

# Tactical Combat Casualty Care Guidelines for Medical Personnel

11 November 2015

\* All changes to the guidelines made since the 150603 annual curriculum update are shown in **red text**.

\* These recommendations are intended to be guidelines only and are not a substitute for clinical judgment.

## **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 limb tourniquet for hemorrhage that is anatomically amenable to tourniquet use.
  - Apply the limb tourniquet over the uniform clearly proximal to the bleeding site(s). If the site of the life-threatening bleeding is not readily apparent, place the tourniquet “high and tight” (as proximal as possible) on the injured limb 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.
  - c. If the previous measures are unsuccessful, perform a surgical cricothyroidotomy using one of the following:
    - Cric-Key technique (Preferred option)
    - Bougie-aided open surgical technique using a flanged and cuffed airway cannula of less than 10 mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intratracheal length
    - Standard open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intra-tracheal length (Least desirable option)
    - Use lidocaine if the casualty is 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 4<sup>th</sup> or 5<sup>th</sup> intercostal space at the anterior axillary line (AAL).
  - b. 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. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.
  - 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 **limb** tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet **use** or for any traumatic

- amputation. Apply directly to the skin 2-3 inches above the wound. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.
- b. For compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal, use Combat Gauze™ as the CoTCCC hemostatic dressing of choice.

**Alternative hemostatic adjuncts:**

- Celox Gauze or
- ChitoGauze or
- XStat™ (Best for deep, narrow-tract junctional wounds)

**Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XStat™). Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied.**

If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

- c. Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If it is, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2-3 inches above wound. Ensure that bleeding is stopped. When possible, a distal pulse should be checked. If bleeding persists or a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side-by-side with the first to eliminate both bleeding and the distal pulse.
- d. Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock; it is possible to monitor the wound closely for bleeding; and the tourniquet is not being used to control bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability are available.
- 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.

## 7. Fluid resuscitation

- a. The resuscitation fluids of choice for casualties in hemorrhagic shock, listed from most to least preferred, are: whole blood\*; plasma, RBCs and platelets in 1:1:1 ratio\*; plasma and RBCs in 1:1 ratio; plasma or RBCs alone; Hextend; and crystalloid (Lactated Ringers or Plasma-Lyte A).
- b. Assess for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse).
  1. If not in shock:
    - No IV fluids are immediately necessary.
    - Fluids by mouth are permissible if the casualty is conscious and can swallow.
  2. If in shock and blood products are available under an approved command or theater blood product administration protocol:
    - Resuscitate with whole blood\*, or, if not available
    - Plasma, RBCs and platelets in a 1:1:1 ratio\*, or, if not available
    - Plasma and RBCs in 1:1 ratio, or, if not available;
    - Reconstituted dried plasma, liquid plasma or thawed plasma alone or RBCs alone;
    - Reassess the casualty after each unit. Continue resuscitation until a palpable radial pulse, improved mental status or systolic BP of 80-90 mmHg is present.
  3. If in shock and blood products are not available under an approved command or theater blood product administration protocol due to tactical or logistical constraints:
    - Resuscitate with Hextend, or if not available;
    - Lactated Ringers or Plasma-Lyte A;
    - Reassess the casualty after each 500 mL IV bolus;
    - Continue resuscitation until a palpable radial pulse, improved mental status, or systolic BP of 80-90 mmHg is present.
    - Discontinue fluid administration when one or more of the above end points has been achieved.
  4. If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate as necessary to restore and maintain a normal radial pulse. If BP monitoring is available, maintain a target systolic BP of at least 90 mmHg.
  5. Reassess the casualty frequently to check for recurrence of shock. If shock recurs, recheck all external hemorrhage control measures to ensure that they are still effective and repeat the fluid resuscitation as outlined above.

\* Neither whole blood nor apheresis platelets as these products are currently collected in theater are FDA-compliant. Consequently, whole blood and 1:1:1 resuscitation using apheresis platelets should be used only if all of the FDA-compliant blood products needed to support 1:1:1 resuscitation are not available, or if 1:1:1 resuscitation is not producing the desired clinical effect.

## 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. Analgesia on the battlefield should generally be achieved using one of three options:

##### Option 1

Mild to Moderate Pain

Casualty is still able to fight

- TCCC Combat pill pack:
- Tylenol - 650-mg bilayer caplet, 2 PO every 8 hours
- Meloxicam - 15 mg PO once a day

##### Option 2

Moderate to Severe Pain

Casualty IS NOT in shock or respiratory distress AND

Casualty IS NOT at significant risk of developing either condition

- Oral transmucosal fentanyl citrate (OTFC) 800 ug
- Place lozenge between the cheek and the gum
- Do not chew the lozenge

##### Option 3

Moderate to Severe Pain

Casualty IS in hemorrhagic shock or respiratory distress OR

Casualty IS at significant risk of developing either condition

- Ketamine 50 mg IM or IN
- Or
- Ketamine 20 mg slow IV or IO

- \* Repeat doses q30min prn for IM or IN
- \* Repeat doses q20min prn for IV or IO
- \* End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes)

\* Analgesia notes

- a. Casualties may need to be disarmed after being given OTFC or ketamine.
- b. Document a mental status exam using the AVPU method prior to administering opioids or ketamine.
- c. For all casualties given opioids or ketamine – monitor airway, breathing, and circulation closely
- d. Directions for administering OTFC:
  - Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure OR utilizing a safety pin and rubber band to attach the lozenge (under tension) to the patient's uniform or plate carrier.
  - Reassess in 15 minutes
  - Add second lozenge, in other cheek, as necessary to control severe pain
  - Monitor for respiratory depression
- e. IV Morphine is an alternative to OTFC if IV access has been obtained
  - 5 mg IV/IO
  - Reassess in 10 minutes.
  - Repeat dose every 10 minutes as necessary to control severe pain.
  - Monitor for respiratory depression.
- f. Naloxone (0.4 mg IV or IM) should be available when using opioid analgesics.
- g. Both ketamine and OTFC have the potential to worsen severe TBI. The combat medic, corpsman, or PJ must consider this fact in his or her analgesic decision, but if the casualty is able to complain of pain, then the TBI is likely not severe enough to preclude the use of ketamine or OTFC.
- h. Eye injury does not preclude the use of ketamine. The risk of additional damage to the eye from using ketamine is low and maximizing the casualty's chance for survival takes precedence if the casualty is in shock or respiratory distress or at significant risk for either.
- i. Ketamine may be a useful adjunct to reduce the amount of opioids required to provide effective pain relief. It is safe to give ketamine to a casualty who has previously received morphine or OTFC. IV Ketamine should be given over 1 minute.
- j. If respirations are noted to be reduced after using opioids or ketamine, provide ventilatory support with a bag-valve-mask or mouth-to-mask ventilations.
- k. Ondansetron, 4 mg ODT/IV/IO/IM, every 8 hours as needed for nausea or vomiting. Each 8-hour dose can be repeated once at 15 minutes if nausea and vomiting are not improved. Do not give more than 8 mg in any 8-hour interval. Oral ondansetron is NOT an acceptable alternative to the ODT formulation.
- l. Reassess – reassess – reassess!

14. Splint fractures and re-check pulses.

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 7.
- e. Analgesia in accordance with the TCCC Guidelines in Section 13 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 15 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 3a above.

19. Documentation of Care

Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Casualty Card (DD Form 1380). 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 the previous measures are unsuccessful, assess the tactical and clinical situations, the equipment at hand, and the skills and experience of the person providing care, and then select one of the following airway interventions:
    - Supraglottic airway, or
    - Endotracheal intubation or
    - Perform a surgical cricothyroidotomy using one of the following:
      - Cric-Key technique (Preferred option)
      - Bougie-aided open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7mm internal diameter, and 5-8 cm of intra-tracheal length
      - Standard open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7mm internal diameter and 5-8cm of intra-tracheal length (Least desirable option)
    - Use lidocaine if the casualty is 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 4<sup>th</sup> or 5<sup>th</sup> 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 a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.

### 3. Bleeding

- a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended limb tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet use or for any traumatic amputation. Apply directly to the skin 2-3 inches above the wound. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.
- b. For compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal, use Combat Gauze™ as the CoTCCC hemostatic dressing of choice.

#### **Alternative hemostatic adjuncts:**

- **Celox Gauze or**
- **ChitoGauze or**
- **XStat™ (Best for deep, narrow-tract junctional wounds)**

**Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XStat™). Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied.**

If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

- c. Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If it is, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2-3 inches above wound. Ensure that bleeding is stopped. When possible, a distal pulse should be checked. If bleeding persists or a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side-by-side with the first to eliminate both bleeding and the distal pulse.
- d. Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock; it is possible to monitor the wound closely for bleeding; and the tourniquet is not being used to control bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability are available.
- 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.

#### 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. O<sub>2</sub> sat  $> 90$
5. Hypothermia
6. PCO<sub>2</sub> (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 CO<sub>2</sub> between 30-35 mmHg
  - c) The highest oxygen concentration (FIO<sub>2</sub>) 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

##### a. The resuscitation fluids of choice for casualties in hemorrhagic shock, listed from most to least preferred, are: whole blood\*; plasma, RBCs and platelets in 1:1:1 ratio\*; plasma and RBCs in 1:1 ratio; plasma or RBCs alone; Hextend; and crystalloid (Lactated Ringers or Plasma-Lyte A).

##### b. Assess for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse).

1. If not in shock:
  - No IV fluids are immediately necessary.
  - Fluids by mouth are permissible if the casualty is conscious and can swallow.
2. If in shock and blood products are available under an approved command or theater blood product administration protocol:
  - Resuscitate with whole blood\*, or, if not available
  - Plasma, RBCs and platelets in a 1:1:1 ratio\*, or, if not available
  - Plasma and RBCs in 1:1 ratio, or, if not available;
  - Reconstituted dried plasma, liquid plasma or thawed plasma alone or RBCs alone;
  - Reassess the casualty after each unit. Continue resuscitation until a palpable radial pulse, improved mental status or systolic BP of 80-90 mmHg is present.
3. If in shock and blood products are not available under an approved command or theater blood product administration protocol due to tactical or logistical constraints:
  - Resuscitate with Hextend, or if not available;
  - Lactated Ringers or Plasma-Lyte A;
  - Reassess the casualty after each 500 mL IV bolus;
  - Continue resuscitation until a palpable radial pulse, improved mental status, or systolic BP of 80-90 mmHg is present.
  - Discontinue fluid administration when one or more of the above end points has been achieved.
4. If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate as necessary to restore and maintain a normal radial pulse. If BP monitoring is available, maintain a target systolic BP of at least 90 mmHg.
5. Reassess the casualty frequently to check for recurrence of shock. If shock recurs, recheck all external hemorrhage control measures to ensure that they are still effective and repeat the fluid resuscitation as outlined above.

\* Neither whole blood nor apheresis platelets as these products are currently collected in theater are FDA-compliant. Consequently, whole blood and 1:1:1 resuscitation using apheresis platelets should be used only if all of the FDA-compliant blood products needed to support 1:1:1 resuscitation are not available, or if 1:1:1 resuscitation is not producing the desired clinical effect.

#### 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. Analgesia on the battlefield should generally be achieved using one of three options:

##### Option 1

Mild to Moderate Pain

Casualty is still able to fight

- TCCC Combat pill pack:
- Tylenol - 650-mg bilayer caplet, 2 PO every 8 hours
- Meloxicam - 15 mg PO once a day

##### Option 2

Moderate to Severe Pain

Casualty IS NOT in shock or respiratory distress AND

Casualty IS NOT at significant risk of developing either condition

- Oral transmucosal fentanyl citrate (OTFC) 800 ug
- Place lozenge between the cheek and the gum
- Do not chew the lozenge

##### Option 3

Moderate to Severe Pain

Casualty IS in hemorrhagic shock or respiratory distress OR

Casualty IS at significant risk of developing either condition

- Ketamine 50 mg IM or IN
- Or
- Ketamine 20 mg slow IV or IO

\* Repeat doses q30min prn for IM or IN

\* Repeat doses q20min prn for IV or IO

\* End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes)

\* Analgesia notes

- a. Casualties may need to be disarmed after being given OTFC or ketamine.
- b. Document a mental status exam using the AVPU method prior to administering opioids or ketamine.
- c. For all casualties given opioids or ketamine – monitor airway, breathing, and circulation closely
- d. Directions for administering OTFC:
  - Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure OR utilizing a safety pin and rubber band to attach the lozenge (under tension) to the patient's uniform or plate carrier.
  - Reassess in 15 minutes
  - Add second lozenge, in other cheek, as necessary to control severe pain
  - Monitor for respiratory depression
- e. IV Morphine is an alternative to OTFC if IV access has been obtained
  - 5 mg IV/IO
  - Reassess in 10 minutes.
  - Repeat dose every 10 minutes as necessary to control severe pain.
  - Monitor for respiratory depression.
- f. Naloxone (0.4 mg IV or IM) should be available when using opioid analgesics.
- g. Both ketamine and OTFC have the potential to worsen severe TBI. The combat medic, corpsman, or PJ must consider this fact in his or her analgesic decision, but if the casualty is able to complain of pain, then the TBI is likely not severe enough to preclude the use of ketamine or OTFC.
- h. Eye injury does not preclude the use of ketamine. The risk of additional damage to the eye from using ketamine is low and maximizing the casualty's chance for survival takes precedence if the casualty is in shock or respiratory distress or at significant risk for either.
- i. Ketamine may be a useful adjunct to reduce the amount of opioids required to provide effective pain relief. It is safe to give ketamine to a casualty who has previously received morphine or OTFC. IV Ketamine should be given over 1 minute.
- j. If respirations are noted to be reduced after using opioids or ketamine, provide ventilatory support with a bag-valve-mask or mouth-to-mask ventilations.
- k. Ondansetron, 4 mg ODT/IV/IO/IM, every 8 hours as needed for nausea or vomiting. Each 8-hour dose can be repeated once at 15 minutes if nausea and vomiting are not improved. Do not give more than 8 mg in any 8-hour interval. Oral ondansetron is NOT an acceptable alternative to the ODT formulation.
- l. Reassess – reassess – reassess!

14. Reassess fractures and recheck pulses.

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 7.
  - e. Analgesia in accordance with the TCCC Guidelines in Section 13 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 15 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 2a 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 the casualty's status on a TCCC Casualty Card (DD Form 1380). Forward this information with the casualty to the next level of care.