

Paramedic - Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Assessing the Safety and Success Rate of Pre-Hospital Rapid Sequence Intubation When Performed by Non-Physician Health Care Providers.

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Clinical Scenario:

You arrive on scene to find a patient with an altered level of consciousness and notable trismus. Following an assessment, you determine that the patient appears to be in respiratory failure and requires immediate endotracheal intubation to restore adequate minute volume. You are able to sedate the patient with the use of opiates and benzodiazepines however are not able to break the trismus and have now further decreased the patient's respiratory effort. Despite not being able to intubate, you are able to transport the patient to hospital with the help of nasopharyngeal airway adjuncts and a bag-valve mask, however ventilation remains inadequate. Upon arrival to hospital, rapid sequence intubation with the use of a paralytic agent is immediately performed and the patient is able to be successfully intubated.

Could this patient have been successfully intubated with RSI drugs by an advanced care paramedic prior to transport, and would it have been safe to do considering all possible adverse events?

PICO (Population – Intervention – Comparison – Outcome) Question:

In all pre-hospital patient's requiring endotracheal intubation, can rapid sequence intubation be performed by advanced care paramedics as safely and successfully as when performed by a licensed physician?



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Search Strategy:

(Paramedic OR EMS OR Pre-Hospital OR Out-of-hospital) AND (RSI OR "Rapid sequence intubation" OR intubation)

Search Outcome:

1484

Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Fouche PF. 2017	A total of 83 previously completed studies were included in this analysis.	Systemic review and meta-analysis	This systemic review compared first pass intubation success rates, intubation success rates regardless of number of attempts, and number of adverse reactions associated with RSI by both physician and non-physician healthcare personnel.	There was a 2% difference in successful intubation proportion for physicians versus non-physicians, 99% (95% confidence interval [CI] 98% to 99%) versus 97% (95% CI 95% to 99%). A 10% difference in first-pass intubation success was noted between physicians versus non-physicians, 88% (95% CI 83% to 93%) versus 78% (95% CI 65% to 89%). For airway trauma, bradycardia, cardiac arrest, endobronchial intubation, hypertension, and hypotension, lower	As a systemic-review and meta-analysis, this study had a large sample size and appears to be a trustworthy source of information. However, although it included many paramedics, the term non-physician is broad and could include other fields such as RN or RT. Also, EMS is difficult to generalize as the level of training varies highly from region to region. Perhaps the level of training of the



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				prevalence of adverse events was noted for physicians. However, non-physicians had a lower prevalence of hypoxia and esophageal intubations. Similar proportions were noted for pulmonary aspiration and emesis.	"non-physicians" involved does not reflect the same level of care provided by your local EMS system.
Lossius, HM. 2012	<p>A total of 58 previously conducted studies were included in this analysis.</p> <p>Inclusion criteria was pre-hospital ETI in adults.</p>	Meta-analysis	This meta-analysis assessed for rates of both successful and failed intubations (regardless of number of attempts) by both physician and non-physician healthcare providers. All physicians had access to RSI drugs whereas Non-physicians were further broken down into groups based on their access to RSI or facilitated intubation via just sedation.	Median success rate was 0.905 (0.491, 1.000). In a weighted linear regression analysis, physicians as providers were significantly associated with increased success rates, 0.092 ($P = 0.0345$). In the non-physician group, the use of drug-assisted intubation significantly increased the success rates. All physicians had access to traditional rapid sequence induction (RSI) and, comparing these to non-physicians using muscle paralytics or a traditional RSI, there still was a significant difference in success rate in favor of physicians,	<p>This meta-analysis had a very large sample size of 58 studies totalling 15,398 pre-hospitally intubated patients.</p> <p>This study has the same EMS generalizability issues as the previous study.</p>



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				0.991 and 0.955, respectively (P = 0.047).	
N/A	N/A	N/A	N/A	N/A	N/A

Consider: When considering only the patients who were intubated via RSI, both meta-analysis studies found slightly higher success rates and fewer failed intubations when performed by a trained physician. Fewer adverse effects were generally associated with intubation performed by physicians. First-pass success rates were found to be especially low when performed by non-physicians when compared to physicians.

Clinical Bottom Line: Both studies found physicians to be more successful at RSI by rates of 2% and 3% respectively. In general, more adverse effects were associated with non-physician performed RSI.

In a separate finding, we can compare the intubation success rates of RSI versus facilitated intubation by non-physicians as found in analysis by HM Lossius. If we do this, we find that RSI is 16% more successful than facilitated intubation attempts even when performed by non-physicians.



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References:

Fouche PF, Stein C, Simpson P, Carlson JN, Doi SA. Nonphysician Out-of-Hospital Rapid Sequence Intubation Success and Adverse Events: A Systematic Review and Meta-Analysis. 2017.

Lossius HM, Roislein J, Lockey DJ. Patient safety in pre-hospital emergency tracheal intubation: a comprehensive meta-analysis of the intubation success rates of EMS providers. 2012.

