
Military Medic Training
How civilian paramedics helped upgrade training for the U.S. Army p. 46

MIH-CP: Innovation Grant Updates p. 35
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A NEW KIND OF RESPONSE

Agencies across the U.S. are developing unique tactical EMS (TEMS) teams as the need for rapid response during an active shooter event only seems to be increasing. From the TEMS team at Wake County EMS in Raleigh, NC, to the Arlington County (VA) Fire Department’s Rescue Task Force that responds to events in close proximity to Washington, D.C., to a joint fire-law enforcement program in Oregon based on military techniques, agencies are finding ways to safely insert EMS personnel in a scene so they can treat victims while an active shooter event is ongoing. Read more at EMSWorld.com/12042545.

NEW

PUBLIC ACCESS TO Tourniquets & AEDs

Davie Fire Rescue in South Florida has recently started to promote tourniquet use by its citizens, placing a “severe bleeding kit” on every registered AED in the town. Department leaders, Assistant Chief Julie Downey and Peter Antevy, MD, feel strongly that tourniquets can be used safely by the lay public after proper training that is given during basic CPR courses. Read more at EMSWorld.com/12042621.

MOULAGE OF THE MONTH

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Bobbie Merica continues her guide to simulating injuries and illnesses through effective use of moulage. This month: Embedded glass. See EMSWorld.com/12042547

EMS WORLD ONLINE NEWSLETTER

EMS World is pleased to announce it has partnered with ReelDx, a pioneer of real-patient video in medical education, to publish real-patient video case studies designed to educate EMS providers. The case studies offer short videos of real encounters in the field and in emergency rooms, substantial case data and imagery, and behind-the-scenes insights on the encounter. Education about best practices for emergency assessment and management is made vivid through real patients, real providers and real medical emergencies.

“This is a powerful learning tool for medical first responders,” says David Spiro, MD, co-founder and chief medical officer of ReelDx. “It’s critical that EMTs and paramedics keep their skills current and their training fresh. However, their exposure to a broad range of conditions is dependent on the medical emergencies that occur in the communities they serve. Through ReelDx cases on EMS World, EMS providers can review real cases from a range of encounters and get bullet-point takeaways for their own practice.”

The EMS World Prehospital Library will feature one new case weekly. Contributors include providers and teachers from Oregon Health & Science University, Kaiser Permanente, University of Louisville, Yale New Haven Hospital, and Woodburn Ambulance Company in Woodburn, OR.

The first case features a 15-year-old MVA victim.

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Program Helps Patients Breathe

Acadian’s community paramedics work to reduce ED visits by pediatric asthma patients

While I was down in New Orleans for the debut of A&E’s Nightwatch and the National Association of EMS Physicians’ annual conference, I was also able to visit with one of Acadian Ambulance’s community paramedics. Ashlee Ellington works with pediatric asthma patients in conjunction with the Louisiana Health Care Connection (LHCC).

Ellington explains that during initial appointments with patients she discusses the program with the parents; reviews the medical history of the child and current medications; notes the patient’s asthma triggers; and outlines what they need to do when they have an asthma attack.

“Patients are seen about once a week,” she says. “During those visits, we take the child’s vital signs and listen to their lung sounds. We have a peak flow meter that we’ll use with them.”

One of the goals of the program is to cut down on ER visits. “We make sure patients are using their medications properly, or if they need refills. I’ll make doctor appointments for them as well,” says Ellington.

When asked whether she misses working on an ambulance, the answer is no. “I enjoyed working on a truck, but this is a little bit more interesting. I love working with the kids and getting to know them. It’s really rewarding.”

Officer Down

EMS operations at an active shooter incident require careful coordination with law enforcement

THE MORNING IS QUIET. Station duties, and a quick training exercise on the use of the new textile devices that can be used to move large persons, are completed.

The urgency of the dispatcher’s voice is evident from the first syllables.

Officer down, active shooting event, Signal 99 for law enforcement. County courthouse, stage away from the scene. Attack One respond.

The Attack One officer processes the words in her head, and silently recites in her mind, “This is not a drill.”

Understanding the communications center will be completely committed to law enforcement activity, the battalion chief takes responsibility for immediately calling for three additional paramedic units, establishing a staging point three blocks from the courthouse for all fire and EMS units, and designating a tactical channel for all fire-EMS communications regarding the incident. A second battalion chief will respond as the safety officer, and a ladder truck will be dispatched to serve initially as staging command.

Before they can arrive at the staging area, Attack One is routed into the scene at the request of the ranking law enforcement officer (LEO) on the scene, who makes the request directly on the EMS radio channel. The battalion chief asks the officer if the scene is safe for entry, and the LEO reports, “No sir, but we have an officer down on the street north of the courthouse with severe injuries.”

The battalion chief confirms the communication with the LEO, and makes sure the Attack One crew understands they will be the only unit entering the area, and to take all necessary precautions to protect themselves while scooping and removing any victim as rapidly as possible.

The Attack One crew leader sets the priorities immediately for the three-person crew.

“Don your helmet and your turnout jacket. The only equipment on us will be tourniquets, a bag of trauma dressings, our trauma scissors and one of those textile devices we just trained on. We will pull up to a protected area half a block away, run to the scene with those rescue items only, and plan to grab the victim and carry him or her back to some protected area near the vehicle. No delays allowed.”

The paramedic places a rapid call to the medical direction phone at the trauma center, which is close to the scene.

“Please place yourself on alert status. We have no details, but are responding to an active shooter scene with the report of one serious injury and an ongoing event at the courthouse. Monitor traffic and we will get you any patient details if we can.”

Attack One approaches and finds three officers, with guns drawn, protecting an officer who is prone on the sidewalk. There is blood visible on the ground as they run in with their streamlined equipment. The officers give a rapid report that at least one individual was shooting inside the courthouse where there are more casualties. This officer was not on duty yet, so was not protected by body armor. As he walked toward the courthouse, the shooter bolted out of a door and shot the officer without warning. The criminal continued to run, but they do not have a direction or a good description of the criminal. This officer has been unconscious since the other officers arrived.

They note the officer was shot in the upper abdomen and in the face. He is not responsive to verbal directions, and his airway and breathing are compromised.

The Attack One crew leader knows the priority immediately for the three-person crew.

The paramedic proceeds quickly to load the officer onto the textile sheet. A trauma dressing is placed over the abdominal wound, and one over the facial wound. The LEOs are advised that the injured officer will be carried half a block away, where they will rendezvous with a transport ambulance, and the officer will be transported immediately to the trauma center.

Officer Down
The officers are requested to provide ongoing security for the crew, and at least one to accompany the paramedic transport unit. Command is notified by the paramedic.

The Attack One crew is to remain on the scene with the officers, and let the transport unit proceed quickly to the trauma center with its own crew. Command has been advised that two more LEOs have been shot inside the courthouse, and the Attack One crew will be responsible for triage and initial care. The remaining EMS resources are staged several blocks away, ready to proceed in when there is sufficient control of the scene.

The Attack One crew is led to the front door of the courthouse, and then into the lobby. There they find two patients, both LEOs with wounds to their legs. They were shot, but both had protective vests in place. One complains of chest pain, and the other has a trauma tourniquet in place on the involved leg. There are no other obvious wounds, and both are speaking and trying to give necessary information to the officers who will be attempting to locate the shooter. Command is notified that two transport ambulances will be needed immediately and a rendezvous point is established near the front of the courthouse, where a large number of armed LEOs are clearing the area and preparing a safe zone for EMS operations.

The paramedic quickly identifies that the injured officers have no further wounds, but both have holes that are close to the arteries in the upper leg so there is no reason to remove the tourniquets in place on each officer. They are reassured the ambulances will have pain medication for them, as the placement of the tourniquet has now resulted in significant pain for both. They are loaded onto sheets and carried outside to the ambulances.

The paramedic is advised by the lead law enforcement official that the area directly in front of the courthouse is now a safe zone, and that fire and EMS resources, and the battalion chief, be put in place as rapidly as possible. Since there are ongoing life threats, the battalion chief will be incident command, and law enforcement will organize themselves in the operations sector. The paramedic quickly communicates that information to the battalion chief, and the paramedic quickly communicates that information to the battalion chief, and the entire set of EMS operations establish the objectives over incident command. Move quickly and safely. Identify and move away from any objects that may be secondary devices. Command is notified that two transport ambulances will be secondary devices.

The Attack One crew members are assigned as triage, and other EMS officers are designated as the transport sector command. The transport command officer has the responsibility to determine transport hospital receiving sites, make contact with the hospitals and track the removals. Treatment sector will care for all persons who need on-scene care, such as those who have minor ailments related to the evacuation process. An initial group of EMS personnel and an officer are assigned to tactical respon-
sibilities, to provide care for any further LEOs who are injured, and to support the operations in the building and surrounding areas where the search is on for the gunman. A fire crew is assigned the responsibility to mitigate any fire dangers and any secondary devices that are found.

Transportation and Hospital Course

A total of three victims are transported from the initial operation. There is the possibility of further victims as the building is searched and the manhunt for the perpetrator takes place. The victims all go to surgery, and two of the three survive. The on-scene operations progress and the building is cleared over the next hours. There are several dead persons in one of the courtrooms. No further victims are identified with serious injuries, and a total of five additional victims will ultimately be transported to hospitals for minor illnesses and injuries.

Organizing Patient Assessment

Many fire and EMS organizations use triage systems that result in patients being numbered in sequential fashion. Figure 1 represents the results of that triage process. The crews triaged eight patients and categorized the patients by the compromise of the ABCDE body systems.

Case Discussion

With the latest incidents that have occurred across the United States and around the world, emergency scenes have an ever-wider range of potential threats. But the fire-EMS services have a lengthy history of managing hazards of all types using the Incident Command System, and those principles prepare emergency personnel for any type of incident.

Regarding EMS victim care, they’re a structured set of principles that save lives, whether a bomb has been detonated, thunderstorm winds have just collapsed a stage onto a big crowd or someone is still shooting. When the incident involves ongoing violence from gun, bombs or fire there is another set of priorities that are related to combat medicine. An active shooter event involves the management of an incident where there is real or potential ongoing violence. The planning for these events requires a high level of cooperation and a joint Incident Action Plan developed by local law enforcement and fire EMS leaders, and followed by training for all levels of public safety personnel.

There are fortunately a growing number of programs that allow school teachers, workers and others to “shelter and fight” to save lives as these incidents first evolve. These are also integrated with law enforcement.

Scene Priorities at an Active Shooter Incident

Public safety providers have a joint opportunity to save all lives possible. Law enforcement has the primary responsibility to neutralize a person or persons with weapons of any type. Their responsibility and training constitute the first wave of responders into the scene. All public safety personnel share a responsibility to perform rescues and operate in a way that maximizes safety for their own personnel.

Active shooter incidents can, of course, have the full range of injuries and illnesses. The majority of life-threatening injuries will involve serious or lethal penetrating wounds with ongoing hemorrhage. EMS emergency care should prioritize the control of hemorrhage. Relatively less spine immobilization is needed, and personnel should be equipped to move patients quickly using blankets or similar equipment and devices. Triage is simplified, without need for fancy devices. In these circumstances, rapid BLS care is the EMS strategy. Airways will usually be managed after the victim is moved to a safe area in the cold zone, and after hemorrhage control has occurred using tourniquets or trauma dressings.

FIGURE 1

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For More Information Circle 21 on Reader Service Card
There are very important rescue equipment considerations for active shooter incidents. EMS personnel must enter the scene with a simple and effective set of tools, leaving the stretcher, bigger bags of equipment and monitors in the outside casualty collection point. Some systems have created a small bag marked as “Trauma MCI Bag.” The needed elements may be as simple as:

• A number of large-size non-sterile gloves;
• Commercial tourniquets in sufficient quantity for the ingoing personnel;
• Trauma dressings for wounds that need to be packed;
• Trauma scissors;
• Blankets, sheets or other textile devices to grab and move patients quickly, or cover victims who are unclothed, or to be moved quickly, and cover if the victims are unclothed;
• Some systems have a set of oral airways and a device to decompress a tension pneumothorax; and
• Triage tags and a marker pen.

In the active scene area, the priorities are to stop bleeding and get the patient out to a casualty collection or transportation point. Rapid evaluation and a few critical interventions will minimize the loss of life among those who are seriously injured. Most medical triage systems—START, SALT and others—allow for that medical work to occur in a few seconds with just a pair of gloves. With the small cache of equipment lifesaving hemorrhage control can be accomplished, and the patient rapidly pulled or moved out of the hot zone to a secured area before rapid transportation to a hospital. En route to the hospital, or in the event of delayed transport or prolonged extrication, there is the consideration of using advanced life support interventions like definitive airway management, IV lines and pain medications.

There must be early implementation of a plan for patient transportation. Communication must be made as early as possible to potential receiving hospitals, even if no specific patient details are available. A critical element of active shooter incidents is the ability of hospitals to prepare surgical resources, and that requires a little time before the first arrival of seriously injured patients. All hospitals must be prepared for these incidents, as designated trauma centers may not necessarily be the closest and most appropriately staffed. Some jurisdictions use police transport teams for these incidents, as these do not need to be located just on the outside the incident. Some systems have created a small bag marked as “Trauma MCI Bag.” The needed elements may be as simple as:

• Triage and other—allow for that medical work to occur in a few seconds with just a pair of gloves. With the small cache of equipment lifesaving hemorrhage control can be accomplished, and the patient rapidly pulled or moved out of the hot zone to a secured area before rapid transportation to a hospital.

PRIORITY ELEMENTS IN AN ACTIVE SHOOTER PROGRAM FOR EMS

• Planned approach integrated with local law enforcement
• Fire-EMS personnel likely to be members of the “second wave” going into the scene
• Fire-EMS personnel should be visible as rescue personnel, not law enforcement

LIFESAVING SCENE CARE

• Injuries are more likely to be serious or lethal penetrating wounds, with hemorrhage the most important life threat
• Control hemorrhage
• Relatively less spine immobilization is needed, and patients are more apt to be moved quickly using blankets or similar

Communication must be made as early as possible to allow needed preparation to the receiving hospital, to further the human losses. So hospitals and transporting EMS systems must keep weapons away from the hospital. For chaotic incidents with the potential for multiple perpetrators, EMS personnel must use processes that reduce the risk of transporting persons with weapons to the hospital.
The scene can be managed using a set of pre-event leadership agreements between law enforcement and rescue agencies. Many utilize the principles of “wave management.” It is clear that law enforcement is the primary element of the “first wave” initial entry into the building, with the aim to neutralize the threats that are part of the initial event and reduce the risk of secondary events. The first wave is followed by a “second wave” of fire-EMS resources that are protected by the police personnel. It should be clear to the EMS rescue personnel that they are not to distract law enforcement from their role in protection, weapons management and investigation. It is not good procedure to have the police officers “pull off” to help do patient care or drag victims out, as they have other priority items to manage.

Los Angeles County Sheriff’s
Department Releases Surviving an
Active Shooter PSA

A graphic new PSA offers the public advice on what to do during a mass shooting. This video is one of the most ambitious projects the Los Angeles County Sheriff’s Department’s Video Production Unit has ever produced,” a release from the LASD says. Watch the video at EMSWorld.com/12040310.

In the planning for these active shooter incidents, fire-EMS personnel may have other scene management roles in the hot zone. The core competencies of fire-rescue that may be critical in active shooter incidents include the firefighting principles of building clearance, the ability to identify potential explosive hazards, the responsibility to extinguish or mitigate fire risks, and skills in the use of thermal imaging cameras to hunt for victims, hazards or perpetrators. While doing patient care and these other responsibilities, fire-EMS personnel have an ongoing responsibility to reduce the contamination of the hot zone, leaving the scene as intact and undisturbed as possible for investigators.

Fire-EMS personnel should have a particular sensitivity for the presence of secondary devices intended to cause ongoing damage. Public safety personnel are jointly responsible for identifying areas where those devices may be located and reducing the likelihood that they will cause further harm. One important note on communication systems: law enforcement may decide at a bombing incident to shut down the cellular phone network in the immediate area, to mitigate the risk of cell phone-activated secondary devices.

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The Benefits of TXA
Implementing tranexamic acid for trauma patients will result in decreased mortality
By Jon E. Thomas, BS, ATP, NREMT-P

In the United States, trauma is the leading cause of death for patients under 45 and the fourth-leading cause of death for all ages. The CDC has reported that more than 140,000 patients die each year from traumatic injuries, and 80,000 are permanently disabled.1-4 The annual number of U.S. in-hospital deaths due to bleeding is estimated to be 12,489.2 Rapid assessment and proper treatment of trauma patients begins in the prehospital environment with the arrival of trained emergency medical personnel and is essential in the presence of life-threatening injuries.6

Tranexamic acid (TXA) was originally developed for the treatment of hemophilia and to reduce bleeding in patients undergoing oral surgery. It has been shown effective as a preoperative drug that minimizes the need for large amounts of whole blood during general surgery procedures.4,7 TXA is now being used to treat severely injured trauma patients who have or are at risk for severe hemorrhage.1,4,7-10,15,17,18

Tranexamic acid is produced by Pfizer Injectables and distributed by the Pharmacia & Upjohn Company as Cyklokapron. TXA is a synthetic amino acid (lysine) that blocks plasminogen from being converted into the enzyme plasmin. Plasmin works to break down already-formed blood clots in the human body by attacking and breaking down fibrin, destroying clots in a process known as fibrinolysis.1 TXA is widely used by hospitals in Europe and other countries for severely injured trauma patients.1,4,7,14,15,18,19 TXA is 1 gram in 100 mL of 0.9% normal saline or Ringer’s lactate. It is used to reduce the mortality of severely injured patients administered within three hours of injury.1,2,6,11,13,14 Mor-tality was shown to decrease even more when it’s given within one hour.1,10,15,16 With the success of TXA during the clinical trials, its low cost, and its safety and side-effect profile, it is reasonable that TXA be introduced as a standard of care for ALS prehospital emergency medical services in the United States. Any patient who has experienced trauma and is at risk for or has significant hemorrhage can benefit from TXA. Although transport times in urban settings can be short, TXA may not be beneficial if it greatly delays scene time to prepare and initiate the initial 1 gram dose and establish an IV. However, TXA would be ideal for situations including prolonged extrication, extended transport times due to heavy traffic or other conditions, and mass-casualty incidents. TXA should be administered at the incident site or as soon as an IV has been established, not as the unit pulls up to the trauma center, to meet the goal of giving the first dose within the first hour of injury. If TXA is administered after three hours, mortality rates have not decreased.4,7 Patients receiving TXA should only be transported to trauma centers that are equipped to handle severely injured patients and can administer or follow patients who have received TXA.

Dr. Carl Bergren, a trauma surgeon at St. Francis Trauma Institute of Tulsa, OK, told the Tulsa World TXA has been used on the battlefield as well as on civilians and that using it on patients before they get to the hospital is a good measure. “For those who meet the criteria, it can show a definite benefit,” he said.10

The cost of tranexamic acid versus favorable outcomes in patient mortality is negligible. The current cost of TXA on the British National Formulary converted into international dollars is $5.70 per gram; in the United States the cost is approximately $10 per gram.14 Further, TXA is very easy to administer for paramedics, as they already have training to give intravenous medications in their scope of practice. The recommended procedure for administering TXA is 1 gram in 100 mL of 0.9% normal saline or Ringer’s lactate given by IV infusion over 10 minutes, followed by 1 gram in 500 mL of 0.9% NS or LR infused over eight hours.4,15,19,20 It is recommended that TXA not be mixed with colloid fluid, (e.g., Hes- tend or Hespan, plasma or any other blood component), nor with solutions containing penicillin, and/or piggybacked into any IV line delivering blood.14,20

Review of Current Literature
The CRASH-2 study, undertaken in 274 hospitals in 40 countries and published in 3 echelon surgical hospitals outside the U.S., and Womack Army Medical Center at Ft. Bragg, NC, for U.S. soldiers wounded in Afghanistan and other combat theaters around the world.14-20,22

The Clinical Randomisation of an Anti-fibrinolytic in Significant Haemorrhage (CRASH-2) study, completed by researchers at the London School of Medicine, and Military Application of Tranexamic Acid in Trauma Emergency Resuscitation study (MATTER) showed that when TXA can be administered within three hours of injury, the mortality of severely injured patients is reduced by up to 30%.1,4,7,14,15,17,19,20 With the introduction of TXA to the standard of care and trauma resuscitation protocols of providers in the prehospital setting (for patients who have experienced significant hemorrhage), survival rates should increase further, extrapolating the results garnered in CRASH-2 and MATTERs. We would expect at the least that an increased number of patients would meet the required three-hour treatment window. TXA use in both the CRASH-2 and MATTER studies showed the greatest reduction in mortality when administration began within an hour of injury.1,3-5,15

Indications for Prehospital Administration
Unlike the chitosan-based HemCon dressings (see sidebar), QuikClot Combat Gauze, QuikClot Sponge and CAT tourniquet making their way into civilian prehospital medicine, tranexamic acid is not a hemostatic agent or tourniquet device.13 TXA is an antifibrinolytic agent that prevents plasminogen activators from attaching to the lysine binding site of the clot.1,2,9,14 During fibrinolysis, the process of blood clot breakdown begins when plasminogen is converted to plasmin, which then begins the destabilization of formed blood clots.1,3,4,7,14,15,18,19 This destabilization leads to increased bleeding and potentially patient death (at least in the severely injured trauma patient requiring surgical intervention).1,3-5,10-12 The administration of TXA prevents this clot destabilization cascade from developing. Large prospective randomized, controlled trials have shown that patient mortality is decreased when TXA is administered within three hours of injury.1,4,7,13,15 Mortality was shown to decrease even more when it’s given within one hour.1,10,15,16

Any patient who has experienced trauma and is at risk for or has significant hemorrhage can benefit from TXA.
The world of EMS: TXA

Host Chris Ceballos chats with New Haven’s Medical Director Heston Lamar and Clinical Education Coordinator Kevin Collopy about the agency’s new protocol for the administration of TXA. See EMSWorld.com/1203368.

TRAUMA CARE

ABOUT THE AUTHOR

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Instructor for the Special Operations Combat Medic Course at the Joint Special Operations Training Center in Fort Bragg, NC, since August 2004.

2010, showed that TXA, when administered within one hour of significant trauma, greatly reduced patient mortality (over 30%) when used in conjunction with blood transfusions.3,4,5 When TXA was used alone, patient mortality was reduced over 20%.6,7,8,9

MATTERS was a retrospective observational study of 893 consecutive admissions of injured persons in a role 3 surgical hospital equivalent to U.S. Level 2 trauma center) in southern Afghanistan. In MAT-

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EVIDENCE-BASED EMS: Needle Decompression

Recent data may cause us to reconsider our preferred thoracostomy location. By Daniel Charles Kolinsky, MD, & Hawnwan Philip Moy, MD

As our population becomes more obese, the distance the needle must traverse becomes longer and the concern that the pleural space is not reached is heightened. The most recent Advanced Trauma Life Support manual recommends “inserting a large-caliber needle into the second intercostal space in the midclavicular line of the affected hemithorax,” but also notes that chest wall thickness can affect the chances of successful needle decompression. This was demonstrated as early as 1996 in a case report that noted after successful needle decompression of tension pneumothorax, when the pressure applied to the chest wall to insert the catheter was removed, the natural recoil of the chest wall dislodged the cannula from the pleural space and in essence recreated tension physiology.1

As patients become larger and the standard catheter length remains unchanged, entering the pleural space becomes more difficult, which may lead to failed decompressions and worse outcomes. This issue was examined by a series of retrospective studies that utilized CT imaging to document chest wall thickness (CWT) and radiographic decompression based on catheter length. One study conducted in a U.S. region with a patient population known to have higher obesity rates compared CT radiographic needle compression success based on catheter length. Unsurprisingly, the longer the catheter length, the higher the predicted success rate. Results showed that the standard 4.6-cm catheter would reach the pleural space in 52.7% of the population, the 5.1-cm catheter would reach it in 64.8%, and the 6.4-cm catheter would reach it in 79.1%2. Similarly, a 2009 study looked at chest wall thickness at the 2ICS-MCL in trauma patients. Using CT scans of 110 patients, it noted that using a standard-size angiocatheter (4.4 cm), needle decompression would be unsuccessful.

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Radiologic Decompression

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Discussion

A retrospective review of needle decompression by prehospital providers concluded the procedure is safe to perform and, when done in the decompressing trauma patient, can have beneficial outcomes.5 Traditionally the recommended needle thoracostomy site has been the second intercostal space, midclavicular line (2ICS-MCL). However, within the last 15–20 years, this has come into question on multiple fronts.

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fueful in 50% of trauma patients based on its patient population.15

Kenji Inaba, MD, and colleagues took this idea one step further. They conducted a retrospective review that compared CWT using CT imaging at the 2ICS-MCL to the fifth intercostal space-anterior axillary line (5ICS-AAL). Thirty randomly selected patients from four predefined BMI quartiles were included for a total of 120 patients. The results were notable for a stepwise increase in CWT in each BMI quartile at both sites. Furthermore, the CWT was statistically greater at the 2ICS-MCL compared to the 5ICS-AAL. Using a 5-cm needle, 42.7% of needle decompressions would be expected to fail at the 2ICS-MCL, compared to 16.7% at the 5ICS-AAL. These results were contradicted by a review done by Leon Sanchez, MD, et al. in 2011. Scans from 159 patients yielded a statistically greater CWT at the fourth ICS and 5ICS-AAL compared to 2ICS-MCL. Additionally, the failure rate based on a 5-cm needle at the 2ICS-MCL was lower (33.6%) compared to the 4ICS-MAL (73.6%) and 5ICS-MAL (55.3%), all statistically significant differences.16

The next logical step was to assess the differences in radiographic decompression using a longer needle. Samuel Chang, MD, et al. performed a retrospective review of 100 CT scans from trauma patients comparing CWT and radiographic decompression success rates using 5-cm versus 8-cm angiocatheters. The results revealed CWT was significantly thicker at the 2ICS-MCL compared to 4ICS-AAL. Using an 8-cm needle, radiographic decompression achieved success at least 96% of the time independent of the site selected. Using a 5-cm needle, radiographic decompression was achieved 66%–76% of the time at the 2ICS-MCL and 75%–81% of the time at the 4ICS-AAL. Authors also noted that radiologic noninjury (defined as the distance to a vital structure greater than needle length) rates were higher for the 5-cm needle (99% or higher at all sites) compared to the 8-cm (68%–100% depending on site). Furthermore, the lateral approach on the left significantly increased the risk of damaging vital structures, mainly the left ventricle, when using an 8-cm needle.15

Simulated Decompression

The majority of the aforementioned studies comparing chest wall thickness were based on radiographic measurements alone. They did not consider variables for which a

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NEEDLE DECOMPRESSION

NEEDLE DECOMPRESSION

One weakness in these studies is that when patients are needle-decompressed, they are lying supine with their arms at their sides and breast tissue falling to dependent positions, usually laterally. However, in the CT scanner, the arms are positioned above the head, which stretches and thins the muscles of the chest wall and redistributes the arms closer to the chest wall. The importance of using animal models or volunteer soldiers and performing ND, then prepped the patient on a military stretcher then entering the CT scanner, the arms are positioned laterally. However, in the CT scanner, the arms are positioned above the head, which stretches and thins the muscles of the chest wall and redistributes the arms closer to the chest wall.

A study done by a Canadian military group compared differences in complications rate, mainly occlusion risk, between rates of radiologic decompression versus true needle decompression (ND). A study done by a Canadian military group compared differences in complica-

minute transport. They visually observed bending/kinking of the catheter at the midaxillary line, especially when straps were placed to secure the arms in the adducted position. This was better quantified by indirectly measuring the threshold pressures to initiate flow through the catheter. The pressure required to establish flow through the catheter at the MCL was 7.9±1.8 mm Hg. The pressure required to establish flow through the catheter at the MAL was higher, at 13.1±3.6 mm Hg. Thus it was concluded that the lateral approach did not work as well as the anterior approach because the catheters were more likely to be kinked and occlude.1

A 2011 study led by Inaba used 20 randomly selected human cadavers to assess differences in CWT (distance) and ND success (entry intro pleural space) between the 2ICS-MCL and the 5ICS-MAL. NDs were performed on both the right and left sides using a 5-cm catheter. The CWT was statistically less at the 5ICS-MAL when compared to the 2ICS-MCL on both the right and left by 1 cm on average. Furthermore, the NT was successful 100% of the time in the 5ICS-MAL bilaterally versus 60% on the right and 55% on the left in the 2ICS-MCL, both of which were statistically significant. The study concludes that although their evidence suggests a lateral approach, trials with living humans are necessary before a change in practice should be advocated.9 It is often overlooked that the instruments used to decompress a patient with a tension pneumothorax are not primarily designed for this purpose. Consequently the catheters have an unacceptable and variable rate of failure despite being in the pleural space. This was demonstrated in a two-arm study that created tension pneumothoraces in porcine models until they reached hemodynamic compromise or pulseless electrical activity arrest. In the first arm, of the 19 created tension pneumothoraces, five catheters (26%) failed due to kinking, obstruction or dislodgment within five minutes of insertion, all associated with hemodynamic decline. Of the 14 that remained patent at five minutes, six failed to relieve tension physiology, for an overall failure rate of 58%. In the second arm, there were 14 tension pneumothoraces with PEA events treated initially with ND. The ND failed to restore perfusion in nine events (64%). A tube thoracostomy was performed as a rescue intervention and restored perfusion in eight of the nine NT failures.11

Bottom Line

Based on the current evidence, advocating for a change in primary site selection is premature. However, there are some valuable conclusions that can be drawn from this pool of data. The fourth/fifth intercostal space at the anterior axillary line should be considered in trauma protocols as an alternative site. The British Thoracic Society has included the axillary approach as an alternative since 1993.12 Furthermore, after completing a study of their own that showed the viability of this alternative site, authors of the Tactical Combat Casualty Care Guidelines revised their guidelines to include the lateral approach as an acceptable alternative.7 There are circumstances in which the 2ICS-MCL may be difficult to access or contraindicated, including a gunshot wound, indwelling Port-A-Cath, AICD, overlying infection or protective body armor. An alternative site may be needed.

The data are unclear whether chest wall thickness is greater at the 2ICS-MCL or the 4/5ICS-MCL. In the series of studies focusing on ND, a trend of increasing needle length has been seen. With the increase in needle length, success of radiographic decompression increased. Based on the patterns seen in these studies, one can conclude that the 8-cm needles will maximize success rates independent of approach. However, note that with such long needles, the lateral approach may increase risk of injury to proximal vital structures. From the limited number of studies that have looked at differences in site safety, it appears the anterior approach is farther from vital structures and has less of a chance of injury with incorrect needle insertion. However, when needle angle is corrected to perpendicular, the...
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risk of injury becomes almost equivalent. 5

At this time there have been no large-scale prospective randomized controlled trials or meta-analyses that have led to a consensus statement. As a result, current practice is based on the various smaller retrospective studies. These studies present weak if not conflicting data. As such, it is difficult to make a new Grade A recommendation to transition to the fourth/fifth intercostal space at the anterior axillary line as the primary site for needle decompression. 5

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MARCH 2015 | EMSWORLD.com
Health Care Innovation Grant Recipients Making Progress

Agencies seeing results already from their grant programs

By Jason Busch, Associate Editor

This past summer, the second round of Health Care Innovation Awards was distributed by the Centers for Medicare & Medicaid Services (CMS). These are funding grants to applicants with compelling new ideas to deliver better health, improved care and lower costs to people enrolled in Medicare, Medicaid and the Children's Health Insurance Program (CHIP), particularly those with the highest healthcare needs. Following is an update on two of these recent grantees, the Mesa (AZ) Fire and Medical Department and the Mount Sinai Medical Center (NY).

Beginning in January, EMS World launched a yearlong series that provides readers with a roadmap for developing MIH-CP programs. This series will address the following topics:

- Planning for rapid implementation;
- Data metrics and outcome measures;
- Collaborations with home healthcare;
- Accreditation of MIH-CP programs;
- MIH Summit at EMS On The Hill Day;
- Payer perspectives for MIH-CP services;
- Choosing practitioner candidates;
- Education of MIH-CP practitioners;
- MIH-CP programs in rural settings;
- International models of MIH-CP.

This month we provide updates on CMS innovation grant recipients.

City of Mesa Fire and Medical Department

- Project Title: “Community Care Response Initiative”
- Geographic Reach: Arizona
- Funding Amount: $12,515,727.

The City of Mesa Fire and Medical Department received an award to test a model that offers comprehensive delivery systems and addresses the impact of chronic disease, falls prevention, self-management skills and medication adherence.

The model aims to reduce high-risk patient returns post-discharge, and the treatment and referral of low-acuity patients from the use of the 9-1-1 systems and the emergency department. The program provides low-acuity patients with on-site evaluation and treatment; and/or refers patients to more appropriate services, which reduces duplication efforts between emergency rooms and private physician providers. High-risk patients receive follow-up evaluations after discharge to reduce the incidence of readmission.

Disease preventative services are provided, including immunizations, falls prevention, home safety inspections and education on the safe use of prescribed medications. The Community Care Response Initiative consists of four units operating 24/7 throughout the Mesa area. Also provided is a physician extender unit—a modified ambulance that takes the team to perform low-acuity services or post-discharge hospital follow-up. The services provided by this unit are similar to services provided by an urgent care: in-depth patient evaluations, behavioral health evaluations, suturing, minor trauma evaluations, cardiac diagnostic capabilities, pain management, prescription services, immunizations, health education, referral services, primary care consultations, sepsis evaluations, post-discharge follow-ups and minor diagnostic testing.

According to Gary Smith, MD, MMM, FAAFP, "Mesa Fire and Medical Depart-

Name Change

The City of Mesa Fire and Medical Department is so serious about providing quality EMS care to its residents, the department changed its name to include medical. "We got so much praise for doing that it was incredible," Beck told an overflow crowd at the 2014 Firehouse World conference in San Diego. "Eighty percent of what we do in Mesa are EMS runs. Our city councilors were pleased that we finally accepted it." Read more at EMSWorld.com/11315858.
Munjal says patients, caregivers and the general community have been very supportive of the overall MACT initiative. Patients seen in the emergency department are evaluated for inpatient admission through the usual pathways, and a patient will be considered for the MACT program only after the decision to admit has been made. He explains cases will be reviewed to identify patients who can be cared for safely at home. The following diagnoses will be considered: Community-acquired pneumonia; urinary tract infection; congestive heart failure; diabetes; chronic obstructive lung disease; cellulitis; venous thromboembolism; and asthma. *
Exploring best practices for prehospital trauma care

By Kevin T. Collopy, BA, FP-C, CCEMT-P, NREMT-P, WEMT, Sean M. Kivlehan, MD, MPH, NREMT-P, & Scott R. Snyder, BS, NREMT-P

Myth #1: Never Insert Nasal Airways in Head-Injured Patients

The myth explained: While the placement of nasal airways, nasal gastric tubes and nasal intubations is common in emergency medicine, EMS classrooms have long taught that whenever a head injury is suspected, particularly a basilar skull fracture, placing anything in the nares is likely to violate the soft bone of the cribiform plate (skull) and penetrate the cranium, rather than being placed in the airway.

The Evidence

A comprehensive review on the use and indications for nasopharyngeal airways was published in a 2005 Journal of Emergency Medicine. This review acknowledged that skull fractures are a contraindication for NPA placement; it went on to identify only two case reports, as of 2005, in all of published medicine. One report was released in 1991 in Anesthesiology, and the other in the Journal of Trauma in 2001. These authors concluded placing an NPA through the skull is extremely rare and is likely associated with improper technique as well as injuries that already have significant morbidity and mortality.

This position was followed by a 2006 case report and letter in the Journal of Emergency Medicine from three physicians in London. In their letter, these physicians reported another case of an NPA in the cranium following severe facial trauma in a patient whose airway could otherwise not be managed due to a clenched jaw. The authors agreed the placement of an NPA into the cranium is exceedingly rare and most likely results from poor placement techniques. It was their opinion that airway management should take precedence over the risk of an extremely rare consequence.

Multiple different sources support the use of proper airway placement for patients with head injuries; the key here being using proper technique and stopping when resistance is met and directing the airway upward toward the eyes increases the likelihood of complications. Keep in mind, these papers are encouraging the use of nasopharyngeal airways and not nasal intubation or nasogastric tubes in head injury. Both of these latter devices are more rigid than the NPA and nasogastric tubes in particular may have a greater likelihood of compromising the basilar skull.

Myth #2: Lidocaine in RSI Prevents Increased ICP in the Head-Injured Patient

The myth explained: It is known that laryngeal manipulation and endotracheal intubation are both associated with a transient rise in intracranial pressure (ICP), and patients who have a head injury with increased ICP are considered at an increased risk for secondary brain injury. Since a transient ICP rise could decrease cerebral perfusion pressures, every effort is made to control ICP. In theory, lidocaine prevents this transient ICP rise, which helps prevent a secondary brain injury. Evidence for lidocaine as a preventive measure first appeared in 1990, when Robert Bedford, et al., published their paper, “Lidocaine prevents increased ICP after endotracheal intubation,” when they monitored 20 patients who were undergoing elective neurosurgery. Their results showed that while patients who received lidocaine did experience a rise in ICP, it was significantly less than in patients who received a placebo. Ultimately, these results were extrapolated to use lidocaine as part of the medication sequence for intubation, although this study did not address this question at all.

The Evidence

Drs. Mike Clancy and Neil Robinson reviewed all of the available literature regarding the use of lidocaine in RSI and published their findings in 2001. After an exhaustive literature review, they only found six papers that addressed lidocaine and intracranial pressure changes. No published studies lidocaine during RSI. These authors concluded there is no evidence to support the use of lidocaine as a clinical intervention during RSI and recommended its administration be limited to clinical trials.

Although there is no evidence to support the use of lidocaine, is there evidence that suggests that lidocaine causes harm? A 2012 paper in the American Journal of Emergency Medicine determined lidocaine...
Lidocaine had no impact on the hemodynamic stability of patients receiving RSI following traumatic injury and determined the drug was safe to administer during RSI. However, one potential problem is that lidocaine administration is time-dependent. Some authors suggest that to have any potential benefit for the patient receiving RSI, lidocaine must be administered at least 2 minutes prior to laryngoscopy. Waiting an additional 2 minutes to intubate a patient with a head injury may be its greatest risk, as during this time patients can remain hypoxic, potentially aspirate and continue to fight, which further exacerbates an increased ICP. Lidocaine has a dose-dependent effect as well and too much lidocaine can be detrimental. While minimal arterial blood pressure changes occur when patients received 1.5 mg/kg of lidocaine prior to neurosurgery, significant blood pressure declines occur when the dose is increased to 2 mg/kg. 

**The Bottom Line**

Backboards have no proven benefit for the trauma patient and can be harmful by compromising a patient’s ventilations, placing them at risk for pressure ulcers and delaying transport to definitive care. That being said, spinal motion restriction in trauma patients is good practice.

**Myth #4: Trendelenburg Position**

The myth explained: During the early part of the 20th century American physiologist Walter Cannon suggested the head-down-legs-up position pioneered by German surgeon Friedrich Trendelenburg could, in theory, displace blood from the lower extremities during hemorrhagic shock to enhance venous return to central circulation. The original Trendelenburg position was intended to permit an improved field of vision during abdominal surgery by displacing its contents cephalad and was never designed for blood pressure changes.

**The Evidence**

The 2010 American Heart Association First Aid guidelines clearly state all recommendations on the use of Trendelenburg position are extrapolated from volume expansion studies and there is no direct evidence to its benefit in shock. Currently, the AHA guidelines recommend keeping patients supine rather than having their legs elevated.

**The Myth Explained**

Lidocaine is not proven to prevent a rise in ICP during RSI. While it may not directly harm patients, its administration does delay the completion of RSI, which puts the patient at risk for continued hypoxia.

**Myth #3: Backboards are Helpful**

The myth explained: Every year, as many as 5 million patients are immobilized with a cervical collar and backboard using the same techniques that have been taught in EMS classes for over 30 years. Three small straps are used to secure a human chest and hips to a flat rigid board and head blocks then prevent head movement. This, in theory, was meant to prevent patient movement and further injury and reduce morbidity.

**The Evidence**

In any population studied, the frequency of spine injury is low. In multi-system trauma patients, rates of spine column injury range between 2%–5%, while cord injury occurs in less than 2% of patients. In minor incidents, such as falls and motor vehicle collisions with restraint use, rates are as low as 1.2%. Thus, it is well understood that the majority of the time patients are immobilized there is no actual injury that the immobilization is theoretically stabilizing. This is one of the many reasons the American College of Surgeons ATLS course textbook recommends patients be removed from a backboard as quickly as possible, and maritime researchers have published their 2014 paper demonstrating our current approach to immobilization does not help the overall population and provided evidence that limiting any spine immobilization to patients who cannot pass a spine examination, and then using immobilization strategies that avoid the long spine board, reduces unnecessary immobilizations and increases patient comfort.

One of the most significant reviews of backboard use was the 2013 joint position paper from the National Association of EMS Physicians and the American College of Surgeons Committee on Trauma, which stated there is no proven benefit to rigid spine immobilization. This paper went on to discuss that immobilization can cause pain, patient agitation, respiratory compromise and decreased tissue perfusion where the patient’s skin presses against the board, which can potentially cause pressure ulcers. It is also known that in healthy patients, full spine immobilization has been shown to cause saeral tissue ischemia capable of producing a pressure ulcer within 30 minutes of longboard application. Further, immobilization causes a significant enough increase in pain that neurological exams become less reliable when the patient remains immobilized.

In the same paper, the NAEMS identified that patients with penetrating trauma to the head, neck and torso without spine deficit do not need immobilization and that immobilization actually causes a delay in transport that can be significant enough to increase patient morbidity and mortality. Further, even when performed properly, backboards do not provide any additional benefit. When patients in two large trauma systems were compared—one in New Mexico, where prehospital immobilization occurred, and the other in Malaysia, where no prehospital immobilization occurred—there was no difference in neurological disability between the patient groups. The authors determined that in blunt spinal injuries immobilization has little to no benefit on patient outcomes.
Myth #5: Patient Extrication with the KED Prevents Spine Movement

The myth explained: Following major motor vehicle collisions, prehospital providers are taught that a patient should remain still within the vehicle and allow properly trained rescuers to control their movements to remove the patient from their vehicle and place them on a long backboard. Prehospital providers are taught several techniques, ranging from rapid extraction to application of a Kendrick Extrication Device (KED). We’re literally taught the patients may kill themselves if they move on their own with an unrecognized spine injury.

The Evidence

In 2009, Jeffery Shafer and Rosanne Naunheim teamed up to compare the differences in spine motion when patients remove themselves from a severely damaged vehicle compared to when the patient is removed with assistance from prehospital professionals. Using motion tracking cameras and strategically placed sensors on their volunteer patients, these authors performed four tests: self-extrication with and without a cervical collar, and extraction by rescuers directly onto a long spineboard, and via KED. In each test the spine motion was recorded for both the overall change from start to finish as well as the range of motion. Self-extrication without a cervical collar produced an average change of 8.7 degrees of motion (standard deviation 11.9°) in the cervical spine with a range of motion over 33°; the application of a cervical collar reduced the overall change to 1.4° (SD 4°) with a range of motion of 6.4°. Standard extraction onto a longboard produced an average of 1° (SD 4.5°); however, the range of motion was 26.6°, and when a KED was used to assist with extraction the patient’s mean overall change was 2° (SD 2.3°) with a range of motion of 31.1°.

Because of this study the authors concluded patient manipulation to apply a KED and slide them onto a longboard directly from a vehicle causes more spine motion than does applying a cervical collar and allowing the patient to extricate themselves and walk to a stretcher. A similar study was repeated by Jack Engberg and his colleagues and published in the Journal of Emergency Medicine in 2013. These researchers found the application of a KED during the extraction process causes more spine motion than assisted extrication directly onto a spineboard and compared to a patient self-extricating after a cervical collar is applied.2

The Bottom Line

The KED increases spinal column motion during the extraction process; alternative methods of extraction need to be considered and explored.

Myth #6: Never Remove a Dressing from a Bleeding Wound; When It Bleeds Through Just Add on More Dressings

The myth explained: Every major first aid resource says to apply a dressing on any uncontrolled hemorrhage, and if it soaks with blood to add more dressings on top of the original but not remove the blood-soaked dressing. The claim is removal of the original dressing may disrupt clots that are forming, causing the patient to continue to bleed.

The Evidence

To start addressing this myth it’s important to understand the basics of hemostasis, the process through which clots form. When an injury to a blood vessel occurs, collagen and von Willebrand factors (vWF) are exposed and promote platelets to attach to the wounded surface. As platelet aggregation occurs, a plug develops which stops the bleeding. Platelet aggregation occurs along human tissue. Once a platelet plug occurs and hemorrhage stops, a fibrin mesh begins to form that stabilizes the clot and strengthens it.

When a dressing is applied to a wound, the goal is to stop the bleeding. This is suc- cessful as of 95% of the blood loss is from vessels within the injury. The key to well-aimed direct pressure is to apply adequate pressure into the injured tissue and on the injured vessel. When pressure is applied generally around the wound there is typically inade- quate pressure to stop the hemorrhage. Well-aimed direct pressure means target- ing the pressure directly into the hemor- rhaging tissue.

There is not one clinical trial that dem- onstrates removing a blood-soaked dress- ing will cause clot removal or cause the clotting process to start over. When large bulky dressings are applied over hemor- rhage sites it becomes very difficult to apply well-aimed direct pressure into the wound and as a result more generalized pressure around the injury occurs. At this point, the dressing becomes a source for collecting the lost blood and is actually doing very little to control hemorrhage.

Dressings that quickly become saturated with blood are an indication adequate pres- sure has not been applied to the bleeding site. Simply adding more dressings on top of the original but not remove the blood-soaked dressing. The claim is removal of the original dressing may disrupt clots that are forming, causing the patient to continue to bleed.

The Evidence

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FOCUS ON DETERMINING WHETHER OR NOT YOU HAVE THE TOOLS TO STABILIZE A PATIENT.

One subgroup proved the exception in Newgard, et al. Patients who presented in hemorrhagic shock during prehospital care and required emergent trauma center intervention did have better 28-day mortality when they arrived at a trauma center within 60 minutes. The same outcome improvement was not noted in head injured patients.

These two papers have come out challenging the golden hour since a 2001 literature review could find no clinical evidence for the instruction of the concept.21 A recent Cochrane review determined MAST do not improve patient outcomes. This is because MAST have no impact on blood flow proximal to the renal arteries.22 Finally, a Cochrane review determined MAST do not decrease a patient’s hospital or ICU stay, and they have no impact on patient morbidity or mortality.23

The Bottom Line
MAST likely have no benefit for trauma patients, although there is limited information about patients with long transport times and lower extremity trauma and pelvic fractures. Given the paucity of evidence for any additional benefit, traction splints and pelvic binders appear to be better focused interventions for these injuries.

Summary
Evidence-based medicine will continually change the paradigm in which emergency medicine is practiced. Fifteen years ago tourniquets were a last resort and often considered a guaranteed way to lose a limb; today they are a gold standard in hemorrhage control. Insisting on, and having practiced, medicine we later learn to be false doesn’t make someone a bad provider, nor does it make them wrong. It simply means emergency medicine and EMS will continue to develop as a profession, and our body of evidence will continue to grow as we learn more about prehospital care.

As we prepare to retire MAST, backboards and lidocaine, and realize the golden

en hour as a concept rather than a number, it’s important to keep a critical eye out for the next intervention that truly will help patients during their prehospital care.

REFERENCES
The clattering of helicopter blades cuts through the humid air in a steamy jungle clearing behind enemy lines. On board an injured soldier lies on a stretcher with an IV dripping plasma into his arm. The pilot increases the pitch on the rotor blades and the helicopter rises on its slow journey to a U.S. Army hospital. This scene took place not in Vietnam but in Burma during World War II in 1945. It was one of the first times a helicopter was used to evacuate a wounded soldier from the battlefield.

Twenty years later, similar scenes occurred thousands of times during the Vietnam War. By then, dedicated U.S. Army air ambulance units, using the call sign Dustoff, had been established with the sole job of getting wounded soldiers to surgical hospitals as soon as possible. Almost 900,000 patients were transported by these units by the time U.S. involvement in the war ended. Since then, Dustoff units have accompanied U.S. troops in every major conflict. The success of their operations in Vietnam became the catalyst for the birth of the civilian air ambulance industry in the 1980s.

Army Flight Medic Training

While civilian air ambulances use highly trained nurses and paramedics, training for U.S. Army flight medics consisted of a NREMT EMT-Basic course with IV administration and advanced airway training. In addition, flight medics took Advanced Cardiac Life Support (ACLS), Pediatric Education for Prehospital Professionals (PEPP) and Prehospital Trauma Life Support (PHTLS).

When a unit returns to the U.S. after a tour of combat, they do an after action review (AAR) that lists positive and negative performance. AARs for medical units began to reflect the lack of critical care skills of the flight medics when treating and transporting very sick and severely injured patients. However, without definitive data, the Army would not act on this anecdotal evidence. Nothing was changed until one particular unit served in Afghanistan.

About two-thirds of all U.S. Army air ambulance units are in the Army National Guard or Reserve. Many of the flight medics in these units work as civilian paramedics for fire departments and ambulance services. In 2009, C Company, 1st Battalion of the 160th Aviation Regiment (C-1/168) was deployed to Afghanistan. It was an Army National Guard air ambulance unit with 12 UH-60 Black Hawk helicopters from California and Nevada, augmented with an additional three Black Hawks and crews from the Wyoming National Guard. Almost all of the flight medics were experienced civilian paramedics.

"Our unit developed its own set of protocols for the flight medics while we were being mobilized to go to Afghanistan," explains Steve Park, a former Army flight medic who deployed with C-1/168. At the time, Park was also a paramedic with the Regional EMS Authority in Reno, NV. Today he is a firefighter-paramedic with the North Lake Tahoe Fire Protection District in Nevada.

"Our noncommissioned-officer-in-charge (NCOIC) of the flight medics, Bob Walters, a paramedic with the Sacramento (CA) Metropolitan Fire Department, developed them. They were pretty aggressive, with things like RSI and Solu-Medrol for head injuries. Once in country, they had to be approved by the brigade flight surgeon who was in charge of all the flight medics. She was reluctant to allow this level of care, but Walters presented her with all of our certifications to show we could do this. We wanted to provide this level of care to our patients. We kept on saying that if every person in our home towns deserved paramedic-level care, our soldiers deserved that same level of care. We had to fight for it, and they finally gave us a trial period with our protocols. Once their staff saw what we were capable of, they allowed us to use our own protocols.
“We were really lucky in that one of our helicopter pilots was a pharmacist who also had some prehospital experience. Before we deployed, he taught several classes on some of the meds we were going to use and was available for any questions while we were deployed. “In Afghanistan, we were doing the traditional flight medic job but were also doing critical care transports from the forward surgical teams (FSTs) on 60–90 minute, or longer, flights with multiple medication drips. The FSTs had a couple of surgeons, a couple of nurses and a few operating room techs. The patients were usually flown out within hours of injury by helicopter to a combat support hospital (CSH) in Bagram or Kandahar. The CSH was the Army equivalent of a Level 1 trauma center. The FSTs did the lifesaving surgery to stabilize patients until they could get to the surgeons at the CSH.” In what would later become a key element to show the Army the benefit of paramedic-level training, the flight medics of C-1/168 developed a robust charting system. “We all thought we wouldn’t have to deal with charting in Afghanistan and would just do our medical care,” Park says. “However, our NCOIC, Rob Walters, insisted upon good charting. We wanted to be able to do QR on our missions. We pulled together the best parts of several different charts to make one that met our requirements and conditions. It started out as a paper chart and then became electronic. One of our guys was really good with computers and was able to use an Army system to create an electronic patient care report (PCR). We would do chart reviews of medication usage, medical care, and difficult or challenging patients. It kept us honest. It also stayed in the patient’s record so the receiving medical personnel would have the care documented.” The flight medics in Afghanistan were no longer just treating young soldiers with traumatic injuries. They were treating older patients just out of surgery, on ventilators and with multiple intravenous fluids and medications. They were also transporting patients over great distances and caring for them for up to two hours. Lt. Col. Robert Mabey, MD, was a battalion surgeon for a special forces battalion that was deployed to Afghanistan in 2005. “I was a paramedic before I became an doctor,” Mabey says, “so I knew the level of care in civilian flight programs was very high. That planted a seed that I thought we needed to upgrade the training of the Army flight medics. I went to the doctors in charge of the Army flight medical program and they said there was no evidence there was anything wrong with what we were doing.” I was told about an Army National Guard air ambulance unit that had mostly civilian paramedics for its flight medics. The unit was C-1/168. Using their patient care reports, I developed a study to show the outcome differences when the flight medics were also civilian paramedics. I looked at all the outcomes of the severely injured patients who arrived by helicopter at the large trauma hospitals in Bagram and Kandahar and their survival rate up to 48 hours. “I compared the patient outcomes for the air ambulance unit that served the year before C-1/168, while C-1/168 was in country, and the unit that served after C-1/168 rotated home. The study showed a 66% less chance of dying with the civilian paramedics of C-1/168. That is a big number. I expected maybe a 15% difference, not 66%. This gave the Army the data it needed to make a change in the training levels for flight medics.” Upgraded Training The U.S. Army Medical Corps decided to upgrade the training of all current and new flight medics to NREMT-Paramedic and add a critical care transport EMT-P course as well. The new training program began in 2012 and is broken down into three phases. Each phase corresponds to a civilian level of prehospital training using the U.S. Department of Transportation curriculum. Phase 1 is five weeks at Fort Rucker, AL, home of U.S. Army aviation. The medic leaves as a certified Emergency Medical Technician-Basic. They use UH-60 Black Hawk trainers to practice their skills inside the vehicle they will be using. They also use a special tower for hoist training. Phase 2 is the paramedic training. It is a 27-week course through the University of Texas Health Science Center (UTHSC) in San Antonio, TX. It includes 1,054 hours of training with 200–300 hours of clinical time with real patients. It is taught by civilian instructors. Phase 3 is an eight-week critical care paramedic (CCP) course. The curriculum is based on the University of Maryland, Baltimore CCP program. It consists of three weeks of didactic training at UTHSC and five weeks of clinical time. The students do their clinical time either at UTHSC or Brooke Army Medical Center (BAMC). Rotations include the operating room for airway procedures, various intensive/critical care wards, the burn unit, cardiac catheterization lab, neonatal intensive care unit and pediatric intensive care unit, and obstetrics for delivering babies. This phase emphasizes development of critical thinking skills. The final part of the CCP course integrates how medics fit into the military medical care system with the protocols they will use in theater for patient care. They also include a veterinarian clinic, since they will be caring for injured military working dogs. The challenge for the Army flight medics versus civilian flight medics is the civilians usually have to have 3–5 years of ground ambulance paramedic experience in a high-volume system before they are accepted into a civilian flight paramedic program. The Army medics are going through the training programs back to back. The goal of the CCP section is to expose the Army flight medics to as many critical patients of all types as possible. “We will ramp up to four classes per year,” explains Sergeant First Class George Hildebrandt, noncommissioned officer-in-charge of the CCP program. “Our goal is to produce 232 flight medics per year going through all three phases of training. The National Guard has the largest need, since a majority of air ambulance units are in the Guard.” The biggest challenge for the Guard personnel is to be away from their normal civilian career for 10 months for training. They will often be deployed immediately after the school for another year. So, they could be away from their home and job for two years. We have at least five National Guard and five Army Reserve slots in each course. The goal is to have all current flight medics upgraded by 2017. The Army plans to double the number of flight medics by 2017 to about 1,200.” The Home Station Training Program was established to allow units to send current flight medics to a local civilian paramedic training program to obtain the Phase 2 training. So far it is being used in units in South Dakota and Colorado. This is especially beneficial to National Guard units. The civil program must meet the Army standards and teach the program in the allotted 27-week time frame. The Army then pays for the tuition, fees and books for the program. The National Guard unit then puts the student on order so they get paid while going to school. There is an active duty unit that is sending 11 students through a program in Colorado. The local units find the programs themselves. It is a cost-effective way to train the soldiers and...
keeps them close to home for the longest phase of the training.

“Sustainment is the other side of this coin,” says Mabry. “The first side is training. Once they are trained, we have to be able to keep their skills up. This is going to be one of the big challenges to this program. There are some units that are already making arrangements to train with local civilian air ambulance programs by riding with them on actual missions. In addition, the flight medics could work for civilian EMS agencies on their off-duty time to gain experience and make some extra money for themselves. A lot of the sustainment structure is still being designed.

“What I hope will happen is the Army develops some regional relationships with major medical centers so the flight medics will be able to do ongoing training without going too far from their home station. We also may bring them back to Fort Sam Houston every few years to update their training.”

The Army is also looking at improving documentation as the new flight medics treat patients. The patient’s chart will have all the care provided by the flight medics documented for medical personnel treating the patient hours or days later. It will also help with prehospital research projects, as well as provide quality assurance/quality improvement opportunities for the flight medics.

The U.S. Army Medical Evacuation Proponency Directorate at Fort Rucker, AL, is working on a standard set of Army-wide protocols that will be used by the new flight medics. The local units will have the ability to adjust these protocols based on local conditions and the skill set of the flight medics.

U.S. Army flight medics have a long history of caring for the sick and injured in some of the most difficult circumstances imaginable. The lessons learned from the wars in Iraq and Afghanistan have found their place in civilian emergency medicine, and advanced civilian prehospital care has found a place in the military.

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EMS Advocacy Starts with You

Few things are as professionally important as advocating for what you do. Federal legislators take notice when you travel from their home districts to discuss issues that affect you and their constituents, says Christopher Way, chief officer, Kootenai County EMS System (KCEMSS), Coeur d’Alene, ID.

EMS On The Hill Day is a coordinated opportunity for EMS professionals from all delivery models—volunteer and career—to share their and the EMS community’s vision and current issues/opportunities with their federal legislators. This year’s EMS On The Hill Day is April 29, with a meeting and briefing day preceding the event on April 28.

Way notes very recently the EMS community has really pushed initiatives for making it easier for military and veteran medics to transition to the civilian side of EMS. “This really takes care of two things—it gives veterans who have served their country an opportunity for a career and on the EMS side it helps with recruitment and work force development, which we know is a tremendous issue in our industry.”

Way adds, while attending EMS On The Hill Day is a great opportunity to advocate, it is not the only way. “I would encourage every EMS professional to get to know your local, state and federal legislators. Specific to the federal legislators, most have local, in-district offices you can visit, introduce yourself to the staff and make a connection. Ensure that as EMS-related legislation and issues come up you contact them to make them aware of how the legislation would affect you and your constituents.”

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A Compact Device that Packs a Big Punch

Having one compact device that does the job of multiple other pieces of equipment—and does it well—is sort of like finding the Holy Grail in EMS. No special quest is required, though, to take advantage of all the pNeuton model S transport ventilator from Airon has to offer.

John Logan, director of Community LifeTeam, Inc., a wholly owned subsidiary of Pinnacle Health System, Harrisburg, PA, says his organization began using the pNeuton S several years ago when they were looking for a device that provided CPAP as well as transport ventilation capabilities. What they found in the pNeuton S was an ideal device for prehospital care.

“The quality and simplicity of it was that it could be easily purchased, it came contained in one unit with its own bag and hoses, it was designed to be utilized in an ambulance, the amount of oxygen it utilizes was significantly less than prior devices we had used so it offered cost savings and efficiency, and it was compact, light and required very little teaching time,” Logan explains.

Airon’s pNeuton model S transport ventilator provides adult/pediatric volume or bi-level pressure ventilation and high-performance CPAP in EMS environments. Pure pneumatic technology eliminates the need for batteries. And a choice of 100% or 65% oxygen delivery lets you significantly extend transport times—up to 45 minutes on a D cylinder.

Logan adds, the pNeuton S is ideal for his agency because it fills all of its response needs. “It works in an emergency prehospital setting and a transitionary setting, where if we go to a skilled nursing facility we’re able to utilize this device to take a person who requires full-time ventilatory assistance to the hospital to have other respiratory issues treated and bring them back home. It’s a great device because it met numerous needs of a large urban, suburban service and it also met the needs of our prehospital services that are rural as well.”


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We've eliminated all of that. We don't have to spend more time figuring out if the data we were reporting was integrated healthcare possible.

Instead of every department going out and spending days of a pair of slacks and a polo shirt serving as adequate EMS protective clothing are gone.

The vest’s ballistic soft armor is comprised of withstanding multi-hit capable system of ballistic materials. Each panel can capture projectiles and disperse their energy over the panel’s entire surface, reducing the chances of injury.

For Mark Roberts, data manager for the State of California Emergency Medical Services, the decision to use ImageTrend solutions came down to one simple chest pouch and additional CAT tourniquets with holders mounted externally on the vest. The CEC is a mixed career employee/volunteer department equipped with three ambulances and two staff vehicles. The CEC has adopted these vests in response to increasingly violent incidents in some parts of its 70-square-mile jurisdiction. “EMS is a part of emergency services, and people face the same risks as our police and fire, risks that are an inherent part of the job,” says CEC Assistant Chief Tim Thomas. “The days of a pair of slacks and a polo shirt serving as adequate EMS protective clothing are gone.”

The Rescue Task Force Vest (RTFV) provides its wearers with one of the largest NIJ 0101.06 Level IIIA front/back panel soft armor protection systems available, which is also available with side armor protection. The vest’s ballistic soft armor is comprised of withstanding multi-hit capable system of ballistic materials. Each panel can capture projectiles and disperse their energy over the panel’s entire surface, reducing the chances of injury.

Thomas says his department couldn’t afford to buy individual vests, which is why the RTFV’s ability to fit waistlines up to 60 inches was a real plus, especially because the vests are deployed such that each active EMS officer has access to them while on-duty. He says the RTFVs are lightweight to wear and come with adjustable MOLLE webbing that “allows the wearers to configure them however they want.”

Besides providing enhanced physical protection to CEC’s EMS staff, the RTFVs have boosted staff morale. “Now that we have this equipment, our staff feel that management truly cares about their safety, and have done something substantial to increase it,” says Thomas. “Wearing these vests has also made our EMS staff more aware of their own safety, and better-suited to handle risks.”

Assistant Chief Tim Thomas. “The Rescue Task Force Vests Provide Real Protection to EMS...”

The SWAT-T is an excellent device. I’m aware of multiple cases where application of the SWAT-T by medics, law enforcement and physicians has saved lives in the setting of confirmed arterial injuries. For all of these reasons, I will continue to carry, teach and recommend the SWAT-T....


Finally, Sena notes, “There is no perfect tourniquet. My professional opinion is that the SWAT-T is an excellent device. I’m aware of multiple cases where application of the SWAT-T by medics, law enforcement and physicians has saved lives in the setting of confirmed arterial injuries. For all of these reasons, I will continue to carry, teach and recommend the SWAT-T....

PRODUCT APPLICATIONS

The Quantum ACR Secures the Smallest Patients

Smith says the advantages of the ACR are numerous. It’s simple, small enough to carry on each truck, providers can tighten it down to the stretcher without the device becoming too tight on the child, and it doesn’t hamper the ability of providers to actually get to the child once it’s in place.

“It’s not often that an item comes along that just fits every need, and this was just a no-brainer,” Smith says. “It’s been very beneficial to have one little kit you can go to, that can fit in the cabinet, that you can use to strap a child in.”

Smith has been equally impressed with Quantum EMS. “They sent me samples when I needed them, and they actually wanted my feedback. I appreciated that.” Visit www.quantum-ems.com.

Circle 45 on the Product Information Card

Elk Offers an Uplifting Experience

T he Richmond Ambulance Authority (RAA) of Richmond, VA, was Mangar International’s first U.S. customer, initially equipping its 247 supervisory vehicles with Mangar ELK (Emergency Lifting Cushions).

The ELK is a compact battery-powered pneumatic lifting cushion capable of lifting a 1,000 lb patient with ease. If someone falls over they can shuffle on to the cushion, or be rolled on from the recovery position and assisted to sit upright. The ELK can be inflated at the touch of a button with someone supporting the individual from behind to bring them to a raised seated position, ready to stand. Once the lift is complete, the ELK can be deflated, folded up and stored tidily.

The impact of the new lifting devices was immediate. From first deployment, the reduced strain and effort on the part of the providers was matched by the patient experience in receiving a dignified lift. RAA COO Rob Lawrence notes that, “After a recent patient arrived at RAH-HQ and left a sizable donation because of the way we lifted and expertly handled the individual using the ELK, we knew we had proven the concept of the device. And it is quite simply the right thing to do to ensure our medics go home in one piece, uninjured.”


Circle 46 on the Product Information Card

When you want information on a subject, you seek out the experts. There’s no name more trusted for cutting-edge information on tactical EMS (TEMS) than the Journal of Special Operations Medicine (JSOM).

The JSOM is the only academic, peer-reviewed medical journal dedicated to tactical casualty care and operational medicine. It is published quarterly in both print and digital versions. The mission of the JSOM is to provide operational and tactical medical personnel a professional forum to discuss their unconventional brand of medicine, says W. Patrick Donihoo, NREMT-P, FP-C, MSG, U.S. Army (Ret.), and advertising representative/subscription outreach coordinator for the JSOM.

Donihoo notes the JSOM is the only published venue that brings military SOF, civilian tactical EMS, federal Department of Justice agencies with tactical medical assets, and those with an interest in prehospital emergency medicine in an austere environment together in one forum. “There is much overlap in areas of concern between the aforementioned populations, and the numerous medical lessons learned by MIL SOF—and DoD in general—since 2001 are of benefit to the TEMS community. Likewise, I think it is much to be learned by MIL SOF from its federal and civil counterparts. It is this cross-pollination that is so valuable and you can’t find it anywhere else. Finally, the JSOM is the only publication that in addition to the TCCC guidelines publishes the Committee for Tactical Emergency Casualty Care (C-TECC) and the National TEMS Council quarterly updates.”

Case reports such as “Another Civilian Life Saved by Law Enforcement—Applied Tourniquets” and “Abdominal Aortic and Junctional Tourniquet Controls Hemorrhage from a Gunshot Wound of the Left Groin” are examples of the kind of cutting-edge coverage the JSOM provides its readers, Donihoo says. “In addition to feature articles, we have an ongoing series titled Law Enforcement and Tactical Medicine written by leaders in DOJ/TEMS medical training. The articles relay information that SO medical personnel can implement in real time to provide expert care and treatment.”


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Certification Experimentation
With EMT-P being phased out, what’s a non-nationally registered medic to do?

THIS MIGHT BE JUST ANOTHER MARCH FOR YOU.
For me it marks a big step in my eventual return to civilian life.

Take a look at my box at the end of this column; this is the last time you’ll see NR after my name. The National Registry requires members to be active practitioners—like with protocols and medical direction and stethoscopes. I still have my ears somewhere, but that’s about it. I haven’t treated a patient since 2013.

I thought maybe I could get certified as the EMS World house medic, but my editor says there’s a law against her signing MD after her name. Yup, even in California. I told her she could always say MD stands for Master of Deadlines or Memorized Dictionary—especially in California. She said something about me having an omega-3 deficiency and invited me to do a feature on résumé-writing.

So, I wondered if I could get an EMS job somewhere that doesn’t involve bending, squatting and lifting—or standing after bending, squatting and lifting. A Google search came up with two possibilities: paramedic on a merry-go-round and night-shift medic at a cemetery. If the latter comes with cable and a Barcalounger, I’m interested.

The Registry says EMT-P is being phased out, so I’m wondering what I should call myself after March 31. If I were still registered, it would be NRP, per Registry guidelines for paramedics. Does that mean I’ll be NNRP, as in not nationally registered, after 3/31? Talk about getting off on the wrong foot with people.

I could accentuate the positive and call myself state-registered, or SRP. But sounds like there should be a price for my name. What if I drop the P and make it RP for registered paramedic? Is RP any better than just plain P? Yeah, I know, lots of words starting with P fit me. We’ll go through that list some other time.

I could always settle for Mike Rubin, paramedic. Sounds a little pretentious, though. Even in Hollywood, where embellishment is a way of life, Marcus Welby, Doctor would have been a bit much.

Back to that idea about state registry. I’m still a Tennessee paramedic—I even have a license that says so. The Volunteer State has pretty much bet the ranch I won’t do anything heroic and stupid to patients in the name of Davy Crockett or Alvin York. I appreciate Tennessee’s loyalty and would like to acknowledge its commitment to me by substituting TN for NR, as in TNP. Wherever I go, whatever I do, everyone will know where my medical direction is supposed to be coming from.

Couldn’t all medics who aren’t nationally registered use their state abbreviations followed by P? Right away we’d be identifying our state, our protocols and which side we were on in the 1860s. I bet some of those nationally registered medic-élites would downgrade just so they could be like us, well, maybe not too many. Still, it would be cool to be part of a brand-new trend. I mean newer than community paramedicine.

State abbreviations as prefixes would create some interesting acronyms. For example, Hawaii would be a good place for medics my age to work, not only because of the climate and scenery, but because we’d all finally be HIP. I spent a lot of time trying to be hip in the 60s. I’m not sure I ever made it. I had the Nehru jacket, but the medallion was too heavy and expensive. When the Hollies sang “He ain’t heavy,” they definitely weren’t talking about someone with a medallion. Colorado would be popular with medics who got into EMS only because they failed law-enforcement physicals. There’s something exhilarating about becoming a COP without any training. You’re basically telling the world you’re a freethinker—an individualist not constrained by other people’s rules, except the ones recommending incarceration for police impersonators.

Do they have medics in the Virgin Islands? They must, at least for sunburns and jellyfish stings, right? Well, then we finally have a place where paramedics will get the respect we deserve. I’m talking about priority seating at the swankiest restaurants, free passes to the best shows and courtesy detours around security checkpoints at airports, if they have any airports in the Virgin Islands. Just show your VIP card. And then there’s Rhode Island. I could accentuate the positive and call myself state-registered, or SRP.

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