

Hospital Associated Morbidity and Mortality Among Newton Fire/EMS Patients who Received Pre-hospital Rapid Sequence Induction (RSI) Between 2002 and 2009.

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Abstract. The primary purpose of this study was to measure success of pre-hospital rapid sequence induction (RSI) done by Newton/Fire EMS (NFEMS) using ER and hospital outcomes. RSI is utilized when intubating a patient requires sedation to paralyze the airway and gag reflex. All adult patients who received RSI from NFEMS from 2002-2009 were identified. Comparisons were selected from 1997-2002. Multiple parameters in patient charts were reviewed including patient age, gender, presenting condition, co-morbidities, Glasgow Coma Score, oxygen saturation, and hospital outcome. The primary outcomes measured were morbidity and mortality. The RSI procedure by NFEMS was not found to have any significant positive or negative effects on the overall outcome of the patients who did receive it.

Introduction

The RSI procedure is used to essentially provide an artificial airway to someone's own compromised airway; whether from significant trauma or those who are at risk of aspiration (drawing in of a foreign substance into the respiratory tract). RSI is of importance in patients with a gag reflex who require sedation and paralyzing of the airway prior to intubation. Special medications are used to relax the patient's oropharynx, larynx, trachea, and diaphragm which allows endotracheal tube placement without a competing gag reflex. [1] Rapid sequence induction is a controversial technique when used in the pre-hospital EMS setting. [2-5] This controversy is due to conflicting patient outcomes (morbidity and mortality) of the RSI procedure as performed by different types of providers in different settings. [2] Research is also conflicting about the success, or outcomes in morbidity/mortality of this procedure; therefore, further research is warranted. Because NFEMS has a small size metropolitan/rural coverage responsibility and longer transport times (to mostly Wichita, Kansas regional and tertiary hospitals), the RSI utility was of importance in regard to maintaining and improving the respiratory status of patients. To date, this procedure had not been evaluated in this setting. This investigation evaluated the RSI outcomes of NFEMS to assist in their decision on its use as well as add to the body of literature on the topic. Therefore, the primary purpose of this study was to determine ER and hospital outcomes among NFEMS patients who received pre-hospital RSI between 2002 and 2009.

Experiment, Results, Discussion, and Significance

All adult patients who received paramedic administered RSI from the Newton Fire/EMS System (NFEMS) from 2002-2009 were identified. Comparisons from NFEMS were selected from 1997-2002. Patient charts were reviewed for a number of items, including patient age, gender, presenting condition, co-morbidities, Glasgow Coma Score (GCS), oxygen saturation, and hospital outcome. These patient charts were reviewed at Via Christi Hospital - St. Francis and Wesley Medical Center, both in Wichita, KS. Charts were also reviewed at Newton Medical Center in Newton, KS. Morbidity and mortality following RSI were the primary outcomes measured. These outcomes were determined by whether a patient died, was discharged to home, or was admitted to the hospital. For those who were admitted to the hospital, we evaluated morbidity and mortality by whether they died, were discharged to rehabilitation, or were discharged to home. During this retrospective cohort study, a total of 77 RSI subjects were compared to 51 controls. The groups were similar with regard to all parameters: age, gender, nature of call, condition assessed, and scene GCS. Chi-square analyses were performed to determine if significant relationships existed between outcomes of the control and RSI groups [Figure 1]. Multinomial logistic regression was used to classify patients based on three categories of the dependent variables: ER outcome and hospital outcome. Each dependent variable consisted of three outcomes: discharge to home, discharge to ICU/hospital, and death if ER

outcome, or discharge to rehabilitation unit or step-down unit if hospital outcome. The independent variables in both regression analyses included age group, gender, RSI intervention, and non-RSI intervention (control group). No significant differences existed between the control and RSI groups in terms of percentage being discharged, admitted, or dying. Multinomial logistic regression revealed that age was the only predictor of hospital outcome comparing those who died in the hospital with the other two possible outcomes. For ER outcomes, age predicted outcome when comparing those who died with those who were admitted to the hospital/ICU. The younger group of patients had the best outcomes. A patient's outcome was not dependent on whether or not they received RSI. Gender was not a factor.

Conclusions

This study was performed to determine the outcomes of the pre-hospital RSI procedure, as performed by NFEMS paramedics. The RSI procedure was found to have no significant positive or negative effects on the overall outcome of the patients receiving the RSI procedure. Therefore, continuation of the RSI procedure is at the discretion of NFEMS. Cost-effectiveness may be a determining factor in this decision. Our study presents opportunities for further research as there is a lack of evidence in both support of and in contest of the RSI procedure, as performed by road-based paramedics.

Relationships by Emergency Room Outcome vs. Hospital Outcome (N=128)				
Percents				X ²
ER Outcome	<u>DC'd*</u>	<u>Admitted*</u>	<u>Died</u>	0.143
Control	2	90.2	7.8	
RSI	1.3	89.6	9.1	
Hospital Outcome	<u>DC'd**</u>	<u>Rehab**</u>	<u>Died</u>	0.401
Control	25.5	43.1	31.4	
RSI	20.8	46.8	32.5	

Figure 1: Percent columns may not add up to 100% because of rounding and respondent omissions. *DC'd = discharged to home; Admitted = admitted to hospital or intensive care unit. **DC'd = discharged to home; Rehab=discharged to step down unit, rehab, or nursing home.

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