logistics; and other medical specialties.

Chapter 3

Tactical Combat Casualty Care Medical Equipment

Tactical Combat Casualty Care-All Combatants (TCCC-AC) must be familiar with the Improved First Aid Kit (IFAK)/Joint First Aid Kit (JFAK) as well as other kits commonly seen in the force today. This chapter discusses the equipment in Generation I and II IFAKs and other commonly used rescue equipment: the Warrior Aid and Litter Kit (WALK), Skedco, and for medics and Soldier familiarity, the M9 Medic Bag.

Improved First Aid Kit/Joint First Aid Kit

The IFAK Generation I is issued to every Service member at a Central Issue Facility for administering immediate self-aid and buddy aid. Every Service member must be trained in the use of all contents of the IFAK. The IFAK does not contain a needle or angiocatheter for chest needle decompression. All IFAK contents are described in the TCCC-AC training on the National Association of Emergency Medical Technicians (NAEMT) website.



Figure 3-1. IFAK Generation I

Table 3-1. IFAK Generation I contents

National Stock No.	Item	No. Per Kit
8465-01-531-3647	100 Round Squad Automatic Weapon (SAW)/Utility Pouch, MOLLE II	1
6515-01-521-7976	Combat Application Tourniquet	1
6510-01-460-0849	Bandage Kit, Elastic	1
6510-01-503-2117	Bandage Gauze, 4 1/2 inch, 100s	1
6510-00-926-8883	Surgical Adhesive Tape, 2 inch, 6s	1
6515-01-180-0467	Nasopharyngeal Airway	1
6515-01-519-9161	Patient Exam Gloves, 100s	4
6545-01-586-7691	Contents Kit, IFAK Resupply	1
6545-01-531-3147	Insert (Folding Panels With Cord)	1
6510-01-562-3325	Dressing, Combat Gauze	1

The Generation II IFAK is issued by the Rapid Fielding Initiative. This IFAK includes two Combat Application Tourniquets, which are stored in pouches that attach to the kit bag. The Generation II IFAK also contains a vented chest seal and eye shield. The Generation II IFAK is similar to the JFAK. Designers added Department of Defense (DD) Form 1380, *Tactical Combat Casualty Care (TCCC) Card*, June 2014, a permanent marker, and strap cutter. The kit weighs 1 pound and contains expendable medical items. The Defense Medical Materiel Program Office is coordinating with the Joint Services on the transition of the IFAK to the JFAK. The U.S. Navy is currently the only Service utilizing needle chest decompression from the JFAK.



Figure 3-2. IFAK Generation II

Table 3-2. IFAK Generation II contents

National Stock No.	Item	No. Per Kit
6545-01-584-1582	U.S. Army IFAK	1
6515-01-521-7976	Combat Application Tourniquet	2
6510-01-492-2275	Bandage Kit, Elastic	1
6510-01-503-2117	Bandage, Gauze, 4 1/2 inch, 100s	1
6510-00-926-8883	Surgical Adhesive Tape, 2 inch, 6s	1
6515-01-180-0467	Nasopharyngeal Airway	1
6515-01-519-9161	Patient Exam Gloves, 100s	4
6510-01-562-3325	Dressing, Combat Gauze	1
4240-01-570-0319	Strap Cutter, Rescue	1
6510-01-549-0939	Bolin Chest Seal	1
6515-01-449-1016	Eye Shield, Fox	1
7520-00-312-6124	Marker, Tube Type	1

Warrior Aid and Litter Kit

The WALK (National Stock Number [NSN]: 6545-01-587-1199) offers an option for a vehicle life-saving kit (see Figure 3-3).

The WALK allows first-aid treatment and immediate evacuation of one patient in a casualty evacuation (CASEVAC) vehicle and treatment of multiple trauma patients at the point of injury (POI). The total weight of the WALK is 29 pounds, 15 ounces.

The system holds the TALON II 90C quad-fold litter and a pocket-system containing medical supplies (see Figure 3-4). The WALK contains a Hypothermia Prevention and Management Kit (HPMK) to help stabilize patients during transport. The WALK also includes the following:

- Five pairs Black Talon nitrile trauma gloves
- Two nasopharyngeal airways, size 28F with lubricant
- One casualty equipment bag
- Two HyFin chest seals
- Two ARS needle decompression kits, 14 gauge by 3.25 inch
- Two combat application tourniquets
- Six trauma dressings, 6 inch
- Four rolls of S-rolled gauze, 4.5 inch by 4.1 yards
- One abdominal emergency trauma dressing
- Two SAM Splint IIs
- One pair of trauma shears, 7.25 inch
- One roll surgical tape, 2 inch
- One role multipurpose tape
- Six polycarbonate eye shields
- One Combat Casualty Reference Card
- Two Combat Casualty Cards (Triage)
- One aviation panel (Recognition, Orange)
- Four tie-down straps (universal litter)

The WALK fits into any standard or nonstandard CASEVAC asset and is useful as part of the prepositioning of medical supplies or cache on a forward operating base, casualty collection point, or at a patrol base.



Figure 3-3. WALK



Figure 3-4. TALON II 90C quad-fold litter

Sked Basic Rescue System

The Sked (NSN: 6545-01-537-7904) is a semirigid litter that utilizes a sled design to allow the evacuator to continue returning fire as the casualty is evacuated. It is used for confined space, high angle, or technical rescue and provides patient protection while allowing the litter bearers to have their hands free for weapons and security.

The Sked is equipped for horizontal hoisting by helicopter or vertical hoisting in caves or industrial confined spaces. When the patient is packaged, the litter becomes rigid. The Sked is rolled for storage in a backpack, which is included with the system. The Sked litter system is 17 pounds.



Figure 3-5. Sked



Figure 3-6. Casualty evacuation using the Sked

M9 Medical Aid Bag

The M9 Medical Aid Bag (NSN 6545-01-539-6448) is in the Department of Defense inventory. It has been modified to decrease the silhouette of an aid bag and the personnel carrying this product. Due to the variety of aid bags available, the M9 is easily acquired and restocked by military logistics. This bag can be utilized mounted or dismounted.



Figure 3-7. M9 Medical Aid Bag



Figure 3-8. M9 Medical Aid Bag interior

Table 3-3. M9 Medical Aid Bag contents

National Stock No.	Item	No. Per Kit
6545-01-572-9964	Medical Equipment Set (MES) Combat Medic	1
4240-01-568-3219	Strap Cutter, Combat	1
6510-00-926-8884	Surgical Adhesive Tape	1
6510-00-935-5823	Elastic Bandage, 6 inch by 4.5 yards	4
6510-01-492-2275	Bandage Kit, Elastic	4
6510-01-503-2117	Bandage Gauze, 4.1 yards.	4
6510-01-519-8421	Occlusive Dressings, 5s	1
6510-01-519-9253	Surgical Sponges, 40s	1
6510-01-532-8930	Bandage, Elastic, 16 by 12 inches	1
6510-01-562-3325	Bandage Gauze, Impregnated	6
6510-01-571-9729	Compress and Bandage	2

Table 3-3. M9 Medical Aid Bag contents (continued)

National Stock No.	Item	No. Per Kit
6510-01-573-0300	Chest Seal Dressing	4
6510-01-587-6579	Burn First Dressing	2
6515-00-9357138	Bandage Scissors	1
6515-01-314-6694	Stethoscope Comb, 28 inch	1
6515-01-449-1016	Rigid Eye Shield, Fox12	4
6515-01-494-1951	Universal Splint	2
6515-01-515-0151	Tool Kit Rescue Oropharyngeal Airway	1
6515-01-5162554	Easy Fit Suction Kit	1
6515-01-5163120	Easy Suction Catheter	1
6515-01-519-6764	Surgical Drainage Tubes, 6s	1
6515-01-521-3082	Pharyngeal Airway, 2s	2
6515-01-521-5730	Leg Splint	1
6515-01-5217976	Non-Pneumatic Tourniquet	6
6515-01-527-8068	Medical Head Lamp	1
6515-01-529-1187	Nasal Trumpet	3
6515-01-536-9363	Intraosseous Infusion	2
6515-01-540-7226	Trauma Leash Shears	2
6515-01-541-0635	Needle Decompression	2
6515-01-557-1136	Oximeter Pulse Port	1
6515-01-573-0692	Cricothyrotomy Set	2
6515-01-593-4841	Resuscitator, Hand Open	1
6532-01-524-6932	Survival Blanket	1
6532-01-525-4062	Heating Blankets, 8s	1
6545-01-539-6450	Medical Aid Bag	1
7520-00-312-6124	Marker, Tube Type	1
8345-01-573-3304	Panel Marker	1

Chapter 4

MARCH/PAWS Treatment Algorithms

This chapter contains flow charts illustrating the proper use of Tactical Combat Casualty Care (TCCC) principles of MARCH/PAWS and best practices for conducting TCCC in a combat environment.

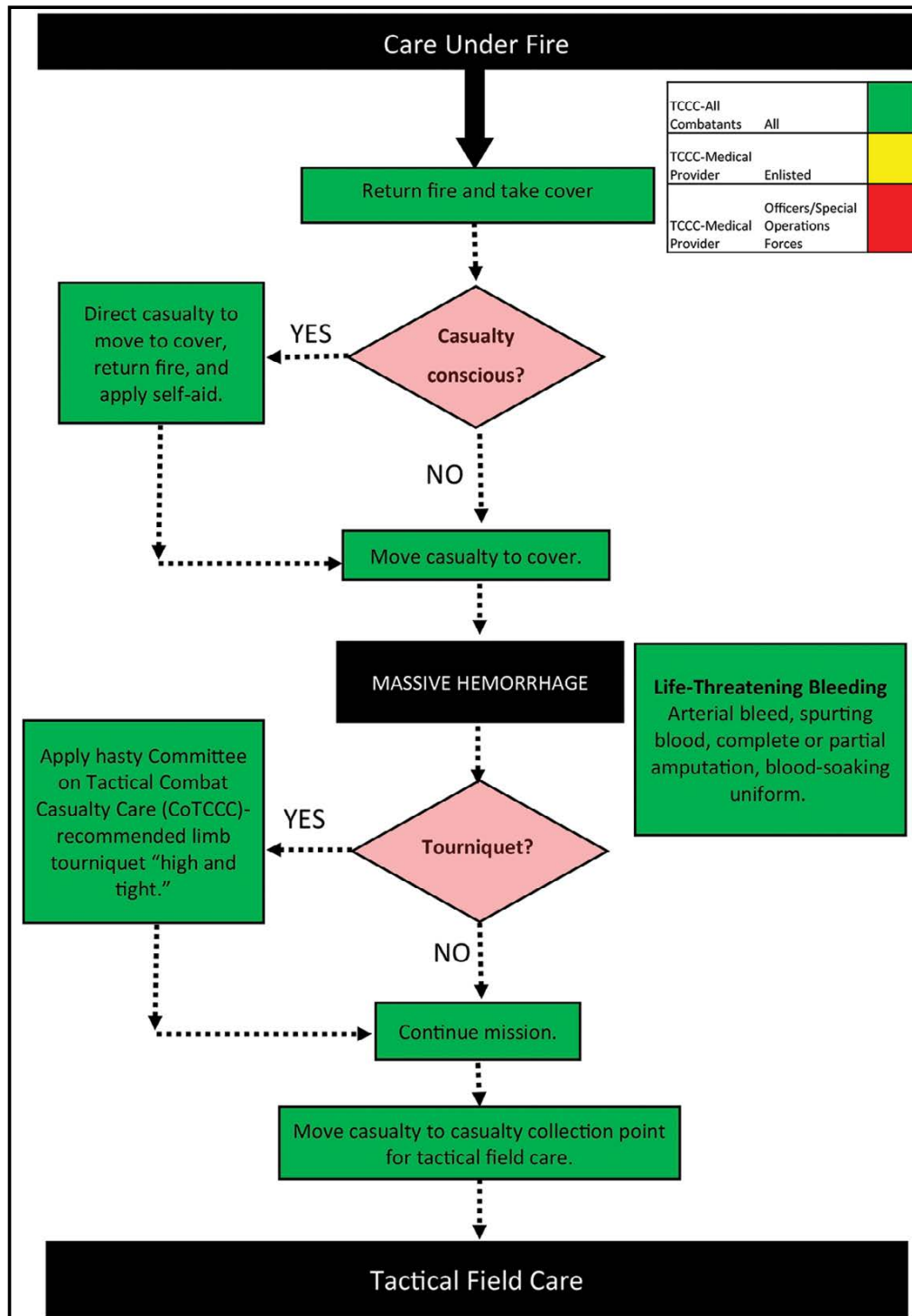


Figure 4-1

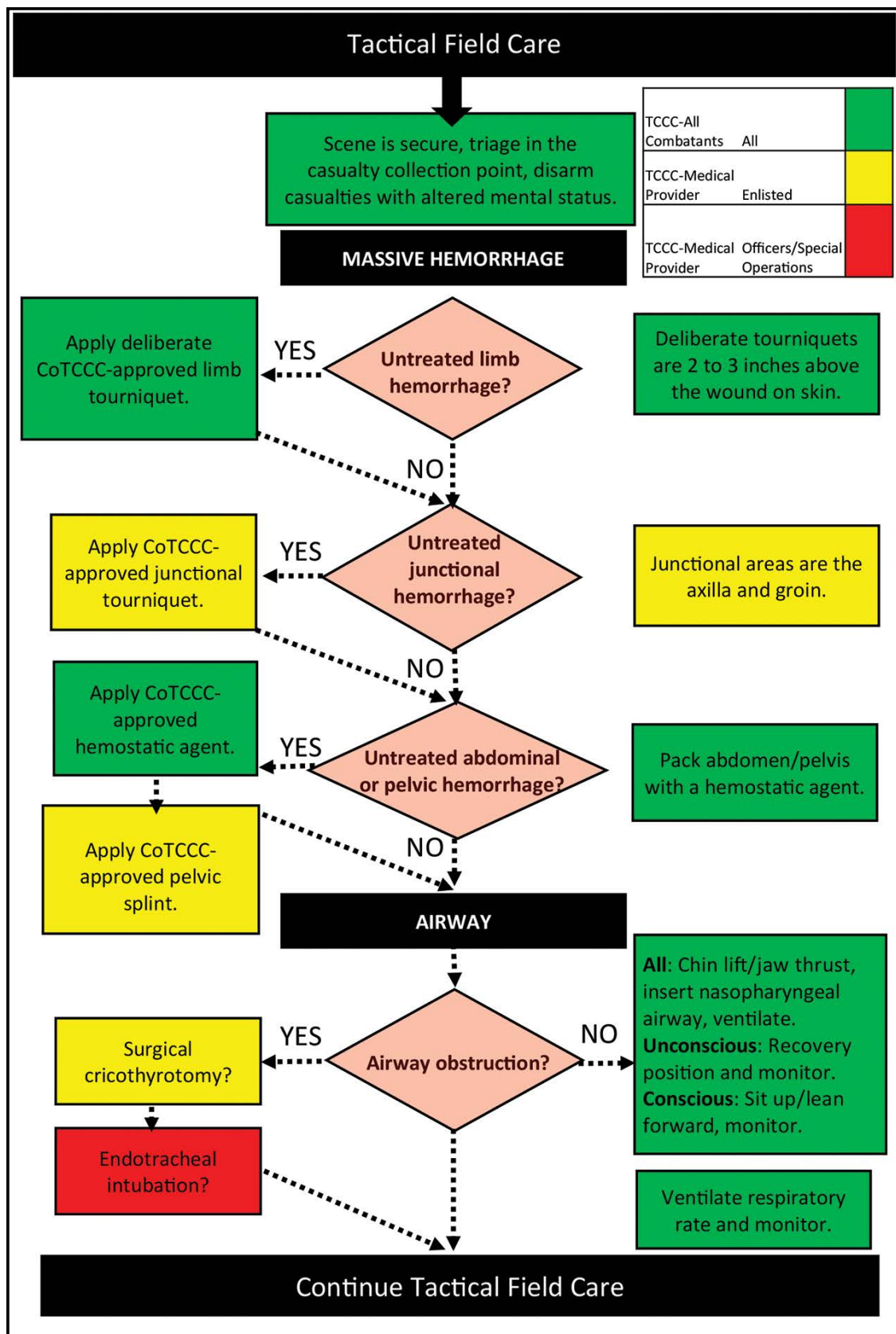


Figure 4-2

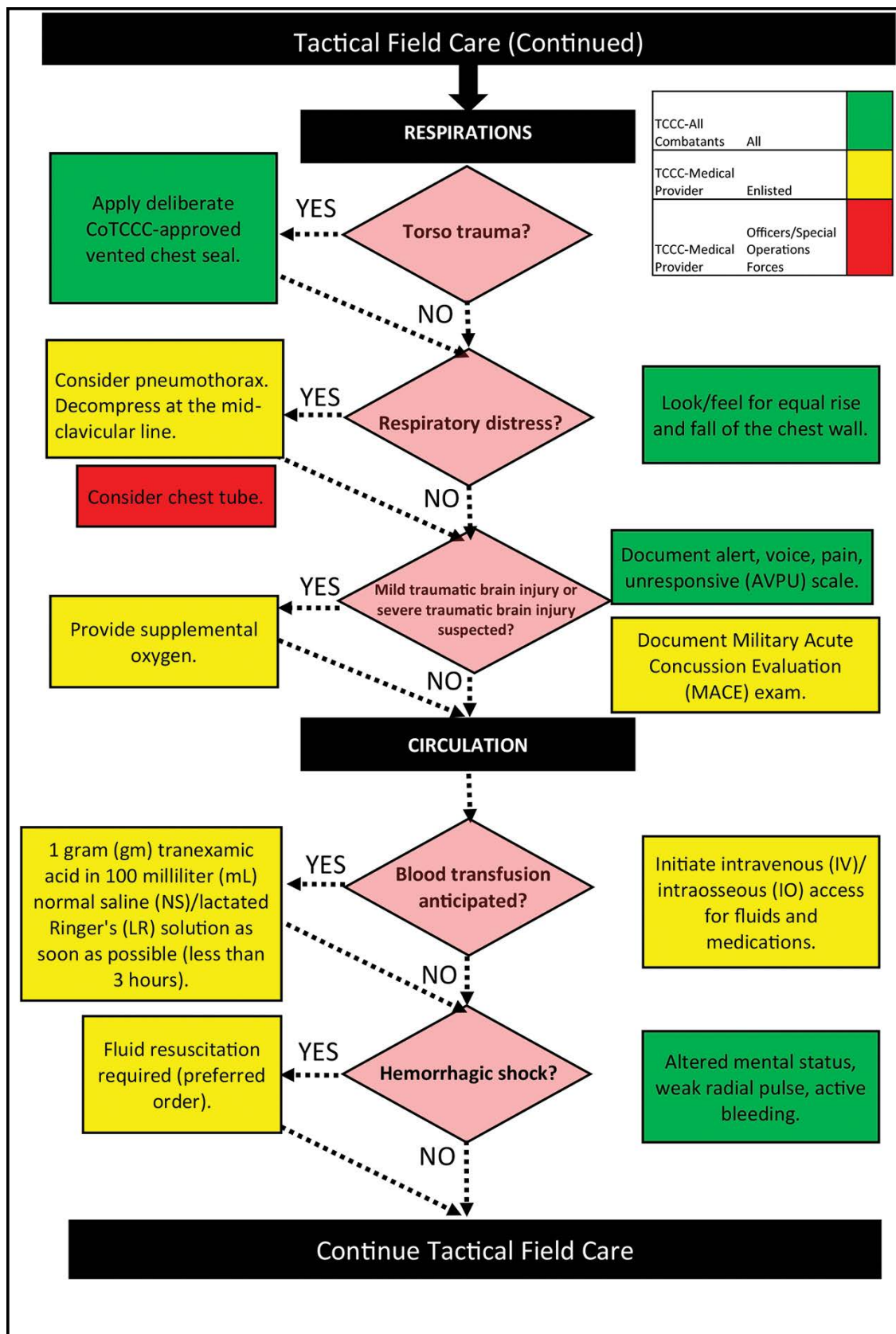


Figure 4-3

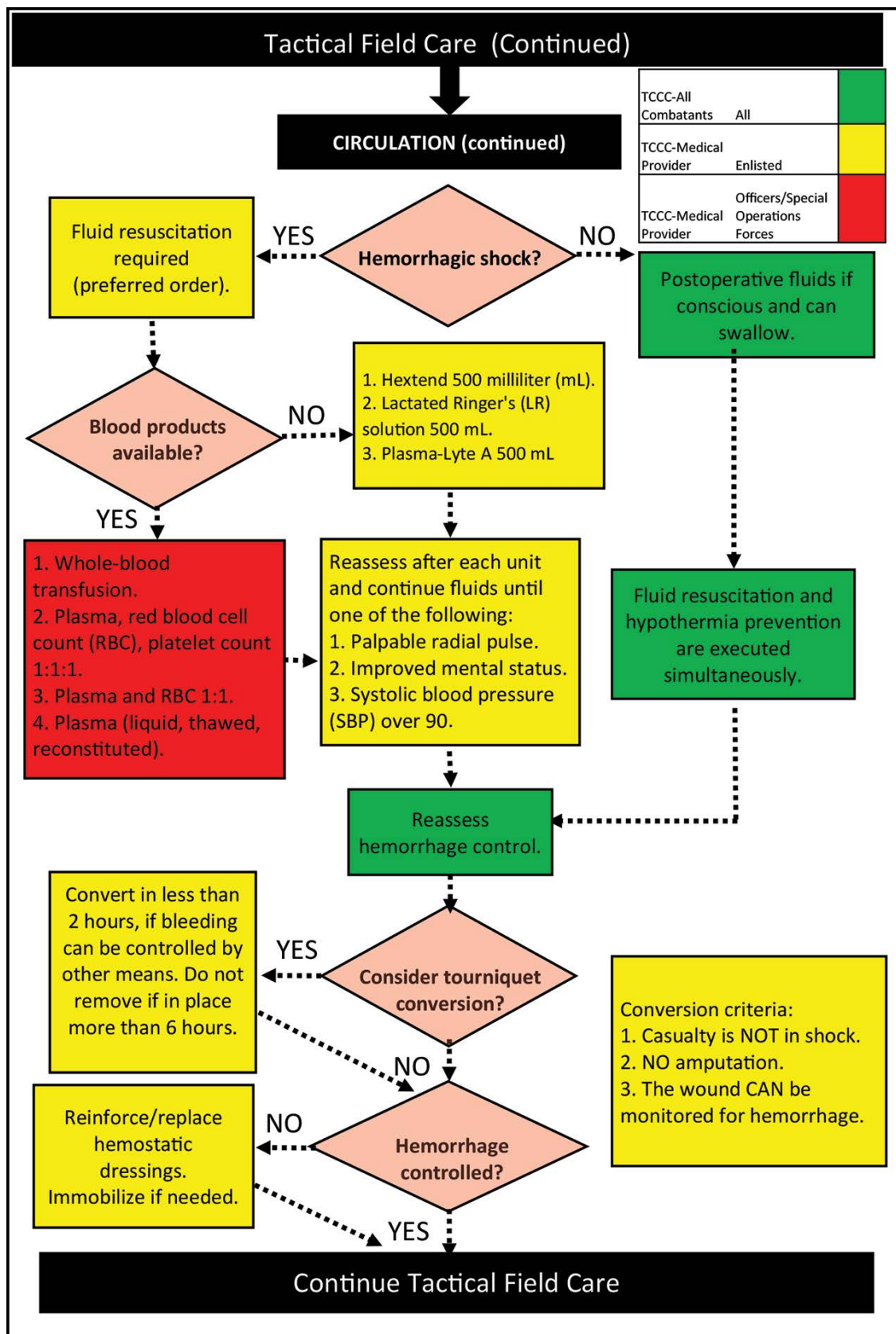


Figure 4-4

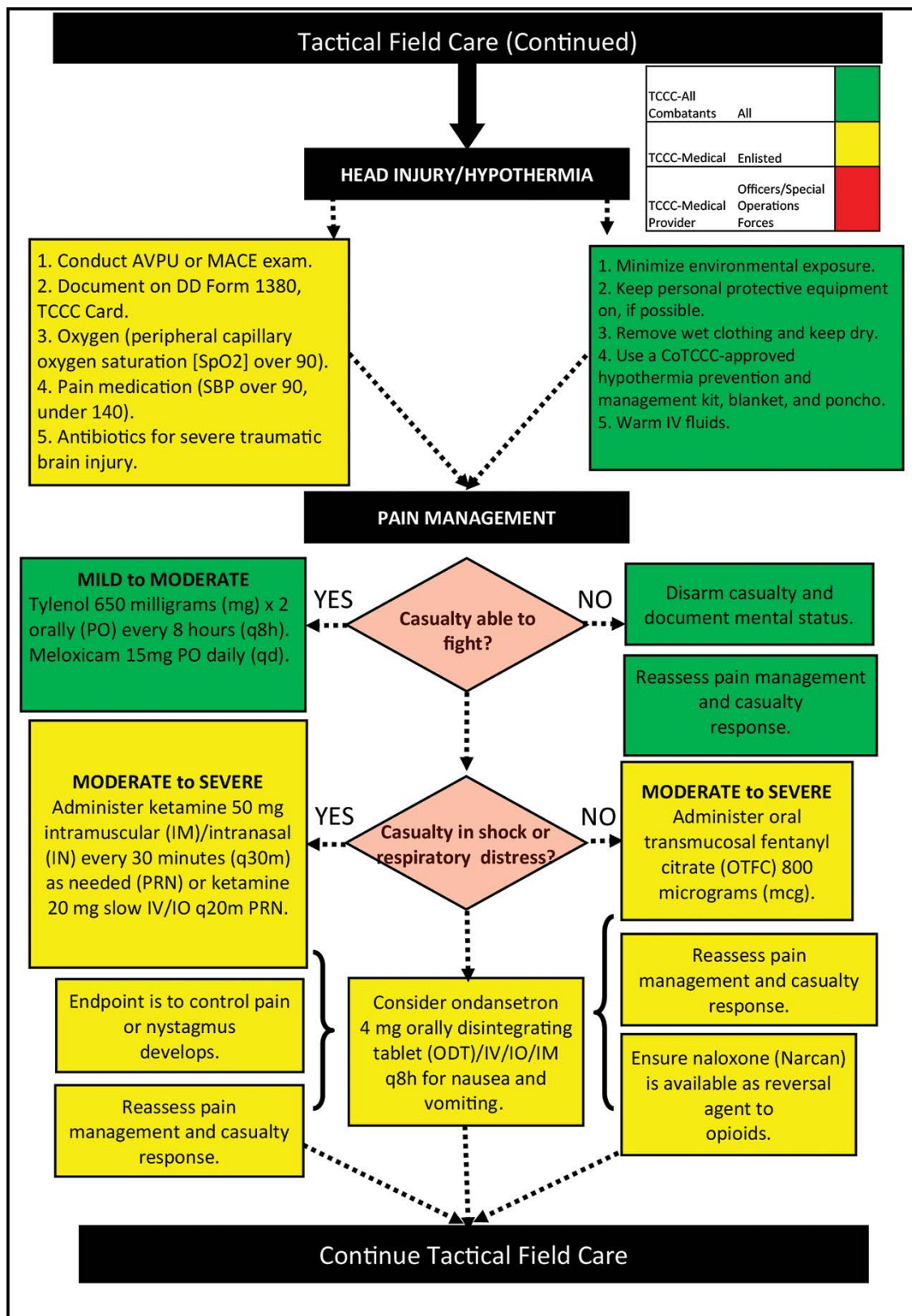


Figure 4-5

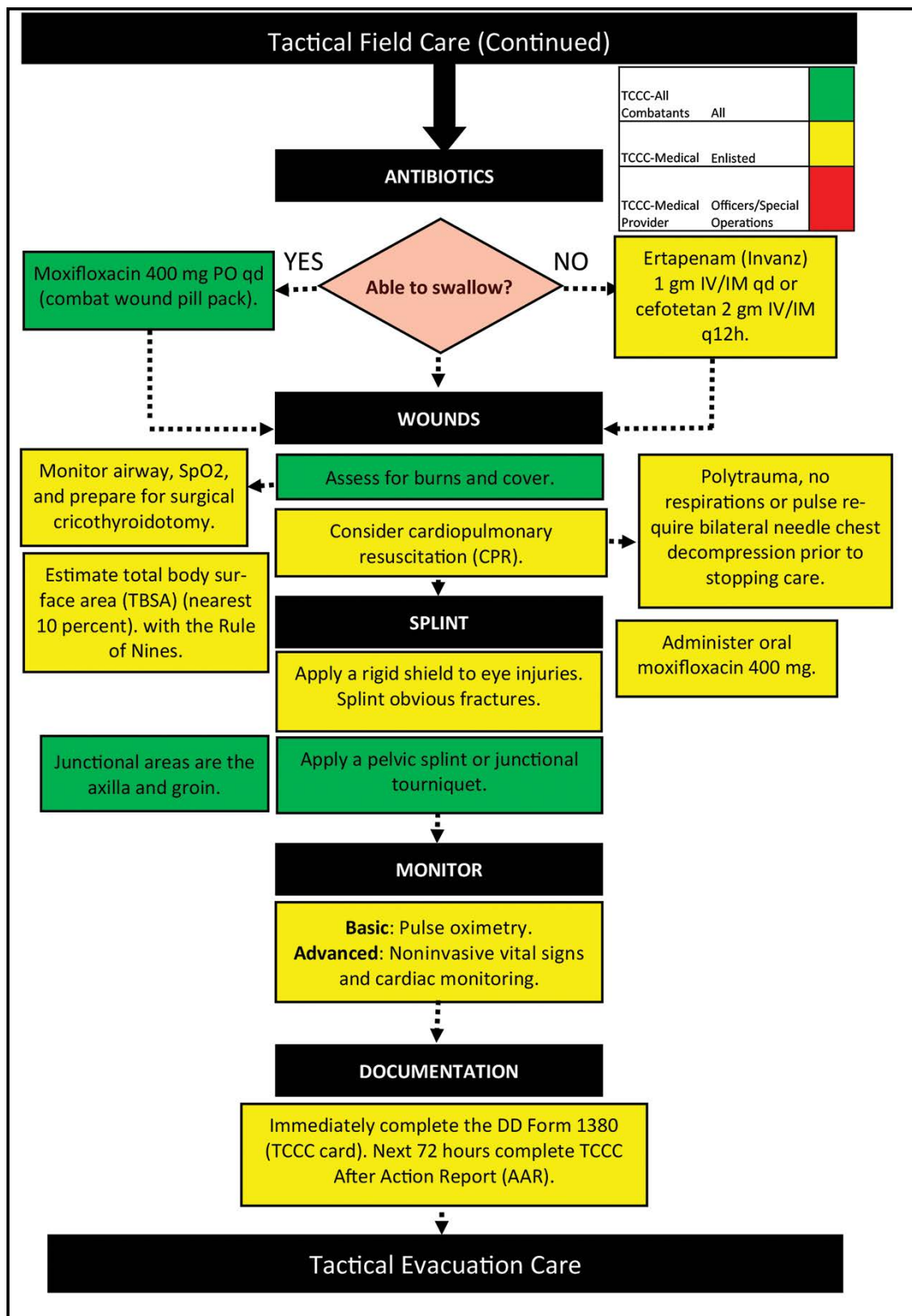


Figure 4-6

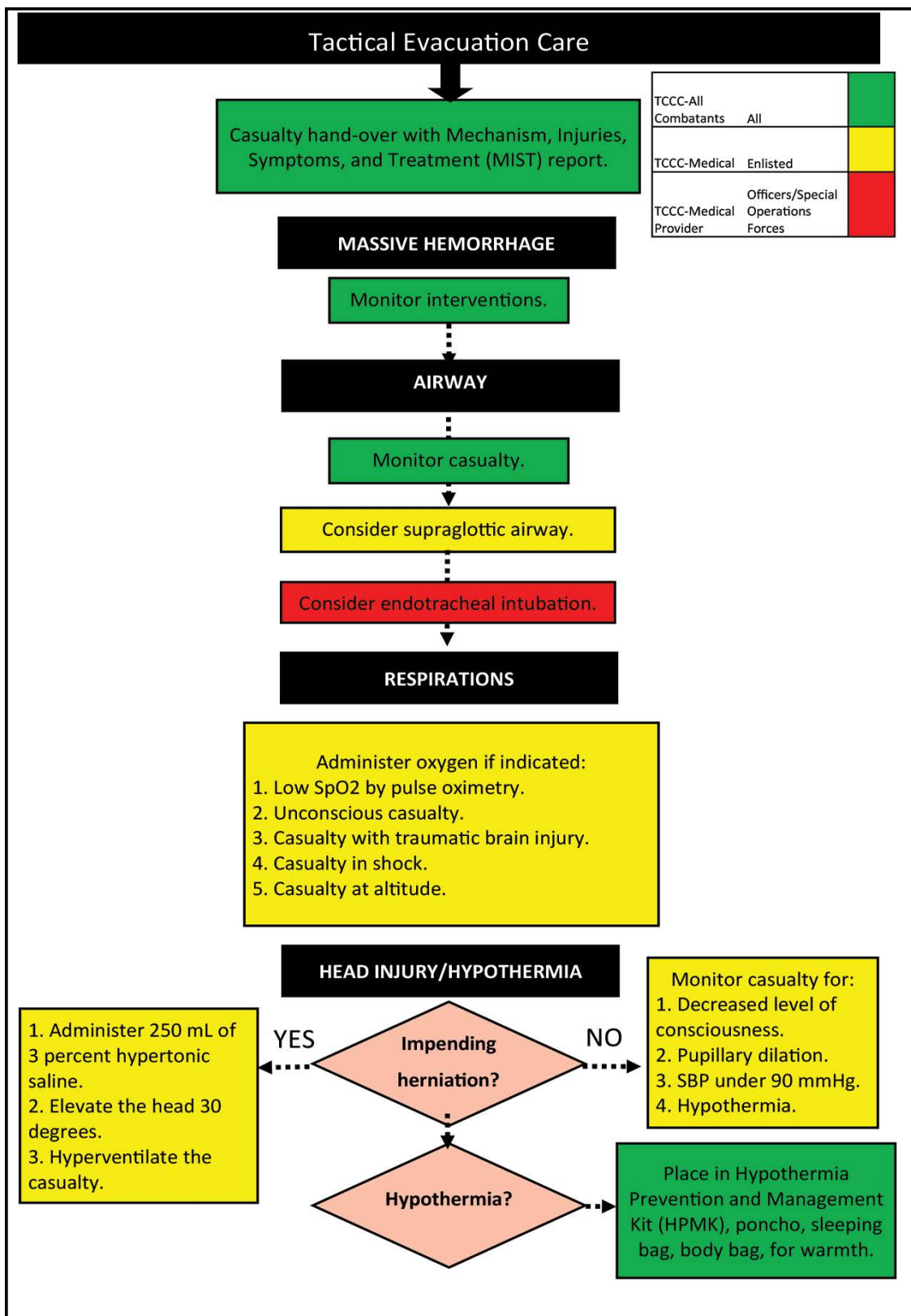


Figure 4-7

Chapter 5

Tactical Combat Casualty Care-All Combatants

Tactical Combat Casualty Care-All Combatants Training

The purpose of this chapter is to discuss training outcomes, provide resources, and aid in the execution of Tactical Combat Casualty Care-All Combatants (TCCC-AC). TCCC-AC is the TCCC course for non-medical personnel. The National Association of Emergency Medical Technicians (NAEMT) TCCC-AC training guidelines are standard for first responder training programs as stated by the Joint Trauma System and the Committee on Tactical Combat Casualty Care (CoTCCC). Medical personnel are the only authorized trainers for TCCC-AC courses. For guidelines, slides, and additional TCCC information, visit NAEMT online at http://www.naemt.org/education/TCCC/guidelines_curriculum or the Defense Health Agency at <http://www.health.mil/tccc>.

TCCC-AC curriculum. The TCCC-AC slides have scenarios, practical exercises, and videos. Instructor guides are available for each slide series.

- Conduct the TCCC-AC written pretest.
- View and review all slides with students.
- Conduct the TCCC-AC written posttest.

Skill station and practical exercises. The skills listed on the NAEMT website are within the scope of practice for a non-medical Service member. The NAEMT website provides documents for these skills, practical exercises incorporating these skills, and an evaluation tool for these skills.

- Conduct TCCC-AC skill-set training.
- Conduct TCCC-AC skill-set validation testing.
- Conduct a practical exercise trauma lane (optional).

Instructors. TCCC-AC instructors are personnel who successfully complete the Tactical Combat Casualty Care-Medical Provider (TCCC-MP) course. The online NAEMT instructor course takes approximately 6 hours. Upon completion, submit the NAEMT instructor application. An NAEMT TCCC-affiliate faculty member monitors the first TCCC course taught. TCCC-AC instruction is authorized in a 10:1 ratio according to CoTCCC guidelines.

- The criterion for becoming a military TCCC instructor is being a military medic, medical technician, corpsman, or other medical personnel (officer or enlisted) trained to conduct medicine in the Armed Services.
- Medical simulation and training centers are located at various Army installations and may have NAEMT TCCC-affiliate faculty designation.
- The Defense Medical Readiness and Training Institute also has NAEMT TCCC-affiliate faculty staff and offer mobile training team courses, which are listed on the Joint Knowledge Online website at <http://jko.jten.mil/>.

Trauma lane. The CoTCCC allows additional lane training for TCCC. A military operations on urbanized terrain (MOUT) or close-quarters combat site can be utilized (for example, an office space, boat, ship, or fuselage) that can offer realistic constraints (for example, difficult evacuation) to render care to casualties.

Tactical Combat Casualty Care-All Combatants Skill Sets

As of 02 June 2014, the CoTCCC requires TCCC-AC first responders to have specific skill sets to perform the following:

- Massive hemorrhage:
 - Apply direct pressure to the hemorrhage.
 - Apply a bandage to the hemorrhage.
 - Apply a pressure dressing to the hemorrhage.
 - Apply a tourniquet to an extremity hemorrhage.
 - Apply combat gauze to the hemorrhage.
- Airway:
 - Demonstrate the chin lift/jaw thrust maneuver on a casualty.
 - Insert a nasopharyngeal airway (NPA) to a casualty.
 - Place a casualty in the recovery position.
 - Demonstrate the sit up/lean forward airway position on a casualty.
- Respirations: Treat a sucking chest wound with a vented chest seal.
- Circulation: Assess a casualty for shock.

- Head injury/hypothermia:
 - Package the casualty with a Hypothermia Prevention and Management Kit (HPMK).
 - Treat penetrating eye injuries and demonstrate proper use of a rigid eye shield.
 - Discuss the appropriate administration of oral moxifloxacin.
- Casualty movement: Demonstrate effective casualty drags and manual carries.
- TCCC medications:
 - Administer oral analgesics (Tylenol, meloxicam) appropriately.
 - Administer oral antibiotics (moxifloxacin) appropriately.
- Splinting:
 - Demonstrate effective application of a rigid eye shield.
 - Demonstrate effective limb splinting.
- Burns: Manage burns by stopping the burning process and covering the casualty.
- Documentation: Correctly complete Department of Defense (DD) Form 1380, *Tactical Combat Casualty Care (TCCC) Card*, June 2014, for a casualty.

Tactical Combat Casualty Care-All Combatants Guidelines

Guidelines established by the CoTCCC are posted on the NAEMT website at <http://www.naemt.org/education/TCCC/tccc-ac>. These recommendations are intended to be guidelines only and are not a substitute for clinical judgment.

Care Under Fire Basic Management Plan

- Return fire and take cover.
- Direct or expect the casualty to remain engaged as a combatant, if appropriate.
- Direct the casualty to move to cover and apply self-aid, if able.
- Try to keep the casualty from sustaining additional wounds.

- Massive hemorrhage: Stop any life-threatening external hemorrhage, if tactically feasible:
 - Direct the casualty to control the hemorrhage by self-aid, if able.
 - Use a CoTCCC-recommended tourniquet for an extremity hemorrhage.
 - Move the casualty to cover.
- Airway management is generally best deferred until the tactical field care (TFC) phase.

Tactical Field Care Basic Management Plan

NOTE: Casualties with an altered mental status should be disarmed immediately.

- Massive hemorrhage:
 - Assess for an unrecognized hemorrhage and control all sources of bleeding.
 - Use one or more CoTCCC-recommended limb tourniquets, if necessary.
 - Use a CoTCCC-approved hemostatic dressing for compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal.
 - Immediately apply a CoTCCC-recommended junctional tourniquet if the bleeding site is amenable to use of a junctional tourniquet.
 - Reassess the prior tourniquet application:
 - * Expose the wound and determine if a tourniquet is needed.
 - * Replace any limb tourniquet placed over the uniform with one applied directly to the skin, 2 to 3 inches above the wound.
 - Expose and use an indelible marker to clearly mark all tourniquet sites with the time of tourniquet application.
- Airway management:
 - Conduct the following for an unconscious casualty without an airway obstruction:
 - * Chin lift/jaw thrust maneuver.

- * NPA.

- * Place the casualty in the recovery position (see Figure 5-1).

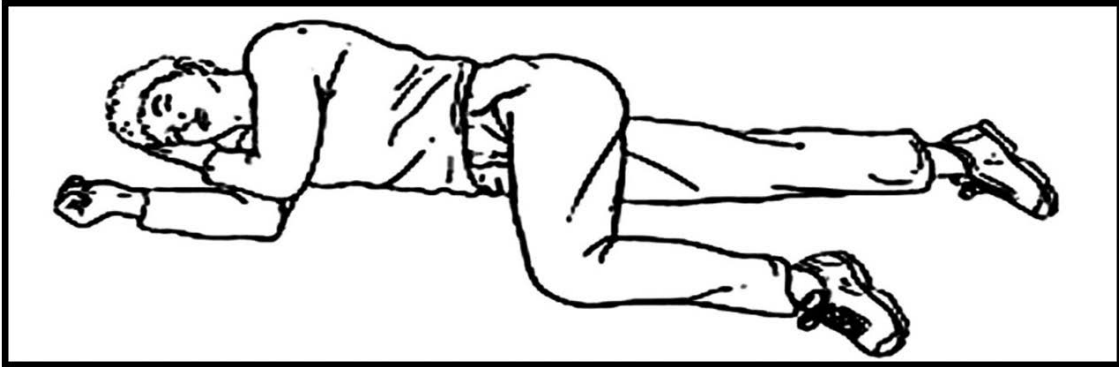


Figure 5-1. Recovery position

- Conduct the following for a casualty with an airway obstruction or impending airway obstruction:
 - * Chin lift/jaw thrust maneuver.
 - * NPA.
 - * Allow a conscious casualty to assume any position that best protects the airway to include sitting up.
 - * Place an unconscious casualty in the recovery position.
 - * If these measures are unsuccessful, refer to a medic immediately. Perform a surgical cricothyroidotomy using one of the following:
 - ◆ CricKey technique.
 - ◆ Bougie-aided open surgical technique.
 - ◆ Standard open surgical technique.
 - ◆ Lidocaine, if the casualty is conscious.
- Respirations:
 - For a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax.
 - All open and/or sucking chest wounds should be treated by:
 - * Immediately applying a vented chest seal to cover the defect.

- * If a vented chest seal is not available, use a non-vented chest seal.
 - * Burping or temporarily removing the dressing. If this does not relieve the respiratory distress, refer to a medic.
- Circulation:
 - Assess the casualty for hemorrhagic shock. If the casualty is not in shock, oral fluids are permissible if the casualty is conscious and can swallow.
 - If the casualty is in shock, refer to a medic.
- Hypothermia prevention:
 - Minimize casualty environmental exposure and promote heat retention.
 - Keep personal protective gear on, if feasible. Replace wet clothing, if possible. Get the casualty onto an insulated surface as soon as possible.
 - Use CoTCCC-approved hypothermia prevention kit, if available.
 - If a hypothermia prevention kit is not available, then use dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty warm and dry.
- Pain management: Analgesia on the battlefield should generally be achieved by one of following options:
 - If there is mild to moderate pain and/or the casualty is able to fight, give the casualty a TCCC combat wound pill pack (CWPP).
 - If there is moderate to severe pain and the casualty is not in shock, refer to a medic.
- Antibiotics (recommended for all open combat wounds):
 - If the casualty can swallow, administer 400 milligrams (mg) of moxifloxacin from the CWPP.
 - If the casualty cannot swallow (shock or unconsciousness), refer to a medic.
- Wounds:
 - Inspect and dress known wounds.
 - Check for additional wounds (for example, scalp lacerations).

- Splinting:
 - If a penetrating eye injury is noted or suspected, conduct the following:
 - * Cover the eye with a rigid eye shield and not a pressure patch.
 - * Administer 400 mg moxifloxacin from the CWPP.
 - Splint fractures.

Tactical Evacuation Care Basic Management Plan

NOTE: In addition to reassessing the principles of tactical field care (TFC), perform manual carries as needed (Warrior Aid and Litter Kit [WALK] or Sked).

Chapter 6

Tactical Combat Casualty Care-Medical Provider

Tactical Combat Casualty Care-Medical Provider Training

The purpose of this chapter is to discuss training outcomes, provide resources, and aid in the execution of Tactical Combat Casualty Care-Medical Provider (TCCC-MP). The National Association of Emergency Medical Technicians (NAEMT) TCCC-MP guidelines and training are the standard for enlisted and officer TCCC medical personnel training as stated by the Joint Trauma System and the Committee on Tactical Combat Casualty Care (CoTCCC). Medical personnel are highly encouraged to utilize the NAEMT TCCC-MP courses because they offer a credential sponsored by the American College of Surgeons and 16 continuing education hours. Visit the NAEMT website at http://www.naemt.org/education/TCCC/guidelines_curriculum or the Defense Health Agency website at <http://www.health.mil/tccc> for guidelines, slides, and additional TCCC information.

TCCC-MP curriculum. The TCCC-MP slides have scenarios, practical exercises, and videos. Instructor guides are available for each slide series.

- Conduct the TCCC-MP written pretest.
- View and review all slides with students.
- Conduct the TCCC-MP written posttest.

Skill station and practical exercises. The skills listed on the NAEMT website are within the scope of practice for a medically trained Service member. Located on the NAEMT site are documents for skills, practical exercises incorporating these skills, and an evaluation tool for each skill.

- Conduct TCCC-MP skill-set training.
- Conduct TCCC-MP skill-set validation test.
- Conduct a practical exercise trauma lane (optional).

Instructors. TCCC-MP instructors are personnel who successfully complete the TCCC-MP course, complete the 6-hour online NAEMT instructor course, submit the NAEMT instructor application, and have an NAEMT TCCC-affiliate faculty member monitor during the first TCCC course taught. TCCC instruction must be given in a 4:1 ratio according to NAEMT (Prehospital Trauma Life Support) guidelines.

- The criterion for becoming a military TCCC instructor is being any military medic, medical technician, corpsman, or other medical personnel (officer or enlisted) trained to conduct medicine in the Armed Services.
- Medical Simulation and Training Centers are located at various Army installations and may have NAEMT TCCC-affiliate faculty designation.
- The Defense Medical Readiness and Training Institute (DMRTI) also has NAEMT TCCC-affiliate faculty staff. DMRTI offers mobile training team courses listed on Joint Knowledge Online website at <http://jko.jten.mil/>.

Trauma lane. CoTCCC allows additional lane training for TCCC. A confined space can be utilized (for example, an office space, boat, ship, or fuselage) that can offer realistic constraints (for example, difficult evacuation) to render care to casualties.

Tactical Combat Casualty Care-Medical Provider Skill Set

As of 02 June 2014, the CoTCCC requires TCCC-MP medical enlisted personnel (medics, medical technicians, corpsmen, medical officers, or operating room special operations medics) to have specific skill sets to perform the following (unless otherwise noted):

- Massive hemorrhage:
 - Apply direct pressure to the hemorrhage.
 - Apply a bandage to the hemorrhage.
 - Apply a pressure dressing to the hemorrhage.
 - Apply a tourniquet to an extremity hemorrhage.
 - Apply Combat Gauze to the hemorrhage.
 - Apply a pelvic splint.
- Airway:
 - Demonstrate the chin lift/jaw thrust maneuver on a casualty.
 - Insert a nasopharyngeal airway (NPA) to a casualty.
 - Place a casualty in the recovery position.
 - Demonstrate the sit up/lean forward airway position on a casualty.

- Demonstrate the insertion of a supraglottic airway.
- Demonstrate a surgical airway (cricothyroidotomy).
- Demonstrate endotracheal intubation (medical officers and operating room special operations medics).
- Respirations:
 - Treat a sucking chest wound with a chest seal.
 - Demonstrate a needle chest decompression (NCD).
 - Demonstrate insertion of a chest tube (medical officers and operating room special operations medics).
 - Demonstrate oxygen administration.
- Circulation:
 - Assess for shock.
 - Initiate an intravenous (IV) access/saline lock.
 - Initiate an intraosseous (IO) access.
 - Demonstrate IV/IO fluid resuscitation.
 - Demonstrate the use of IV/IO analgesics.
 - Demonstrate the use of IV/IO tranexamic acid (TXA).
 - Demonstrate the use of IV/IO antibiotics.
 - Demonstrate the use of IV/IO blood product administration (medical officers and operating room special operations medics).
- Head injury/hypothermia:
 - Demonstrate the Hypothermia Prevention and Management Kit (HPMK).
 - Treat penetrating eye injuries:
 - * Demonstrate the proper use of a rigid eye shield.
 - * Discuss appropriate administration of oral moxifloxacin.
- Casualty movement: Demonstrate effective casualty drags, manual carries, use of a Talon litter (in the Warrior Aid and Litter Kit [WALK]) and Sked stretcher.

- TCCC medications:
 - Administer oral analgesics (Tylenol, moxifloxacin) appropriately.
 - Administer oral antibiotics appropriately.
 - Administer oral transmucosal fentanyl citrate (OTFC) appropriately.
 - Administer intramuscular (IM) antibiotics appropriately.
 - Administer intranasal (IN), IM, IV, or IO ketamine appropriately.
 - Administer IV or IO morphine appropriately.
- Fractures:
 - Demonstrate effective splinting with a rigid eye shield.
 - Demonstrate effective splinting with a pelvic splint.
 - Demonstrate effective limb splinting.
- Burns:
 - Manage burns by stopping the burning process and covering the casualty.
 - Cover the burn injuries.
 - Initiate the burn-fluid resuscitation procedures.
- Documentation: Correctly complete Department of Defense (DD) Form 1380, *Tactical Combat Casualty Care (TCCC) Card*, June 2014.
- Monitoring: Demonstrate the use of mission-appropriate electronic monitoring devices (pulse oximeter, Zoll monitor/defibrillator, Propaqmonitor, etc.).

Tactical Combat Casualty Care-Medical Provider Guidelines

As of 11 November 2015, the guidelines established by the CoTCCC are posted on the NAEMT website at <http://www.naemt.org/education/TCCC/tccc-ac>. These recommendations are intended to be guidelines only and are not a substitute for clinical judgment.

Care Under Fire Basic Management Plan

- Return fire and take cover.
- Direct or expect the casualty to remain engaged as a combatant, if appropriate.
- Direct the casualty to move to cover and apply self-aid, if able.
- Keep the casualty from sustaining additional wounds.
- Massive hemorrhage:
 - Stop a life-threatening external hemorrhage, if tactically feasible.
 - Direct the casualty to control the hemorrhage by self-aid, if possible.
 - Use a CoTCCC-recommended tourniquet for an extremity hemorrhage.
 - Move the casualty to cover.
- Airway management is generally best deferred until the tactical field care (TFC) phase.

Tactical Field Care Basic Management Plan

NOTE: Casualties with an altered mental status should be disarmed immediately.

- Massive hemorrhage:
 - Assess the casualty for an unrecognized hemorrhage and control all sources of the bleeding.
 - Use one or more CoTCCC-recommended limb tourniquets, if necessary.

- Use a CoTCCC-approved hemostatic dressing for a compressible hemorrhage not amenable to a limb tourniquet use or as an adjunct to tourniquet removal:
 - * Combat Gauze, Celox Gauze, or ChitoGauze (abdomen or pelvis).
 - * Special Operations Forces only: XStat sponges (deep, narrow-tract, junctional wounds).
- Immediately apply a CoTCCC-recommended junctional tourniquet if the bleeding site is amenable to use of a junctional tourniquet.
- Reassess the prior tourniquet application by doing the following:
 - * Expose the wound and determine if a tourniquet is needed.
 - * Replace any limb tourniquet placed over the uniform with one applied directly to the skin, 2 to 3 inches above the wound.
- Airway management:
 - For an unconscious casualty without airway obstruction, perform the following:
 - * Chin lift/jaw thrust maneuver.
 - * NPA.
 - * Place the casualty in the recovery position (see Figure 6-1).

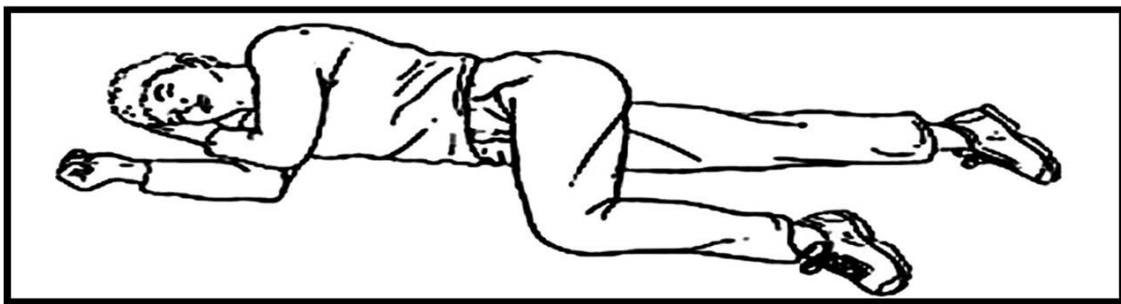


Figure 6-1. Recovery position

- For a casualty with an airway obstruction or impending airway obstruction, perform the following:
 - * Chin lift/jaw thrust maneuver.
 - * NPA.

- * Allow a conscious casualty to assume any position that best protects the airway to include sitting up.
- * Place an unconscious casualty in the recovery position.
- Respiration:
 - For a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and NCD on the side of the injury:
 - * Remove the plastic cap from the 3.25 inch, 14-gauge needle.
 - * Insert the needle into the skin over the superior border of the third rib, mid-clavicular line, and direct the needle into the second intercostal space at a 90 degree angle.
 - * As the needle enters the pleural space, a “pop” will be felt. If a “hiss” of air is heard, ensure that the needle is advanced all the way to the hub.
 - * Remove the needle, leaving the catheter in place.
 - * Stabilize the catheter hub to the chest wall with 1/2 inch gauze tape.
 - Each open and/or sucking chest wound is treated by:
 - * Immediately applying a vented chest seal to cover the defect.
 - * If a vented chest seal is not available, use a non-vented chest seal.
 - * If respiratory distress ensues, burp or temporarily remove the dressing. If there is no improvement, consider an NCD.
- Circulation:
 - Control of bleeding takes precedence over infusing fluids. Start an 18-gauge IV or saline lock, if indicated.
 - An IO device is an alternative route for administering fluids when fluid resuscitation is required and IV access cannot be obtained.
 - Give 1 gm of TXA as soon as feasible to casualties in or at risk of hemorrhagic shock.

- Clinical signs of shock on the battlefield are (1) unconsciousness or altered mental status not due to coexisting traumatic brain injury (TBI) or drug therapy, and/or (2) abnormal radial pulse. If the casualty is not in shock, oral fluids are permissible if the casualty is conscious and can swallow. If the casualty is in shock, resuscitate with whole blood, freeze-dried plasma, or 500 milliliter (ml) bolus of Hextend. The casualty should then be observed for 30 minutes. If there is insufficient clinical improvement, a second 500 mL bolus of Hextend should then be administered in a similar manner. Do not administer more than 1,000 ml of Hextend.
- Convert limb tourniquets and junctional tourniquets if the following three criteria are met:
 - * The casualty is not in shock.
 - * It is possible to monitor the wound closely for bleeding.
 - * The tourniquet is not being used to control bleeding from an amputation.
- Do not attempt to remove a tourniquet if the anticipated evacuation time is less than 2 hours or the casualty is in shock.
- Resuscitate the casualty frequently until there is a palpable radial pulse, improved mental status, or a systolic blood pressure (SBP) of 90 millimeter of mercury (mmHG) is present. Discontinue fluids when one or more points are achieved.
- Reassess the casualty every 15 minutes for recurrence of shock. If shock recurs, verify all hemorrhages are under control and repeat fluid resuscitation as above.
- Hypothermia prevention:
 - Minimize casualty environmental exposure and promote heat retention.
 - Keep personal protective gear on, if feasible. Replace wet clothing, if possible. Get the casualty onto an insulated surface as soon as possible. Use CoTCCC-approved hypothermia prevention kit, if available. If not available, use dry blankets, poncho liners, sleeping bags, or any heat-retaining item and keep the casualty warm and dry.
 - Warm IV fluids, if possible.

- Casualties with both shock and TBI should receive IV or IO fluids until the radial pulse is restored, which corresponds to an SBP of approximately 70 mmHg.
- Pain management:
 - Analgesia on the battlefield should generally be achieved by one of the three following options:
 - * If there is mild to moderate pain and/or the casualty is able to fight, give the casualty the TCCC combat wound pill pack (CWPP).
 - * If there is moderate to severe pain and the casualty is not in shock, administer 800 micrograms (mcg) of OTFC.
 - * If there is moderate to severe pain and the casualty is in shock, administer 50 milligrams (mg) of ketamine IM or IN every 30 minutes, as needed, or administer 20 mg of ketamine by slow IV or IO push every 20 minutes, as needed.
 - **NOTE:** The endpoint control of pain for ketamine is an eye nystagmus. Consider 4 mg of ondansetron (Zofran) by IV, IO, or IM every 8 hours for nausea and vomiting.
- Antibiotics: Antibiotics are recommended for all open combat wounds.
 - If the casualty can swallow, administer 400 mg of moxifloxacin, from the combat wound pill pack (CWPP).
 - If the casualty cannot swallow (because of shock or if unconsciousness), administer 1 gram (gm) ertapenem (Invanz) by IV or IM.
- Wounds:
 - Inspect and dress known wounds.
 - Check for additional wounds (for example, scalp lacerations).
- Splinting:
 - Conduct the following for splinting a penetrating eye trauma:
 - * Perform a rapid field test of the casualty's visual acuity.
 - * Cover the eye with a rigid eye shield and not a pressure patch.

- * Administer 400 mg moxifloxacin from the CWPP if the casualty can swallow. If the casualty cannot swallow, administer IV or IM antibiotics.
- For fractures, apply a pelvic splint for lower extremity traumatic amputation, vehicle rollover, or building collapse.
- Monitoring: Utilize pulse oximetry as an adjunct to clinical monitoring.
- Communication and documentation: Communicate with the casualty and the next higher Role of care. Use the TCCC Casualty Card to record care. The TCCC Card is formatted in the MIST (mechanism of injury, injuries, signs/symptoms, and treatment) Report. The MIST Report is a standardized patient hand-over.
- Cardiopulmonary resuscitation (CPR):
 - Battlefield blast or penetrating trauma casualties with no pulse, no respirations, and no other signs of life should not be resuscitated.
 - Casualties with torso trauma or polytrauma and no pulse or respirations should have bilateral NCD performed to confirm or deny pneumothorax prior to discontinuing resuscitation.
- Burns:
 - Facial burns should be aggressively monitored for airway status and potential inhalation injury.
 - Estimate total body surface area (TBSA) burned to the nearest 10 percent, utilizing the Rule of Nines. (See Figure 6-2.)

Rule of Nines

Estimate the TBSA that has been burned on an adult by using multiples of 9. The percentage of the body involved can be calculated as follows:

Head = 9%

Chest (front) = 9%

Abdomen (front) = 9%

Upper/mid/low back and buttocks = 18%

Each arm = 9% (front = 4.5%, back = 4.5%)

Groin = 1%

Each leg = 18% total (front = 9%, back = 9%)

Figure 6-2. Rule of Nines

- Cover burned areas with dry, sterile dressings. For burns over 20 percent TBSA, consider placing the casualty into an HPMK, body bag, or alternative.
- United States Army Institute of Surgical Research Rule of Ten fluid resuscitation (calculate the TBSA of the burns to the nearest 10 percent):
 - * For burns over 20 percent of TBSA, initiate IV or IO fluids as soon as possible with lactated Ringers (LR), normal saline (NS), or Hextend solution.
 - * If Hextend solution is used, use no more than 1,000 ml followed by LR or NS, as needed.

Tactical Evacuation Care Basic Management Plan

NOTE: In addition to the principles of tactical field care (TFC), consider the following for tactical evacuation care:

- Massive hemorrhage: Continually reassess all tourniquets and bandages for bleeding from vehicular vibrations.

- Airway management: Consider the following for a casualty with a current or impending airway obstruction:
 - Supraglottic airway (King LT, iGel, etc.).
 - Endotracheal intubation (suction, Tube Tamer, bag-valve mask, bougie, GlideScope).
- Respirations:
 - Consider a chest tube insertion if the casualty has no improvement and/or if a long transport is anticipated.
 - Administer oxygen when possible for the following types of casualties:
 - * Low oxygen saturation by pulse oximetry (shock, chest wound, etc.).
 - * Injuries associated with impaired oxygenation.
 - * An unconscious casualty.
 - * A casualty with TBI (maintain oxygen saturation over 90 percent).
 - * Casualty at altitude (over 5,000 feet above sea level).
- Circulation: Continuously reassess IV or IO access for patency and security.
- Head injury/hypothermia:
 - Casualties with moderate to severe (penetrating) TBI should be monitored for:
 - * Decreases in level of consciousness.
 - * Pupillary dilation.
 - * SBP over 90 mmHg or mean arterial pressure over 60.
 - * Oxygen saturation (pulse oximetry) over 90 percent.
 - * Hypothermia (core temperature under 96 F [35.5 C]).
 - * Partial pressure of carbon dioxide (if capnography is available, maintained between 35 to 40 mmHg).

- * For a penetrating head trauma, administer antibiotics (ertapenam, 1 gm).
- * Assume a C-spine injury until cleared.
- If impending herniation is suspected, take the following actions:
 - * Administer 250 ml of 3 percent or 5 percent hypertonic saline bolus by IV or IO.
 - * Elevate the casualty's head 30 degrees.
 - * Control pain even in an unconscious patient (no morphine).
 - * Hyperventilate the casualty (bag-valve mask ventilation rate of 14 to 20).
- Package the casualty in an HPMK or equivalent Blizzard Survival Blanket, poncho, sleeping bag, etc.

