

International Prehospital Medicine Institute



IPHMI Literature Review

Keeping You Up To Date with Current EMS Literature and Studies

Vol. 1.9

- 1. Cut and Rip and Cut Alone Techniques Versus Usual Practice in the Removal of Trauma Patient Clothing.** Sibley A, Jain T, Nicholson B, Atkinson P. *Canad J Emerg Med.* 2018;20(4):600-605.
- 2. Effectiveness of Instructional Interventions for Hemorrhage Control Readiness for Laypersons in the Public Access and Tourniquet Training Study (PATTS).** A Randomized Clinical Trial. Goralnick E, Chaudhary MA, McCarty JC, et al. *JAMA Surg.* 2018;153(9):791-799.
- 3. Characteristics, Prehospital Management, and Outcomes in Patients Assessed for Hypoglycemia: Repeat Access to Prehospital or Emergency Care.** Sinclair J.E., Austin M, Froats M, et al. *Prehosp Emerg Care.* Published on-line Sep 2018.
- 4. Contingency Medical Countermeasures for Mass Nerve-Agent Exposure: Use of Pharmaceutical Alternatives to Community Stockpiled Antidotes.** Schwartz M, Sutter M, Eisnor D, Kirk M. *Disaster Med Public Health Preparedness.* Published on-line October 2018

- 1. Cut and Rip and Cut Alone Techniques Versus Usual Practice in the Removal of Trauma Patient Clothing.** Sibley A, Jain T, Nicholson B, Atkinson P. *Canad J Emerg Med.* 2018;20(4):600-605.

Rapid exposure of a trauma patient by EMS providers is paramount in completing the primary assessment. No standard exists regarding what technique is best to rapidly remove clothing. The purpose of this study was to compare two techniques of clothing removal to usual paramedic practice using standard trauma shears to see if any of the techniques was quicker.

This study was a randomized, timed, observed, comparison of two different techniques using new trauma shears, cut and rip (CAR) and cut alone (CAL) to remove the clothing of a trauma patient compared to usual EMS practices (UP) using standard trauma shears. A total of 24 individuals (8 per group) were recruited to participate in the study. 23 of the participants are included in the study. One participant was dropped from the results due to failure to follow protocol. Participants comprised of current Advanced Care Paramedic students for the CAR and CAL groups and practicing Paramedics for the UP group. An identical full-body adult mannequin placed on a standard cot was utilized and dressed in similar type clothing for each attempt. Timing was started when the cutting device touched the clothing and was stopped when the patient/mannequin clothing was completely removed and a log-roll performed to expose the back. Based on the timed observations, the CAR technique (average time of 104 seconds) was faster than both the UP technique (average time of 124 seconds) or CAL technique (average time of 136 seconds).

There are a number of issues with the study. The total number of participants was low. The mannequin utilized does not replicate the differences in anatomy encountered by EMS providers. The study did not replicate the traditional environment most EMS providers operate in when assessing a

International Prehospital Medicine Institute

trauma patient. While the mannequins were dressed in a number of different types of materials, clothing made of leather or very thick materials was not tested, nor was any of the clothing wet as would be the case if it were blood-soaked. This study also did not address the important issue of attempting to preserve evidence such as knife or bullet holes when removing clothing.

While this study looked at two specific techniques (CAR & CAL) compared to usual practices by experienced paramedics, it did not replicate important factors encountered by EMS providers when assessing and treating trauma patients. Based on this study it would be difficult to support a specific change in current practice by EMS providers. Even though this study demonstrated that the “cut and rip” technique was slightly faster (approximately 30 seconds), the fact remains that EMS providers should use whatever technique is best for removal of clothing based on the patient, their choice of clothing, the surrounding environment, and available resources and should have experience in more than one technique. No single technique has been established as the “Golden Standard” for the removal of clothing and may not be feasible due to the ever changing patients and conditions encountered by EMS providers.

2. Effectiveness of Instructional Interventions for Hemorrhage Control Readiness for Laypersons in the Public Access and Tourniquet Training Study (PATTS). A Randomized Clinical Trial. Goralnick E, Chaudhary MA, McCarty JC, et al. JAMA Surg. 2018;153(9):791-799.

With the recent national focus on controlling hemorrhage after mass shootings and point of care initiation of treatment for those, and all, trauma victims with severe hemorrhage, identifying optimal training methodologies using nationally available standardized courses as well as point of care (just in time) instructions is of paramount importance.

This randomized observational study was conducted at a large Massachusetts sports complex from April 2017 to August 2017 utilizing stadium employees and staff. Five hundred sixty-two (562) participants were enrolled in the study. Ninety-seven (97) participants were excluded due to prior hemorrhage control training. The remaining volunteers were randomized into 4 groups: (1) control group (no training or point of care instructions), (2) Audio instruction kits at the point of care, (3) Flashcards at the point of care, and (4) American College of Surgeons (ACS) Bleeding Control (B-Con) Course. There was no statistical difference in demographics between the four (4) groups. The study also examined degradation rates 3 to 9 months post training. Assessment and testing were conducted with a positive result being proper application of a tourniquet.

Of the four groups, the group that took the B-Con course had the highest correct tourniquet application rate at 87.7%. The control group had the lowest with 16.3%, and the audio and flashcard groups had 23.0% and 19.7% respectively. There were no statistical differences between the control group (no training or point of care instructions) and either the audio or flashcard groups. The main reason for failure to meet the end point goal of proper application of the tourniquet in all groups was the tourniquet being applied too loosely to effectively control bleeding. Of note, less than one-half of the participants in the audio or flashcard groups actually used the guidance provided.

After the initial evaluation, all three non-B-Con groups received standard B-Con training. Participants were then re-evaluated 3-9 months after their initial training using the original end point of proper tourniquet placement to determine skill retention. Overall 303 of the original 465 participants were re-evaluated. Of those retested 54.5% applied the tourniquet correctly post training.

The results of this study overwhelmingly show that live, in-person didactic training with a psychomotor (hands-on) skill application component had higher initial and retention testing results than the other three groups. It also showed that point of care instructional flashcards or audio prompts had little to no increase in the successful application of the tourniquet over the control group.

International Prehospital Medicine Institute

There has been a lot of discussion regarding the optimal length of hemorrhage control training for the lay responder. This study clearly shows that the combination of lecture and skills practice provided in the ACS B-Con course was superior to both flashcards and AED-style audio instructions. There are a number of additional points to consider:

1. The main reason for unsuccessful tourniquet application was the device being applied without the proper tension (too loose). This is consistent with other studies and the issue of correct tightness should be reinforced in all tourniquet training.
2. The optimal re-training interval is unknown and further study would be useful.
3. While point of care instructions that were delivered by flashcards or audio prompts showed no better results compared to the control group, several other options should be evaluated:
 - A group using EMS Emergency Medical Dispatch real time guidance.
 - A group that combined initial B-Con training with either audio or flashcard prompts in an attempt to decrease the 33.2% degradation rate at re-testing.

3. Characteristics, Prehospital Management, and Outcomes in Patients Assessed for Hypoglycemia: Repeat Access to Prehospital or Emergency Care. Sinclair J.E., Austin M, Froats M, et al. Prehosp Emerg Care. Published on-line Sep 2018.

Currently, Canada does not have a treat-and-release protocol for EMS personnel to use when managing diabetic patients who present with hypoglycemia. In addition, the safety of this practice remains unclear. Also, of concern is the cost associated with prehospital assessment, treatment, and transportation as well as the cost of emergency department assessment of patients that receive no additional treatment. This study was performed to describe the characteristics, management, and outcomes of patients with hypoglycemia treated by paramedics and to determine the predictors of repeat access to prehospital or emergency department care within 72 hours of initial paramedic assessment.

A retrospective review of prehospital care reports from the Ottawa (Canada) Paramedic Service and records from 4 emergency departments located in Ottawa, Canada was conducted for a 12-month period (January 1, 2011 through December 31, 2011). Patient selection for consideration was based on adults (18 years old or >) that had at least one documented blood glucose level of less than 72 mg/dl (4.0 mmol/L) with or without a history of diabetes and who had been assessed by paramedics regardless of treatment or transport. A total of 1,177 patients were identified that met the initial inclusion criteria. After applying exclusion criteria (age less than 18 years, need for active airway intervention, absent vital signs, present of terminal illness), the final sample for review was 791 patients.

Of the 791 patients assessed and treated by paramedics for hypoglycemia, 235 patients (29.7%) refused transport while 556 patients (70.3%) were transported to one of the 4 participating emergency departments. The mean glucose level upon prehospital assessment was 50 mg/dl (2.8 mmol/L). Interestingly, 487 patients (61.6%) had a history of diabetes and 343 patients (46.1%) were on insulin, while 304 reported no history of diabetes. Of the 556 patients transported to an emergency department 134 (24.1%) were admitted to the hospital, 9 (1.6%) died in the ED (sepsis, myocardial infarction, intracerebral hemorrhage), 383 (68.9%) were discharged from the ED, and 29 (5.2%) left without being seen by a physician or left against medical advice. Of the 383 patients discharged from the ED 199 (51.9%) had no additional treatment/management in the ED with the exception of blood work. Overall 43 (5.4%) patients required repeat prehospital and/or emergency department care within 72 hours of the initial hypoglycemic event. Of the 43 repeat patients, 8 patients (18.6%) were for re-occurring hypoglycemic event. Analysis showed that compared to patients who did not require repeat access to care, those who did often had a history of seizures and alcohol dependency, were more likely to have been given oral glucose gel by paramedics, and were likely not on insulin.

International Prehospital Medicine Institute

Because of the retrospective nature of the study, there is the possibility that adverse events could have been missed. The definition of hypoglycemia utilized for his study was lower than traditionally use in previous studies (72 mg/dl or less versus 80 mg/dl or less). Repeat patients may have been missed if they were transported by a different service program to a hospital outside of the study group.

This study found that patients with a prehospital hypoglycemic event, particularly those on insulin, were less likely to need repeat EMS or emergency department care after their initial treatment by paramedics. Additionally, a significant number of patients treated for hypoglycemia by paramedics and transported to the emergency department were discharged without any additional treatment. These findings suggest that treatment-and-release of patients experiencing a hypoglycemic event may be safe and appropriate. Additional studies should be considered to establish predisposing patient conditions to support treat-and-release protocols by paramedics to assist in decreasing emergency department visits and cost associated with transport and ED visits as well to identify causes of hypoglycemia in patients without documented diabetes.

4. Contingency Medical Countermeasures for Mass Nerve-Agent Exposure: Use of Pharmaceutical Alternatives to Community Stockpiled Antidotes. Schwartz M, Sutter M, Eisnor D, Kirk M. Disaster Med Public Health Preparedness. Published on-line October 2018

Having sufficient stockpile of medical countermeasures for the treatment of multiple patients poisoned by an acetylcholinesterase inhibiting nerve agent following a mass chemical exposure is a challenge for all communities. While there are current first-line pharmaceutical agents (atropine, diazepam, pralidoxime) available for nerve agent exposure they are limited in number and may not be sufficient for a large-scale exposure. Alternative pharmaceutical agents, administration routes, and delivery devices need to be explored.

An ad hoc expert working group was convened and performed a review of published articles and discussed alternate pharmaceutical agents that met the Public Health Emergency Medical Countermeasures Enterprise (PHEMCE) requirements for nerve agent countermeasures. Available evidence was reviewed and discussed to support the utilization of nontraditional first-line nerve agent antidotes and administration routes during a large-scale release of an acetylcholinesterase inhibiting nerve agent. Alternatives to atropine include cyclopentolate, glycopyrrolate, propantheline and ipratropium or tiotropium. Alternative benzodiazepines to diazepam include midazolam and lorazepam.

Utilization of alternate pharmaceutical agents (if readily available) and routes of administration can be of benefit during the treatment of multiple patients following a large-scale release of a nerve agent. Unfortunately, most EMS programs will not be able to utilize the findings of this study group without involvement of local medical direction and changes to local protocol and possible change in the EMS provider's scope-of-practice. In addition, most of the alternative medications are not routinely available on EMS vehicles.