

Tactical Combat Casualty Care: A Brief History



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Battlefield Trauma Care: 1970

“All seem uncertain regarding the best method to implement factual knowledge to the man most in need, the front line trooper....citing our ineptness in the field of self-help and first aid” little if any improvement has been made in this phase of treatment of combat wounds in the past 100 years.”

*CAPT J.S. Maughon
Mil Med 1970*



Battlefield Trauma Care: 2001

- Based on trauma courses NOT developed for combat
- Medics taught NOT to use tourniquets
- No hemostatic agents
- No junctional tourniquets
- Large volume crystalloid fluid resuscitation for shock
- 2 large bore IVs on all casualties with significant trauma
- Civil War-vintage technology for battlefield analgesia (IM morphine)
- No focus on prevention of trauma-related coagulopathy
- No tactical context for care rendered
- Heavy emphasis on endotracheal intubation for prehospital airway management

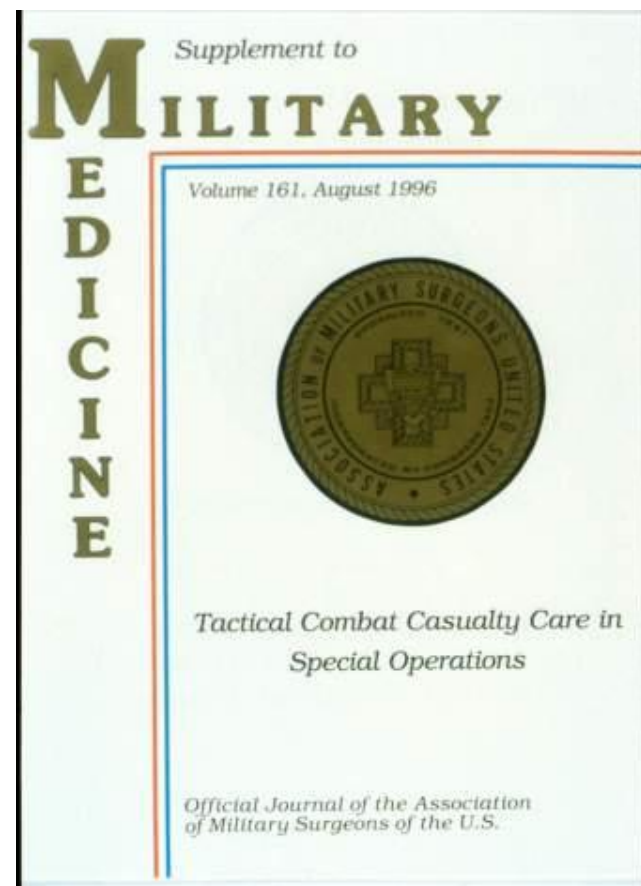


Battlefield Trauma Care Review 1993-1996

- Biomedical research project
- Naval Special Warfare then USSOCOM funding
- Partnership with USUHS for the review
- Sharply focused on the on the causes of preventable death on the battlefield – hemorrhage, airway obstruction, and tension pneumothorax
- Prolonged evacuation time considered
- Combat environment considered
- Extensive combat medic input included
- **Rule of evidence applied to current practice as well as proposed new interventions**



Tactical Combat Casualty Care in Special Operations



Military Medicine Supplement August 1996

***Trauma care guidelines
customized for the battlefield***



TCCC: A Brief History

- Original paper published 1996
- First used by Navy SEALs, Army Rangers, and Air Force Pararescue in 1997
- Updates published in PHTLS manual since 1999
- ACS COT and NAEMT endorsement
- USSOCOM adopted in 2005
- Now used throughout the U.S. military
- Numerous government agencies
- Allied nations and civilian sector





TCCC Early in the Iraq and Afghanistan Conflicts

- **NOT widely used at the start of the wars**
- **Increased use by both Special Operations and conventional units beginning in 2005**

The Drivers:

- **Early reports of success with TCCC, especially TQs**
- **Holcomb study: “Causes of SOF Deaths 2001-2004” – highlighted need for TCCC**
- **USAISR tourniquet study by Walters et al (2005)**
- **TCCC Transition Initiative begun in 2005**
- **USSOCOM TCCC message - March 2005**
- **USCENTCOM tourniquet and hemostatic agents (HemCon) message - 2005**



Battlefield Trauma Care: Now

- Phased care in TCCC
- Aggressive use of tourniquets in CUF
- Combat Gauze hemostatic dressing
- Aggressive needle thoracostomy
- Sit up and lean forward airway positioning
- Surgical airways for maxillofacial trauma
- Evidence-based tactical fluid resuscitation
- IVs only when needed/IO access if required
- PO meds, OTFC, ketamine as “Triple Option”
for battlefield analgesia
- Hypothermia prevention; avoid NSAIDs
- Battlefield antibiotics
- Tranexamic acid
- Junctional tourniquets





TCCC: How Do We Know That it's Working?



Tourniquets in the U.S. Military - 2003





Lest we forget – most of the U.S. military went to war in Afghanistan and Iraq without tourniquets



Tourniquets in Vietnam: A Historical Perspective

“The striking feature was to see healthy young Americans with a **single injury of the distal extremity** arrive at the magnificently equipped field hospital, usually within hours, but **dead on arrival**. In fact there were **193 deaths** due to wounds of the upper and lower extremities, or two percent of the 2600.”

*CAPT J.S. Maughon
Mil Med 1970*



Tourniquets in TCCC Mil Med 1996

“It is very important, however, to stop major bleeding as quickly as possible since injury to a major vessel may result in the very rapid onset of hypovolemic shock...Although ATLS discourages the use of tourniquets, they are appropriate in this instance because direct pressure is hard to maintain during casualty transport under fire. Ischemic damage to the limb is rare if the tourniquet is left in place less than an hour and tourniquets are often left in place for several hours during surgical procedures. In the face of massive extremity hemorrhage, in any event, it is better to accept the small risk of ischemic damage to the limb than to lose a casualty to exsanguination.... The need for immediate access to a tourniquet in such situations makes it clear that all SOF operators on combat missions should have a suitable tourniquet readily available at a standard location on their battle gear and be trained in its use.”



A Preventable Death: 2003

This casualty was wounded by an RPG explosion and sustained a traumatic amputation of the right arm and a right leg wound. He bled to death from his leg wound despite the placement of three field-expedient tourniquets.

What could have saved him

CAT Tourniquet

**TCCC training for all
unit members**

***Note: Medic killed at
onset of action**





Preventable Combat Deaths from Not Using Tourniquets

- Maughon – *Mil Med 1970*: Vietnam
 - 193 of 2,600
 - 7.4% of total combat fatalities
- Kelly – *J Trauma 2008*: OEF + OIF (2003/4 and 2006)
 - 77 of 982 (in both cohorts of fatalities)
 - 7.8% of total fatalities – no better than Vietnam
- **Tourniquets became widely used in 2005-2006**
- Eastridge – *J Trauma 2012*: OEF + OIF (to Jun 2011)
 - 119 of 4,596
 - **2.6% of total fatalities – a 67% decrease**



Tourniquet Outcomes in TCCC Transition Initiative Report

- **Sixty-seven** successful tourniquet applications identified
- **No avoidable loss of limbs due to tourniquet use identified**

Butler, Greydanus, Holcomb

2006 USAISR Report

“TCCC: Combat Evaluation 2005”



Tourniquets – Kragh et al Annals of Surgery 2009



- Ibn Sina Hospital, Baghdad, 2006
- Tourniquets are saving lives on the battlefield
- **31 lives saved in 6 months** period by the use of prehospital tourniquets
- **Author estimated 2000 lives saved with tourniquets in this conflict (Extrapolation provided to MRMC)**



TCCC: Success in Combat 3rd Infantry Division

“The adoption and implementation of the principles of TCCC by the medical platoon of TF 1-15 IN in OIF 1 resulted in **overwhelming success**. Over 25 days of continuous combat with 32 friendly casualties, many of them serious, we had 0 KIAs and 0 Died From Wounds, while simultaneously caring for a significant number of Iraqi civilian and military casualties.”

CPT Michael Tarpey

Battalion Surgeon 1-15 IN

AMEDD Journal 2005



TCCC in Canadian Forces

Savage et al: Can J Surg 2011

CONCLUSION

For the first time in decades, the CF has been involved in a war in which its members have participated in sustained combat operations and have suffered increasingly severe injuries. Despite this, the CF experienced the highest casualty survival rate in history. Though this success is multifactorial, the determination and resolve of CF leadership to develop and deliver comprehensive, multileveled TCCC packages to soldiers and medics is a significant reason for that and has unquestionably saved the lives of Canadian, Coalition and Afghan Security Forces. Further-



Eliminating Preventable Death on the Battlefield



- Kotwal et al – Archives of Surgery 2011
- All Rangers and docs trained in TCCC
- U.S. military preventable deaths: 24%
- Ranger preventable death incidence: 3%²¹



Questions?