



DEFENSE HEALTH BOARD
FIVE SKYLINE PLACE, SUITE 810
5111 LEESBURG PIKE
FALLS CHURCH, VA 22041-3206

AUG 13 2010

DHB

MEMORANDUM FOR CHARLES L. RICE, PRESIDENT, UNIFORMED SERVICES
UNIVERSITY OF THE HEALTH SCIENCES, PERFORMING THE DUTIES OF
THE ASSISTANT SECRETARY OF DEFENSE FOR HEALTH AFFAIRS

SUBJECT: Tactical Combat Casualty Care Burn Management Guidelines

1. References:

- a. King B, Renz E: Management of Burns in TCCC. In, Butler FK, Giebner S, McSwain N, Pons P, eds: Prehospital Trauma Life Support Manual. 7th Edition, 2010.
- b. Memorandum, Assistant Secretary of Defense for Health Affairs (ASD(HA)), Tactical Combat Casualty Care and Minimizing Preventable Fatalities in Combat, 6 August 2009.
- c. Presentation: Tactical Combat Casualty Care, Prehospital Trauma Life Support: Defense Health Board Update on the Committee on Tactical Combat Casualty Care, by Dr. Frank Butler, 13 November 2009.
- d. Presentation: Tactical Combat Casualty Care, TCCC Burn Management Guidelines, Trauma and Injury Subcommittee Update on the Committee on Tactical Combat Casualty Care, by Dr. Frank Butler, 4 November 2009.
- e. Chung K, Wolf S, Cancio L, et al: Resuscitation of severely burned military casualties; fluid begets more fluid. *J Trauma* 2009;67(2):231-237
- f. Ennis JL, Chung KK, Renz EM, et al. Joint Theater Trauma System Implementation of Burn Resuscitation Guidelines Improves Outcomes in Severely Burned Military Casualties. *Journal of Trauma Injury, Infection, and Critical Care* 2008; 64: S146-S152.
- g. White CE, Renz EM. Advances in surgical care: management of severe burn injury. *Crit Care Med* 2008; 36(7 suppl.): S318-24.
- h. National Association of Emergency Medical Technicians. Pre-Hospital Trauma Life Support Manual. 6th Edition, 2006.
- i. Wesley, R. Burn Injuries. *Anesthesia and Perioperative Care of the Combat Casualty*. 1995; 515: ill.

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2. The initial Tactical Combat Casualty Care (TCCC) guidelines were included in the fourth Edition of the American College of Surgeons (ACS)-sponsored Pre-Hospital Trauma Life Support (PHTLS) Manual published in 1998. TCCC guidelines are periodically reviewed by subject matter experts to comply with the most current evidence-based practices. This memorandum outlines the newly endorsed TCCC Burn Treatment guidelines, and recommends that this curriculum be implemented in-theater, across all military Services.
3. The Committee on Tactical Combat Casualty Care (CoTCCC), an expert advisory Subpanel to the Trauma and Injury Subcommittee of the DHB, performs a quarterly review of the TCCC Guidelines and recommends updates for these guidelines as needed. Based on recent studies conducted by the United States Army Institute of Surgical Research (USAISR), a new chapter on the Management of Burn Injuries in TCCC will be included in the next edition of the PHTLS Manual.
4. Following a brief on 03 November 2009, the CoTCCC recommended revisions to the TCCC Guidelines to address the management of burns in TCCC. These changes were presented to the DHB Trauma and Injury Subcommittee and unanimously approved on 04 November 2009. The recommendations were then presented on behalf of the Subcommittee at the DHB meeting on 13 November 2009, and subsequently deliberated and passed unanimously by the Board in open session on 01 March 2010.

BACKGROUND

5. The TCCC Guidelines have been used by Special Operations units since 1997. As stated in the Marines Administrative Message (MARADMIN), on 30 October 2009, they became the preferred standard of care for the management of trauma in the prehospital tactical environment after studies noted that training all combatants in TCCC could prevent up to 20% of combat fatalities. On 06 August 2009, the Defense Health Board recommended these guidelines be implemented across all military Services as required advanced training for all deploying combatants, medical department personnel, and combat leaders.
6. Burn treatment has not been included in TCCC Guidelines in the past because burns have not historically been a major cause of preventable deaths on the battlefield. The increasing incidence of burns resulting from improvised explosive device (IED) attacks on vehicles and the proposed new fluid resuscitation plan for burns recently advanced by the United States Army Institute of Surgical Research (USAISR) were the primary reasons for adding this section to the TCCC Guidelines at this time.
7. Burn injuries have been present in approximately 5-20 percent of combat casualties during OPERATION IRAQI FREEDOM (OIF) and OPERATION ENDURING FREEDOM (OEF). Among these patients, approximately 20 percent suffered severe burns, greater than 20 percent of total body surface area (TBSA), and would thus require life-saving intravenous resuscitation. Furthermore, combined burn and trauma (multisystem) injuries correlate with increased mortality rates, and contribute to a two to

three-fold increase in the incidence of inhalation injury; currently, 5-15 percent of burn patients experience inhalation injury.

FINDINGS

8. USAISR studies have documented that successful resuscitation of burn casualties can be accomplished with lower initial fluid volumes. Over-resuscitation of burns can contribute to complications such as abdominal compartment syndrome (ACS) and Acute Respiratory Distress Syndrome (ARDS).
9. The USAISR has, therefore, proposed a modified burn resuscitation protocol that is simpler for medical personnel to use and that provides for a somewhat lower initial fluid resuscitation, called the Institute of Surgical Research (ISR) Rule of Tens. Both this updated fluid resuscitation formula and recommendations for such aspects of care as analgesia and hypothermia prevention in burn patients have been incorporated into the revised TCCC Guidelines.

CONCLUSIONS

10. The Board recognizes the importance of TCCC Guidelines in optimizing the pre-hospital management of burns sustained in combat. The Board approves and endorses the following TCCC burn management strategies and recommends the Department endorse the use of the following guidelines across the Services.

RECOMMENDATIONS

11. **Based on these findings, the Board submits the recommendations below to the ASD(HA), for consideration and endorsement of the TCCC Burn Management guidelines, as proposed actions that are expected to immediately improve the survival of burn casualties in-theater. These updated guidelines and the revised TCCC curriculum that supports them are now available to military medical training facilities in the Training and Education section of the Military Health System website.**
 - a. **Basic Management Plan for Care Under Fire**
 - i. **Casualties should be extricated from burning vehicles or buildings and moved to places of relative safety. Do what is necessary to stop the burning process.**
 - b. **Basic Management Plan for Tactical Field Care**
 - i. **Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.**

- ii. **Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.**
 - iii. **Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Blizzard Survival Blanket in the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.**
 - iv. **Fluid resuscitation (USAISR Rule of Ten)**
 - **If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer’s, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer’s or normal saline as needed.**
 - **Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40- 80 kg.**
 - **For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.**
 - **If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the TCCC Guidelines in Section 6 (PHTLS Manual, Sixth Edition).**
 - v. **Analgesia in accordance with the TCCC Guidelines in Section 12 (PHTLS Manual, Sixth Edition) may be administered to treat burn pain.**
 - vi. **Pre-hospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per the TCCC guidelines in Section 14 (PHTLS Manual, Sixth Edition) if indicated to prevent infection in penetrating wounds.**
 - vii. **All TCCC interventions can be performed on or through burned skin in a burn casualty.**
- c. **Basic Management Plan for Tactical Evacuation Care**
- i. **Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.**
 - ii. **Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.**
 - iii. **Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Blizzard Survival Blanket in**

the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.

- iv. **Fluid resuscitation (USAISR Rule of Ten)**
 - **If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer's, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer's or normal saline as needed.**
 - **Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40-80 kg.**
 - **For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.**
 - **If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the TCCC Guidelines in Section 5 (PHTLS Manual, Sixth Edition).**
- v. **Analgesia in accordance with TCCC Guidelines in Section 11 (PHTLS Manual, Sixth Edition) may be administered to treat burn pain.**
- vi. **Pre-hospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per TCCC guidelines in Section 13 (PHTLS Manual, Sixth Edition) if indicated to prevent infection in penetrating wounds.**
- vii. **All TCCC interventions can be performed on or through burned skin in a burn casualty.**
- viii. **Burn patients are particularly susceptible to hypothermia. Extra emphasis should be placed on barrier heat loss prevention methods and IV fluid warming in this phase.**

12. The above recommendations were unanimously approved.

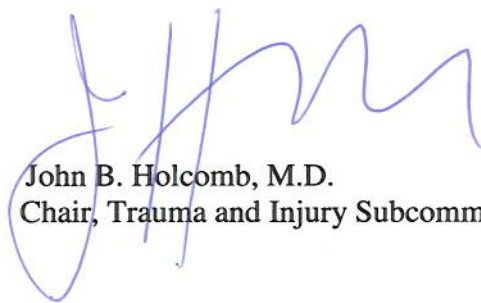
FOR THE DEFENSE HEALTH BOARD:



Wayne M. Lednar, M.D. Ph.D.
DHB Co-Vice-President



Gregory A. Poland, M.D.
DHB Co-Vice-President

A handwritten signature in blue ink, appearing to read 'J. Holcomb', is positioned above the printed name.

John B. Holcomb, M.D.
Chair, Trauma and Injury Subcommittee

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Additional References

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