TCC Lecture and Demonstration

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Objectives

- Define TCCC
- Who TCCC applies to
- How is it structured
- Future Applications
- C4
- Demonstration
Traumatic Combat Causality Care

- **ATLS in 1980**
- **PHTLS in 1984**
- **TCCC in 1996**
- **CoTCCC est. in 2001**
- **Updated Guidelines in 2003**
- **Consistent changes since**

**Figure 2:** Dr. Styron’s plane after he and his family crashed in a rural Nebraska cornfield in 1976. Printed with the permission of Dr. James Styron.

I don’t know how long I sat there after the world became silent; it seemed like just a second. The first thing I thought about after you’re still alive was fire. I inhaled to the right into the opening and ran into the back of the fuselage that entangled the aircraft. This got my attention and my next thought was ‘the kids are still in there!’ I saw Randy and started to extract him when I realized he was pinned under the fuselage. Chris tried to give me Kim and discovered his right arm was fractured. I set Kim away from the aircraft and removed Rick. I then turned my attention to Randy. I used only my hands to dig the leg out. I don’t know how hard the ground was but there were no marks on my hands. His leg fell off the impact and I waited for the bleeding; it never started. Chris was able to extract himself.

Now that all were away from the aircraft and fire was not a problem, I realized we had a potential for hypothermia. We gathered clothing from scattered suitcases and made a bed in the back compartment. I placed the kids on top, and piled more cloths over them. Chris and I sat in the front and waited for help; it never came.

I went looking for my wife 3 different times and found her on the crescent, checked her, and confirmed she was gone. The fuselage was expelled and we had a clear sky with a near full moon. I went back to check for 3 more times to be sure she was gone.

While sitting in the aircraft, we could see a road at the left some distance away. After waiting until about 2:00 AM, I decided to go for help. I instructed Chris to stay with the children. We talked about my ribs injury and the possibility of a knee problem. He was instructed not to come looking for me if I did not return, to stay with the children. Both of us handled the entire experience without any outward emotion. I walked about 500 ft in a mile along a dirt road next to the point to the highway and flagged down a car after 2 trucks failed to stop. I had to jump into a roadside ditch as the trucks passed to keep from getting hit. As I approached the car, the occupants saw the dried blood on my face and thought it might be a mess; they chose to wait. Their names were Kiki and David. I told them what had happened. We drove back to the accident site and loaded up the kids. I cannot recall how we assembled 7 in the car or how much protection we gave their necks.
Where does TCCC occur

Survivability >98%
Why do we talk about TCCC

- Most likely, as a physician, you will not practice TCCC, however:

- **Many physicians and physician assistants have limited training and experience in trauma care, especially pre-hospital trauma care.** TCCC practices, interventions, and medications (fentanyl lozenges, ketamine, TXA, Hextend) are unfamiliar and/or seldom used by these providers. If they are not familiar with TCCC medications and technology, then they will not allow their enlisted medics to utilize them either. This is the primary reason we continue to see NS and LR being used for battlefield trauma resuscitation instead of Hextend.
Why are we presenting this?

- There is no assurance that AF physicians will receive TCCC training… **Physicians deploying in support of combat operations need to know TCCC and to have trauma center rotations.** (BAF Role I – USAF Senior PJ)

- "**Physicians don’t know battlefield trauma care.**” (BAF Role I – USAF Senior PJ)

- **Senior medical leaders cannot force individual physicians to provide medical care that they do not agree with.** (KAF Role I – 3rd Infantry Division)

- Physicians and physician assistants are assigned to support units that then provide medical support to SEAL teams, rather than being integrated into the SEAL team structure… **They are not reliably trained in TCCC at present.** (Tarin Kowt Role I – NSW)
Who does TCCC?

- Practiced by all Special Operations Units and many other units have adopted these principles
- “Effective immediately, all applicable Air Force Training Courses and programs will incorporate the most current TCCC guidelines…”
- 14 Mar 2014: TCCC is now required training for Physicians, PA, NP, Medics, Corpsmen, PJ’s and Nurses who deploy to Afghanistan
TCCC

- Consists of 3 different stages:
  - Care Under Fire
  - Tactical Field Care
  - Tactical Evacuation Care

- Guidelines as of 28 Oct 2013
Care Under Fire

1. **Return Fire and take cover**
2. Direct the casualty to continue to return fire and suppress enemy if able
3. Direct casualty to move to cover and apply self-aid if able
4. Try to keep the casualty from sustaining additional wounds
   - A. Casualties should be extricated from burning vehicles or buildings and moved to places of relative safety
5. Airway management is generally best deferred until the tactical Field Care phase
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 Tourniquet for hemorrhage control
   - Move casualty to cover, apply the hasty tourniquet proximal to the bleeding site (over the uniform) and tighten “High and Tight”
CoTCCC Tourniquets

**Extremity**

**Junctional**

ICE website

Croc Website

Breachbangclear.com

EMS solutions
Tactical Field Care

- Done when ‘scene is safe’ or close approximate
- Abbreviated Steps:
  - Disarm casualties with AMS
  - Manage airway:
    - Without Obstruction: use NPA
    - With Obstruction: Basic measures, then:
      - Surgical Cricothyrotomy
  - Breathing:
    - Consider Tension Pneumothorax: Needle Decompression (bilateral Needle D)
    - Cover all chest wounds with vented or non vented chest seal
    - Supplemental oxygen if suspected TBI (sat >90%)
SCRIC vs. Supraglottic Airway

- **Surgical Cricothyrotomy**
  - Data suggests it is effective in airway obstruction, however not done correctly in observation
  - LOC is not an indication

- **Supraglottic Airway**
  - King LT (pictured) carried by USMC corpsman and 68W
  - Inflated cuffs should be filled with H2O and not air

USCENTCOM, Prehospital Report, 31 Jan 2013
Surgical Cricothyrotomy
Needle Decompression

- 2nd ICS at Midclavicular Line
- OR 4th or 5th ICS at Ant Axillary Line
- Needle is NOT medial to nipple line and NOT directed at the heart
Tactical Field Care

- **Bleeding**
  - Assess for unrecognized hemorrhage and control bleeding
  - If needed apply 1\textsuperscript{st} deliberate tourniquet (directly on skin, 2-3” above wound)
    - Use a 2\textsuperscript{nd} deliberate tourniquet (kissing) on LE
  - If appropriate, use JUNCTIONAL tourniquet
  - Not tourniquet appropriate? Use Combat Gauze (Kaolin) with 3 MIN of direct pressure
Hasty vs. Deliberate

- **Hasty Tourniquet:**
  - Care Under Fire
  - High and Tight
  - No exposure of wound

- **Deliberate**
  - Tactical Field Care
  - Exposed wound
  - 2-3 inches above wound
Tactical Field Care

- Fluid Resuscitation
  - 18 gauge IV or IO access
  - If NOT in Shock:
    - PO fluids if possible, No IV fluids necessary
  - IN Shock:
    - Hextend, 500 mg IV Bolus, repeat in 30 min if still in shock (then STOP)
  - Needs Blood Transfusion:
    - TXA (limited to Special Operations Community)
    - 1 g TXA/100 mL NS/LR WITHIN 3 hrs of injury
    - Repeat after fluid resuscitation effort with 1 g TXA
    - Must have it’s own dedicated IV line

Butler, 2011 Fluid Resuscitation in TCCC
Tactical Field Care

- Hypothermia
- Minimize exposure
- Replace wet clothing and dry if possible
- Thermal Blanket
- No thermal blanket? Use anything to retain heat and keep casualty dry

![Image of a thermal blanket and a casualty on a stretcher]
Tactical Field Care

- **Penetrating Eye Trauma**
  - Rapid field test of visual acuity
  - Rigid eye shield (NO pressure patch)
  - Moxifloxacin 400 mg PO or IV/IM ABX

- **Monitoring**
  - Reassess: Tourniquets, airway, breathing, and circulation
  - Dress known wounds, check for additional wounds
  - Additional interventions
  - Mod/Severe TBI: monitor with pulse oximetry
Tactical Field Care

- Analgesia as necessary:
  - Mild to Moderate Pain: Tylenol/Mobic
  - Mod to Severe Pain:
    - Not able to fight and no risk of shock
    - Oral Transmucosal Fentanyl Citrate (OTFC) 800 mcg transbuccally (no chewing): Tape to finger!
    - Morphine 5 mg IV/IO, repeat q10 min, alt to OTFC
  - Mod to Severe Pain:
    - Not able to fight and RISK of shock:
      - Ketamine 50 mg IM/IN or 20 mg slow IV/IO
        - Repeat q 30 min prn IM/IN, q20 min IV/IO
        - STOP with pain control or development of nystagmus
  - Promethazine (Phenergan) 25 mg IV/IM/IO q6 hr for N/V PRN

- ALWAYS REASSESS!
Tactical Field Care

- Splint fractures and recheck pulse
- Antibiotics: recommended for all open combat wounds
  - Moxifloxacin 400 mg PO daily
  - Cefotetan 2 g IV (3-5 min push)/IM q12 hr OR
  - Ertapenem 1g IV/IM daily
Tactical Field Care

- **Burns**
  - Facial Burns: assess airway, plan for early surgical airway
  - Estimate TBSA to nearest 10% (rule of 9s)
  - Fluids indicated if >20% TBSA affected
  - Initial IV/IO fluid rate is: %TBSA x 10cc/hr for adults 40-80 kg
    - Every 10 kg above 80 kg, increase rate by 100 mL/hr
  - Hemorrhagic Resuscitation takes precedence over burn resuscitation
  - Analgesia as above
Tactical Field Care

- Communicate with casualty if possible (encourage, reassure, explain)

- CPR: SHOULD NOT BE ATTEMPTED
  - If torso trauma or polytrauma, who have NO pulse or respirations, should have BILATERAL Needle Decompression to ensure NO Tension PTX prior to discontinuation

- Documentation of Care with TCCC Casualty Card
  - Same rules as here: if not documented, didn’t happen
  - From OEF, OIF there were over 30,000 casualties by 2007, only 10% had any documentation of care done before reaching MTF.
    - In 2011 it had risen to 14%
TCCC Casualty Cards

Kotwal et al, 2013, TCCC Casualty Card change 1301
Tactical Evacuation Care

- This Phase done in a more secure environment/higher level of care
- Similar to Tactical Field Care
- Includes both CASEVAC and MEDEVAC

Airway Management:
- now can use Supraglottic Airway or ET intubation or Surgical Cricothyrotomy
Tactical Evacuation Care

- **Airway Management:**
  - now can use Supraglottic Airway or ET intubation or Surgical Cricothyrotomy

- **Breathing**
  - Consider chest tube insertion
  - Supplemental Oxygen if: TBI, shock, High Altitude, Unconscious, Low O2 Sat, Injuries causing impaired oxygenation

- **Bleeding:** same as TFC

- **Fluids:** same as TFC
Tactical Evacuation Care

- Casualties with mod/severe TBI monitored for:
  - Decreases in level of consciousness
  - Pupillary dilation
  - SBP > 90 mmHg
  - O2 Sat >90%
  - Hypothermia
  - PCO2 (35-40 mmHg if capnography available)
  - Penetrating head trauma

- Unilateral pupillary dilation with decreased consciousness: impending cerebral herniation:
  - Hypertonic saline (3-5%) 250 cc
  - Elevate head 30 degrees
  - Hyperventilate (respiratory rate of 20)
  - Capnography (30-35)
  - Highest O2 concentration possible
Tactical Evacuation Care

- Prevention of hypothermia
  - Use Heat Reflective Shell and Ready Heat blanket
  - Portable fluid warmer to warm all IV fluids including blood products

- Penetrating Eye Trauma

- Monitoring
- Inspect and dress known wounds
- Check for additional wounds

- Analgesia
- Reassess fractures

- Antibiotics
- Burns
Tactical Evacuation Care

- Pneumatic Antishock Garment (PASG):
  - Used to stabilize pelvic fractures
  - Contraindicated with thoracic or brain injuries

- CPR: Can be done IF
  - Casualty does not have obviously fatal wounds
  - Surgical ability within a short period of time
  - No compromise of mission or denying lifesaving care to others

- Document
Future/Civilian Applications

- TCCC has been used by various SWAT teams in the US
- X-Stat Rapid Hemostasis System
  - Now for use by US Military
  - Medical sponges coated with TXA, each equipped with a tiny radiopaque marker so they can be found on XR
Next is Demonstration
References

A Physician once said, “The best medicine for humans is love.” Someone asked, “what if it doesn’t work?” He smiled and said “increase the dose.”