

## FEATURE ARTICLES

# Tactical Combat Casualty Care (TCCC) Guidelines for Medical Personnel

15 December 2021\*

**RED text** indicates new text in this year's update to the TCCC Guidelines; **BLUE text** indicates text that did not change but was relocated within the guidelines.

Recent changes include junctional and airway device recommendations, analgesia, and abdominal evisceration guidelines.

### Basic Management Plan for Care Under Fire/Threat

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 or when tactically feasible, move or drag casualty to cover.
4. Try to keep the casualty from sustaining additional wounds.
5. Casualties should be extracted from burning vehicles or buildings and moved to places of relative safety. Do what is necessary to stop the burning process.
6. Stop life-threatening external hemorrhage if tactically feasible:
  - a. Direct casualty to control hemorrhage by self-aid if able.
  - b. Use a CoTCCC-recommended limb tourniquet for hemorrhage that is anatomically amenable to tourniquet use.
  - c. 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.
7. Airway management is generally best deferred until the Tactical Field Care phase.

### Basic Management Plan for Tactical Field Care

1. Establish a security perimeter in accordance with unit tactical standard operating procedures and/or battle drills. Maintain tactical situational awareness.
2. Triage casualties as required. Casualties with an altered mental status should have weapons and communications equipment taken away immediately.
3. Massive Hemorrhage
  - 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 bleeding site. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.
  - b. For compressible (external) 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)
    - iTClamp (may be used alone or in conjunction with hemostatic dressing or XStat)
  - 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. (Note: XStat is not to be removed in the field, but additional XStat, other hemostatic adjuncts, or trauma dressings may be applied over it.)
  - If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a 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. For external hemorrhage of the head and neck where the wound edges can be easily re-approximated, the iTClamp may be used as a primary option for hemorrhage control. Wounds should be packed with a hemostatic dressing or XStat, if appropriate, prior to iTClamp application.
    - The iTClamp does not require additional direct pressure, either when used alone or in combination with other hemostatic adjuncts.
    - If the iTClamp is applied to the neck, perform frequent airway monitoring and evaluate for an expanding hematoma that may compromise the airway.
    - Consider placing a definitive airway if there is evidence of an expanding hematoma
    - DO NOT APPLY on or near the eye or eyelid (within 1cm of the orbit).
  - d. Perform initial assessment for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse) and consider immediate initiation of shock resuscitation efforts.
- #### 4. Airway Management
- a. Conscious casualty with no airway problem identified:
    - No airway intervention required
  - b. Unconscious casualty without airway obstruction:
    - Place casualty in the recovery position
    - Chin lift or jaw thrust maneuver or
    - Nasopharyngeal airway or
    - Extraglottic airway

\*Joint Trauma System Clinical Practice Guidelines are listed and available at [https://jts.amedd.army.mil/index.cfm/PL\\_CPGs/cpgs](https://jts.amedd.army.mil/index.cfm/PL_CPGs/cpgs)

- c. Casualty with airway obstruction or impending airway obstruction:
  - Allow a conscious casualty to assume any position that best protects the airway, to include sitting up and/or leaning forward.
  - Use a chin lift or jaw thrust maneuver
  - Use suction if available and appropriate
  - Nasopharyngeal airway or
  - Extraglottic airway (if the casualty is unconscious)
  - Place an unconscious casualty in the recovery position
- d. If the previous measures are unsuccessful, perform a surgical cricothyroidotomy using one of the following:
  - 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.
  - Use lidocaine if the casualty is conscious.
- e. Cervical spine stabilization is not necessary for casualties who have sustained only penetrating trauma.
- f. Monitor the hemoglobin oxygen saturation in casualties to help assess airway patency.
- g. Always remember that the casualty's airway status may change over time and requires frequent reassessment.

#### Airway Notes:

- If an extraglottic airway with an air-filled cuff is used, the cuff pressure must be monitored to avoid overpressurization, especially during TACEVAC on an aircraft with the accompanying pressure changes.
- Extraglottic airways will not be tolerated by a casualty who is not deeply unconscious. If an unconscious casualty without direct airway trauma needs an airway intervention, but does not tolerate an extraglottic airway, consider the use of a nasopharyngeal airway.
- For casualties with trauma to the face and mouth, or facial burns with suspected inhalation injury, nasopharyngeal airways and extraglottic airways may not suffice and a surgical cricothyroidotomy may be required.
- Surgical cricothyroidotomies should not be performed on unconscious casualties who have no direct airway trauma unless use of a nasopharyngeal airway and/or an extraglottic airway have been unsuccessful in opening the airway.

#### 5. Respiration/Breathing

- a. Assess for tension pneumothorax and treat, as necessary.
  - Suspect a tension pneumothorax and treat when a casualty has significant torso trauma or primary blast injury and one or more of the following:
    - Severe or progressive respiratory distress
    - Severe or progressive tachypnea
    - Absent or markedly decreased breath sounds on one side of the chest
    - Hemoglobin oxygen saturation < 90% on pulse oximetry
    - Shock
    - Traumatic cardiac arrest without obviously fatal wounds
      - ◆ If not treated promptly, tension pneumothorax may progress from respiratory distress to shock and traumatic cardiac arrest.
  - Initial treatment of suspected tension pneumothorax:

- If the casualty has a chest seal in place, burp or remove the chest seal.
  - Establish pulse oximetry monitoring.
  - Place the casualty in the supine or recovery position unless he or she is conscious and needs to sit up to help keep the airway clear as a result of maxillofacial trauma.
  - Decompress the chest on the side of the injury with a 14-gauge or a 10-gauge, 3.25-inch needle/catheter unit.
  - Either the 5th intercostal space (ICS) in the anterior axillary line (AAL) or the 2nd ICS in the mid-clavicular line (MCL) may be used for needle decompression (NDC.) If the anterior (MCL) site is used, do not insert the needle medial to the nipple line.
  - The needle/catheter unit should be inserted at an angle perpendicular to the chest wall and just over the top of the lower rib at the insertion site. Insert the needle/catheter unit all the way to the hub and hold it in place for 5–10 seconds to allow decompression to occur.
  - After the NDC has been performed, remove the needle and leave the catheter in place.
    - If a casualty has significant torso trauma or primary blast injury and is in traumatic cardiac arrest (no pulse, no respirations, no response to painful stimuli, no other signs of life), decompress both sides of the chest before discontinuing treatment.
  - The NDC should be considered successful if:
    - Respiratory distress improves, or
    - There is an obvious hissing sound as air escapes from the chest when NDC is performed (this may be difficult to appreciate in high-noise environments), or
    - Hemoglobin oxygen saturation increases to 90% or greater (note that this may take several minutes and may not happen at altitude), or
    - A casualty with no vital signs has return of consciousness and/or radial pulse.
  - If the initial NDC fails to improve the casualty's signs/symptoms from the suspected tension pneumothorax:
    - Perform a second NDC on the same side of the chest at whichever of the two recommended sites was not previously used. Use a new needle/catheter unit for the second attempt.
    - Consider, based on the mechanism of injury and physical findings whether decompression of the opposite side of the chest may be needed.
    - Continue to re-assess!
  - If the initial NDC was successful, but symptoms later recur:
    - Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC
    - Continue to re-assess!
  - If the second NDC is also not successful: continue on to the Circulation section of the TCCC Guidelines.
- 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. Initiate pulse oximetry. All individuals with moderate/severe TBI should be monitored with pulse oximetry. Readings may be misleading in the settings of shock or marked hypothermia.
- d. Casualties with moderate/severe TBI should be given supplemental oxygen when available to maintain an oxygen saturation > 90%.

## 6. Circulation

### a. Bleeding

- A pelvic binder should be applied for cases of suspected pelvic fracture:
  - Severe blunt force or blast injury with one or more of the following indications:
    - Pelvic pain
    - Any major lower limb amputation or near amputation
    - Physical exam findings suggestive of a pelvic fracture
    - Unconsciousness
    - Shock
- Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If it is needed, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2–3 inches above the bleeding site. Ensure that bleeding is stopped. If there is no traumatic amputation, 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. If the reassessment determines that the prior tourniquet was not needed, then remove the tourniquet and note time of removal on the TCCC Casualty Card.
- 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.
- Expose and clearly mark all tourniquets with the time of tourniquet application. Note tourniquets applied and time of application; time of re-application; time of conversion; and time of removal on the TCCC Casualty Card. Use a permanent marker to mark on the tourniquet and the casualty card.

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

### c. IV/IO Access

- Intravenous (IV) or intraosseous (IO) access is indicated if the casualty is in hemorrhagic shock or at significant risk of shock (and may therefore need fluid resuscitation), or if the casualty needs medications, but cannot take them by mouth.
  - An 18-gauge IV or saline lock is preferred.

- If vascular access is needed but not quickly obtainable via the IV route, use the IO route.

### d. Tranexamic Acid (TXA)

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

#### OR

- If the casualty has signs or symptoms of significant TBI or has altered mental status associated with blast injury or blunt trauma:
  - Administer 2gm of tranexamic acid via slow IV or IO push as soon as possible but NOT later than 3 hours after injury.

### e. Fluid Resuscitation

- Assess for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse.
- The resuscitation fluids of choice for casualties in hemorrhagic shock, listed from most to least preferred, are:
  - (1) Cold stored low titer O whole blood
  - (2) Pre-screened low titer O fresh whole blood
  - (3) Plasma, red blood cells (RBCs) and platelets in a 1:1:1 ratio
  - (4) Plasma and RBCs in a 1:1 ratio
  - (5) Plasma or RBCs alone

**NOTE:** Hypothermia prevention measures [Section 7] should be initiated while fluid resuscitation is being accomplished.

- If not in shock:
  - No IV fluids are immediately necessary.
  - Fluids by mouth are permissible if the casualty is conscious and can swallow.
- If in shock and blood products are available under an approved command or theater blood product administration protocol:
  - Resuscitate with cold stored low titer O whole blood, or, if not available
  - Pre-screened low titer O fresh whole blood, or, if not available
  - Plasma, RBCs, and platelets in a 1:1:1 ratio, or, if not available
  - Plasma and RBCs in a 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 100mmHg is present.
  - Discontinue fluid administration when one or more of the above end points has been achieved.
  - If blood products are transfused, administer one gram of calcium (30mL of 10% calcium gluconate or 10mL of 10% calcium chloride) IV/IO after the first transfused product.
- Given increased risk for a potentially lethal hemolytic reaction, transfusion of unscreened group O fresh whole blood or type specific fresh whole blood should only be performed under appropriate medical direction by trained personnel.
- Transfusion should occur as soon as possible after life-threatening hemorrhage in order to keep the patient alive. If Rh negative blood products are not

immediately available, Rh positive blood products should be used in hemorrhagic shock.

- If a casualty with an altered mental status due to suspected TBI has a weak or absent radial pulse, resuscitate as necessary to restore and maintain a normal radial pulse. If BP monitoring is available, maintain a target systolic BP between 100–110mmHg.
- Reassess the casualty frequently to check for recurrence of shock. If shock recurs, re-check all external hemorrhage control measures to ensure that they are still effective and repeat the fluid resuscitation as outlined above.

f. Refractory Shock

- If a casualty in shock is not responding to fluid resuscitation, consider untreated tension pneumothorax as a possible cause of refractory shock. Thoracic trauma, persistent respiratory distress, absent breath sounds, and hemoglobin oxygen saturation < 90% support this diagnosis. Treat as indicated with repeated NDC or finger thoracostomy/chest tube insertion at the 5<sup>th</sup> ICS in the AAL, according to the skills, experience, and authorizations of the treating medical provider. Note that if finger thoracostomy is used, it may not remain patent and finger decompression through the incision may have to be repeated. Consider decompressing the opposite side of the chest if indicated based on the mechanism of injury and physical findings.

7. Hypothermia Prevention

- Take early and aggressive steps to prevent further body heat loss and add external heat when possible for both trauma and severely burned casualties.
- Minimize casualty's exposure to cold ground, wind and air temperatures. Place insulation material between the casualty and any cold surface as soon as possible. Keep protective gear on or with the casualty if feasible.
- Replace wet clothing with dry clothing, if possible, and protect from further heat loss.
- Place an active heating blanket on the casualty's anterior torso and under the arms in the axillae (to prevent burns, do not place any active heating source directly on the skin or wrap around the torso).
- Enclose the casualty with the exterior impermeable enclosure bag.
- As soon as possible, upgrade hypothermia enclosure system to a well-insulated enclosure system using a hooded sleeping bag or other readily available insulation inside the enclosure bag/external vapor barrier shell.
- Pre-stage an insulated hypothermia enclosure system with external active heating for transition from the non-insulated hypothermia enclosure systems; seek to improve upon existing enclosure system when possible.
- Use a battery-powered warming device to deliver IV/IO resuscitation fluids, in accordance with current CoTCCC guidelines, at flow rate up to 150mL/min with a 38°C output temperature.
- Protect the casualty from exposure to wind and precipitation on any evacuation platform.

8. Penetrating Eye Trauma

- If a penetrating eye injury is noted or suspected:
  - Perform a rapid field test of visual acuity and document findings.
  - Cover the eye with a rigid eye shield (NOT a pressure patch).
  - Ensure that the 400mg moxifloxacin tablet in the Combat Wound Medication Pack (CWMP) is taken

if possible and that IV/IO/IM antibiotics are given as outlined below if oral moxifloxacin cannot be taken.

9. Monitoring

- Initiate advanced electronic monitoring if indicated and if monitoring equipment is available.

10. Analgesia

a. TCCC non-medical first responders should provide analgesia on the battlefield achieved by using:

- Mild to Moderate Pain
- Casualty is still able to fight
  - TCCC Combat Wound Medication Pack (CWMP)
    - Acetaminophen – 500mg tablet, 2 PO every 8 hours
    - Meloxicam – 15mg PO once a day

b. TCCC Medical Personnel:

Option 1

- Mild to Moderate Pain
- Casualty is still able to fight
  - TCCC Combat Wound Medication Pack (CWMP)
    - Acetaminophen – 500mg tablet, 2 PO every 8 hours
    - Meloxicam – 15mg PO once a day

Option 2

- Mild to Moderate 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) 800µg
    - May repeat once more after 15 minutes if pain uncontrolled by first

TCCC Combat Paramedics or Providers:

- Fentanyl 50 mcg IV/IO 0.5–1 mcg/kg
- May repeat q 30 min
- Fentanyl 100 mcg IN
  - May repeat q 30 min

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 20–30mg (or 0.2–0.3mg/kg) slow IV or IO push
    - Repeat doses q20 min prn for IV or IO
    - End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes).
  - Ketamine 50–100mg (or 0.5–1mg/kg) IM or IN
    - Repeat doses q20–30 min prn for IM or IN

Option 4

TCCC Combat Paramedics or Providers:

- *Sedation required:* significant severe injuries requiring dissociation for patient safety or mission success or when a casualty requires an invasive procedure; must be prepared to secure the airway:
  - Ketamine 1–2mg/kg slow IV/IO push initial dose
    - Endpoints: procedural (dissociative) anesthesia
  - Ketamine 300mg IM (or 2–3mg/kg IM) initial dose
    - Endpoints: procedural (dissociative) anesthesia
      - ◆ If an emergence phenomenon occurs, consider giving 0.5–2mg IV/IO midazolam.



- ◆ If continued dissociation is required, move to the Prolonged Casualty Care (PCC) analgesia and sedation guidelines.
  - If longer duration analgesia is required:
    - Ketamine slow IV/IO infusion 0.3mg/kg in 100mL 0.9% sodium chloride over 5–15 minutes.
      - Repeat doses q45min prn for IV or IO
      - End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes).
  - c. Analgesia and sedation notes:
    - Casualties need to be disarmed after being given OTFC, IV/IO fentanyl, ketamine, or midazolam.
    - The goal of analgesia is to reduce pain to a tolerable level while still protecting their airway and mentation.
    - The goal of sedation is to stop awareness of painful procedures.
    - Document a mental status exam using the AVPU method prior to administering opioids or ketamine.
    - For all casualties given opioids, ketamine or benzodiazepines – monitor airway, breathing, and circulation closely.
    - Directions for administering OTFC:
      - Place lozenge between the cheek and the gum.
      - Do not chew the lozenge.
      - 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.
    - Ketamine comes in different concentrations; the higher concentration option (100mg/mL) is recommended when using IN dosing route to minimize the volume administered intranasally.
    - Naloxone (0.4mg IV/IO/IM/IN) should be available when using opioid analgesics.
    - TBI and/or eye injury does not preclude the use of ketamine. However, use caution with OTFC, IV/IO fentanyl, ketamine, or midazolam in TBI patients as this may make it difficult to perform a neurologic exam or determine if the casualty is decompensating.
    - 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 a narcotic. IV Ketamine should be given over 1 minute.
    - If respirations are reduced after using opioids or ketamine, reposition the casualty into a “sniffing position”. If that fails, provide ventilatory support with a bag-valve-mask or mouth-to-mask ventilations.
    - Ondansetron, 4mg Orally Dissolving Tablet (ODT)/IV/IO/IM, every 8 hours as needed for nausea or vomiting. Each 8-hour dose can be repeated once after 15 minutes if nausea and vomiting are not improved. Do not give more than 8mg in any 8-hour interval. Oral ondansetron is NOT an acceptable alternative to the ODT formulation.
    - The use routine of benzodiazepines such as midazolam is NOT recommended for analgesia. When performing procedural sedation, benzodiazepines may also be considered to treat behavioral disturbances or unpleasant (emergence) reactions. Benzodiazepines should not be used prophylactically and are not commonly needed when the correct pain or sedation dose of ketamine is used.
  - Polypharmacy is not recommended; benzodiazepines should NOT be used in conjunction with opioid analgesia.
  - If a casualty appears to be partially dissociated, it is safer to administer more ketamine than to use a benzodiazepine.
11. **Antibiotics**
    - a. Antibiotics recommended for all open combat wounds.
    - b. If able to take PO meds:
      - Moxifloxacin (from the CWMP), 400mg PO once a day.
    - c. If unable to take PO meds (shock, unconsciousness):
      - Ertapenem, 4g IV/IO/IM once a day.
  12. **Inspect and dress known wounds.**
    - a. Inspect and dress known wounds.
    - b. Abdominal evisceration – [Control bleeding]; rinse with clean (and warm if possible) fluid to reduce gross contamination. Hemorrhage control – apply combat gauze or CoTCCC recommended hemostatic dressing to uncontrolled bleeding. Cover exposed bowel with a moist, sterile dressing or sterile water-impermeable covering.
      - Reduction: do not attempt if there is evidence of ruptured bowel (gastric/intestinal fluid or stool leakage) or active bleeding.
      - If no evidence of bowel leakage and hemorrhage is visibly controlled, a single brief attempt (<60 seconds) may be made to replace/reduce the eviscerated abdominal contents.
      - If unable to reduce; cover the eviscerated organs with water impermeable non-adhesive material (transparent preferred to allow ability to re-assess for ongoing bleeding); examples include a bowel bag, IV bag, clear food wrap, etc. and secure the impermeable dressing to the patient using adhesive dressing (examples: ioban, chest seal).
      - Do NOT FORCE contents back into abdomen or actively bleeding viscera.
        - The patient should remain NPO.
  13. **Check for additional wounds.**
  14. **Burns**
    - a. Assess and treat as a trauma casualty with burns and not burn casualty with injuries.
    - b. 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.
    - c. Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.
    - d. 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.
    - e. Fluid resuscitation (USAISR Rule of Ten):
      - If burns are greater than 20% of TBSA, 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 10mL/hr for adults weighing 40–80kg.
  - For every 10kg ABOVE 80kg, increase initial rate by 100mL/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).
  - Consider oral fluids for burns up to 30% TBSA if casualty is conscious and able to swallow.
- f. Analgesia in accordance with the TCCC Guidelines in Section (10) may be administered to treat burn pain.
  - g. Prehospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per the TCCC guidelines in Section (11) if indicated to prevent infection in penetrating wounds.
  - h. All TCCC interventions can be performed on or through burned skin in a burn casualty.
  - i. Burn patients are particularly susceptible to hypothermia. Extra emphasis should be placed on barrier heat loss prevention methods.
15. **Splint fractures and re-check pulses.**
16. **Cardiopulmonary resuscitation (CPR).**
- a. 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.
  - b. 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 (5a) above.
17. **Communication**
- a. Communicate with the casualty if possible. Encourage, reassure and explain care.
  - b. Communicate with tactical leadership as soon as possible and throughout casualty treatment as needed. Provide leadership with casualty status and evacuation requirements to assist with coordination of evacuation assets.
  - c. Communicate with the evacuation system (the Patient Evacuation Coordination Cell) to arrange for TACEVAC. Communicate with medical providers on the evacuation asset if possible and relay mechanism of injury, injuries sustained, signs/symptoms, and treatments rendered. Provide additional information as appropriate.
18. **Documentation of Care**
- Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Card (DD Form 1380). Forward this information with the casualty to the next level of care.
19. **Prepare for Evacuation**
1. Complete and secure the TCCC Card (DD 1380) to the casualty.
  2. Secure all loose ends of bandages and wraps.
  3. Secure hypothermia prevention wraps/blankets/straps.
  4. Secure litter straps as required. Consider additional padding for long evacuations.

5. Provide instructions to ambulatory patients as needed.
6. Stage casualties for evacuation in accordance with unit standard operating procedures.
7. Maintain security at the evacuation point in accordance with unit standard operating procedures.

### Principles of Tactical Evacuation Care (TACEVAC)

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

### Basic Management Plan for Tactical Evacuation Care

#### 1. Transition of Care

- a. Tactical force personnel should establish evacuation point security and stage casualties for evacuation.
- b. Tactical force personnel or the medic should communicate patient information and status to TACEVAC personnel as clearly as possible. The minimum information communicated should include stable or unstable, injuries identified, and treatments rendered.
- c. TACEVAC personnel should stage casualties on evacuation platforms as required.
- d. Secure casualties in the evacuation platform in accordance with unit policies, platform configurations and safety requirements.
- e. TACEVAC medical personnel should re-assess casualties and re-evaluate all injuries and previous interventions.

#### 2. **Massive Hemorrhage** (same as Tactical Field Care)

#### 3. **Airway Management**

Endotracheal intubation may be considered in lieu of cricothyrotomy if trained.

#### 4. **Respiration/Breathing**

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
- Known or suspected smoke inhalation

#### 5. **Circulation** (same as Tactical Field Care)

#### 6. **Traumatic Brain Injury**

- a. Casualties with moderate/severe TBI should be monitored for:
  - o Decreases in level of consciousness
  - o Pupillary dilation
  - o SBP should be >90mmHg
  - o O<sub>2</sub> sat > 90
  - o Hypothermia
  - o End-tidal CO<sub>2</sub> (If capnography is available, maintain between 35–40mmHg)
  - o Penetrating head trauma (if present, administer antibiotics)
  - o 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:
  - Administer 250mL of 3 or 5% hypertonic saline IV/IO bolus.
  - Elevate the casualty's head 30 degrees.
  - Hyperventilate the casualty.

- Respiratory rate 20
  - Capnography should be used to maintain the end-tidal CO<sub>2</sub> between 30–35mmHg.
  - The highest oxygen concentration (FIO<sub>2</sub>) possible should be used for hyperventilation.
  - Do not hyperventilate the casualty unless signs of impending herniation are present. Casualties may be hyperventilated with oxygen using the bag-valve-mask technique.
7. **Hypothermia Prevention** (same as Tactical Field Care)
  8. **Penetrating Eye Trauma** (same as Tactical Field Care)
  9. **Monitoring** (same as Tactical Field Care)
  10. **Analgesia** (same as Tactical Field Care)
  11. **Antibiotics** (same as Tactical Field Care)
  12. **Inspect and dress known wounds** (same as Tactical Field Care)
  13. **Check for additional wounds.** (same as Tactical Field Care)
  14. **Burns** (same as Tactical Field Care)
  15. **Splint fractures and re-check pulses** (same as Tactical Field Care)
  16. **Cardiopulmonary resuscitation (CPR) in TACEVAC**
    - 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 (4a) 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.
  17. **Communication**
    - a. Communicate with the casualty if possible. Encourage, reassure and explain care.

- b. Communicate with medical providers at the next level of care as feasible and relay mechanism of injury, injuries sustained, signs/symptoms, and treatments rendered. Provide additional information as appropriate
18. **Documentation of Care** (same as Tactical Field Care)

### SUMMARY OF 2021 CHANGES:

#### 3. Massive Hemorrhage

- b. “CoTCCC-Recommended” is removed from junctional tourniquets. No specific products are recommended by the CoTCCC. End users should select any FDA-approved device that is indicated for junctional hemorrhage control.

#### 4. Airway Management

- d. Removes Cric-Key technique as preferred option for surgical cricothyroidotomy and remove “least desirable option” from the standard open surgical technique. Units and end users should use the technique they are best trained to execute.

**Airway Notes:** Removes iGel as the preferred extraglottic airway. Units may still use iGel if mission are at high elevation or evacuation is at high altitudes.

6. Analgesia – adjust Ketamine IV/IO dosing to 20–30mg (or 0.2–0.3mg/kg)
12. Inspect and dress known wounds
  - b. Adds the preference of cleaning abdominal evisceration with clean and warm water if possible; clarifies guidance on conditions to attempt reduction of abdominal contents; that patient should remain NPO and NOT be administered oral medicals (Combat Wound Medication pack) and removes prolonged care considerations (now covered in separate PCC guidelines).

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