

# First Responder



April '12 Newsletter

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## The new paradigm is: "Cervical Splinting"

The practice of Cervical Splinting (CS) is replacing conventional cervical spine management procedures at an unprecedented rate. Since research such as the one summarised below has been published, Emergency Medical Services (EMS) across the globe are rethinking their approach to cervical spine injury management.

Up until the last 2 years, there's been little in EMS, more automatic than applying cervical collars to patients with possible neck injuries. Research published in 2010 by the *Journal of Trauma* raised a horrifying prospect that implications in some cases cause more harm in doing this. A research team found that using extrication collars in the presence of severe dissociative neck injuries can result in abnormal separation within the upper cervical spine. On cadaver models with recreated c-spine injuries, collars produced a separation of 7.3 +/- 4.0 mm between C1 and C2.



In the USA, Cervical extrication collars are put on about 15 million times a year to protect the cervical spine in case of a bad injury. It is known that after a person has a bad injury, you can create a secondary injury very easily. Researchers have discovered that the cervical collar, in the case of a really bad injury, not only doesn't protect the spine, but can actually make things a lot worse. The cadaver recreations were based on real cases where researchers cut the bodies' neck ligaments and membranes but left supporting musculature. They then captured images by x-ray, fluoroscopy and/or CT scan before patient with unstable cervical anatomy, this could contribute to secondary injury-or worse.

When people have cervical spinal injuries, the neck by definition is unstable, so as you care for that patient, you need to make sure you move that neck as little as possible. With internal decapitation injuries, contrary to what some may believe, not all patients die before EMS arrive on scene. That makes it important that these are identified in the field, or at least care for these patients is given properly. The types of injuries examined in this research may be fatal in the field. However, fluoroscopy has documented the same effect on a living patient with a high cervical injury, and dissociation need not be complete for additional spinal cord trauma to occur. So the researchers suggest that EMS need to be vigilant about the neck. The difficulty is that severe neck injuries are often accompanied by substantial other trauma. Victims will likely have other injuries that demand providers' attention.

And, more difficult still, if the current methods of c-spine immobilization are suboptimal, then what? What should we use instead?

The purpose of collars is to minimize movement of the head and neck. Hard collars may not do that much better than soft collars and head blocks, as the research team showed, even a correctly sized collar can allow a slight lateral wobble when a board tilts. Providers must also guard against any tendency, when holding stabilization on the head, to unconsciously provide gentle traction. The aim is to try to have and keep the head in a neutral position. Depending on circumstances, there may be half a dozen different ways to do that, but the goal is a neutral position, and not to be distracting.

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Additional research published by the Journal of *Trauma* also found higher mortality in victims of penetrating trauma who were spine-immobilized. Those authors, from Johns Hopkins, advised against the routine use of spinal immobilization for those patients.

With dissociative neck injuries, most mechanisms were blunt, and the Research team wasn't able, in reviewing trauma center records, to find any patients who'd survived them. They did, however, find a handful who experienced otherwise-unexplained hypotension and died. "That was unnerving" stated the researchers. "Now they're wondering if those folks could all have been in neurogenic shock when everybody was looking for sources of hypovolemic shock, which they could never find."



### *Splinting Cervical Injuries in Position*

Patients with potential cervical injuries aren't always found with their head and neck in a neutral position - which is required for the patient to be in when applying a traditional c-collar. What is required, is the capability to splint the patient in the position found, rather than moving an unstable neck. An example could be a patient who fell out of a tree and landed on his shoulders and neck, and he is complaining of severe neck pain. The patient presents with his head turned to the left. He can feel and wiggle his fingers and toes. Without excessive movement you know you will be unable to fit him into a standard collar with his head turned. You now may have to splint the patient as they lie. This may require improvising with rolled up towels and sandbags.



The new option is to utilize products like EmeGear's X-Collar and NexSplint, which can be applied to patients in their position of injury, allowing use on those who are asymmetrical. A study by the University of Pittsburgh's Emergency Responder Human Performance Laboratory found the XCollar more protective against movement in all directions-flexion/ extension, left and right flexion and left and right rotation-on both seated and boarded patients than other collars tested. Another advantage of these new cervical splinting



## New treatment for seizures

Seizures are caused by a disruption in the brain's electrical system, and in most cases they resolve themselves after a minute or so. Roughly 2 percent of Americans have epilepsy, a condition marked by chronic seizures. Some seizures, known as status epilepticus or prolonged seizures, can last several minutes or longer, and they may require drugs to stop them. More than 50,000 people in the United States die from prolonged seizures every year, either from brain damage due to the seizure itself or from accidents related to losing consciousness mid-attack.

Results from a recent study released earlier this year in the USA, have the potential change how seizures are treated by paramedics.

The two-year study, published in the New England Journal of *Medicine*, concluded that a single stab from an auto-injector was more effective in stopping a prolonged seizure than the traditional method of inserting an intravenous line and delivering the drug directly into the bloodstream.

Injecting patients in the thigh with a drug-loaded syringe is a safe and effective way to stop a seizure in an emergency, according to results of a national study, a finding that could pave the way toward making such syringes as widely available as EpiPens used to treat severe allergic reactions.

The U.S. Department of Defense also has taken special interest in the study, because auto-injectors would be much more convenient than IV drug treatment in a large-scale bioterrorism attack involving seizure-inducing nerve gas. "The advantage is you can give it the auto-injection faster," said Dr. Walter Koroshetz, deputy director of the National Institute of Neurological Disorders and Stroke. "If you have 100 people simultaneously seizing, no way can you do all those IVs. But you could just run around and inject everybody for their seizures."

The study, which was funded primarily by the National Institutes of Health, involved 79 hospitals nationwide. More than 4,000 paramedics were trained to participate in the study and 893 patients were treated.

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## **A drug and a placebo**

Every patient was given both the auto-injector shot, usually to the thigh, and an intravenous injection. But in half the cases the auto-injector was filled with a placebo, and in the other half the IV drug was a placebo. Neither patients nor paramedics knew which treatment was the placebo in any given case.

Researchers found that 73 percent of patients who were given the auto-injector drug had stopped seizing by the time they reached the emergency room; 63 percent of patients who got the IV drug were seizure-free. Patients who were given the auto-injector drug were less likely than the IV group to be admitted to the hospital after their seizure.

"This auto-injection should be the new standard of care," said Dr. James Quinn, a professor of surgery and emergency medicine at Stanford who led the study there. "It's great when you can do a study and it's probably going to change how we do things."

Although two different drugs were used in the trial - midazolam for the auto-injector and lorazepam for the intravenous injection - researchers don't believe that the drugs made a difference in how effective the treatments were. Rather, they said, the auto-injectors are simply easier to use. It's much simpler to give a single shot than to try to start an intravenous line on a patient who is actively convulsing, doctors and paramedics said. In the study, 42 patients did not receive the intravenous treatment because the paramedic couldn't start the IV, whereas only five patients didn't receive the auto-injector shot because the syringe malfunctioned. "It takes time to set up an IV. You have to find a vein that's going to be good, you have to isolate the arm and hold it still, you have to clean the arm, you have to insert the needle," said Judy Klofstad, a paramedic with the San Francisco Fire Department who participated in the study. "If you're really good, it can take 2 1/2 minutes." Paramedics took on average just 20 seconds to use the auto-injector, according to the study. "You just hold their thigh down, target it, and it can go right through their clothing, through jeans even," Klofstad said.

Doctors said that because the auto-injection drug causes heavy sedation and can lead to respiratory problems and low blood pressure, more research is needed before the syringes are handed out to patients.

## ResQPOD - The Facts. Does your organisation have it ?

The ResQPOD, or impedance threshold device (ITD), has been the subject of over 50 published animal and clinical studies. In 2011, The Lancet published the first clinical trial demonstrating improved long-term survival following cardiac arrest with device technology. In this study, when the ResQPOD was used in combination with active compression decompression cardiopulmonary resuscitation (ACD-CPR), patients had a 53% improvement in survival to hospital discharge with favorable neurologic outcome, and this survival benefit persisted to one year. An ITD carries a Class II recommendation as a CPR adjunct in the 2010 American Heart Association (AHA) guidelines.

The ResQPOD ITD has been evaluated in 18 clinical trials during both conventional, standard manual CPR and Active Compression Decompression CPR (ACD-CPR).

These studies have shown that the ResQPOD:

1. Improves hemodynamics:
  - ◆ Increased ETCO<sub>2</sub>
  - ◆ Systolic BP during cardiac arrest improved 20 - 97%
  - ◆ Mean coronary perfusion pressure improved 70%
2. Improves short- and/or long-term survival from prehospital cardiac arrest:
  - ◆ Survival to ED admission improved 50 - 71%
  - ◆ Survival to 24 hrs in all patients improved 45 - 68%
  - ◆ ROSC rates improved 31 - 80%
  - ◆ Survival to hospital discharge improved 30 - 98%
  - ◆ Survival to hospital discharge with favorable neurologic outcome improved 38 - 120% ( even in the absence of therapeutic hypothermia)
  - ◆ Six-fold improvement in survival to 90 days with favorable neurologic outcome independent of therapeutic hypothermia
  - ◆ Survival to one year with favorable neurologic outcome improved 49%
  - ◆ Meta-analysis showed more than doubling of favorable neurologic outcome



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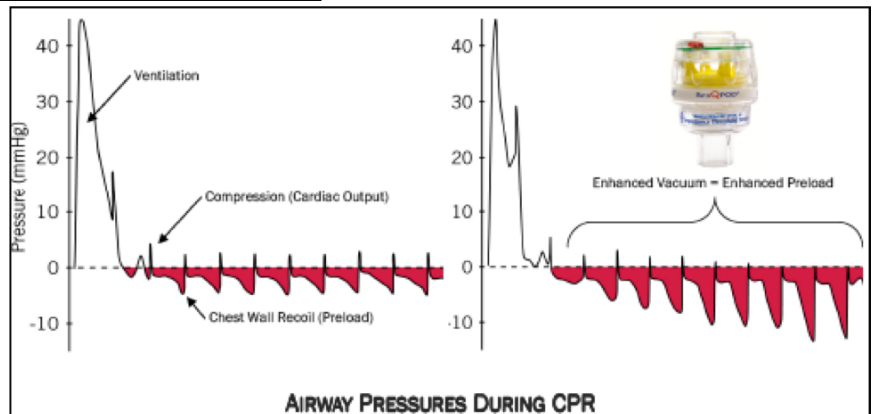
3. Improves short- and/or long-term survival from in-hospital cardiac arrest:
  - ◆ Survival to hospital discharge rates improved 60 - 65% with adoption of AHA guidelines (including an ITD)
4. Provides benefit in non-V-fib cardiac arrest rhythms:
  - ◆ In PEA patients, survival to 24 hrs more than doubled and survival to hospital discharge improved >100%
  - ◆ Survival in patients presenting in asystole tripled
5. Works effectively on a variety of airway adjuncts
6. Is clinically proven and cost-effective

Finally, the best outcomes following cardiac arrest are achieved combining a continuum of care and therapies, not a single drug or device. Advanced Circulatory Systems Inc (ACSI) supports the approach taken by the Take Heart America™ Demonstration Project, which promotes a full spectrum of optimal therapies, including public recognition, widespread CPR training, performance of high - quality CPR with an ITD, and definitive, specialized care at Cardiac Arrest Centers offering state-of-the art post-resuscitation care to optimize neurologic recovery (e.g. therapeutic hypothermia).

In summary the ResQPOD:

- Doubles blood flow to the heart
- Doubles systolic blood pressure
- Increases the likelihood of successful defibrillation
- Circulates drugs more effectively
- Increases blood flow to the brain by 50%
- Increases survival rates
- Provides benefit in all cardiac arrest rhythms

## HEMODYNAMIC EFFECTS OF ResQPOD® ITD



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... increasing blood flow to vital organs

**CPR with ResQPOD®**

... improving venous return (preload) and coronary artery perfusion

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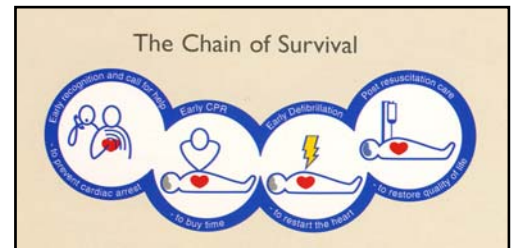
## Defibrillators - A phone call away

A Minneapolis ambulance service making defibrillators a phone call away. An ambulance service based in St. Paul is working with a Florida company to answer the question with a map of all automated external defibrillators in the Twin Cities. With the map and an electronic system for alerting good Samaritans, the emergency call center at Allina Medical Transportation hopes it will be able to quickly dispatch not just ambulances to cardiac arrest patients but also the nearest automated external defibrillator.

The local effort is just one example of how communities coast to coast are using crowd sourcing and other means to develop registries that might harness the public health potential of the devices, called AEDs for short. "This is a way to increase the functionality of the AEDs and make them a community resource," said Dr. Charles Lick, medical director of Allina Medical Transportation. Automated external defibrillators are portable, lightweight devices that can deliver an electric shock through the chest to restart the heart, helping patients stricken by sudden cardiac arrest, a condition that causes death if not treated within minutes.

A patient's survival chance drops by 10 percent with every minute that passes, so emergency medical services are interested in using the thousands of AEDs that are scattered across Minnesota. If a volunteer can get a device to a patient even a few minutes before paramedics arrive, it can make a big difference, Dr. Lick said.

Over the past decade, AEDs have become commonplace in schools, shopping malls, workplaces and other public spaces. Even so, there are cases in which witnesses to cardiac arrests don't know that a machine is nearby and at other times, people with access to a defibrillator don't know of a nearby patient.



Across the country, many are trying to address the information gap. Last year, the fire department in San Ramon, Calif., developed an iPhone app that people in the Bay Area town can use to find the nearest AED in an emergency.

In January, researchers at the University of Pennsylvania took steps toward creating a registry for Philadelphia by asking people to submit photos of AEDs as part of a contest. The participant who uses a contest mobile phone app to submit the most AED photos - tagged with location and other details about machines - could win \$10,000.

Meanwhile, the New York-based nonprofit group iRescu recently concluded its own find-the-AED contest with an awards ceremony on Valentine's Day. The group, hopes to launch this year a mobile phone app in five cities that people can use to find AEDs. Unfortunately most AEDs are not in a database anywhere.



In the Twin Cities, Allina Medical Transportation and an emergency medicine group at the University of Minnesota have opted to develop an AED registry in conjunction with a Florida company called Atrus Inc.

Whereas the California and New York systems are designed for people to call up information about AEDs on their mobile phones, the Atrus program, which goes by the name AED Link, is meant to be a resource for 911 operators. When 911 centers get cardiac arrest calls, AED Link automatically looks to see if a device has been registered within 300 feet of the patient. If so, the system sends a text message or cellphone call to an individual or individuals who have agreed to consider bringing the device to sudden cardiac arrest victims. Whereas registry developers in New York and Pennsylvania are calling on the general public to find AEDs, the Minnesota system is asking the companies, governments, schools and individuals that own the machines to register their devices. Registration gives machine owners free updates from AED Link about when they should replace batteries and electrode pads. There have been reported instances where AEDs have been pulled out and the batteries or electrodes have expired.

When device owners register their AEDs, they identify who should be notified in the case of a nearby emergency and during what hours. People who receive those messages are asked to reply to the 911 center and indicate whether they can respond. There are concerns that if message recipients say they can't respond and a cardiac arrest victim dies, could the owner of the AED be held liable? Atrus CEO stated "I'm not a lawyer, but from what I understand there is no duty to respond." Owners who register also can decline to receive notices; such information, though, could still be useful for communities to strategically place new machines. The service is free to device owners however 911 centers must pay for it. A 911 center covering a city the size of St. Paul - with about 285,000 people - would pay about \$34,000 to use the service for three years. That works out to about 4 cents per person per year. The whole genesis of the system is that entry into pre-hospital cardiac arrest care by a layperson is simply by calling Call 911.

Currently, the Minnesota registry includes about 400 AEDs but there are estimated to be thousands of unregistered devices across the state. Organizers of the University of Pennsylvania registry hope to collect information by the end of this year and share it with local 911 centers. That way, call center operators can guide people phoning in an emergency to the nearest AED.

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Fisch, the company's CEO, questioned whether crowd-sourced registries would quickly capture when AEDs either are relocated or unavailable. A crowd-sourced registry might send people searching for an AED that isn't actually an option, he said, because the doors to a school or workplace may be locked at that time of day. Still, Fisch said there's room for the various registries to work cooperatively. "Our mantra is: You can't get a defibrillator if you don't know where it is," Fisch said.

## The Last Word

### *Ethical guidance on resuscitation - has your organisation given this some thought?*

First Response Australia delivers training to various organisations that are remote from the "urban" Emergency Medical Services (EMS). In many instances Emergency Response personnel have found themselves in the situation of having to apply resuscitation to work colleagues or visitors in their workplace with no support from arriving emergency services as one would have in an urban environment. This has led to them being in the unenviable situation of having to commence and / or continue resuscitation in some instances for what may seem as hopeless and futile situations.

A recent article in the journal *Resuscitation* (Jan. 2012) discusses "Guidance for ambulance personnel on decisions and situations to out-of-hospital CPR". Although this article was aimed at Ambulance personnel, the guiding principles suggested in this article can be adapted to or adopted by organisations that find themselves in situations where the EMS cannot simply "take over" a resuscitation situation. Any policy formation should include all stakeholders such as the local EMS, Emergency Response personnel, management, company medical adviser etc.

Listed below is a summary of the conclusions from that article:

#### **General ethical aspects:**

- \* The overall objective is to restore the patient to a life of (from the viewpoint of the patient) acceptable quality, if this is what the patient wants.
- \* A successful CPR attempt means that the patient can be discharged from hospital with acceptable quality of life and in accordance with his or her will.
- \* Decisions to hold or withdraw CPR must always be based on sufficient information. As a result, it is important to accept that some resuscitation attempts will be subsequently regarded as unethical or unjustified, when further information about the medical condition of a patient prior to the cardiac arrest is obtained.
- \* It is generally beyond the competence of the emergency personnel to assess whether or not a resuscitation attempt is in the patient's best interest, or to determine the kind of death the patient would have preferred. As a result, the views of the members of the emergency team regarding what constitutes a peaceful and dignified death should be used cautiously when guiding the action that should be taken.
- \* There is no relevant ethical difference between not initiating, initiating then subsequently withdrawing CPR from the patient's perspective, as the consequence is basically the same - the patient will die.

#### **The decision making process:**

- \* The general rule is to initiate CPR when confronted by a person with an out-of-hospital cardiac arrest. As a result, when there is the slightest doubt about what is the right thing to do, the active treatment strategy should always be chosen.
- \* An experienced ambulance or emergency services staff member with the appropriate training could be given a mandate to decide not to initiate or to stop a resuscitation attempt in well-defined conditions.
- \* The creation of an organisation in which emergency personnel could easily consult physicians with a particular area of expertise in emergency medicine at the prehospital stage, to obtain support, advice or a second opinion, is recommended.
- \* Family members could be asked if they know, or what they think the patient would have wanted, when it comes to CPR. However, it should be made clear to them that they are not responsible for the final decision. Aspects in the concrete situation. The potential risk of severe cerebral damage for the survivor, as well as the patient's biological age, should be taken into account. However, biological age *per se* should not be used as a single discriminatory factor for treatment decisions related to CPR.
- \* The emergency personnel involved in a resuscitation attempt outside hospital should obtain information about whether or not the patient survived to be discharged from hospital and about his/her mental and physical condition on discharge.

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***Withholding or withdrawing out-of-hospital CPR:***

- \* A decision to withhold or withdraw CPR should be made after weighing the relevant medical facts and ethical Treatment with CPR for an out-of-hospital cardiac arrest can be withheld or withdrawn in an out-of-hospital setting in obvious cases of mortal injury or death (e.g. decapitation, rigor mortis, and decomposition), or when the following criteria are met: the arrest was not witnessed; no bystander CPR was administered; the time between the alarm and the arrival of ambulance exceeded 15 minutes; and the type of arrhythmia recorded by the rescue team is asystole.
- \* Moreover, in cases in which emergency personnel has access to definite and reliable information that the patient with a cardiac arrest is suffering from the end stage of an irreversible medical condition (life expectancy < 6-12 months) and there is a clear written statement (an advance directive) saying that he or she does not want CPR and/or a valid do not resuscitate (DNR) order, treatment with CPR could be withheld or withdrawn in an out-of-hospital setting.

***Caring for those who are close to the patient and/or bystanders:***

- \* Family members should generally be offered the chance to be present during CPR. If they wish to be present, it is important that the personnel provide information about what is happening and take care of them during the procedure.
- \* It could be regarded as ethically defensible for the personnel to continue CPR for a short period time, even though they expect it to be unsuccessful, to show bystanders/family members that they did something good when they initiated CPR and to make them feel that everything that can possible be done to save the patient's life is actually being done.
- \* Before leaving the scene, emergency team members have a professional responsibility to provide emotional support for the people who have lost someone close to them.

*Stay Safe  
Charles Makray*

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Reardon et al. The Sarin Gas Attacks on the Tokyo Subway // 10 years later / lessons learned Journal of Traumatology (June 2008)

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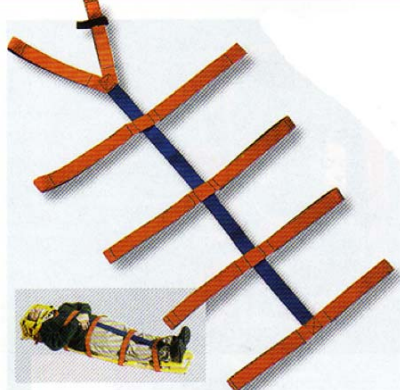
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**QuikClot Advanced Clotting Sponge:**

- ★ QuikClot@1st Response acts as a selective molecular sponge.
- ★ It is biologically inert, inorganic, and traps water molecules by hydrogen bond formation in a molecular cage.
- ★ QuikClot@causes rapid localized coagulation and the formation of a stable blood clot in a variety of wounds.
- ★ It does not absorb into the body, and is safe to leave in the wound until further medical care is available.
- ★ QuikClot@controls bleeding faster than conventional methods.

**QuikClot Advanced Clotting Sponge:**

Supplied in 1 box of 5 x 25g sachets  
Normally \$82.35 (GST exclusive)  
Now only \$ 75.00 ea.(GST exclusive)