

Tactical Combat Casualty Care Guidelines

17 September 2012

* All changes to the guidelines made since those published in the 2010 Seventh Edition of the PHTLS Manual are shown in **bold text**. The most recent changes are shown in **bold blue text**.

Basic Management Plan for Care Under Fire

1. Return fire and take cover.
2. Direct or expect casualty to remain engaged as a combatant if appropriate.
3. Direct casualty to move to cover and apply self-aid if able.
4. Try to keep the casualty from sustaining additional wounds.
5. Casualties should be extricated from burning vehicles or buildings and moved to places of relative safety. Do what is necessary to stop the burning process.
6. Airway management is generally best deferred until the Tactical Field Care phase.
7. Stop *life-threatening* external hemorrhage if tactically feasible:
 - Direct casualty to control hemorrhage by self-aid if able.
 - Use a CoTCCC-recommended tourniquet for hemorrhage that is anatomically amenable to tourniquet application.
 - Apply the tourniquet proximal to the bleeding site, over the uniform, tighten, and move the casualty to cover.

Basic Management Plan for Tactical Field Care

1. Casualties with an altered mental status should be disarmed immediately.
2. Airway Management
 - a. Unconscious casualty without airway obstruction:
 - Chin lift or jaw thrust maneuver
 - Nasopharyngeal airway
 - Place casualty in the recovery position
 - b. Casualty with airway obstruction or impending airway obstruction:
 - Chin lift or jaw thrust maneuver
 - Nasopharyngeal airway
 - Allow casualty to assume any position that best protects the airway, to include sitting up.
 - Place unconscious casualty in the recovery position.
 - If previous measures unsuccessful:
 - Surgical cricothyroidotomy (with lidocaine if conscious)
3. Breathing
 - a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart. **An acceptable alternate site is the 4th or 5th intercostal space at the anterior axillary line (AAL).**
 - b. All open and/or sucking chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.
 - c. **Casualties with moderate/severe TBI should be given supplemental oxygen when available to maintain an oxygen saturation > 90%.**
4. Bleeding
 - a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet application or for any traumatic amputation. Apply directly to the skin 2-3 inches above wound.
 - b. For compressible hemorrhage not amenable to tourniquet use or as an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), use Combat Gauze as the hemostatic agent of choice. Combat Gauze should be applied

with at least 3 minutes of direct pressure. Before releasing any tourniquet on a casualty who has been resuscitated for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation if there is no traumatic brain injury (TBI). **If a lower extremity wound is not amenable to tourniquet application and cannot be controlled by hemostatics/dressings, consider immediate application of mechanical direct pressure including CoTCCC recommended devices such as the Combat Ready Clamp (CRoC).**

- c. Reassess prior tourniquet application. Expose wound and determine if tourniquet is needed. If so, move tourniquet from over uniform and apply directly to skin 2-3 inches above wound. If a tourniquet is not needed, use other techniques to control bleeding.
- d. When time and the tactical situation permit, a distal pulse check should be accomplished. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.
- e. Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

5. Intravenous (IV) access

- Start an 18-gauge IV or saline lock if indicated.
- If resuscitation is required and IV access is not obtainable, use the intraosseous (IO) route.

6. Tranexamic Acid (TXA)

If a casualty is anticipated to need significant blood transfusion (for example: presents with hemorrhagic shock, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding)

- **Administer 1 gram of tranexamic acid in 100 cc Normal Saline or Lactated Ringers as soon as possible but NOT later than 3 hours after injury.**
- **Begin second infusion of 1 gm TXA after Hextend or other fluid treatment.**

*** Note: Per the Assistant Secretary of Defense for Health Affairs memo dated 4 November 2011, use of TXA outside of fixed medical facilities is limited to the Special Operations community.**

7. Fluid resuscitation

Assess for hemorrhagic shock; altered mental status (in the absence of head injury) and weak or absent peripheral pulses are the best field indicators of shock.

- a. If not in shock:
 - No IV fluids necessary

- PO fluids permissible if conscious and can swallow

b. If in shock:

- Hextend, 500-mL IV bolus
- Repeat once after 30 minutes if still in shock.
- No more than 1000 mL of Hextend

c. Continued efforts to resuscitate must be weighed against logistical and tactical considerations and the risk of incurring further casualties.

d. If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate as necessary to maintain a palpable radial pulse.

8. Prevention of hypothermia

a. Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.

b. Replace wet clothing with dry if possible. **Get the casualty onto an insulated surface as soon as possible.**

c. Apply the Ready-Heat Blanket from the Hypothermia Prevention and Management Kit (HPMK) to the casualty's torso (not directly on the skin) and cover the casualty with the Heat-Reflective Shell (HRS).

d. If an HRS is not available, the previously recommended combination of the Blizzard Survival Blanket and the Ready Heat blanket may also be used.

e. If the items mentioned above are not available, use dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.

f. Warm fluids are preferred if IV fluids are required.

9. Penetrating Eye Trauma

If a penetrating eye injury is noted or suspected:

- a) Perform a rapid field test of visual acuity.
- b) Cover the eye with a rigid eye shield (NOT a pressure patch.)
- c) Ensure that the 400 mg moxifloxacin tablet in the combat pill pack is taken if possible and that IV/IM antibiotics are given as outlined below if oral moxifloxacin cannot be taken.

10. Monitoring

Pulse oximetry should be available as an adjunct to clinical monitoring. **All individuals with moderate/severe TBI should be monitored with pulse oximetry.** Readings may be misleading in the settings of shock or marked hypothermia.

11. Inspect and dress known wounds.

12. Check for additional wounds.

13. Provide analgesia as necessary.

NOTE: Ketamine must not be used if the casualty has suspected penetrating eye injury or significant TBI (evidenced by penetrating brain injury or head injury with altered level of consciousness).

a. Able to fight:

These medications should be carried by the combatant and self-administered as soon as possible after the wound is sustained.

- Mobic, 15 mg PO once a day
- Tylenol, 650-mg bilayer caplet, 2 PO every 8 hours

b. Unable to fight:

Note: Have naloxone readily available whenever administering opiates.

- Does not otherwise require IV/IO access
- Oral transmucosal fentanyl citrate (OTFC), 800 µg transbucally
 - Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure
 - Reassess in 15 minutes
 - Add second lozenge, in other cheek, as necessary to control severe pain
 - Monitor for respiratory depression

OR

- **Ketamine 50-100mg IM**
 - **Repeat dose every 30 minutes to 1 hour as necessary to control severe pain or until the casualty develops nystagmus (rhythmic eye movement back and forth)**

OR

- **Ketamine 50 mg intranasal (using nasal atomizer device)**
 - **Repeat dose every 30 minutes to 1 hour as necessary to control severe pain or until the casualty develops nystagmus**

- IV or IO access obtained:
- Morphine sulfate, 5 mg IV/IO
 - Reassess in 10 minutes.
 - Repeat dose every 10 minutes as necessary to control severe pain.
 - Monitor for respiratory depression

OR

- **Ketamine 20 mg slow IV/IO push over 1 minute**
 - **Reassess in 5-10 minutes.**
 - **Repeat dose every 5-10 minutes as necessary to control severe pain or until the casualty develops nystagmus**
 - **Continue to monitor for respiratory depression and agitation**

- Promethazine, 25 mg IV/IM/IO every 6 hours as needed for nausea or for synergistic analgesic effect

Note: Narcotic analgesia should be avoided in casualties with respiratory distress, decreased oxygen saturation, shock, or decreased level of consciousness.

14. Splint fractures and recheck pulse.

15. Antibiotics: recommended for all open combat wounds

a. If able to take PO:

- Moxifloxacin, 400 mg PO one a day

b. If unable to take PO (shock, unconsciousness):

- Cefotetan, 2 g IV (slow push over 3-5 minutes) or IM every 12 hours

or

- Ertapenem, 1 g IV/IM once a day

16. Burns

a. Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.

b. Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.

c. Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Heat-Reflective Shell or Blizzard Survival Blanket from the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.

d. Fluid resuscitation (USAISR Rule of Ten)

– If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer's, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer's or normal saline as needed.

– Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40- 80 kg.

– For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.

– If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the TCCC Guidelines in Section 6.

e. Analgesia in accordance with the TCCC Guidelines in Section 12 may be administered to treat burn pain.

f. Prehospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per the TCCC guidelines in Section 14 if indicated to prevent infection in penetrating wounds.

g. All TCCC interventions can be performed on or through burned skin in a burn casualty.

17. Communicate with the casualty if possible.

- Encourage; reassure
- Explain care

18. Cardiopulmonary resuscitation (CPR)

Resuscitation on the battlefield for victims of blast or penetrating trauma who have no pulse, no ventilations, and no other signs of life will not be successful and should not be attempted. **However, casualties with torso trauma or polytrauma who have no pulse or respirations during TFC should have bilateral needle decompression performed to ensure they do not have a tension pneumothorax prior to discontinuation of care. The procedure is the same as described in section 3 above.**

19. Documentation of Care

Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Casualty Card. Forward this information with the casualty to the next level of care.

Basic Management Plan for Tactical Evacuation Care

* The term “Tactical Evacuation” includes both Casualty Evacuation (CASEVAC) and Medical Evacuation (MEDEVAC) as defined in Joint Publication 4-02.

1. Airway Management

- a. Unconscious casualty without airway obstruction:
 - Chin lift or jaw thrust maneuver
 - Nasopharyngeal airway
 - Place casualty in the recovery position
- b. Casualty with airway obstruction or impending airway obstruction:
 - Chin lift or jaw thrust maneuver
 - Nasopharyngeal airway
 - Allow casualty to assume any position that best protects the airway, to include sitting up.
 - Place unconscious casualty in the recovery position.
 - If above measures unsuccessful:
 - **Supraglottic airway** or
 - Endotracheal intubation or
 - Surgical cricothyroidotomy (with lidocaine if conscious).
- c. Spinal immobilization is not necessary for casualties with penetrating trauma.

2. Breathing

- a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart. **An acceptable alternate site is the 4th or 5th intercostal space at the anterior axillary line (AAL).**
- b. Consider chest tube insertion if no improvement and/or long transport is anticipated.
- c. Most combat casualties do not require supplemental oxygen, but administration of oxygen may be of benefit for the following types of casualties:
 - Low oxygen saturation by pulse oximetry
 - Injuries associated with impaired oxygenation
 - Unconscious casualty
 - Casualty with TBI (maintain oxygen saturation > 90%)
 - Casualty in shock
 - Casualty at altitude
- d. All open and/or sucking chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.

3. Bleeding

- a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet application or for any traumatic amputation. Apply directly to the skin 2-3 inches above wound.
- b. For compressible hemorrhage not amenable to tourniquet use or as an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), use Combat Gauze as the hemostatic agent of choice. Combat Gauze should be applied with at least 3 minutes of direct pressure. Before releasing any tourniquet on a casualty who has been resuscitated for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation if there is no TBI.) **If a lower extremity wound is not amenable to tourniquet application and cannot be controlled by hemostatics/dressings, consider immediate application of mechanical direct pressure including CoTCCC recommended devices such as the Combat Ready Clamp (CRoC).**
- c. Reassess prior tourniquet application. Expose wound and determine if tourniquet is needed. If so, move tourniquet from over uniform and apply directly to skin 2-3 inches above wound. If a tourniquet is not needed, use other techniques to control bleeding.
- d. When time and the tactical situation permit, a distal pulse check should be accomplished. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.
- e. Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

4. Intravenous (IV) access

- a. Reassess need for IV access.
 - If indicated, start an 18-gauge IV or saline lock
 - If resuscitation is required and IV access is not obtainable, use intraosseous (IO) route.

5. Tranexamic Acid (TXA)

If a casualty is anticipated to need significant blood transfusion (for example: presents with hemorrhagic shock, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding)

- **Administer 1 gram of tranexamic acid in 100 cc Normal Saline or Lactated Ringers as soon as possible but NOT later than 3 hours after injury.**

- **Begin second infusion of 1 gm TXA after Hextend or other fluid treatment.**

*** Note: Per the Assistant Secretary of Defense for Health Affairs memo dated 4 November 2011, use of TXA outside of fixed medical facilities is limited to the Special Operations community.**

6. Traumatic Brain Injury

a. Casualties with moderate/severe TBI should be monitored for:

- 1) Decreases in level of consciousness
- 2) Pupillary dilation
- 3) SBP should be >90 mmHg
- 4) O2 sat > 90
- 5) Hypothermia
- 6) PCO2 (If capnography is available, maintain between 35-40 mmHg)
- 7) Penetrating head trauma (if present, administer antibiotics)
- 8) Assume a spinal (neck) injury until cleared

b. Unilateral pupillary dilation accompanied by a decreased level of consciousness may signify impending cerebral herniation; if these signs occur, take the following actions to decrease intracranial pressure:

- 1) Administer 250 cc of 3 or 5% hypertonic saline bolus.
- 2) Elevate the casualty's head 30 degrees.
- 3) Hyperventilate the casualty.
 - a) Respiratory rate 20
 - b) Capnography should be used to maintain the end-tidal CO2 between 30-35
 - c) The highest oxygen concentration (FIO2) possible should be used for hyperventilation.

Notes:

- Do not hyperventilate unless signs of impending herniation are present.
- Casualties may be hyperventilated with oxygen using the bag-valve-mask technique.

7. Fluid resuscitation

Reassess for hemorrhagic shock (altered mental status in the absence of brain injury and/or change in pulse character.) **If BP monitoring is available, maintain target systolic BP 80-90 mmHg.**

a. If not in shock:

- No IV fluids necessary.
- PO fluids permissible if conscious and can swallow.

b. If in shock and blood products are not available:

- Hextend 500-mL IV bolus
- Repeat after 30 minutes if still in shock.
- **Continue resuscitation with Hextend or crystalloid solution as needed to maintain target BP or clinical improvement.**

- c. **If in shock and blood products are available under an approved command or theater protocol:**
 - **Resuscitate with 2 units of plasma followed by packed red blood cells (PRBCs) in a 1:1 ratio. If blood component therapy is not available, transfuse fresh whole blood. Continue resuscitation as needed to maintain target BP or clinical improvement.**
- d. **If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate as necessary to maintain a palpable radial pulse. If BP monitoring is available, maintain target systolic BP of at least 90 mmHg.**

8. Prevention of hypothermia

- a. Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.
- b. Replace wet clothing with dry if possible. **Get the casualty onto an insulated surface as soon as possible.**
- c. **Apply the Ready-Heat Blanket from the Hypothermia Prevention and Management Kit (HPMK) to the casualty's torso (not directly on the skin) and cover the casualty with the Heat-Reflective Shell (HRS).**
- d. **If an HRS is not available, the previously recommended combination of the Blizzard Survival Blanket and the Ready Heat blanket may also be used.**
- e. If the items mentioned above are not available, use poncho liners, sleeping bags or anything that will retain heat and keep the casualty dry.
- f. **Use a portable fluid warmer capable of warming all IV fluids including blood products.**
- g. Protect the casualty from wind if doors must be kept open.

9. Penetrating Eye Trauma

If a penetrating eye injury is noted or suspected:

- a) Perform a rapid field test of visual acuity.
- b) Cover the eye with a rigid eye shield (NOT a pressure patch).
- c) Ensure that the 400 mg moxifloxacin tablet in the combat pill pack is taken if possible and that IV/IM antibiotics are given as outlined below if oral moxifloxacin cannot be taken.

10. Monitoring

Institute pulse oximetry and other electronic monitoring of vital signs, if indicated.
All individuals with moderate/severe TBI should be monitored with pulse oximetry.

11. Inspect and dress known wounds if not already done.

12. Check for additional wounds.

13. Provide analgesia as necessary.

NOTE: Ketamine must not be used if the casualty has suspected penetrating eye injury or significant TBI (evidenced by penetrating brain injury or head injury with altered level of consciousness).

a. Able to fight:

These medications should be carried by the combatant and self-administered as soon as possible after the wound is sustained.

- Mobic, 15 mg PO once a day
- Tylenol, 650-mg bilayer caplet, 2 PO every 8 hours

b. Unable to fight:

Note: Have naloxone readily available whenever administering opiates.

- Does not otherwise require IV/IO access
- Oral transmucosal fentanyl citrate (OTFC), 800 µg transbucally
- Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure
- Reassess in 15 minutes
- Add second lozenge, in other cheek, as necessary to control severe pain
- Monitor for respiratory depression

OR

- Ketamine 50-100mg IM

- Repeat dose every 30 minutes to 1 hour as necessary to control severe pain or until the casualty develops nystagmus (rhythmic eye movement back and forth)**

OR

- Ketamine 50 mg intranasal (using nasal atomizer device)

- Repeat dose every 30 minutes to 1 hour as necessary to control severe pain or until the casualty develops nystagmus**

- IV or IO access obtained:

- Morphine sulfate, 5 mg IV/IO

- Reassess in 10 minutes.
- Repeat dose every 10 minutes as necessary to control severe pain.
- Monitor for respiratory depression

OR

- Ketamine 20 mg slow IV/IO push over 1 minute

- Reassess in 5-10 minutes.**
- Repeat dose every 5-10 minutes as necessary to control severe pain or until the casualty develops nystagmus**
- Continue to monitor for respiratory depression and agitation**

- Promethazine, 25 mg IV/IM/IO every 6 hours as needed for nausea or for synergistic analgesic effect

Note: Narcotic analgesia should be avoided in casualties with respiratory distress, decreased oxygen saturation, shock, or decreased level of consciousness.

14. Reassess fractures and recheck pulses.

15. Antibiotics: recommended for all open combat wounds

a. If able to take PO:

- Moxifloxacin, 400 mg PO once a day

b. If unable to take PO (shock, unconsciousness):

- Cefotetan, 2 g IV (slow push over 3-5 minutes) or IM every 12 hours,

or

- Ertapenem, 1 g IV/IM once a day

16. Burns

a. Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.

b. Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.

c. Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Heat-Reflective Shell or Blizzard Survival Blanket from the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.

d. Fluid resuscitation (USAISR Rule of Ten)

– If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer's, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer's or normal saline as needed.

– Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40-80 kg.

– For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.

– If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the TCCC Guidelines in Section 5.

e. Analgesia in accordance with TCCC Guidelines in Section 11 may be administered to treat burn pain.

f. Prehospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per TCCC guidelines in Section 13 if indicated to prevent infection in penetrating wounds.

g. All TCCC interventions can be performed on or through burned skin in a burn casualty.

h. Burn patients are particularly susceptible to hypothermia. Extra

emphasis should be placed on barrier heat loss prevention methods and IV fluid warming in this phase.

17. The Pneumatic Antishock Garment (PASG) may be useful for stabilizing pelvic fractures and controlling pelvic and abdominal bleeding. Application and extended use must be carefully monitored. The PASG is contraindicated for casualties with thoracic or brain injuries.

18. CPR in TACEVAC Care

a. Casualties with torso trauma or polytrauma who have no pulse or respirations during TACEVAC should have bilateral needle decompression performed to ensure they do not have a tension pneumothorax. The procedure is the same as described in section 2 above.

b. CPR may be attempted during this phase of care if the casualty does not have obviously fatal wounds and will be arriving at a facility with a surgical capability within a short period of time. CPR should not be done at the expense of compromising the mission or denying lifesaving care to other casualties.

19. Documentation of Care

Document clinical assessments, treatments rendered, and changes in casualty's status on a TCCC Casualty Card. Forward this information with the casualty to the next level of care.