Emerging Science in EMS

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Objectives:

• Learn basic skills to gather and review evidence-based literature
• Practice critical-thinking skills based on the analysis of research
• Evaluate how evidence-based literature might become evidence-based practice in EMS
Evidence-based, why?

“Data-driven, evidence-based EMS systems can promote improved quality of patient care.”

(NHTSA, 2017, n.p.)
National EMS Research Agenda

“With this document, we are seeking support for **elevating the science of EMS and prehospital care to the next level.** It is essential that we examine innovative ways to deliver prehospital care. Strategies to **protect the safety of both the patient and the public safety worker** must be devised and tested. There are many questions that remain to be asked, many practices to be evaluated, and many procedures to be improved. **Research is the key to obtaining the answers.**” (NHTSA, 2001, p.4)
Disclaimer:

This is a recruitment pitch:


2. Proposal: Annual statewide research summit where small workgroups develop Alaska-specific research questions and access existing databases to gather data, develop and abstract on their findings and present the results (a “poster”) during symposium.
Let’s get down to it...

• Research (or the lack thereof) we’ll review today-
  • BLS versus ALS
  • RLS
  • Epinephrine (good or bad?)
  • HUP CPR
  • NTG in Inferior MI
Prachi Sanghavi

Is Doing More, Doing Better?
Basic vs. Advanced Life Support Ambulances for Out-of-Hospital Medical Emergencies

Interfaculty Initiative in Health Policy

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**BLS vs ALS**


**Outcomes of Basic Versus Advanced Life Support for Out-of-Hospital Medical Emergencies.**

*Sanghavi P, Jena AB, Newhouse JP, Zaslavsky AM.*

**Abstract**

**BACKGROUND:**

Most Medicare patients seeking emergency medical transport are treated by ambulance providers trained in advanced life support (ALS). Evidence supporting the superiority of ALS over basic life support (BLS) is limited, but some studies suggest ALS may harm patients.

**OBJECTIVE:**

To compare outcomes after ALS and BLS in out-of-hospital medical emergencies.
BLS vs ALS

1. What impact could this evidence have on EMS systems?
2. How might this data change the practice of EMS in Alaska?
3. What further questions does this research raise?
Red Lights and Siren(RLS)

“A review of the literature on emergency response reveals a consensus among authors that certain procedures, such as early defibrillation and application of CPR, correlate with improved survival.¹ However, today there doesn't appear to be a correlation between a response time standard of eight minutes and 59 seconds and improved survival.”

(Isaacs, 2017, n.p.)
RLS

• “Personnel trained in an RLS protocol were 5.6 times less likely to transport RLS. Interestingly enough, although the group trained on RLS protocol transported far less (vs. a similar service that did not), there was no impact on patient outcome.” (Merlin, 2012, p. 524)

• “In a survey of more than 230,000 EMS personnel through the National Registry of EMTs, 7% reported having been in a crash, and 100% of these crashes were while using RLS. Surprisingly, weather was not a factor in any of these crashes.” (Heick, 2009, p.963)
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Epinephrine

“During the third or "metabolic" phase of cardiac arrest, continuing dosages of EPI appear to be associated with a worse neurologic outcome in survivors. Continued accumulating dosages of EPI produce impaired oxygen utilization, increased myocardial oxygen demand, myocardial and cerebral ischemia, dysrhythmias, impaired lactate clearance, and a prothrombotic state.” (Callaway, 2012, p. 1198)
Epinephrine

“In summary, the data suggest that the benefits of EPI are likely to be optimal in the first 10 minutes after cardiac arrest, and EPI may be detrimental beyond that timeframe.... It's time to put the "backboard of cardiac arrest" aside. It's time to start making more intelligent decisions about how to care for victims of cardiac arrest and use EPI in a more sensible way instead of being strapped to dogmatic longstanding protocols that are bereft of good evidence.”
Epinephrine

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Epinephrine

- Epinephrine use and outcomes in anaphylaxis patients transported by emergency medical services.
- Manivannan V1, Hyde RJ1, Hankins DG1, Bellolio MF1, Fedko MG1, Decker WW1, Campbell RL2.
- Author information
- Abstract
- BACKGROUND:
  - Anaphylaxis is a potentially life-threatening allergic reaction that may require emergency medical system (EMS) transport. Fatal anaphylaxis is associated with delayed epinephrine administration. Patient outcome data to assess appropriateness of EMS epinephrine administration are sparse.
- OBJECTIVES:
  - The objectives of this study are to (1) determine the frequency of epinephrine administration in EMS-transported patients with allergic complaints, (2) identify predictors of epinephrine administration, and (3) determine frequency of emergency department (ED) epinephrine administration after EMS transport.
Epinephrine

**Conclusion:** Low rates of epinephrine administration were observed. The association of EMS administration of epinephrine with respiratory symptoms, fulfillment of anaphylaxis diagnostic criteria, and low rate of additional epinephrine administration in the ED suggest that ALS EMS administered epinephrine based on symptom severity. Additional studies of EMS anaphylaxis management including ED management and outcomes are needed.
Epinephrine

“In pediatric patients who met criteria for anaphylaxis and the use of epinephrine, only 54% received epinephrine and the overwhelming majority received it prior to EMS arrival. EMS personnel may not be treating anaphylaxis appropriately with epinephrine.” (Carillo, 2015, n.p.)
Epinephrine

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HUP CPR
• The Effect of Head Up Cardiopulmonary Resuscitation on Cerebral and Systemic Hemodynamics.
• Ryu HH1, Moore JC2, Yannopoulos D3, Lick M4, McKnite S5, Shin SD6, Kim TY7, Metzger A8, Rees J9, Tsangaris A10, Debaty G11, Lurie KG12.
• Author information

• Abstract

• AIM:

  • Chest compressions during cardiopulmonary resuscitation (CPR) increase arterial and venous pressures, delivering simultaneous bidirectional high-pressure compression waves to the brain. We hypothesized that this may be detrimental and could be partially overcome by elevation of the head during CPR.
Conclusion: The HUP position in both C-CPR and ACD+ITD CPR significantly improved CerPP. This simple maneuver has the potential to improve neurological outcomes after cardiac arrest.
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NTG in Inferior AMI


Prehospital Nitroglycerin Safety in Inferior ST Elevation Myocardial Infarction.

Robichaud L, Ross D, Proulx MH, Légaré S, Vacon C, Xue X, Segal E.

Abstract

• Patients with inferior ST elevation myocardial infarction (STEMI), associated with right ventricular infarction, are thought to be at higher risk of developing hypotension when administered nitroglycerin (NTG).
NTG in Inferior AMI

**Conclusion:** NTG administration to patients with chest pain and inferior STEMI on their computer-interpreted electrocardiogram is not associated with a higher rate of hypotension compared to patients with STEMI in other territories. Computer interpretation of inferior STEMI cannot be used as the sole predictor for patients who may be at higher risk for hypotension following NTG administration.
NTG in Inferior AMI

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Thank You!

Please email dwallace6@alaska.edu if you are interested in either State-wide Quarterly Literature Review CME or Annual EMS Research Summit.
Sources:


Sources:


Callaway CW. Questioning the use of epinephrine to treat cardiac arrest. *JAMA.* 2012;307:1198-1199.
