

# **International Prehospital Medicine Institute**



## **IPHMI Literature Review**

Keeping You Up To Date with Current EMS Literature and Studies

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#### **1. Needle Thoracostomy: Does Changing Needle Length and Location Change Patient Outcome?**

Weichenthal LA, Owen S, Stroh G, Ramos J. *Prehosp Disaster Med* 2018;33:237-244.

Needle thoracostomy (NT) for suspected tension pneumothorax is commonly performed in the prehospital setting. This pre- and post- observational study examines whether the location (mid-clavicular line vs. mid-axillary line), length and diameter of catheter as well as the timing of the NT resulted in increased survival.

The study was conducted in a central California EMS system. Over the study period three-hundred and five (305) trauma patients were treated with NT per local protocols. The "before" group was comprised of one hundred sixty nine (169) patients who underwent NT in the mid-clavicular line (MCL) group with a 14 gauge IV catheter that was at least 5.0 cm in length. The second or "after" group consisted of one-hundred thirty six (136) patients that were decompressed using a 10G IV catheter that was at least 9.5 CM long in the 5<sup>th</sup> intercostal space in the mid-axillary Line (MAL). It is important to note that the group one patients were decompressed only after initial "stabilization" on the scene and after placement into the transporting vehicle whereas the group 2 patients were decompressed on scene while the initial stabilization was being performed. The mortality of patients in both groups was 79%. This death rate is somewhat higher than other studies, but it is important to note that almost two thirds (59%) of those patients enrolled in the study presented in traumatic cardiac arrest. The study also enrolled both blunt and penetrating trauma patients. The patients in the MAL had a lower ISS and as noted by the authors NT was performed more often post training on the MAL approach. Positive outcome was more likely in patients who had a lower ISS and who had an improvement in clinical status after NT was accomplished. No complications were identified in either group as a direct result of NT.

The results of this study are somewhat surprising given that three NT variables were changed, each of which would be expected to improve trauma patient outcome, specifically longer catheter, choice of NT site, and timing of insertion. Prior studies have shown that shorter catheters and needle placement in the 2<sup>nd</sup> ICS fail to enter the thoracic cavity as much as 60% of the time. In addition, performance of the procedure earlier in the management process would be expected to improve the potential survival. Despite making these changes in management in the group 2 patients, outcome in both groups was the same. Unfortunately, no information about prehospital times or the specific time from arrival of responders to NT was provided. Not surprising is that survival was better in those patients who had a lower ISS (less severe injuries) and in those patients who had a positive clinical response to the

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decompression. This paper provides us little new information to better guide our prehospital trauma patient management.

## **2. Morbidity and Mortality Associated with Prehospital “Lift-assist” Calls.** Leggatt L, Van Aarsen K, Columbus M, Et al. *Prehosp Emerg Care* 2017;21:556-562.

Every day, EMS professionals respond to calls for individuals requiring assistance with mobilization. Many of these calls do not result in treatment or transportation to a hospital. The requesting individual is simply lifted or assisted up to a more mobile position. These calls are often referred to, and coded as, a “lift assist”. It is possible the need for this sort of assistance may represent a sentinel event for covert disease processes, such as infection, or representative of the individual’s decline in functional mobility. The challenge for EMS providers is to determine the specific nature or cause for the individual’s inability to mobilize themselves and the need for transport for further evaluation.

For this paper, the authors looked at all “lift assist” calls from a single EMS agency over a one-year period, 804 of 42,055 (1.9%) EMS calls. Ambulance patient care reports were cross referenced with the local hospital medical records to identify patients that had an Emergency Room visit, admission to the hospital or hospital death within fourteen days of their “lift assist” response.

Many individuals had multiple “lift assist” responses. The mean age for individuals requesting “lift assist” was 74.8 years. The authors found 169 Emergency Room visits (21%), 93 admissions to the hospital (11.6%) and 9 deaths (1.1%) within fourteen days of the initial “lift assist” request. Of the 93 patients who were admitted to hospitals, 71 (76%) were discharged to nursing homes, retirement homes or assisted living facilities rather than back to their original domicile. Additionally, the authors looked at all reported out of hospital deaths. No “lift assist” patients were identified within this subgroup. The authors identified 113 prehospital patient care records charts (14%) that were missing at least one vital sign, of which, 28 (24.8%) were missing at least one additional vital sign. Forty-four of 160 prehospital charts for diabetic patients (27.5%) had no blood glucose level recorded.

“Lift assist” calls may be early indicators of conditions that require comprehensive medical evaluation and treatment. In this study, advanced age (elderly population) was found to be an indicator of both an Emergency Room visit and admission to the hospital within fourteen days of a “lift assist” response. The “lift assist” population should be assessed with the same level of care as those who call for specific medical complaints, as the need for a “lift assist” may represent covert pathology or increased risk for future injury. EMS providers should perform a complete history and physical examination looking for underlying pathology and document a full set of vital signs, including blood glucose and temperature when appropriate, for all “lift assist” responses.

## **3. Paramedics as a New Resource for Women Experiencing Intimate Partner Violence.** Sawyer S, Coles J, Williams A, Williams B. *J Interpersonal Violence* 2018

Intimate Partner Violence (IPV) has an immense impact on women around the world. Paramedics often observe signs of IPV directly within patient homes offering a first glimpse into early recognition of IPV. Further, victims of IPV often choose not to be transported to emergency departments. Therefore, the cycle of violence continues for these victims. There has been a general lack of IPV education in healthcare settings even while past research has supported a link with IPV education and earlier recognition of IPV victimization, hopefully resulting in increased referral of victims and decreased rates of IPV worldwide. This study is the first evidence-based guideline designed for paramedics in recognizing and referring IPV patients.

This study describes the development of a comprehensive, consensus-based guideline focused on the paramedic management of IPV patients. The authors utilized the World Health Organization’s

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(WHO) clinical recommendations for health care practitioners in the management of IPV patients as a basis; removing recommendations not appropriate for paramedicine. The authors utilized the Policy Delphi Method to gain consensus from an expert panel in Australia. A total of 42 participants provided consensus on the draft guideline. Health care professionals including paramedics, research experts, service delivery experts and specialty group advocates provided consensus in three rounds. Modifications occurred in all aspects of protocol from each round to the next with the questioning method providing the longest to reach consensus.

Four sections were included in the final guideline: recognize, respond, refer, and record. The first section (recognize) lists indicators of IPV including the recognition of feelings and behaviors associated with mental health disorders such as depression, agitation, withdrawal, suicidal thoughts, self-harm, and drug or alcohol abuse. Additional indicators include unexplained chronic medical symptoms, physical trauma and sexual violence. Further, an additional indicator focusing on the perpetration of IPV by males, the use of fear or violence as a means of control, was included. .

The second section (respond) identified the preferred methods of discussion with IPV patients. A three-step process of discussion was proposed. The first step is to ensure the patient is alert and in a safe, private environment. The patient should feel comfortable and feel there is no imminent physical threat. The second step is to conduct a discussion with the focus being on fear and safety concerns rather than patient behaviors. The discussion should be open, indirect and contain no judgement. Experts stressed the need for skills-based training delivered by expert educators to ensure discussions are sensitive and appropriate.

The third section of the guideline (refer) lists local referral agencies that paramedics can recommend to patients verbally and/or via printed materials, to include counseling, police, legal advice, safety planning and emergency accommodation. Finally, the record section indicated appropriate documentation of IPV cases in the patient record, again modified from the WHO's documentation recommendations, to include appropriate documentation of injuries, police presence and the assurance of confidentiality.

The limitations of this study include the use of expert consensus rather than empirical evidence as well as the lack of IPV patient involvement. In addition, while the guideline recommends a suitable method of discussing IPV with patients, it cannot ensure that the discussion is sensitive and appropriate.

The recommendations from this study represent the first comprehensive, consensus-based guideline for paramedics (and in fact all responding medical personnel) in responding to IPV patients in the prehospital setting. Paramedics can play a crucial role in the recognition and referral of IPV resulting in increased referral rates for IPV victims and the potential prevention of further abuse. While paramedics routinely interact with victims of IPV and provide expert medical care and transportation to the Emergency Department, they are rarely prepared to provide pathways to referral services and instead rely on emergency department staff to intervene on the patient's behalf. While this interaction in the Emergency Department provides the patient with needed resources, it does not address the needs of the patient that is not transported. The recommendations from this study provide an outline for others to follow in the development of a treatment plan for those victims of IPV who are not transported. Further research is needed to determine if early intervention by paramedics provides the desired outcome of decreasing IPV.

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### **4. Undertriage of Firearm-Related Injuries in a Major Metropolitan Area. Lale A, Krajewski A, and Friedman LS. JAMA Surg. 2017 May 1;152(5):467-474**

Prehospital trauma triage criteria are designed to ensure that any critically injured patient or any patient who may potentially have serious injuries is transported to a trauma center. Multiple studies have shown a survival benefit for patients treated at a trauma center over a non-trauma center. The Centers for Disease Control and Prevention (CDC) publish the “Guidelines for Field Triage of Injured Patients” which specify which patients should be preferentially transported to a trauma center. Anatomic criteria requiring trauma center transport include penetrating trauma proximal to the knee or elbow.

This is a five year retrospective study reviewing patients in Cook County, Illinois (city of Chicago) who sustained a firearm-related injury. The authors specifically looked at patients who were undertriaged, meaning they met trauma triage criteria for transport to a trauma center but were instead transported to a non-trauma center. Their study population also included those patients who were transferred to a trauma center after receiving the initial care at a non-trauma center.

During the five-year period 9,886 firearm-related injuries occurred in Cook County. There were 2842 patients (28.7%) who received care at a non-trauma center and 7044 patients (71.3%) who received care at a trauma center. Those who were treated at a non-trauma center were less severely injured although 884 (31.1%) did meet the anatomic criteria for transport to a trauma center. Of the 4934 Cook County residents who met anatomic triage criteria, approximately 1 in 6 were treated at a non-trauma center. The South and West areas of Cook County are the areas most likely to have patients treated at a non-trauma center. For those familiar with the geographic distribution of trauma centers in Chicago, there was no trauma center in the southern portion of the city in 2009-2013 when this article was researched. The authors note that patients treated at non-trauma centers were less likely to die than patients treated at a trauma center. This is due to trauma centers treating a much more severely injured cohort of patients with a higher risk of death. A key finding of the study is that fewer patients died during the first 24 hours at a trauma center compared to a non-trauma center.

This study had surprising results. It demonstrated that undertriage of trauma patients occurs even in a major, developed, urban trauma system. Reasons for this are unknown but are likely due to a combination of EMS mistriage and a portion of patients being transported to the wrong hospital by private vehicle prior to EMS arrival on scene. Additionally distance to the nearest trauma center could play a factor, particularly in Chicago where there was no trauma center in the South side of town at the time of this study. The study demonstrates the need for continual quality improvement and self-assessment among all trauma systems.