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IPHMI Literature Review

Keeping You Up To Date with Current EMS Literature and Studies

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- 1. The Reliability of the Pre-hospital Physical Examination of the Pelvis: A Retrospective, Multicenter Study.** Lustenberger T, Walcher F, Lefering R, et al. World J Surg 2016;40:3073-3079.

It is thought that a careful and thorough physical examination can reliably detect unstable pelvic injuries and that undetected pelvic injuries are usually minor or stable and do not requiring immediate intervention. However, the data supporting this consideration is based on in-hospital evaluation with thorough no data available regarding the reliability of prehospital pelvic physical examination to detect pelvic fracture.

The Trauma Registry of the German Trauma Society which includes hospitals located primarily in Germany (90%) but also hospitals in Belgium, Finland, Luxembourg, Slovenia, Switzerland, and the Netherlands has been collecting data, including pelvic injury since 2002.

The inclusion criteria for this study were "primary admission, blunt trauma, ISS \geq 9 and information available regarding the out of hospital suspected injury pattern." These criteria were met by 35,490 cases. The patients were grouped according to the injury suspected by the physician at the scene and the final hospital discharge diagnosis. Patients were categorized as suspected pelvic injury which they deemed a false positive, pelvic injury missed which they termed false negative or correctly diagnosed pelvic injury or true positive.

A total of 11,062 (31.2%) of the identified trauma patients had either suspected or proven pelvic injuries. Pelvic fracture was confirmed in the Emergency Department in 7,201 patients or 20.3% of the total. A pelvic injury was suspected in the prehospital setting in 7,784 (22.2%) of the 35,490 patients. . Of the 7,201 patients with a documented pelvic fracture, 3,781 (52.5%) were not suspected based on

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the examination performed in the field. A total of 3,861 patients that were suspected to have pelvic fractures in the field were not confirmed in the hospital.

The authors state that while the evidence published to date suggests that a clinical assessment can rule out significant pelvic injuries in the blunt trauma patient, they challenge this conclusion as based upon in-hospital rather than prehospital findings. The number of missed pelvic fractures in this prehospital study was significant. They recommend that when treating severely injured blunt trauma patients in the field, some type of mechanical pelvic stabilization should be considered regardless of the results of the physical exam of the pelvis.

This study has a number of limitations All of the data used were collected and reviewed retrospectively. The quality and extent of the pelvic exams was not performed in a standard fashion across the patient population. This study was derived from a Physician-based EMS response system. Given that fact, any extrapolation of these results to an emergency medical technician or paramedic based EMS system is inappropriate. This type of study should be repeated using the various levels of personnel found in other prehospital systems.

2. N95 Respirators vs Medical Masks for Preventing Influenza Among Health Care Personnel A Randomized Clinical Trial. Radonovich Jr LJ, Simberkoff MS, Bessesen MT, et al. JAMA. 2019;322(9):824-833.

For many people, including the otherwise healthy, influenza (flu) is a serious disease resulting in hospitalization and, in some cases, death. Healthcare workers are at risk of contracting the flu from infected patients and coworkers alike and, if infected, may transmit the virus to those they care for. Many healthcare organizations require, and many more encourage, all employees to receive an annual flu vaccine or wear a mask during all patient contacts and while in common areas of their institutions. The United States Centers for Disease Control and Prevention (CDC) report that from 2017-2018 flu vaccination amongst healthcare workers overall was only 78.4%. Organizations that require flu vaccinations rose to 94.8% vaccination coverage. Flu vaccination compliance was highest amongst the more extensively trained healthcare professionals. Physicians, pharmacists and nurses had 96.1% - 90.5% compliance. Less trained providers had lesser compliance to flu vaccinations; 71.1% for assistants and aids.

For those healthcare providers that choose not to receive an annual flu vaccination, or are unable to receive one due to known allergies or pre-existing health conditions, the question remains how can they best protect themselves from contracting the flu while at work? A 2009 article in the Annals of Internal Medicine concluded that along with good and frequent handwashing, donning a mask may help to prevent individuals from contracting the flu.

While existing clinical evidence is inconclusive, this study attempted to determine if disposable N95 Respirators were more effective, or less effective, than medical (surgical) masks in preventing the flu amongst outpatient healthcare providers in close proximity to persons with respiratory illness. The authors conducted a cluster randomized, multicenter pragmatic effectiveness trial. This outpatient study was conducted between the spring of 2011 and summer 2016 at seven healthcare systems throughout the United States. Participants were all full-time employed adults (age 18 or greater) and who routinely work within six feet of patients. Exclusions from the trial were medical, or anatomical, conditions that prevented the safe and effective donning of an N95 respirator. Participants were cluster randomized to N95 respirator or medical mask groups. Study groups were directed to wear their assigned protective devices during the 12 weeks that viral respiratory illnesses were predicted to be at their greatest for the year.

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Participants who self-reported symptoms of respiratory illness had nasal swabs collected within 24 hours of reporting symptoms. Additionally, 2 random swabs were obtained from each participant within the 12-week study period for each year. The primary outcome was the incidence of confirmed influenza by laboratory analysis.

Adherence to the study design was reported on daily surveys by participants; 22,330 surveys for The N95 respirator group and 23,315 for the medical mask group. “Always” was reported 65.2% of the time by those participants using the N95 respirator and 65.1% of the time for the medical mask groups. The incidence of laboratory confirmed influenza infection occurred in 8.2% of the N95 respirator group and 7.2% of the medical mask group.

The study suggests that neither N95 respirators nor medical masks are superior to the other for preventing viral respiratory infection / illness amongst participants when worn consistently with clinical practice guidelines. Annual flu vaccination remains the best option for healthcare workers to prevent contracting the flu from patients and coworkers. For those that are unwilling, or unable, to take the flu vaccine, medical masks appear as effective as and are less costly than N95 respirators when worn appropriately during patient contacts.

3. Evaluation of an Integrated Rescue Task Force Model for Active Threat Response. Bachman MW, Anzalone BC, Williams JG, et al . Prehosp Emerg Care 2019;23:309-318.

Integrated (police and EMS) response to an active shooter incident is gradually becoming an operational standard across the USA. The use of the Rescue Task Force (RTF) model has been implemented in most major cities without objective data to support its use. The authors of this study evaluate the performance of the RTF in response to an active shooter incidence utilizing predetermined performance measures.

This observational study was conducted over an 18 day period using 69 separate scenarios events that evaluated 388 EMS providers and 468 Law Enforcement Officers (LEOs) within a system that serves a population of 1 million. One month prior to the simulation, the EMS and LEO providers received separate live didactic and hands on training presentations on their specific role in the RTF. The scenario that was repeated for each group of providers evaluated command staff, LEOs in the threat suppression role and two RTFs comprised of EMS personnel and LEOs. The event took place with 11 simulated casualties in a two story building of 13,000 sq./ft. Evaluators recorded the performance of 30 predetermined objective data points during the evolutions.

The study’s data showed the following median times in minutes:

From time of dispatch to:

The establishment of unified command	4.1
RTF assembled	9.4
First victim contact	11.9
Victim moved to CCP	16.6
Victims ready for evacuation	21.6

Patient care:

Appropriate Tourniquet application by EMS	97%
Appropriate Tourniquet application by LEO	89%
Inappropriate Chest Decompression by EMS	4%
Unnecessary Initial Treatment	15%

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Tactical Data points recorded including tactical communication in %:

Correct communication (safe to treat)	70%
Incorrect operation actions to maintain tactical formation	49%
Inappropriate patient evacuation	20%

This study demonstrates that the trauma and medical care rendered in a simulated active shooter event appears to be on par with normal EMS operational guidelines. The only exception appears to be unnecessary initial treatment of patients given that nature of the incident. This desire to provide more than basic life-saving care is commonly seen in mass casualty situations of all types, not just active shooter incidences. Of note, an area of concern relates to the operational management during the tactical situation. The RTF failed to maintain an appropriate tactical formation in almost one half (49%) of the time and tactical communication was well below desired benchmarks. This study demonstrates that a greater emphasis must be placed on tactical movement and operational communications during both didactic and scenario-based training for active shooter events.

4. A Remote Scene Size-up Using an Unmanned Aerial Vehicle in a Simulated Mass Casualty Incident. Sibley AK, Jain TN, Butler M, et al. Prehosp Emerg Care 2019;23:332-339.

In recent years Unmanned Aerial Vehicles (UAVs – also referred to as drones) have been increasingly used for both military and civilian applications. Many of the civilian public safety applications involve searching for and subsequent guiding of rescue teams to lost or injured victims in remote areas. Civilian law enforcement has used drones to locate wanted suspects hiding from authorities, sometimes at night using infrared technologies. Fire services have been using UAV's both in structural and wildfire situations for a number of years to assess hazardous situations and mitigate deployment dangers to firefighting personnel. Some EMS agencies are studying the use of UAV's to deliver life-saving medical equipment, such as automated external defibrillators, to the scene of the incident prior to EMS arrival.

This study looks at the potential utilization of UAVs during a mass casualty incident as a tool to conduct remote assessment and triage of simulated patients. The authors simulated a terrorist attack on a college campus; with the script not allowing EMS providers the ability to enter the scene due to multiple unexploded improvised explosive devices (IEDs). A commercially available UAV piloted by a certified Royal Canadian Mounted Police (RCMP) Pilot was used to locate and film the 15 highly moulaged, simulated patients using line-of-sight control. The location was initially viewed from an altitude of 200 meters (656 feet) for 3 minutes to gain an overall view of the location. After 3 minutes, the UAV would descend and conduct a systematic grid search of the area. When a hazard was identified or a victim located, the UAV would then hover at a distance of 3-5 meters (10-16 feet) for 15-30 seconds to record the points of interest. This video was then saved for later viewing by the study participants.

The primary outcome measure of the study was to correctly identify responses to the first step of the SALT triage algorithm - global sorting. Secondary outcomes included the ability to accurately report body injury location, identified scene hazard, and was as the victim and hazard location.

Ninety six participants were enrolled in the study. The participants were almost equally divided between males (52%) and females (48%) and were made up of participants at a medical conference. The majority (47%) were primary care paramedics. Others were various healthcare providers including physicians and nurses. The enrolled participants were given a one-hour (1) presentation on the SALT triage system. After the presentation, the participants were asked to review the video obtained previously. Of the 96 participants, 79 (82%) were able to correctly sort at least 12 of the 15 simulated patients and 75 (78%) identified at least 3 of 4 hazards at the scene.

This study demonstrates that the use of UAV's in the mass casualty environment may be a viable tool as the technology and flight rules continue to evolve. Further studies should include actual real-

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time assessment by participants as well as factors such as weather, use of the UAV indoors, and battery life.