Committee on Tactical Combat Casualty Care Meeting

31 January – 1 February 2017
San Antonio, TX

Meeting Minutes

22 May 2017

Dr. Frank Butler
Dr. Stephen Giebner

31 January 2017

1. Chairman's Welcome: Dr. Frank Butler, Chairman of the CoTCCC, called the meeting to order and had attendees introduce themselves. He presented a plaque to COL Kevin O'Connor, a CoTCCC member who is retiring from active duty and leaving the CoTCCC. The Committee's next meeting dates and location are yet to be determined because the Joint Trauma System is moving to the Defense Health Agency. Dr. Butler briefly reviewed the Committee's progress in prehospital combat trauma care since 2001, its current knowledge products, and process improvement sources. He then reviewed the agenda and asked for disclosures from the attendees. Several disclosures were noted. Dr. John Holcomb has a financial interest in the Junctional Emergency Treatment Tool, one of the three CoTCCC-recommended junctional tourniquets. Dr. Russ Kotwal and Mr. Harold Montgomery consult for LynnTech, a company that manufactures blood analysis technology. Mr. Steve Viola is a medical consultant for RGovAccess branch of Robbins Gioia.

2. Combat Medic Presentation: SMSgt Ivan Ruiz, an Air Force Pararescueman, presented a TCCC scenario from Afghanistan. He began with a reminder that the primary missions of Air Force Pararescue are Combat Search and Rescue and Personnel Recovery. Tactical evacuation of casualties is a secondary mission. He reported on casualties sustained and treated during a mission south of Khandahar. He was embedded in a Special Forces "A" team that was operating with Afghan Commandos. After his element gained entry to

the target compound to perform battle damage assessment, two U.S. servicemen were wounded by AK-47 fire at a range of 10 yards and three Afghans sustained fragmentation and gunshot wounds:

1. (US) - Immediate – Gunshot wound (GSW) to the right tibia and fibula above the ankle and another GSW entry wound at the top of left trapezius muscle with an exit wound in the mid-back just to the left of the spine.
2. (US) - Delayed - GSW through and through to left mid front quadriceps muscle.
3. (Afghan) - Delayed – Minor grenade fragmentation wounds to the right arm
4. (Afghan) - Delayed – GSW through and through to the left thigh.
5. (Afghan) Delayed - Minor grenade fragmentation wounds to the right foot and debris to both eyes.

After 10-15 minutes of an intense firefight, he and his teammates were able to suppress enemy fire enough to allow a "grab and go." The unit moved the casualties to cover and SMSgt Ruiz started to treat their injuries. His Tactical Field Care (TFC) included tourniquets (he carried the RATS and the SOFT-T tourniquets), wound packing and dressing, IVs, analgesics (IM ketamine and OTFC), Hextend, tranexamic acid (TXA), antibiotics (IM Rocephin), tourniquet conversion, eye shields, splints, litters and preparation for Tactical Evacuation (TACEVAC.)

His primary lesson learned was in regards to casualty movement. The team dragged the casualties to move them to cover; SMSgt Ruiz dragged casualty #1 over several dead bodies, possibly adding to the casualty's physical and emotional trauma. In retrospect, he felt he should have called for the Skedco litter and moved the casualty on that instead.

SMSgt Ruiz received the Air Force Cross for his actions during this engagement.

3. Senior Leader Remarks: MG Brian Lein is the Commanding General of the U.S. Army Medical Department Center and School. In his view, the Department of Defense (DoD) performs poorly in gathering medical lessons learned. The Defense Health Agency (DHA) currently has no process to capture this information. There is also opportunity to improve in the medical preparation for missions, especially regarding aid bags, where we have yet to determine the contents of a DoD-wide standard medical kit.

We should be preparing for the battlefield of future (i.e.- early entry operations) where DUSTOFF (US Army MEDVAC) and PEDRO (US Air Force Pararescue TACEVAC) may not be available and TACEVAC times may be prolonged. We need to be able to make use of telemedicine and teleconsultation far forward. We

should prepare for increased lethality on the battlefield as a result of weapons such as drones and thermobaric weapons. We should also be training doctors, nurses, medics and other providers in civilian trauma centers.

The Army Chief of Staff has determined that readiness is the Army's single mission. We need to define appropriate medical readiness standards.

4. TCCC Update: Dr. Frank Butler presented an update on TCCC issues. Among the topics covered were:

- The voting for this year's TCCC Award for outstanding contributions to the TCCC effort resulted in a tie, so awards were presented to both COL (Ret) Warner "Rocky" Farr and Col Stacy Shackelford.
- Dr. John Holcomb from the TCCC Expert Panel won the US Civil War Museum's 2016 Letterman Award.
- CoTCCC member Dr. Mel Otten was recently honored by the University of Cincinnati College of Medicine establishing the Edward J. (Mel) Otten Chair for Education in Emergency Medicine.
- Ms. Julie Chase, the CoTCCC Liaison Member from both State Department Security and the National Association of Emergency Medical Technicians (NAEMT) is the new chair of the NAEMT Prehospital Trauma Committee.
- Dr. Butler discussed the findings of the recent National Academy of Science, Engineering, and Medicine (NASEM) report on trauma care that called for the establishment of a National Trauma System in the US. A preliminary outline of a plan for the prehospital component of a National Trauma System that incorporates battlefield trauma care advances from Iraq and Afghanistan was presented to the medical leadership at the Department of Homeland Security in November.
- The new Secretary of Defense, General (ret) James Mattis, has previously taken a personal interest in TCCC issues as a result of the 2013 "Savings Lives on the Battlefield" report conducted as a joint effort of both the US Central Command (USCENTCOM) and the Joint Trauma System (JTS).
- The new USCENTCOM Surgeon, CAPT Darren Via, indicated during his brief at the Association of Military Surgeons of the US (AMSUS) meeting in December that CENTCOM will continue to require that forces deploying to that Area of Operations (AO) be trained in TCCC.
- Two changes to the TCCC Guidelines have recently been approved: the use of pelvic binders for casualties with suspected pelvic fractures, led by Col Stacy Shackelford, and the comprehensive TCCC review change, led by Mr. Harold "Monty" Montgomery.

- Dr. Butler outlined the most significant items in the current CoTCCC opportunities for improvement:

1) A TCCC Equipment Rapid Fielding Initiative

2) Adoption of a high-quality, standardized TCCC training course in the DoD. The NAEMT TCCC course is the best model at present for this training.

3) TCCC training for physician, PAs, and nurses in the DoD

4) A DoD-FDA Military Use Panel to address combat-specific medications and blood products.

5) Better documentation of TCCC care.

5. JTS Director's Brief: CAPT Zsolt Stockinger, the Director of the JTS, noted that DOD Instruction 6040.47, which covers the JTS, was signed on 28 September 2016. This instruction formally established the JTS as a permanent entity in the Military Health System. The National Defense Authorization Act of 2017 makes the JTS law. Although the DoD Instruction had called for the JTS to remain at the US Army Medical Research and Materiel Command (MRMC), NDAA 17 directs that the JTS be relocated to become part of DHA. With its present level of manpower and resources, the JTS cannot provide all of the functions directed by the DODI and NDAA 17, so the DoD has 180 days (until 01 Jul 17) to present to Congress a plan for ramping up the JTS. The ongoing Joint Staff-sponsored Capabilities-Based Assessment of the JTS will probably provide the basis for that report. The JTS must grow while the federal government must shrink.

6. Hartford Consensus Update: Dr. Lenworth Jacobs is Vice President for Academic Affairs at Hartford Hospital in Hartford, CT; Professor of Surgery at the University of Connecticut; and Chairman of the Hartford Consensus. He briefed the group on the history and publications of the Hartford Consensus to date.

Hartford Consensus III addressed the implementation of bleeding control. Its goals were to modify the mission of law enforcement to include bleeding control; to move EMS closer to the wounded for earlier treatment of external hemorrhage; and to enable the public to respond immediately to control life-threatening external hemorrhage.

The target of Hartford Consensus IV was to increase national resilience. Calling 911 may not be enough to save lives in an emergency – the average non-medical member of the public must also act to stop the bleeding in the event of life-threatening external hemorrhage. In a recent Hartford Consensus survey, ninety-two percent of the public surveyed indicated a willingness to act, but expressed concern about possibly causing further harm. BleedingControl.org was launched by the American College of Surgeons and the Hartford Consensus to provide the public with information on proper bleeding control techniques. This website offers registration in the Bleeding Control Basics course for individuals who have little or no medical training, but who may be called upon as immediate responders

7. Prehospital Ketamine Use at the Mayo Clinic: Dr. Scott Zeitlow, trauma surgeon at the Mayo Clinic, presented a case report of a patient whose arm was captured and mangled in an industrial auger. Prehospital treatment included a CAT tourniquet, two IVs, thawed plasma, whole blood, and amputation in the field. Pain was managed with ketamine. Prehospital ketamine is gaining in popularity nationwide, and is used about twice a week now in the Mayo trauma system. Dr. Zeitlow reviewed Mayo's protocol including indications, contraindications, dosages, education, training and oversight. He noted that prehospital ketamine use has increased fourfold over the last 3 years. He is reviewing their observed 5% incidence of decreased respiratory rate which may be associated with the concurrent use of OTFC. Dr. Zietlow's overall assessment of the Mayo Clinic's experience with prehospital ketamine was it they have found it to be "profoundly effective."

8. iGel as the Supraglottic Airway of Choice in TCCC: Dr. Mel Otten recommends the i-Gel as the supraglottic airway (SGA) of choice in TCCC. In 2012, the Defense Health Board approved the CoTCCC recommendation to use SGAs in the TACEVAC phase of care without specifying a particular device. Casualties who are unconscious from hemorrhagic shock or severe TBI but who have not suffered direct airway trauma are likely to be the best candidates for SGAs. There is increasing evidence in the medical literature that the iGel performs well in comparison to other SGAs. Interoperability would be enhanced if all medics were trained on a single device. Dr. Otten noted that, in an Armed Forces Medical Examiner System (AFMES) "Feedback to the Field" case series, of 7 military postmortem cases in which the King-LT had been used, 4 were incorrectly positioned. It is important to note that the position of the device as seen at autopsy may have been affected by post-mortem events.

The iGel has a very low incidence of dislodgement and is easy to position correctly. Other characteristics of the iGel include:

- Has a gastric tube port
- Has an oxygen port
- Provides easy access for fiberoptic intubation
- Is associated with very little aspiration
- Is popular with anesthesiologists
- Is widely used in European ambulance services
- Has a gel-filled cuff, not an inflatable balloon
- Can be inserted with the patient in the prone position
- Is easily trained
- Costs about half of what other SGAs cost
- Has a 3-year shelf life
- Can be tolerated by conscious casualties after ketamine administration
- Comes in a smaller package than other SGAs

Significant facial trauma, neck trauma or airway/chest trauma are contraindications to the use of the iGel.

Dr. Otten proposes that the CoTCCC recommend the iGel as the SGA of choice in both TACEVAC and in TFC.

In the ensuing discussion MSgt Travis Shaw noted that Air Force PJs use the LMA Supreme and that they have been happy with that device. He forwarded several published studies on the LMA Supreme that document the good performance of this device.

9. Comprehensive Review - TCCC Guideline Change 1603: Mr. Harold Montgomery, Operational Liaison for the JTS/CoTCCC announced that this change, which he coordinated, has now been unanimously approved by the CoTCCC. This change has 23 components:

- Add establishing a security perimeter to the beginning of Tactical Field Care (TFC).
- Specify securing both weapons and communications equipment of casualties with altered mental status in TFC.
- Add a “Massive Hemorrhage” paragraph as the first medical intervention in TFC and Tactical Evacuation Care (TACEVAC).
- Change the “Breathing” section title to “Respiration/Breathing”
- Change the “Bleeding” section title to “Circulation.” Make the first subsection “Bleeding” and include in it pelvic binders, replacing or doubling limb tourniquets, converting tourniquets, and recording times of tourniquet events. Follow “Bleeding” with “IV Access,” “TXA,” and “Fluid Resuscitation.”
- Shift the initiation of pulse oximetry to the Respiration/Breathing section.
- Add known or suspected smoke inhalation as an indication for supplemental oxygen when available.
- Replace the term “*wound site* with “*bleeding site*” throughout the TCCC Guidelines when addressing hemorrhage control.
- Add "Remove tourniquet if it was never actually needed to control bleeding" to the bleeding section.
- Modify “check a distal pulse if possible” to specify that the “if possible” caveat applies to a traumatic amputation.
- Clarify that XStat, unlike other hemostatic dressings, should not be removed by combat medical personnel in the field after it has been applied, but more XStat may be added and/or a different hemostatic dressing applied over the XStat.
- Clarify tourniquet documentation requirements.
- Specify the indications for establishing intravenous (IV) or intraosseous (IO) access.
- Clarify the wording regarding time urgency and the duration of infusion of tranexamic acid (TXA) when indicated.
- Specify that hypothermia prevention should generally be undertaken

concurrently with fluid resuscitation when the latter is indicated.

- Eliminate cefotetan as a recommended antibiotic option.
- Add a requirement to document the results of the rapid field test of visual acuity in known or suspected eye injuries.
- Recommend advanced electronic monitoring in TFC if and when that technology is available in this phase.
- Change the name of the oral medication pack from “Combat Pill Pack” to “Combat Wound Medication Pack.”
- Expand the communication paragraph in TFC to include communicating with tactical leadership and the evacuation system as well as with the casualty. Add a similar paragraph to TACEVAC.
- Add a section on preparing the casualty for evacuation to the end of TFC.
- Add a section on transition of care to the beginning of TACEVAC.
- Rearrange the guidelines as needed to better reflect the actual priority of clinical interventions.

Potential future guideline changes for the Committee’s consideration identified during this review include changes in the following areas:

- TBI
- Airway Management
- Fluid Resuscitation
  - Consideration of normotensive fluid resuscitation for patients with controlled bleeding
- TXA administration
  - Consider eliminating the second dose of TXA from TCCC unless evacuation is prolonged

10. Noncompressible Hemorrhage in TCCC: Dr. Frank Butler from the JTS Noted that the preventable death analysis by COL Brian Eastridge was one of the most important papers to come out of the wars in Iraq and Afghanistan. He and his co-authors found that hemorrhage was the most prevalent cause of potentially preventable prehospital combat death in the US Military during these conflicts. Due to the increased use of tourniquets and hemostatic dressings pioneered by TCCC and becoming widespread in among US forces in 2005-2006, deaths from extremity hemorrhage were reduced by 67% by 2011.

At present, non-compressible hemorrhage is the leading cause of preventable death among US Military combat fatalities. What can medical and line leaders do to reduce the number of these deaths? Dr. Butler reviewed the steps that can be undertaken at present by medical and line leaders to minimize preventable deaths from non-compressible hemorrhage in combat fatalities:

- Minimize casualty evacuation time to a surgical capability
- Train, equip, and use pelvic binders
- Treat hemorrhagic shock with far-forward Damage Control

Resuscitation, using whole blood whenever feasible
- Optimize TXA use - administer this medication immediately when there is significant risk of death from hemorrhage
- Avoid platelet-impairing NSAID medications in deployed forces
- Use the TCCC Triple-Option Analgesia plan
- Use the TCCC hypothermia prevention measures

Dr. Butler thanked COL (retired) John Holcomb for his assistance with this topic. This presentation can be downloaded from the www.cotccc.com website.

11. Three Things I Would Change about TCCC: MSgt Travis Shaw, the Director of the PJ Community at the Air Combat Command, continued in the CoTCCC series of presentations about what aspects of TCCC need to be changed. MSgt Shaw's recommendations included:

- Structuring the CoTCCC meetings so that there would be less focus on overview and information topics and more action. Specifically, he would like to see more breakout meetings with subcommittees focusing on particular topics and then doing briefbacks for the meeting attendees as a whole.

- He noted that the CoTCCC is inconsistent in its handling of specifying particular equipment items. For example, the CoTCCC-recommended tourniquets are named in the PHTLS textbook, but not in the TCCC Guidelines, while the TCCC-recommended hemostatic dressings and pelvic binders are named in the TCCC Guidelines themselves. MSgt Shaw believes we should remove all specific equipment item names from the TCCC Guidelines main body, and create a Guideline Appendix with equipment names. Dr. Butler noted that some of these inconsistencies have been a result of the evolutionary nature of CoTCCC decision-making methodology and acknowledged that there is a need to better inform new members of the TCCC Working Group of some of these historical points, such as the WoundStat experience.

- MSgt Shaw believes that the CoTCCC should lead the way more vigorously with respect to battlefield trauma care training and equipment and should more strongly encourage the services to incorporate TCCC concepts and techniques. He expressed concern about recent Air Force decisions to train its non-medical members in an abbreviated hemorrhage control program rather than using the more inclusive TCCC for All Combatants course. He stressed the need for the services to move away from using colloids and crystalloids for fluid resuscitation and begin using whole blood and other blood components. He advocated for the CoTCCC to make a whole blood protocol available to TCCC users.

- He recommended reducing the current four TCCC Provider Levels to only two Levels – TCCC for Medical Professionals and TCCC for All Combatants. His thought is that this step would reduce confusion about which combat medical personnel should be performing which interventions on the battlefield.

12. New Business: Dr. Butler solicited input on limb tourniquets. The CoTCCC in the past has advocated for periodic comprehensive testing of new tourniquets and hemostatic dressings. These laboratory evaluations have not been undertaken because it was the judgment of DoD research managers that there was no capability gap in those areas. Despite this lack of a tourniquet capability gap, one of the services has developed a new tourniquet. The CoTCCC may be asked to provide a recommendation regarding this new tourniquet in the near future. Dr. Butler stated that we need a comprehensive USAISR tourniquet study that evaluates all of the currently available tourniquets using a standardized methodology before updating the TCCC tourniquet recommendations. He also noted that updated tourniquet recommendations should reflect the fact that the US Military now has extensive battlefield experience with the CAT and the SOFT-T tourniquets and that these two devices have been well-accepted by combat medical personnel.

February 1, 2017

13. Combat Medic Presentation: 1SG Matthew Harmon is a certified Flight Paramedic and the Senior Flight Medic for the Wyoming Army National Guard. He presented a TACEVAC scenario that involved an in-flight trauma cardiac arrest from OEF.

The weather was clear on the day of the event. The 9-line request identified one CAT-A casualty (lower extremity amputation) and one CAT-B casualty. The mission launched 9 minutes after the request was received. Prior to arrival at the transfer point, the CAT-B casualty had been reclassified as a CAT-A. On the aircraft's approach, he noted one of the two litter-borne casualties had CPR underway.

Upon landing, a litter team approached the aircraft with compression-only CPR in progress. The "Battle Hand Off" with the ground corpsman was: "He just stopped breathing." The casualty's TCCC Card showed a below-the-knee (BKA) of the left lower extremity (LLE), a mangled RLE, four CAT tourniquets, five pressure dressings, no medications and no other interventions. He was pulseless and apneic. His RLE was rotated 90 degrees from anatomic and his RUE was splinted over pressure dressings. 1SG Harmon took this casualty aboard his MEDEVAC Lead helicopter where he was assisted by the crew chief and an EMT-P. The casualty's initial diagnosis was cardiac arrest presumed secondary to exsanguination.

The second casualty had minor fragment wounds to both lower extremities. He was loaded onto the MEDEVAC chase helicopter where he was attended by an

EMT-P and an EMT. The aircraft spent only 3 minutes on scene, then departed for the Role III which was 8 minutes away.

The crew chief in 1SG Harmon's helicopter performed CPR during the flight. En-route treatment included a humeral head EZ-IO, transfusion of 1 unit of red blood cells (RBCs), epinephrine, intubation (took two attempts), and repeated defibrillation. Although monitoring variously showed pulseless electrical activity, ventricular tachycardia, and ventricular fibrillation in flight, the casualty was in asystole by the time his evacuation flight landed. He was taken directly to the OR where he received massive transfusion after which he had return of spontaneous circulation. He survived for three days, but then succumbed to complications from his injuries.

1SG Harmon's key points and comments regarding TACEVAC care:

- For intraosseous access, 1SG Harmon noted that he has witnessed fewer complications and better placement with humeral head EZ-IOs than with FAST-1 IOs.
- The Vampire blood transfusion protocol calls for 1:1 with RBCs and plasma, but the MEDEVAC crew usually receives only two units of packed red cells and no plasma for missions.
- Blood products can be infused faster when injected by 60cc syringe rather than when infused by gravity alone.
- End-tidal carbon dioxide (ETCO2) after intubation is very useful.
- A Ranger Video Glidescope to assist with intubations is a good thing to have on TACEVAC platforms.
- The Turkel needle decompression device gives a red → green visual indication when the needle used for NDC has entered the pleural space. This is good to have in a noisy environment.
- We need more than one Flight Paramedic on TACEVAC platforms. His unit flies dual medics.
- 1SG Harmon also noted that guidance is needed for flight medics about whether or not to perform CPR in cases of traumatic cardiac arrest. He noted that that is not done in his civilian EMS system.

After the presentation, Dr. Butler asked whether the lower extremity tourniquets had been applied too late or were ineffective for some reason. 1SG Harmon said that he did not receive that information from the ground medics.

14. AFMES Update: Lt Col Ed Mazuchowski presented an update from the Armed Forces Medical Examiner System (AFMES). He noted that the AFMES now falls under DHA, where it has been placed in the Research and Development Directorate. Dr. Mazuchowski reviewed the AFMES mission and vision. AFMES provides forensic pathology investigations and mortality surveillance. Its facilities are at Dover AFB, adjacent to the Carson Center for Mortuary Affairs. Governance for AFMES is contained in DoDI 5154.30. In this

directive, the definitions of both Died of Wounds and Killed in Action have been modified by changing “medical treatment facility” to "damage control surgery capability." AMES currently works routinely with the JTS to conduct preventability analyses for US combat fatalities in order to better inform performance improvement efforts in combat casualty care.

15. TCCC Skill Sets by Provider Level: Dr. Butler
The TCCC Skill Sets by Provider Level document outlines four levels of TCCC Provider: All Combatants (AC), Combat Life Saver (CLS), Combat Medic (CM), and Combat Paramedic (CPM). Recent changes to the TCCC have made it necessary to update this document in the sections shown below. Dr. Butler proposed the changes highlighted in yellow to these recommended skill sets. The group was in agreement with these changes. Dr. Butler will send the revised document out for a formal vote.

Skill	All	CLS	CM	CPM
Hemostasis				
Apply Tourniquet	X	X	X	X
Remove Tourniquet			X	X
Apply Direct Pressure	X	X	X	X
Apply Bandage	X	X	X	X
Apply Hemostatic Dressing	X	X	X	X
Apply Pressure Dressing	X	X	X	X
Apply Junctional Tourniquet			X	X
Apply XStat			X	X
Apply Pelvic Binder			X	X
Penetrating Eye Injuries				
Rapid Field Test of Vision	X	X	X	X
Cover Eye with Rigid Shield	X	X	X	X
Administer Oral Moxifloxacin	X	X	X	X

16. Three Things I Would Change About TCCC: CDR Geir Strendenes, the Senior Medical Officer for the Norwegian Special Operations Commando Force and the Norwegian liaison member to the CoTCCC, presented his thoughts on what items in TCCC need to be changed.

- Airway management in CUF could recommend a quick “Tactical Airway Flip” to put unconscious casualties in the recovery position and note that advanced airway management is generally best deferred until the Tactical Field Care phase.
- Airway management in TFC should exclude the chin lift and jaw thrust maneuver in unconscious casualties without airway obstruction and go directly to the recovery position.
- The nasopharyngeal airway should be removed from the TCCC Guidelines.

- Positive pressure ventilation in the presence of shock is dangerous and should be avoided unless absolutely necessary.

- Shock may not correlate precisely to blood pressure. Hypotensive resuscitation may not achieve the minimum level of oxygen delivery required for a good outcome for the casualty. If bleeding is controlled, CDR Strandenes recommends resuscitating to normovolemia as noted by a systolic blood pressure of 110-120 mmHg, especially in casualties with TBI.

- Hextend should be removed from the recommended resuscitation fluids in TCCC and albumin and/or fibrinogen added.

17. Squad Overmatch TCCC Training Update: COL Dan Irizarry from the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI), reviewed recent Squad Overmatch (SOvM) TCCC developments. SOvM integrates curricula and simulation to improve squad performance enabling them to overcome the chaos and confusion that accompanies combat environments with casualties. SOvM TCCC training addresses 5 domains: team development, resilience and performance improvement, advanced situational awareness, TCCC, and integrated after-action reporting. Early data shows statistically significant performance improvement in all domains ranging from 26% (Team Development) to 40% (TCCC) improvement in individual and collective skills measured. A SOvM TCCC Train-The-Trainer interactive web-based program is being developed and tested this year to facilitate unit implementation of Squad Overmatch sites at home station. Realistic combat trauma simulators and training devices are an integral part of Squad Overmatch TCCC.

The Army is developing an exportable TCCC simulation package (TC3X) to be used for home station training derived from the simulation capabilities tested during SoVM. TC3X will provide training devices for trainers to conduct “crawl, walk, run” TCCC training for all combatants. TC3X technologies will provide both realism and objective measurement of performance, essentially providing a standardized 'target" against which the Army can measure TCCC individual and collective skills in a more objective way, similar to marksmanship targets. Ultimately, the goal is for SOvM TCCC to evolve into a comprehensive standard training methodology that will help units achieve and verify the Commander’s Casualty Response System is at the desired level of proficiency in their casualty response training.

18. Needle Decompression (NDC) of Tension Pneumothorax in TCCC: Dr. Butler reviewed the evolution of NDC recommendations in the TCCC Guidelines. Among the innovations made by TCCC in this area over the 20 years that the program has been in existence are:

- Revised indications for NDC – 1996
- Chest tubes usually not needed for initial management – 1996
- 3.25-inch, 14-gauge catheter – 2008
- Bilateral NDC for prehospital traumatic arrests – 2011

- Incorporating the use of an external anatomy landmark as a technique to minimize the risk of complications in NDC – 2012
- Use of a lateral NDC site (4th or 5th intercostal space at the anterior axillary line) as an alternative to the 2nd intercostal space at the midclavicular line - 2012

Recent publications in the medical literature as well as the observation at the JTS weekly trauma teleconferences that many casualties undergo multiple attempts at NDC have suggested that there may be opportunities to improve in this area. To enhance success with NDC, the CoTCCC could address such areas as:

- Other techniques for NDC
  - Finger thoracostomy
  - Veres needle
  - 10 Fr IV catheter
  - ThoraQuik
  - 10 Fr Vygon thoracic trocar
  - Donaldson Needle
  - Laprascopic trocar
- Require demonstration of the correct site for NDC on fellow students during TCCC training
- Recommend the the 4/5th ICS at the anterior axillary line as the preferred site for NDC
- Develop TCCC critical decision videos to help students better understand <u>when</u> NDC should be performed, as well as how to do the procedure
- Specify the optimal angulation of the NDC device when performing NDC
- Specify the best positioning of casualty for the procedure
- Recommend a sequence of alternate techniques to employ when NDC is not successful at relieving the suspected tension pneumothorax

Dr. Butler asked the members of the TCCC Working Group to submit any recommendations that they have for items to include in this proposed change. The CoTCCC will then develop a proposed change to the TCCC Guidelines for this intervention.

19. Far Forward REBOA: MAJ Justin Manley is a general surgeon attached to the Air Force Special Operations Command (AFSOC.) He recently deployed with a Special Operations Surgical Team for 50 days in support of operations in Iraq and Syria. During that time, he performed Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) 4 times (3 of them in aortic Zone I; the other in Zone 3). He used EFAST (Extended Focused Assessment with Sonography for Trauma) to help evaluate the chest before REBOA. The REBOA catheter was inserted without radiography – its location was manually confirmed by the surgeon. Balloons were subsequently deflated over 3-5 minutes, and all 4 casualties tolerated deflation well. The arteriotomy was managed by manual pressure alone in 2 and surgical repair in the other 2. There were no

complications from the REBOA, and all 4 casualties survived transport to the next level of care. MAJ Manley noted that the REBOA balloon will migrate if the catheter is not secured. He also mentioned that a new REBOA device coming out in the near future will allow partial occlusion of the aorta, which may allow for longer safe inflation times.

20. Senior Leader Remarks: RADM Colin Chinn is the Director of the Research & Development Directorate (J9) at the Defense Health Agency and Deputy Commander, US Army Medical Research and Materiel Command. On the governance diagram of the Military Health System, the Defense Health Agency (DHA) falls under the Assistant Secretary of Defense for Health Affairs. The DHA was established to help eliminate the redundancies and inefficiencies inherent in the previous organizational structure of three separate medical departments in the Armed Services and one purchased health care system (TRICARE). DHA will take over all common military medical functions in the DoD. The JTS has been designated by Congress to be the lead agency for optimizing combat casualty care in the US Military. Combat casualty care is a common service, so the JTS (and the CoTCCC) will be moved to the DHA. RADM Chinn discussed the structure and function of the DHA and shared VADM Bono's vision for the organization. The eventual location of the JTS when it moves to DHA is currently under review. It may fall under the J3 (Operations) section as well as working with the J7 (Education and Training) section.

RADM Chinn recalled his experience working as the Battalion Surgeon for the Recon Marines in Okinawa at Camp Schwab in 1985. There was an incident in which a Marine put his right arm through a plate glass window and suffered a laceration that included an injury to his ulnar artery. There was severe bleeding from the injury site that was managed initially with direct pressure. He entertained the possibility of applying a tourniquet, but was advised by a surgeon on a telephone consult NOT to use a tourniquet. That was the conventional wisdom at the time. RADM Chinn thanked the meeting attendees for the advances in trauma care, such as tourniquets and far forward use of blood products, that the efforts of the TCCC Working Group have helped the DoD to implement.

21. TCCC Web Mobile Update: Mr. Harold Montgomery reviewed the progress to date on this DHA/CoTCCC medical informatics research project. He reported that cotccc.com, a website designed specifically to support combat medics, corpsmen, and PJs, went live in October 2016 and he presented statistics for hits on the website as well as user demographics. Mr. Montgomery demonstrated the cotccc.com website's function for the group. Following that, Mr. Dave Rogers demonstrated the functioning of a beta version of the TCCC Mobile application on a smart phone for the group. This was followed by a demonstration of portions of the TCCC curriculum that had been converted from the current Powerpoint

format to a well-done video format. There was strongly positive feedback from the meeting attendees on both of these demonstrations.

Acknowledgments: The authors gratefully acknowledge the ongoing efforts of all of the members of the TCCC working group, our invited speakers, and other meeting attendees to improve the battlefield trauma care provided to our nations' combat wounded.

Disclaimers: The opinions or assertions contained herein reflect the events of the 31 January/1 February meeting of the CoTCCC. They are not to be construed as reflecting the views of the Department of the Army or the Department of Defense.

_____ 17 Mar 2017

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Committee on TCCC

_____ 22 May 2017

Frank K. Butler, M.D. Date
CAPT, MC, USN (Ret)
Chairman
Committee on TCCC

Enclosure (1)

Meeting Attendance

31 Jan – 1 Feb 2017

CoTCCC Voting Members

Col Jeff Bailey
CAPT Sean Barbabella
Dr. Frank Butler
MSG Curt Conklin
COL Jim Czarnik
LTC Steve DeLellis
COL Brian Eastridge
COL Erin Edgar
CAPT Matt Hickey
SOCM James Holmes
Dr. Ken Kelly
Mr. Win Kerr
MSG Danny Morissette
COL Kevin O'Connor
LCDR Dana Onifer
Dr. Mel Otten
Mr. Don Parsons
HSCM Glenn Royes
Col Stacy Shackelford
MSgt Travis Shaw
CAPT Zsolt Stockinger
CAPT Jeff Timby
HMCS Jeremy Torrisi

TCCC Subject Matter Experts

Dr. Brad Bennett
Dr. Jeff Cain
Dr. Howard Champion
Mr. Bill Donovan
Dr. Warren Dorlac
Dr. Rocky Farr
Dr. John Gandy
Dr. John Holcomb

Dr. Don Jenkins
Dr. Russ Kotwal
Mr. Steve Viola

CoTCCC Staff

Dr. Steve Giebner
Ms. Danielle Davis
Mr. Harold Montgomery

Military Liaisons

COL Lance Cordoni	CDID
CAPT Scott Cota	USSOCOM
Maj Kevin Cron	CENTCOM
MSG Mike Eldred	CPHM
Mr. Kevin Kelley	DHA
CDR Harry Hamilton	MCCDC
LTC (P) Jennifer Gurney	JTS
COL Dan Irizzary	MSTC
CAPT Paul Kane	FFC
LtCol Ed Mazuchowski	AFMES
Ms. Mary Ann Spott	JTS
CSM Tim Sprunger	FORSCOM
COL Ian Wedmore	OTSG EM Consultant
Mr. Ed Whitt	OASD/HA

Allied Liaisons

MAJ Shuichi Kawano	JSDF
CDR Geir Strandenes	Norway

Interagency and TEMS Liaisons

Ms. Julie Chase	State Dept/NAEMT
Dr. Bruce Cohen	FBI
Dr./SWAT Lt Alex Eastman	DHS
Mr. Josh Knapp	ATF

VIP

RADM Colin Chinn	DHA
MG Brian Lien	MEDCOM
BG Mike Talley	FORSCOM

Speakers from Outside TCCC WG

Ms. Cynthia Barrigan	TCCC Web Mobile Project
1Sgt Matt Harmon	Combat Medic Presentation
Dr. Lenworth Jacobs	Hartford Consensus V
Maj Justin Manley	REBOA CR
MSgt Ivan Ruiz	Combat Medic Presentation
Dr. Scott Zietlow	Prehospital Ketamine at the Mayo Clinic

Invited Guests

HMCS Ryan Christensen	NSWDG
MAJ Robin Hauffa	MEDOPS – NATO