Tactical Emergency Casualty Care (TECC) Guidelines

Pediatric Appendix

DIRECT THREAT CARE (DTC)

Goals:

1. Accomplish the mission with minimal casualties
2. Prevent any casualty from sustaining additional injuries
3. Keep response team maximally engaged in neutralizing the existing threat (e.g. active shooter, unstable building, confined space HAZMAT, etc.)
4. Minimize public harm

Principles:

1. Establish tactical supremacy and defer in depth medical interventions if engaged in ongoing direct threat (e.g. active fire fight, unstable building collapse, dynamic explosive scenario, etc.).
2. Threat mitigation techniques will minimize risk to casualties and the providers. These should include techniques and tools for rapid casualty access and egress.
3. Minimal trauma interventions are warranted.
4. Consider hemorrhage control
    a. TQ application is the primary "medical" intervention to be considered in Direct Threat Care.
    b. Consider instructing casualty to apply direct pressure to the wound if no tourniquet available or application is not tactically feasible.
5. Consider quickly placing or directing casualty to be placed in position to protect airway.

Guidelines:

1. Mitigate any threat and move to a safer position (e.g. Return fire, utilize less lethal technology, assume an overwhelming force posture, extraction from immediate structural collapse, etc.).
2. Direct the casualty to move to a safer position and apply self aid if able.
    a. Attention must be paid to the type of instruction that will be presented to this population.
    b. Use of tactile direction, visual signaling and simple language may improve communication.
3. Casualty Extraction

a. If a casualty can move to safety, they should be instructed to do so.

b. If a casualty is unresponsive, the scene commander or team leader should weigh the risks and benefits of a rescue attempt in terms of manpower and likelihood of success. Remote medical assessment techniques should be considered.

c. If the casualty is responsive but cannot move, a tactically feasible rescue plan should be devised.

d. Recognize that threats are dynamic and may be ongoing, requiring continuous threat assessments.

4. Stop life threatening external hemorrhage if tactically feasible:

    a. Provider should not hesitate to apply tourniquets to pediatric casualties.

    b. Apply a tourniquet over the clothing as proximal-- high on the limb-- as possible.

    c. Tighten until cessation of bleeding and move to safety. Consider moving to safety prior to application of the TQ if the situation warrants.

    d. Consider instructing casualty to apply direct pressure to the wound if no tourniquet available or application is not tactically feasible

5. Consider quickly placing casualty, or directing the casualty to be placed, in position to protect airway if tactically feasible

Skill Sets:

1. Tourniquet application
2. Consider PACE Methodology- Primary, Alternative, Contingency, Emergency
3. Commercially available tourniquets
4. Field expedient tourniquets
5. Tactical casualty extraction
6. Rapid placement in recover position

INDIRECT THREAT CARE (ITC)

Goals:

1. Goals 1-4 as above with DTC care
2. Stabilize the casualty as required to permit safe extraction to dedicated treatment sector or medical evacuation assets

Principles:

1. Maintain tactical supremacy, mitigate threats and complete the overall mission.
2. Conduct dedicated patient assessment and initiate appropriate life-saving interventions as outlined in the ITC guidelines. DO NOT DELAY casualty extraction/evacuation for non life-saving interventions.
3. Consider establishing a casualty collection point if multiple casualties are encountered
4. Establish communication with the tactical and/or command element and request or verify initiation of casualty extraction/evacuation.
5. Prepare casualties for extraction and document care rendered for continuity of care purposes.

Guidelines:

1. Bleeding:
    a. Assess for unrecognized hemorrhage and control all sources of major bleeding:
        i. If not already done, use a tourniquet for potentially life-threatening bleeding.
            ❖ Apply the tourniquet over the clothing as proximal-- high on the limb-- as possible. If able and tactical situation permits, consider fully exposing the wound, applying tourniquet directly to the skin.
            ❖ For any traumatic total or partial amputation, a tourniquet should be applied regardless of bleeding.
        ii. Apply pressure dressing with deep wound packing to control life-threatening external hemorrhage that is anatomically amenable to such treatment.
    b. For compressible hemorrhage not amenable to tourniquet use, or as an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), apply a hemostatic agent in accordance with the directions for its use with an

appropriate pressure bandage. Before releasing any tourniquet on a casualty who has received IV fluid resuscitation for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation).

c. Reassess all tourniquets that were applied during previous phases of care. Consider exposing the injury. Tourniquets applied hastily during DTC phase that are determined to be both necessary and effective in controlling hemorrhage should remain in place if the casualty can be rapidly evacuated to definitive medical care. If ineffective in controlling hemorrhage or if there is any potential delay in evacuation to care, expose the wound fully, identify an appropriate location immediately proximal (or adjacent) to the first tourniquet, and apply a new tourniquet directly to the skin.

d. When time and the tactical situation permit, a distal pulse check should be accomplished on any limb where a tourniquet is applied. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.

e. Expose and clearly mark all tourniquet sites with the time of tourniquet application.

2. Airway Management:

a. Unconscious casualty without airway obstruction:

i. Chin lift or jaw thrust maneuver

ii. Nasopharyngeal airway

iii. Place casualty in the recovery position

iv. Caution advised in patients with suspected C-spine injury.

b. Casualty with airway obstruction or impending airway obstruction:

i. Chin lift or jaw thrust maneuver

ii. Nasopharyngeal airway

iii. Allow casualty to assume position that best protects the airway- including sitting up

iv. Place unconscious casualty in the recovery position

c. If previous measures unsuccessful:

i. Airway positioning may be enhanced by elevation of the shoulders

ii. Bag mask ventilation is equivalent to intubation in the pediatric pre-hospital population

iii. Oral/nasotracheal intubation

iv. Consider surgical/invasive airway

- ❖❖ Needle cricothyroidotomy recommended if signs of puberty are absent
- ❖❖ Surgical cricothyroidotomy only recommended in pediatric patients with signs of puberty

v. Consider Supraglottic Devices (e.g. King LT, CombiTube, or LMA) per protocol.

d. Apply oxygen if available

3. Breathing:

a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider tension pneumothorax. Needle thoracostomy should be performed on the side of the injury, using the largest gauge (minimum 18-gauge) and the longest length appropriate for body size/chest wall thickness:

i. In the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is lateral to the nipple line and is not directed towards the heart.

ii. If properly trained, consider a lateral decompression, inserting the needle in the 4-5th intercostals space, anterior to the mid-axillary line on the injured side.

b. All open chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.

4. Intravascular (IV/IO) access:

a. If rapid fluid resuscitation is indicated consider primary intraosseous (IO) route (per agency protocol).

b. Consider IV saline lock

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

a. If not in shock:

i. No IV fluids necessary

ii. PO fluids permissible if:

- ❖❖ Conscious, can swallow, and has no injury requiring potential surgical intervention
- ❖❖ If confirmed long delay in evacuation to care

b. If in shock:

i. Administer appropriate IV fluid bolus (20cc/kg NS/LR) and re-assess casualty. Repeat bolus after 30 minutes if still in shock.

ii. If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate to mid age-specific systolic blood pressure range, or return of strong peripheral pulse.

6. Prevention of hypothermia (Note: due to high total body surface area ratio and other physiological variables, children are at high risk of hypothermia):

a. Initiate all efforts to eliminate heat loss as soon as operationally feasible, after life-saving interventions have been employed.

b. Minimize casualty's exposure to the elements.

c. Replace wet clothing with dry if possible. Place the casualty onto an insulated surface as soon as possible.

d. Cover the casualty with commercial warming device, dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.

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

7. 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). If a commercial eye shield is not available, use casualty's eye protection device or anything that will prevent external pressure from being applied to the injured eye.

8. Reassess casualty:

a. Complete secondary survey checking for additional injuries. Inspect and dress known wounds that were previously deferred.

b. Consider splinting known/suspected fracture to include applying pelvic binding techniques for suspected pelvic fractures.

9. Provide analgesia as necessary.

a. Consider oral or rectal (if available) non-narcotic medications such as Tylenol for mild to moderate pain.

b. Avoid the use of non-steroidal anti-inflammatory medications (e.g. aspirin, ibuprofen, naproxen, ketorolac, etc) in the trauma patient as these medications interfere with platelet functioning and may exacerbate bleeding.

c. Narcotic pain medications should be utilized per protocol. Consider utilization of mucosal atomizer devices (MAD). Exercise caution when using narcotic

medications (e.g. fentanyl citrate) and/or Ketamine for moderate to severe pain in pediatric patients due to their higher volumes of distribution.

i. Consider adjunct administration of anti-emetic medicines

ii. Have naloxone readily available whenever administering opiates

iii. Monitor for adverse effects such as respiratory depression or hypotension.

10. Antibiotics: Consider initiating antibiotic administration for casualties with open wounds and penetrating eye injury when evacuation to definitive care is significantly delayed or infeasible. This is generally determined in the mission planning phase and requires medical oversight.

11. Burns:

a. Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Look for singed nasal hairs or facial hair or soot in and around the nares which may indicate possible inhalational injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early definitive airway management for respiratory distress or oxygen desaturation.

b. Smoke inhalation, particularly in a confined space, may be associated with significant carbon monoxide and cyanide toxicity. Patients with signs of significant smoke inhalation plus:

i. Significant symptoms of carbon monoxide toxicity should be treated with high flow oxygen if available

ii. Significant symptoms of cyanide toxicity should be considered candidates for cyanide antidote administration

c. Estimate total body surface area (TBSA) burned to the nearest 10% using the appropriate locally approved burn calculation formula.

d. Cover the burn area with dry, sterile dressings and initiate measures to prevent heat loss and hypothermia.

e. If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated under medical control as soon as IV/IO access is established. If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock as per the guidelines.

f. All previously described casualty care interventions can be performed on or through burned skin in a burn casualty.

g. Analgesia in accordance with TECC guidelines may be administered.

h. Aggressively act to prevent hypothermia for burns greater than 20% TBSA.

12. Monitoring: Apply appropriate monitoring devices and/or diagnostic equipment if available. Obtain and record vital signs.
13. Prepare casualty for movement: Consider environmental factors for safe and expeditious evacuation. Secure casualty to a movement assist device when available. If vertical extraction required, ensure casualty secured within appropriate harness, equipment assembled, and anchor points identified.
14. Communicate with the casualty if possible. Encourage, reassure and explain care.
15. Cardiopulmonary resuscitation (CPR) within a tactical environment 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 unless appropriate manpower is available.
    a. However, consider bilateral needle decompression for victims of torso or polytrauma with no respirations or pulse to ensure tension pneumothroax is not the cause of cardiac arrest prior to discontinuation of care.
    b. In certain circumstances, such as electrocution, drowning, atraumatic arrest, or hypothermia, performing CPR may be of benefit and should be considered in the context of the tactical situation.
16. Documentation of Care: Document clinical assessments, treatments rendered, and changes in the casualty's status in accordance with local protocol. Consider implementing a casualty care card that can be quickly and easily completed by non-medical first responders. Forward this information with the casualty to the next level of care.

Skill set:

1. **Hemorrhage Control:**
    a. Apply Tourniquet
    b. Apply Direct Pressure
    c. Apply Pressure Dressing
    d. Apply Wound Packing
    e. Apply Hemostatic Agent
2. **Airway:**
    a. Apply Manual Maneuvers (chin lift, jaw thrust, recovery position, shoulder elevation)
    b. Insert Nasal pharyngeal airway
    c. Insert Supraglottic Device (LMA, King-LT, Combitube, etc)
    d. Perform Tracheal Intubation
    e. Perform Surgical Cricothyrotomy (Not recommended for under 10 yrs)
    f. Perform Needle Cricothyrotomy
3. **Breathing:**
    a. Application of effective occlusive chest seal
    b. Assist Ventilations with Bag Valve Mask
    c. Apply Oxygen
    d. Apply Occlusive Dressing

e. Perform Needle Chest Decompression

4. **Circulation**:
   a. Gain Intravascular Access
   b. Gain Intraosseous Access
   c. Apply saline lock
   d. Administer IV/IO medications and IV/IO fluids
   e. Administer blood products
5. **Wound management:**
   a. Apply Eye Shield
   b. Apply Dressing for evisceration
   c. Apply Extremity Splint
   d. Apply Pelvic Binder
   e. Initiate Basic Burn Treatment
   f. Initiate Treatment for Traumatic Brain Injury
6. **Prepare Casualty for Evacuation:**
   a. Move Casualty (drags, carries, lifts)
   b. Apply Spinal Immobilization Devices
   c. Secure casualty to litter
   d. Initiate Hypothermia Prevention
7. **Other Skills:**
   a. Perform Hasty Decontamination
   a. Initiate Casualty Monitoring
   b. Establish Casualty Collection Point
   c. Perform Triage

EVACUATION CARE (EVAC):

Goals:

1. Maintain any life saving interventions conducted during DTC and ITC phases
2. Provide rapid and secure extraction to a appropriate level of care
3. Avoid additional preventable causes of death

Principles:

1. Reassess the casualty or casualties
2. Rapidly evacuate patients/casualties is critical
3. Utilize additional resources to maximize advanced care
4. Avoid hypothermia
5. Communication is critical, especially between tactical and non tactical EMS teams.

Guidelines:

1. Reassess all interventions applied in previous phases of care. If multiple wounded, perform primary triage.
2. Airway Management:

a. The principles of airway management in Evacuation Care are similar to that in ITC with the addition of increased utility of supraglottic devices and endotracheal intubation.

a. Unconscious casualty without airway obstruction:

i. Chin lift or jaw thrust maneuver

ii. Nasopharyngeal airway

iii. Place casualty in the recovery position

iv. Caution advised in patients with suspected C-spine injury

b. Casualty with airway obstruction or impending airway obstruction:

i. Recovery position

ii. Naso/oropharyngeal airway

iii. Airway positioning may be enhance by elevation of shoulders

iv. Bag mask ventilation is equivalent to intubation in the pediatric pre-hospital setting

v. If previous measures unsuccessful, it is prudent to consider supraglottic Devices (King LT, CombiTube, LMA, etc), endotracheal intubation with Rapid Sequence Intubation.

vi. Needle cricothyroidotomy recommended if signs of puberty are absent

vii. Surgical cricothyroidotomy only recommended in patients with signs of puberty

c. If intubated and attached to a mechanical ventilator, consider lung protective strategies and reassess for respiratory decline in patients with potential pneumothoraces.

d. Consider the mechanism of injury and the need for spinal immobilization. Spinal immobilization is not necessary for casualties with penetrating trauma if the patient is neurologically intact. Patients may be clinically cleared from spinal immobilization under a locally approved protocol if they have none of the following:

i. Midline c-spine tenderness

ii. Neurologic impairment

iii. Altered mental status

iv. Distracting injury

3. Breathing:

a. Reassess casualties who have had chest seals applied or had needle thoracostomy. If there are signs of continued or progressive respiratory distress:

    i. Consider repeating needle decompression. If this results in improved clinical status, the decompression can be repeated multiple times.

    ii. If appropriate provider scope of practice and approved local protocol, consider placing a chest tube if no improvement of respiratory distress after decompression if long duration or air transport is anticipated.

b. All open chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax. Tension pneumothoraces should be treated as described in ITC.

c. Administration of oxygen may be of benefit (absent an environmental risk for fire or explosion) for all traumatically injured patients, especially for the following types of casualties:

    i. Low oxygen saturation by pulse oximetry

    ii. Injuries associated with impaired oxygenation

    iii. Unconscious casualty

    iv. Casualty with TBI (maintain oxygen saturation > 90%)

    v. Casualty in shock

    vi. Casualty at altitude

    vii. Casualties with pneumothoraces

4. Bleeding:

a. Fully expose wounds to reassess for unrecognized hemorrhage and control all sources of major bleeding.

b. If not already done, use a tourniquet or an appropriate pressure dressing with deep wound packing to control life-threatening external hemorrhage that is anatomically amenable to such treatment. For any traumatic total or partial amputation, a tourniquet should be applied regardless of bleeding.

c. Reassess all tourniquets that were applied during previous phases of care. Expose the injury and determine if a tourniquet is needed.

    i. Tourniquets applied in prior phases that are determined to be effective in controlling hemorrhage should remain in place if the casualty can be rapidly evacuated to definitive medical care.

    ii. If ineffective in controlling hemorrhage or if there is any potential delay in evacuation to care, apply a new tourniquet immediately above the first.

iii. If delay to definitive care longer than 2 hours is anticipated and wound for which tourniquet was applied is anatomically amenable, attempt a tourniquet downgrade as described in ITC (this should be a paramedic or MD action).

iv. A distal pulse check should be performed on any limb where a tourniquet is applied. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.

v. Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

5. Fluid resuscitation:

a. Reassess for hemorrhagic shock (altered mental status in the absence of brain injury, weak or absent peripheral pulses, and/or change in pulse character).

b. If BP monitoring is available, maintain target systolic BP (minimum normal systolic BP = 70 + (Age x 2) or Mean Arterial Pressure greater than 50 mm Hg in children under 10 years.

c. Establish intravascular access if not performed in ITC phase. Consider primary intraosseous access in Pediatric population

d. Management of resuscitation as in ITC with the following additions:

i. If in shock and blood products are not available or not approved under scope of practice/local protocols resuscitate as in ITC.

ii. If in shock and blood products are available with an appropriate provider scope of practice under an approved medical protocol:

1. Resuscitate with 10cc/kg of plasma (FFP) and 10cc/kg of packed red blood cells (PRBCs) in a 1:1 ratio.

2. If blood component therapy is not available, and appropriate training, testing and protocols are in place, consider transfusing fresh whole blood.

3. Continue resuscitation as needed to maintain target BP or clinical improvement.

iii. If a casualty with an altered mental status due to suspected TBI has a weak or absent peripheral pulse, resuscitate as necessary to maintain mid age-specific systolic blood pressure range, or a strong peripheral pulse.

iv. If suspected TBI and casualty not in shock, raise the casualty's head to 30 degrees and maintain MAP > 60mm Hg with volume resuscitation or

vasopressor medications, if indicated and approved under scope of practice/local protocols.

6. Prevention of hypothermia:
    a. Continue all efforts to eliminate heat loss as operationally feasible, after life-saving interventions have been employed.
    b. Minimize casualty's exposure to the elements. Move into a medic unit, warmed vehicle, or warmed structure if possible. Ensure transport vehicle climate control system does not worsen hypothermia.
    c. Replace wet clothing with dry if possible. Place the casualty onto an insulated surface as soon as possible.
    d. Cover the casualty with commercial warming device, dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.
    e. Warm fluids are preferred if IV fluids are required.
7. Monitoring
    a. Institute electronic monitoring if available, including pulse oximetry, cardiac monitoring, etCO2 (if assisted ventilation or altered mental status), and blood pressure.
    b. Obtain and record vital signs.
8. Reassess casualty:
    a. Complete secondary survey checking for additional injuries. Inspect and dress known wounds that were previously deferred.
    b. Determine mode and destination for evacuation to definitive care.
    c. Splint known/suspected fractures and recheck pulses.
    d. Apply pelvic binding techniques for suspected pelvic fractures.
9. Provide analgesia as necessary.
    a. Mild pain:
        i. Consider oral non-narcotic medications
        ii. Avoid the use of non-steroidal anti-inflammatory medications (e.g. aspirin, ibuprofen, naproxen, ketorolac, etc.) in the trauma patient as these medications interfere with platelet functioning and may exacerbate bleeding
    b. Moderate to severe pain:
        i. Narcotic pain medications should be utilized per protocol. Consider utilization of mucosal atomizer devices (MAD). Exercise caution when

using narcotic medications (e.g. fentanyl citrate.) and/or Ketamine for moderate to severe pain in pediatric patients due to their higher volumes of distribution.

- ❖❖ Place patient on appropriate monitor
- ❖❖ Consider adjunct administration of anti-emetic medicines
- ❖❖ Have naloxone readily available whenever administering opiates
- ❖❖ Monitor for adverse effects such as respiratory depression or hypotension.

10. Burns:

a. Burn care is consistent with the principles described in ITC.

b. Smoke inhalation, particularly in a confined space, may be associated with significant carbon monoxide and cyanide toxicity. Patients with signs of significant smoke inhalation plus:

i. Significant symptoms of carbon monoxide toxicity should be treated with high flow oxygen if available

ii. Significant symptoms of cyanide toxicity should be considered candidates for cyanide antidote administration

c. Be cautious of off-gassing from patient in the evacuation vehicle if there is suspected chemical exposure (e.g. cyanide) from the fire.

d. Consider early airway management if there is a prolonged evacuation period and the patient has signs of significant airway thermal injury (e.g. singed facial hair, oral edema, carbonaceous material in the posterior pharynx and respiratory difficulty).

11. Prepare casualty for movement: Consider environmental factors for safe and expeditious evacuation. Secure casualty to a movement assist device when available. If vertical extraction required, ensure casualty secured within appropriate harness, equipment assembled, and anchor points identified.

12. Communicate with the casualty, transporting crew and with the accepting facility. Encourage, reassure and explain care to patient and parents.

13. Cardiopulmonary resuscitation (CPR) may have a larger role during the evacuation phase especially for patients with electrocution, hypothermia, non traumatic arrest or near drowning.

a. Consider rescue breaths in small children with deteriorating cardiopulmonary status.

b. Consider bilateral needle decompression for victims of torso or polytrauma with no respirations or pulse to ensure tension pneumothroax is not the cause of cardiac arrest prior to discontinuation of care.

14. Documentation of Care: Continue or initiate documentation of clinical assessments, treatments rendered, and changes in the casualty's status in accordance with local protocol. Forward this information with the casualty to the next level of care.

Skills:

1. Familiarization with advanced monitoring techniques

2. Familiarization with transfusion protocols

3. Ventilator and advanced airway management

4. Familiarization with staging, transport and vehicle operations

REFERENCES

1. American Academy of Pediatrics Section on Orthopaedics; American Academy of Pediatrics Committee on Pediatric Emergency Medicine; Et Al. "Management of pediatric trauma." Pediatrics. 2008 Apr;121(4):849-54.
2. Badjatia N, Carney N, Et Al "Guidelines for prehospital management of traumatic brain injury 2nd edition." Prehosp Emerg Care. 2008;12 Suppl 1:S1-52.
3. Bankole S, Asuncion A, Ross S, Aghai Z, Nollah L, Echols H, et al. "First responder performance in pediatric trauma: A comparison with an adult cohort." Pediatr Crit Care Med. 2011;12:e166–70.
4. Bhalla T, Dewhirst E, Sawardekar A, Dairo O, Tobias JD. Perioperative management of the pediatric patient with traumatic brain injury. Paediatr Anaesth. 2012 Jul;22(7):627-40.
5. Bell MJ, Kochanek PM. "Pediatric traumatic brain injury in 2012: the year with new guidelines and common data elements." Crit Care Clin. 2013 Apr;29(2):223-38.
6. Berg, Marc D.; Stephen M. Schexnayder; Leon Chameides; Mark Terry; Aaron Donoghue; Robert W. Hickey; Robert A. Berg; Robert M. Sutton; Mary Fran Hazinski. Pediatric Basic Life Support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122[suppl 3]:S862– S875.
7. Blackbourne LH, Baer DG, Eastridge BJ, Kheirabadi B, Bagley S, Kragh JF Jr, Cap AP, Dubick MA, Morrison JJ, Midwinter MJ, Butler FK, Kotwal RS, Holcomb JB. Military medical revolution: prehospital combat casualty care. J Trauma Acute Care Surg. 2012 Dec;73(6 Suppl 5):S372-7.
8. Bochicchio GH et. Al. Endotracheal intubation in the field does not improve outcomes in trauma patients who present without an acutely lethal traumatic brain injury. J Trauma, Feb 2003; 54:2 307-311.
9. Boer C, Franschman G, Loer SA. Prehospital management of severe traumatic brain injury: concepts and ongoing controversies. Curr Opin Anaesthesiol. 2012 Oct;25(5):556-62.
10. Browne GJ, Cocks AJ, McCaskill ME. "Current trends in the management of major paediatric trauma." Emerg Med (Fremantle). 2001 Dec;13(4):418-25.
11. DiRusso et al., Intubation of Pediatric Trauma Patients in the field: Predictor of negative outcome despite risk stratification. J Trauma, Jul 2005; 59:1 84-91.
12. Doyle, G. et al. "Tourniquets: A Review of Current Use with Proposals for Expanded Prehospital Use." Prehospital Emergency Care. 2008, Vol.12 (2): 241-256.
13. Eastridge BJ, Mabry RL, Seguin P, et al. Death on the battlefield (2001-2011): implications for the future of combat casualty care. J Trauma Acute Care Surg. 2012 Dec;73(6 Suppl 5):S431-7.
14. Eastridge BJ, Hardin M, Cantrell J, Oetjen-Gerdes L, Zubko T, Mallak C, Wade

CE, Simmons J, Mace J, Mabry R, Bolenbaucher R, Blackbourne LH. Died of wounds on the battlefield: causation and implications for improving combat casualty care. J Trauma. 2011 Jul;71(1 Suppl):S4-8.

15. Eastridge BJ, Salinas J, McManus JG, et al. Hypotension begins at 110 mm Hg: redefining "hypotension" with data. J Trauma. 2007;63(2):291-297.

16. Edwards MJ, Lustik M, Eichelberger MR, Elster E, Azarow K, Coppola C. Blast injury in children: an analysis from Afghanistan and Iraq, 2002-2010. J Trauma Acute Care Surg. 2012 Nov;73(5):1278-83.

17. Eidelman M, Katzman A, Bialik V. "A novel elastic exsanguination tourniquet as an alternative to the pneumatic cuff in pediatric orthopedic limb surgery."J Pediatr Orthop B. 2006 Sep;15(5):379-84.

18. Fiorito et al. Intraosseous access in the setting of pediatric critical care transport. Pediatr Crit Care Med, Jan 2005; vol 6:1 50-53.

19. Fowler et al. The role of intraosseous vascular access in the out-of-hospital environment. Prehospital Emergency Care, 2007 vol 11:1 63-66.

20. Gausche M et al., Effect of out-of-hospital pediatric endotracheal intubation on survival and neurological outcomes. JAMA, Feb 2000; 283: 6.

21. Gerhardt RT, Berry JA, Blackbourne LH. Analysis of life-saving interventions performed by out-of-hospital combat medical personnel. J Trauma. 2011 Jul;71(1 Suppl):S109-13.

22. Hansen M, Meckler G, Spiro D, Newgard C. Intraosseous line use, complications, and outcomes among a population-based cohort of children presenting to California hospitals. Pediatr Emerg Care. 2011 Oct;27(10):928-32.

23. Huwer, C. Are colloid solutions essential for the treatment of pediatric trauma or burn patients? World Health Organization Review, Nov 2012

24. Ivashkov Y. and Bhananker, SM. Perioperative management of pediatric trauma patients. Int J Crit Illn Inj Sci. 2012 Sep-Dec; 2(3): 143–148.

25. Johnson, L, Bugge, J. Child-Led Disaster Risk Reduction: A Practical Guide. The International Save the Children Alliance. 2007.

26. Kannikeswaran N, Mahajan PV, Et Al "Epidemiology of pediatric transports and non-transports in an urban Emergency Medical Services system." Prehosp Emerg Care. 2007 Oct-Dec;11(4):403-7.

27. Kokoska, E., et al. Early hypotension worsens neurological outcome in pediatric patients with moderately severe head trauma. J of Ped Surg. February 1998 Vol. 33 (2) 333-338.

28. Kotwal RS, Montgomery HR, Kotwal BM, Champion HR, Butler FK Jr, Mabry RL, Cain JS, Blackbourne LH, Mechler KK, Holcomb JB. Eliminating preventable death on the battlefield. Arch Surg. 2011 Dec;146(12):1350-8

29. Kragh et al. Survey of Trauma Registry Data on Tourniquet Use in Pediatric War Casualties. Pediatric Emergency Care 2012.

30. Kragh JF Jr, Walters TJ, Baer DG, Fox CJ, Wade CE, Salinas J, Holcomb JB. Survival with emergency tourniquet use to stop bleeding in major limb trauma. Ann Surg. 2009 Jan;249(1):1-7.

31. Kotwal RS, Montgomery HR, Kotwal BM, Champion HR, Butler FK Jr, Mabry RL, Cain JS, Blackbourne LH, Mechler KK, Holcomb JB. Eliminating preventable death on the battlefield. Arch Surg. 2011 Dec;146(12):1350-8.

32. Mackenzie R, Sutcliffe R. “The injured child.” J R Army Med Corps. 2002 Mar; 148(1):58-68.
33. Navsa et al. Dimensions of the neonatal cricothyroid membrane - how feasible is a surgical cricothyroidotomy? Pediatr Anesth, 2005; 15: 402-406
34. Patel S, Rasmussen TE, Gifford SM, Apodaca AN, Eastridge BJ, Blackbourne LH.Interpreting comparative died of wounds rates as a quality benchmark of combat casualty care. J Trauma Acute Care Surg. 2012 Aug;73(2 Suppl 1):S60-3.
35. Pietrini, D. Plasma Substitutes Therapy in Pediatrics. Curr Drug Targets, 2012; 13:893-899.
36. Praveen, K. “Management of a child with multiple trauma.” Indian Journal of Critical Care Medicine. April-June, 2004 Vol. 8 (2): 78-84.
37. Schweer, L. “Pediatric Trauma Resuscitation: Initial Fluid Management.” Journal of Infusion Nursing: March/April 2008 Vol. 31(2): 104–111.
38. Seid T, Ramaiah R, Grabinsky A. “Pre-hospital care of pediatric patients with trauma.” Int J Crit Illn Inj Sci. 2012 Sep;2(3):114-20.
39. Seidel JS, Hornbein M, Yoshiyama K, Kuznets D, Finklestein JZ, St Geme JW., Jr. “Emergency medical services and the pediatric patient: Are the needs being met?” Pediatrics. 1984;73:769–72.
40. Seidel JS. “Emergency medical services and the pediatric patient: Are the needs being met? II. Training and equipping emergency medical services providers for pediatric emergencies.” Pediatrics. 1986;78:808–12.
41. Simma, Burkhard MD; Burger, Rene MD; Falk, Markus MSC; Sacher, Peter MD; Fanconi, Sergio MD. A prospective, randomized, and controlled study of fluid management in children with severe head injury: Lactated Ringer's solution versus hypertonic saline. Pediatric Critical Care 1998 Vol. 26 (7): 1265-1270.
42. Spinella PC, Borgman MA, Et. Al “Pediatric trauma in an austere combat environment.” Crit Care Med. 2008 Jul;36(7 Suppl):S293-6.
43. Stevens, S. “The Impact of Training and Experience on EMS Providers' Feelings Toward Pediatric Emergencies in a Rural State.” Pediatric Emergency Care. January 2005 Vol. 21(1): 12-17.
44. The American Academy of Pediatrics. “Equipment for Ambulances.” Policy Statement, 2009.
45. “Theater Shooting Victims Are 4 Months Old To Adults.” KMGH-TV. 20 July 2012.
46. Thompson T, Lyle K, Mullins SH, Dick R, Graham J. A state survey of emergency department preparedness for the care of children in a mass casualty event. Am J Disaster Med. 2009 Jul-Aug;4(4):227-32.
47. US Department of Homeland Security (DHS). FY 2013 Homeland Security Grant Program (HSGP) Funding Opportunity Announcement (FOA).
48. Wallis LA, Carley S. “Comparison of paediatric major incident primary triage tools.” Emerg Med J. 2006 Jun;23(6):475-8.
49. Watkins N. “Paediatric prehospital analgesia in Auckland.” Emerg Med Australas. 2006 Feb;18(1):51-6.
50. Wedmore, I. et al. “A Special Report on the Chitosan-based Hemostatic Dressing: Experience in Current Combat Operations.” Journal of Trauma-Injury Infection & Critical Care. March 2006 Vol. 60 (3): 655-658.

628 51. Weiss et al. Proposal for the management of the unexpected difficult pediatric airway.
629 Pediatr Anesth, May 2010 20:5 454-464.
630 52. Wilson KL, Schenarts PJ, Bacchetta MD, Rai PR, Nakayama DK. Pediatric trauma
631 experience in a combat support hospital in eastern Afghanistan over 10 months, 2010 to 2011.
632 Am Surg. 2013 Mar;79(3):257-60.