Impact of the Implementation of a Critically Ill Patient Bundle of Care on the Performance of Key Medical interventions for Respiratory Distress Patients by Paramedics in the Field

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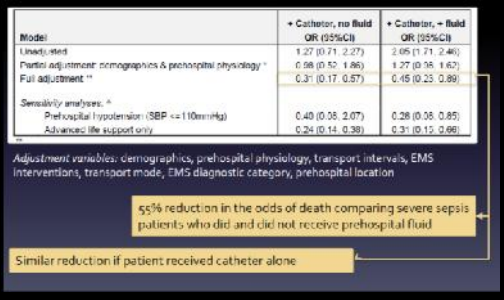
Disclosures

- None

Background

- Bundles of care have been advocated as a processed based system to improve patient care and outcomes using evidenced based guidelines.
- For prehospital patients with specific medical (non-traumatic) conditions execution of key, evidenced based interventions in the field by EMS providers is associated with reduced mortality.

Impact for prehospital intervention for Sepsis



Model	+ Catheter, no fluid OR (95%CI)	+ Catheter, + fluid OR (95%CI)
Unadjusted	1.27 (0.71, 2.27)	2.05 (1.71, 2.46)
Partial adjustment: demographics & prehospital physiology *	0.98 (0.52, 1.86)	1.27 (0.95, 1.62)
Full adjustment **	0.31 (0.17, 0.57)	0.45 (0.23, 0.89)
Sensitivity analyses: ^		
Prehospital hypotension (SBP <= 110mmHg)	0.40 (0.08, 2.07)	0.28 (0.06, 0.85)
Advanced life support only	0.24 (0.14, 0.38)	0.31 (0.12, 0.66)

Adjustment variables: demographics, prehospital physiology, transport intervals, EMS interventions, transport mode, EMS diagnostic category, prehospital location

55% reduction in the odds of death comparing severe sepsis patients who did and did not receive prehospital fluid

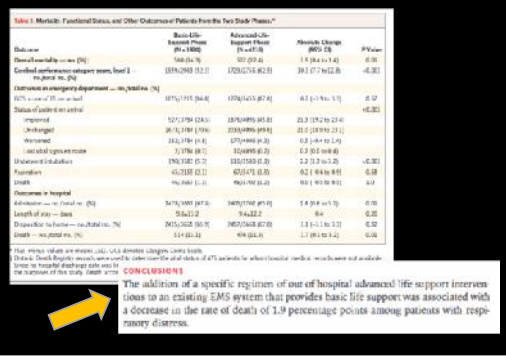
Similar reduction if patient received catheter alone

Seymore, et al., *Ann Emergency Med*. (2012)

Intravenous access during pre-hospital emergency care of non-injured patients: a population-based outcome study

Prehospital Interventions for Respiratory Distress: OPALS Trail

Steill, et al., *New England Journal of Medicine* (2007)



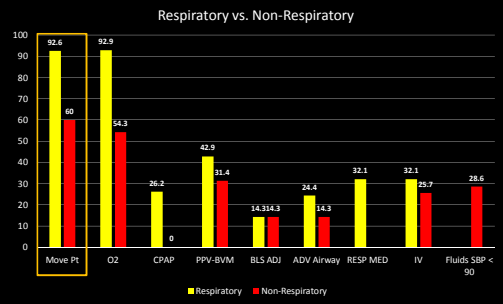
CONCLUSIONS

The addition of a specific regimen of out of hospital advanced life support interventions to an existing EMS system that provides basic life support was associated with a decrease in the rate of death of 1.9 percentage points among patients with respiratory distress.

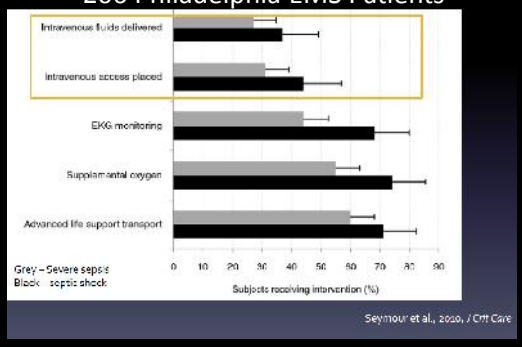
Pittsburgh EMS: 2010-2013

- Failure to accomplish critical interventions for medical patients associated with post EMS contact cardiac arrest
  - Respiratory Distress
  - Altered Mental Status
  - Medical Shock
  - Cardiac
- Mean time from EMS contact to arrest = 16.03 minutes

Documented Interventions Prior to Arrest



Interventions in Sepsis: 206 Philadelphia EMS Patients

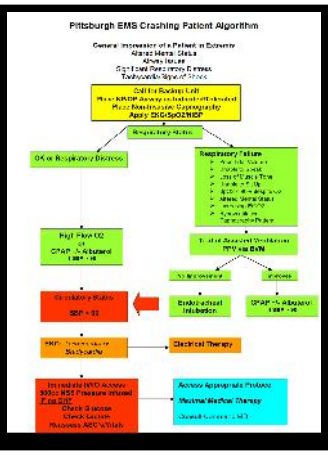


Hypothesis

- The implementation of a Prehospital "Crashing Patient" Critical Care Bundle would improve the execution of key prehospital interventions for patients presenting with respiratory distress and decrease the incidence of system post EMS contact cardiac arrest.

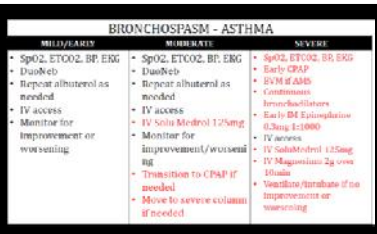
Methods

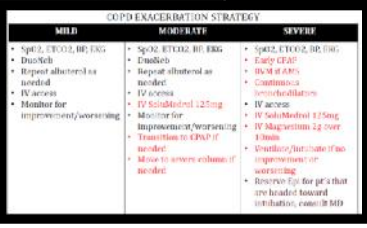
- Urban all paramedic municipal (third service) EMS System
- 63,000+ responses per year
- 3600+ Respiratory Distress calls per year
- "Crashing Patient" Critical Bundle implemented 2012-2014



Key Interventions prior to moving the patient:

- EKG, EtCO2 Monitoring
- BLS Airway
- Early CPAP
- IV Access
- Medications per State Protocol





Methods

- Implementation 2012-2017:
  - Bureau wide training
    - Classroom, skill & scenario based
  - Field Case Based Scenario Training
  - QI Feedback on cases and system performance

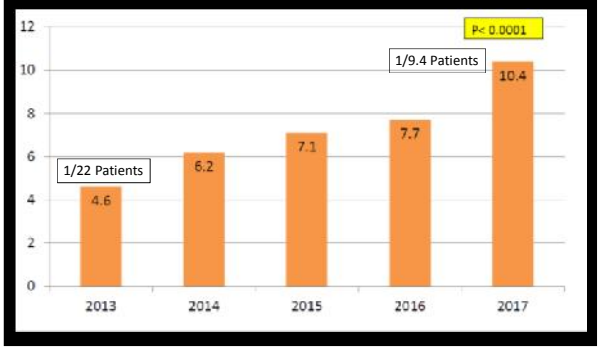
Methods – Data Collection

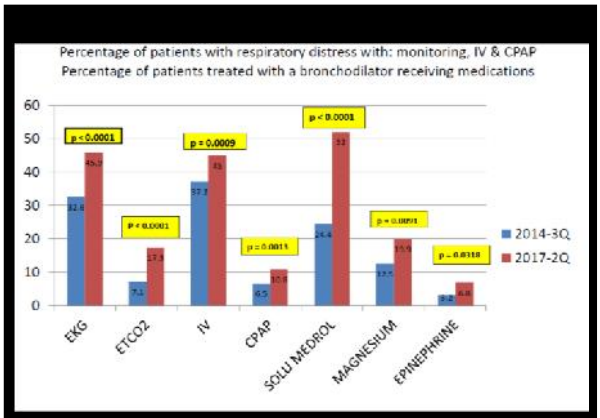
- Data collected out of ePCR: EMSCharts®
- Calls coded "Respiratory Distress"
  - 3rd Quarter (July-September) 2014: 905 Cases
  - 2nd Quarter (April-June) 2017: 885 Cases
- Measured
  - EKG monitoring
  - EtCO2 monitoring
  - IV initiation
  - CPAP Use (also measured CPAP use per year 2013-2017)

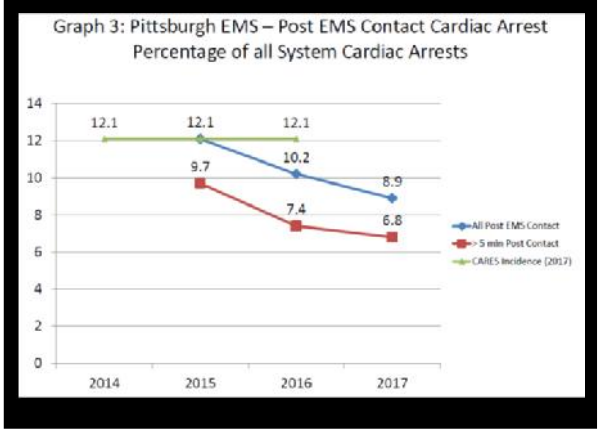
Methods – Data Collection

- For patients with bronchospasm receiving Albuterol® or Atrovent ® measured use of:
  - Solu-Medrol ®
  - Magnesium Sulfate
  - 1:1000 Epinephrine
- 3rd QTR 2014: 408 of 905 cases (45.1%)
- 2nd QTR 2017: 306 of 885 cases (34.6%)

CPAP Use 2013-2017



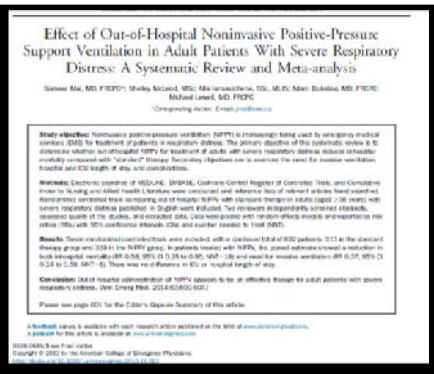




Results

- Significant increases in CPAP usage from 2013-2017
- Significant increases in EKG monitoring, EtCO2 monitoring & IV access in 2017 vs. 2014.
- Significant increases in the administration of medications for patients with bronchospasm
  - Solu-Medrol ®
  - Magnesium Sulfate
  - 1:1000 Epinephrine

Decrease in the incidence of post EMS contact cardiac arrest that was not significant



Effect of Out-of-Hospital Noninvasive Positive-Pressure Support Ventilation in Adult Patients With Severe Respiratory Distress: A Systematic Review and Meta-analysis

NNT to prevent one death = 18
NNT to prevent one intubation = 8

Limitations

- Retrospective data review that did not take into account the initial severity of patient presentation
- No data on patient outcome other than the incidence of post EMS contact cardiac arrest

Conclusions

- The implementation of a prehospital critical ("crashing") patient bundle of care resulted in significant performance improvements in accomplishing key interventions for respiratory distress patients by paramedics in the field setting.
- Patient care bundles may have significant utility to improve patient care and safety in the prehospital setting

Questions ?