**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 intra-tracheal 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 4th or 5th intercostal space at the anterior axillary line (AAL).

1. 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**

**- XStatTM (Best for deep, narrow-tract junctional wounds)**

**Hemostatic dressings should be applied with at least 3 minutes of direct pressure**

**(optional for XStatTM). 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 8­hour dose can be repeated once at 15 minutes if nausea and vomiting are not improved. Do not give more than 8 mg in any 8­hour 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
	+ 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.**Tactical Evacuation Care**

## Casualties need evacuation as soon as feasible after significant injuries.

## Evacuation asset may be a ground vehicle, aircraft, or boat.

## **Evacuation time is highly variable – significant delays may be encountered.**

## Tactical situation and hostile threat to evacuation platforms may differ markedly from one casualty scenario to another.

## The Tactical Evacuation phase allows for additional medical personnel and equipment to be used.

# **Evacuation Terminology**

# **MEDEVAC**: evacuation using special dedicated medical assets marked with a Red Cross.

#  MEDEVAC platforms are non-combatant assets

# **CASEVAC**: evacuation using non-medical platforms.

# May carry a Quick-Reaction force and provide close air support as well

# **Tactical Evacuation (TACEVAC)** – this term encompasses both types of evacuation above

# **Aircraft Evacuation Planning**

# Flying rules vary widely among different aircraft and units

# Consider:

### Distances and altitudes involved

### Day versus night

### Passenger capacity

### Hostile threat

### Medical equipment

### Medical personnel

### Icing conditions

## Ensure that your evacuation plan includes aircraft capable of flying the missions you need

## Plan for primary, secondary, & tertiary options

# **Ground Vehicle Evacuation**

## More prevalent in urban-centric operations in close proximity to a medical facility

## Vehicles may be organic to the unit or designated MEDEVAC assets

# **Tactical Evacuation Care**

## TCCC guidelines for care are largely the same in TACEVAC as they are in Tactical Field Care.

## There are some changes that reflect the additional medical equipment and personnel that may be present in the TEC setting.

## This section will focus on those differences.

# **Airway in TACEVAC**

## Additional Options for Airway Management

### Supraglottic airway

### Endotracheal Intubation

## Confirm ETT placement with CO2 monitoring

## These airways are advanced skills not taught in the basic TCCC course

# **Breathing in TACEVAC**

## Watch for tension pneumothorax as casualties with a chest wound ascend into the lower pressure at altitude.

## Pulse ox readings will become lower as casualty ascends unless supplemental oxygen is added.

## Chest tube placement may be considered if a casualty with suspected tension pneumo fails to respond to needle decompression

# **Supplemental Oxygen in Tactical Evacuation Care**

## Most casualties do not need supplemental oxygen, but have oxygen available and use it for:

### Casualties in shock

### Low oxygen sat on pulse ox

### Unconscious casualties

### Casualties with TBI (maintain oxygen saturation 90%)

### Chest wound casualties

# **Tactical Evacuation Care Guidelines**

## **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 (TXA) in 100 cc Normal Saline or Lactated Ringer’s 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.

# **TXA Administration – 2nd Dose**

## Typically given after the casualty arrives at a Role II/Role III medical facility.

## May be given in Tactical Evacuation Care if the first dose was given earlier, and fluid resuscitation has been completed before arrival at the medical facility.

### Should NOT be given with Hextend or through an IV line with Hextend in it

### Inject 1 gram of TXA into a 100-cc bag of normal saline or lactated Ringer’s

### Infuse slowly over 10 minutes

## **6. Traumatic Brain Injury**

## Casualties with moderate/severe TBI should be monitored for:

## Decreases in level of consciousness

## Pupillary dilation

## SBP should be >90 mmHg

## O2 sat > 90

## Hypothermia

## PCO2 (If capnography is available, maintain between 35-40 mmHg)

## Penetrating head trauma (if present, administer antibiotics)

## Assume a spinal (neck) injury until cleared

## 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 250cc of 3% or 5% hypertonic saline bolus

## Elevate the casualty’s head 30 degrees

## Hyperventilate the casualty

## Respiratory rate 20

## Capnography should be used to maintain the end-tidal CO2 between 30-35 mmHg

## The highest 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.

# **Fluid Resuscitation in Tactical Evacuation Care**

## Blood products are being pushed forward into the prehospital phase of combat trauma care.

### Now near the end of the conflict in Afghanistan, U.S. forces and coalition partners have reported successful use of thawed plasma and RBCs for fluid resuscitation aboard evacuation platforms during transport.

## **Hypothermia Prevention in TACEVAC**

## Remember to keep the casualty on an insulated surface or get him/her on one as soon as possible.

## 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).

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

## Use a portable fluid warmer capable of warming all IV fluids including blood products.

# Remember: Prevention of Hypothermia in Helicopters!

* Cabin wind and altitude cold result in cold stress
* Protection is especially important for casualties in shock and for burn casualties

# **Tactical Evacuation Care Guidelines**

## **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.

# **TACEVAC CARE – Hoisting**

* Rigid Litters Only When Hoisting!
* Check and double-check rigging

# **TACEVAC Care for Wounded Hostile Combatants**

## Principles of care are the same for all wounded combatants

## Rules of Engagement may dictate evacuation process

## Restrain and provide security

## Remember that each hostile casualty represents a potential threat to the provider and the unit and take appropriate measures

## **They still want to kill you.**

# **Tactical Evacuation Care Summary of Key Points**

## Evacuation time is highly variable

## Thorough planning is key

## Similar to Tactical Field Care guidelines but with some modifications