Research Perspective on Controversies In Prehospital Care

Christopher Fischer, MD

Beth Israel Deaconess Medical Center
Harvard Affiliated Emergency Medicine Residency
Boston, MA
Introduction

• What is Research?
• Why Do Research?
• Research In Prehospital Care
• Examples of Controversies in Prehospital Care
• Review of Relevant Research
Why Do Research?

• Determine what is possible
• Determine what is necessary
• Determine what is best practice
• Support expanding scope of practice
• Debunk myths
Research In Prehospital Care

1973 - 2000

1974 -
Types of Research

- Case Reports
- Retrospective Review
- Prospective Review
  - Randomized
  - Blinded, Double-blinded
- Review
- Meta-analysis
Controversies in Prehospital Care

- Airway Management in Brain Injured Patients
- Prehospital Acquisition and Interpretation ECG for STEMI
Intubation in Brain Injury
Background

Out of Hospital Endotracheal Intubation and Outcome After Traumatic Brain Injury
– Wang HE, Peitzman AB, et al
– University of Pittsburgh

Annals of Emergency Medicine
November 2004
Intubation in Brain Injury

Background

• Controversy about effect of out-of-hospital intubation in traumatic brain injury
  – Improved survival vs. worse survival

• Role of RSI in prehospital setting vs. “conservative” management
Intubation in Brain Injury Research

- Different approaches to performing research in the pre-hospital setting
  - Retrospective
  - Prospective
  - Randomized
Intubation in Brain Injury
Methods

• Retrospective analysis

• Pennsylvania Trauma Outcome Study
Intubation in Brain Injury

Inclusion

• Age >= 18
• January 2000 – December 2002
• Abbreviated Injury Scale >3
  – “serious”, “severe”, “critical”, “unsurvivable”
• Transported by ALS
• Intubated by EMS or in ED
Intubation in Brain Injury
Outcome Measures

• Mortality

• Neurologic Outcome
  – Inferred from discharge diagnosis

• Functional Outcome
  – Feeding, locomotion, expression, transfer mobility, social interaction
Intubation in Brain Injury
Data Analysis

• Covariates to adjust for severity of clinical presentation
  – Age, gender
  – Head/neck AIS, Injury Severity Score
  – Admission systolic blood pressure
  – Mechanism of injury
  – Mode of transport
  – +/− neuromuscular blocking agent
  – Propensity score
Intubation in Brain Injury

Results

• Overall unadjusted mortality 37%

• Prehospital Group
  – Slightly younger
  – Slightly lower SBP
  – More severely injured
Intubation in Brain Injury

Results

• “Out-of-hospital endotracheal intubation patients had a more than three-fold odds of mortality after adjustment for the potential confounders (OR 3.99, 95% CI 3.21 - 4.93)”

• Increased odds or poor neurologic outcome (OR 1.61)

• Increased odds of moderate or severe functional impairment (OR 1.92)
Intubation in Brain Injury

Conclusion

“Out-of-hospital endotracheal intubation was associated with adverse outcomes after severe traumatic brain injury. The implications for current clinical care remain undefined.”
Intubation in Brain Injury

Discussion

• Regression and adjusting for confounders

• Why worse outcomes?

• What next?
Prehospital ECG for STEMI

Background

Reduction in treatment delay by paramedic ECG diagnosis of myocardial infarction with direct CCU admission

– Millar-Craig MW, Joy AV et al
– Derbyshire Royal Infirmary NHS Trust, Derby, England

Heart
November 1997
Prehospital ECG for STEMI

**Background**

- Thrombolysis or PCI has proven benefit

- Benefit is time-dependent
Prehospital ECG for STEMI

**Background**

ACC/AHA STEMI Guidelines 2004–Executive Summary

Journal of American Cardiology 2004; 44(3): 676

**Goals†**

- **Patient**
  - 5 min after symptom onset

- **Dispatch**
  - 1 min

- **EMS on scene**
  - Within 8 min

- **EMS transport**
  - Prehospital fibrinolysis: EMS-to-needle within 30 min
  - EMS transport: EMS-to-balloon within 90 min
  - Patient self-transport: Hospital Door-to-balloon within 90 min

**Total ischemic time:** Within 120 min†

*Golden Hour = First 60 minutes*

ACC/AHA STEMI Guidelines 2004–Executive Summary
Journal of American Cardiology 2004; 44(3): 676

Beth Israel Deaconess Medical Center
Prehospital ECG for STEMI

Methods/Inclusion

• ALS providers given instruction in ECG acquisition and interpretation
• Phased implementation
• All patients with suspected MI
• Direct admission to CCU for suspected STEMI at the discretion of the paramedic
Prehospital ECG for STEMI

Results

162 ECGs at site of 999

124 Admitted direct to CCU

65 Thrombolysis

5 Not MI

5 MI

59 No thrombolysis

48 Not MI

11 MI

38 Admitted to A&E

37 Not MI

1 MI
Prehospital ECG for STEMI

Results

[Bar chart showing time intervals for different phases of STEMI treatment, comparing Phase I and Phase II.]
Prehospital ECG for STEMI

Conclusion

“Interval duration between a patient calling the emergency services and subsequently receiving thrombolytic treatment after ECG confirmation of myocardial infarction may be reduced by the provision of a specially trained paramedic service.”
Prehospital ECG for STEMI Discussion

- What next?
- Prehospital thrombolytics?
- “STEMI Code” initiated by EMS?
References