Cardiology


- **Reviewer:** Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine
- **Why is this important?:** ECG changes occur during prehospital care that, if ignored, may delay later diagnosis in the emergency department. The prehospital ECG can affect many decisions about patient care.
- **Limitations:** Only half of eligible patients were enrolled in the study, though they still met targets for statistical power. This is a single study from one prehospital system, utilising two academic tertiary EDs.

Cardiac Arrest / Resuscitation


- **Reviewer:** Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine
- **Why is this important?:** This trial adds to the body of evidence showing no benefit for the use of mechanical CPR devices in a general cardiac arrest population.
- **Limitations:** There may be several reasons that these data suggest mechanical CPR has no patient oriented benefit. First, maybe the subgroup that would benefit has not been identified - e.g. patients requiring extended moving down stairs, etc. Second, for many patients the emergency department has no additional interventions compared to prehospital care. This may change, however, as hospitals adopt ED ECMO protocols to bridge patients to definitive interventions. Lastly, providers received additional training and emphasis on providing quality manual CPR during the trial period. It is possible that manual CPR during the trial period was higher quality than normal. On a final note, while there is not a patient oriented outcome, perhaps there is a provider oriented one. Are providers less likely to be injured while moving, lifting, and transporting a patient with mechanical CPR?


- **Reviewer:** Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine
- **Why is this important?:** Prehospital providers have been quick to implement post-arrest cooling. As it turns out, this may do more harm than good. Cooled patients re-arrest more, and don’t come out neurologically intact.
- **Limitations:** About 20% of eligible patients were not enrolled. This may create bias in the results - e.g. providers were too busy to follow study protocol with sicker patients.

- **Reviewer:** Minh Le Cong, Assistant professor in Retrieval medicine, Royal Flying Doctor Service, Australia.
- **Why is this important?:** This prehospital and ED focussed study demonstrates impressive survival from out of hospital cardiac arrest with excellent neurologic outcomes using aggressive prehospital resuscitation and ED initiated ECMO. The use of mechanical CPR and prehospital cooling in a protocolised manner blended with early ECMO appears to point to the future path for OHCA care.
- **Limitations:** Pilot observational study, non randomised. Single centre so results not generalisable. Difficult to know if conventional treatment would have produced similar results.


- **Reviewer:** Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine
- **Why is this important?:** More evidence that epinephrine doesn’t help during out-of-hospital cardiac arrest.
- **Limitations:** This was an observational study from a Paris, France system that utilises pre-hospital physicians. Because of its observational design, this study does not establish causation. The use of epinephrine, and other practise patterns may vary from other systems, limiting the external validity of this study.


- **Reviewer:** Justin Benoit, MD, University of Cincinnati
- **Why is this important?:** More evidence that high-quality CPR is critical after out-of-hospital cardiac arrest. This should be top of the QA/QI list for medical directors.
- **Limitations:** Observational study, but confounding/bias less likely here.


- **Reviewer:** Justin Benoit, MD, University of Cincinnati
- **Why is this important?:** BLS units have clear guidelines on when further efforts after out-of-hospital cardiac arrest are futile. This would save the US healthcare system $50-500 million/year. This study shows it can and should be implemented. There’s no excuse!
- **Limitations:** Since this was a TOR rule for EMT-B’s, any differences in EMS systems would have minimal effect on external validity. The implementation was done in Canada, where medical-legal risks are different.

Reviewer: Justin Benoit, MD, University of Cincinnati

Why is this important?: An RCT demonstrates efficacy, but does it work in the real world? This showed that real world statewide implementation of best practices after cardiac arrest (early PCI, hypothermia) improves outcomes. Do it! There is no excuse!

Limitations: It doesn't actually show that “regionalization” itself improved outcomes.

Ultrasound


Reviewer: Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine

Why is this important?: Ultrasound has rapidly become the standard of care for assessing the trauma patient. The logical extension is to make this assessment prehospital. This papers examined how accurately providers can perform eFAST, cardiac, and lung exams after 1 day of training, 6 internet training modules, and some proctored ED scans.

Limitations: The crew configuration in this study was RN/Medic, making it difficult to extrapolate to crews that utilise physicians or RN/RN. The study also looked at diagnostic accuracy rather than any patient oriented outcome.

Trauma


Reviewer: Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine

Why is this important?: For a long time, torniquetes were considered a last resort in haemorrhage control, but in recent years have become a first line treatment. This study speaks to the efficacy of torniquetes in the prehospital setting.

Limitations: This is an observational paper. Patients who died before hospital arrival were not part of the data set, creating a large potential for survivor bias. This is from US military data (healthy, non-obese, young, adult men), so the conclusions may not hold up in a more heterogenous civilian population.


Reviewer: Mike Steuerwald, M.D., University of Cincinnati

Why is this important?: The aim of this study was to evaluate the association between prehospital red-blood cell transfusion and outcomes in severely injured patients. Findings included a lower risk of 24-hour mortality, 30-day mortality, and coagulopathy in the patients receiving prehospital RBCs. This is the first study to demonstrate these associations in a civilian population.

Limitations: This is a secondary analysis of a cohort study not designed to address this specific question. Identification of mode-of-transportation to hospital (i.e. GEMS vs HEMS) was not included.

- **Reviewer:** Rob Bryant MD. Utah Emergency Physicians, Salt Lake City, UT

- **Why is this important?** This is a retrospective review of prospectively collected airway registry data evaluating the impact of Nasal Cannula apneic oxygenation on the incidence of peri-intubation hypoxemia (Sat<93% at any time during induction of anesthesia and intubation, regardless of any pre-existing hypoxemia). In 728 Intubations, (310 pre, 418 post introduction of apneic oxygenation) the incidence of peri-intubation hypoxemia dropped from 22.6 to 16.5% with the use of apneic oxygenation.

- **Limitations:** Retrospective study of registry data. Study suggests an association between apneic oxygenation and decreased hypoxemia. A higher cutoff for hypoxemia was used than in other HEMS studies, giving a higher pre and post intervention incidence of hypoxemia.


- **Reviewer:** Mike Steuerwald, M.D., University of Cincinnati

- **Why is this important?** The primary aim of this study was to compare paramedic intubation success rates between two different video laryngoscope systems. This particular trial is notable as the authors chose to compare an indirect, hyper-curved video system (KV) to a standard geometry video system capable of both direct and indirect visualization strategies (C-MAC with Mac 4 blade loaded).

- **Limitations:** Several limitations exist. Most notably, no information was given about the training provided. I would like to know exactly how the providers were trained to use the standard geometry blades. The authors conclude that this device functioned poorer than historical DL, which is interesting considering the C-Mac Mac 4 is a very capable direct laryngoscope.


- **Reviewer:** Mike Steuerwald, M.D., University of Cincinnati

- **Why is this important?** The primary aim of this study was to compare standard open surgical cricothyroidotomy with cricothyroidotomy facilitated by the CricKey device. The CricKey was faster to insert and demonstrated a trend towards increased first attempt success.

- **Limitations:** This was a cadaver-based trial without any bleeding in the model (simulated or otherwise). The study also remarked that the cadavers had easily discernible neck anatomy.


- **Reviewer:** Justin Benoit, MD, University of Cincinnati
Why is this important?: Our current understanding of airway management during out of hospital cardiac arrest is bag-valve mask > endotracheal intubation > supraglottic airways. This US based study mirrors data from Japan (Hasegawa 2013).

Limitations: Observational study. Results could be confounded by indication - i.e. less sick patients got only BVM.

Other


Reviewer: Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine

Why is this important?: Hand hygiene is critical for patient and provider health. This study demonstrated that prehospital providers may be a vector for passing pathogenic microorganism. Further, many providers do not follow proper hygiene guidelines.

Limitations: This study used a small convenience sample for cultures, presumably from the same region. Hand hygiene practice data were collected by survey.


Reviewer: Minh Le Cong, Assistant professor in Retrieval medicine, Royal Flying Doctor Service, Australia.

Why is this important?: This prehospital study adds to the growing evidence base for use of ketamine to manage acute agitation in the prehospital setting. It demonstrates a reasonable safety profile and good rapid sedation. The use of a protocolised method of acute agitation management with sedation demonstrates the feasibility and adequacy of a standardised approach.

Limitations: Retrospective study, non randomised with likely selection bias. Single service so results not generalisable. Difficult to know if conventional treatment would have produced similar results.


Reviewer: Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine

Why is this important?: Flight EMS is a valuable resource that should only be deployed in appropriate settings. This study suggests that mechanism of injury is the least accurate criteria and has the highest overtriage rate. Paramedics using a phone to interrogate callers had similar accuracy to ground crew requests.

Limitations: Retrospective, single system studied.


Reviewer: Mat Goebel, NREMT-P, MS1, UC San Diego School of Medicine

Why is this important?: The utility of flying patients is often debated. This observational study compared patients who were flown to those who went by ground ALS. Though flight patients arrived faster, they didn’t do better, suggesting that the level of care is more important than mode of transport.

Limitations: Retrospective design, single centre study.