Paramedic – Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: *RSI vs. non-RSI in pre-hospital first-pass success rates*

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Clinical Scenario: *You are working as a Paramedic in a system that has traditionally only allowed intubation to take place using 'facilitated intubation/rapid sequence sedation'. However, RSI has just been added to protocols/treatment guidelines. Given the choice of how to approach intubation, some of your colleagues are choosing to 'stick with what they know', but others are utilizing RSI. You want to follow the evidence, in order to choose the technique that provides the best chance of first-pass success.*

PICO (Population – Intervention – Comparison – Outcome) Question:
P- pre-hospital patients requiring intubation
I- RSI
C- non-RSI
O- increased 1st-pass success

i.e. 'In pre-hospital patients requiring intubation, does the use of RSI increase-first pass success rates as compared with non-RSI?'

Search Strategy:
((((prehospital or pre-hospital or "out of hospital" or ambulance or paramed* or EMT-P or EMS or EHS or EMT or field or "in field")) AND (rsi or "rapid sequence intubation" or "rapid sequence induction" or paralytic)) AND ("non-rsi" or "non rsi" or "facilitated intubation" or rss)) AND ("first pass success" or "first-pass-success" or First-pass success" or "success rates" or "first pass" or "first-pass" or success)

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Search Outcome:

4 papers (both by brown/hubble used, bernard as well - totalling 3 papers for this CAT)

Relevant Papers (none were directly relevant to the PICO question):

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Hubble/Brown et al, 2010	*Patients requiring field intubation* *a total of 57,132 prehospital patients were included* *This was a meta-analysis of 117 separate studies. The study sample sizes ranged from 7–5,371 patients.*	*This was a meta-analysis, so is considered level 1 evidence*	*The authors were looking for overall field intubation success rates (49% of these procedures were performed by Paramedics, and the rest by other providers)*	*Overall success rates for non-RSI OETI in non–cardiac arrest patients: 69.8%* *A 96.7% success rate was seen in procedures where RSI was utilized* *No combined p-value or confidence interval was provided*	*This study was not specifically designed to compare RSI to non-RSI, yet this data is easily discernible to readers interested in this portion of the dataset* *huge combined sample size* *Definitely generalizable to the EMS setting, as all procedures were performed prehospitally* *There are very few papers available that provide prehospital-specific data on this topic, making this dataset very valuable. The data*

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					contained in this report appear to be relatively free of bias and trustworthy.
Bernard et al; 2010	prehospital head trauma patients older than 15, GCS less than 10 with intact airway reflexes 1045 were evaluated, 328 of whom were enrolled.	RCT (best, besides meta-analysis or systematic review): level 1 or 2 evidence, depending on which criteria is being used	Favorable neurologic outcome at 6 months (field vs in-hospital intubation)	51% of patients receiving field intubation displayed favorable neurologic outcomes vs. only 39% favorable neurologic outcome in patients who were intubated in-hospital $P = 0.046$	Very well designed trial, but did not reach statistical significance. This study did not provide data that directly compares RSI vs non-RSI
Hubble, Brown et al; 2011	Prehospital patients requiring intubation	Systematic review; level 1 evidence. 36 studies covered, including a combined total of 4,574 procedures were included	The study designers were looking to find overall prehospital intubation success rates in order to use data as benchmarks for managers to improve clinical practice. However; there are datasets within the paper that allow one to compare RSI to non-RSI ETI.	96.7% success rate for prehospital ETI using RSI as compared with 86.4% for prehospital ETI performed without RSI	The data in this well-designed systematic review appear trustworthy and are directly applicable to EMS/EHS

Comments: *It was very surprising to see such a lack of existing research on this topic. Most EMS/EHS medical directors prohibit prehospital use of RSI (forcing practitioners to utilize DFI/RSS), yet is is common for anesthetists to claim it is irresponsible to intubate without utilizing paralytics. This double-standard facilitates a self-fulfilling*

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prophecy, where paramedic first-pass success rates are likely negatively affected due to being forced to use sub-optimal medications; and those lower first-pass success rates are used as examples for other medical professionals to support their claims that intubation is a procedure that should be reserved for physicians. All of this points to the fact that prehospital professionals need to come together to design and participate in a high-quality, multi-centre RCT that can gather definitive data to show what the above papers hint at: if Paramedics are given an equal playing-field ie allowed to use RSI/paralytics, our first-pass success rates can equal or super cede those of in-hospital practitioners.

Consider: *The evidence in the three articles reviewed above should be viewed with cautious optimism. None of the papers were looking specifically at the PICO 'prehospital RSI vs non-RSI'. It would be best to use the evidence from the three papers above as 'hypothesis-generating' data; to motivate us to create and participate in an RCT that specifically compares prehospital RSI and non-RSI.*

Clinical Bottom Line: *The 2010 & 2011 papers by hubble/Brown et al provided convincing data that in non-arrest patients, RSI appears to increase first-pass success rates. We already know that RSI is the gold-standard for in-hospital intubation; these papers reveal it is time to design a large, multicentre RCT to provide definitive evidence that RSI should be the gold-standard in the prehospital arena.*

References:

1. **Michael W. Hubble, Lawrence Brown, Denise A. Wilfong, Attila Hertelendy, Randall W. Benner & Michael E. Richards (2010) A Meta-Analysis of Prehospital Airway Control Techniques Part I: Orotracheal and Nasotracheal Intubation Success Rates, Prehospital Emergency Care, 14:3, 377-401, DOI: 10.3109/10903121003790173** https://doi.org/10.3109/10903121003790173

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2. **Airway Management in the Air Medical Setting Lawrence H. Brown, MPH&TM,1 Michael W. Hubble, PhD, NREMT-P,2 Denise A. Wilfong, PhD, NREMT-P,2 Attila Hertelendy, MS, MHSM, NREMT-P,3 and Randall W. Benner, MEd, NREMT-P,4**

3. **Prehospital Rapid Sequence Intubation Improves Functional Outcome for Patients With Severe Traumatic Brain Injury A Randomized Controlled Trial Stephen A. Bernard, MD∗ ,¶, Vina Nguyen, BSc†, Peter Cameron, MD‡,¶, Kevin Masci, §, Mark Fitzgerald, MBBS∗ ,¶, David J. Cooper, MD‡,¶, Tony Walker, B Paramed Std, MEd,§, Paul Myles, MD‡,¶, Lynne Murray, BAppSc‡,¶, David, McD, Taylor, MD||, Karen Smith, BSc, MEd, PhD§, Ian Patrick, §, John Edington, MB, ChB§, Andrew Bacon, MBBS§, Jeffrey V. Rosenfeld, MD, MS‡,¶, and Rodney Judson, MBBS|**