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The Effect of Paramedic Rapid Sequence Intubation on Outcome in Trauma Patients

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Objectives: The objective of this study is to evaluate the effect of paramedic rapid sequence intubation on trauma patient outcome.

Methods: Consecutive major trauma patients were prospectively enrolled in 2 phases, the first before and the second after the implementation of a paramedic RSI program. Paramedics with experience in this mixed suburban and rural emergency medical services (EMS) system were eligible for RSI training. RSI training consisted of 6 hours of didactic and mannequin training. Operating room intubation experience is required for oral intubation clearance in the system but is not used for RSI training. All trauma patients with a Glasgow Coma Scale (GCS) score between 3 and 8 and for whom resuscitation was indicated were eligible for inclusion.

Exclusion criteria included death in the field or ED and inability to obtain outcome information. For both phases, intubation was indicated for trauma patients with a GCS score of 3 to 8. For phase 2, oral intubation was attempted for all patients before RSI. Etomidate and succinylcholine were administered for RSI. RSI was not attempted for patients for whom the alternative airways, esophageal-tracheal twin-lumen airway device (Combitube), cricothyrotomy, or bag-valve-mask ventilation was judged not feasible. The Combitube was used as the primary salvage airway device. Method of airway control, intubation success rates, and survival to hospital discharge were determined.

Results: There were 134 patients with outcomes in phase 1: 19 of 21 (90.5%) in arrest at presentation had a definitive airway established, and 19 had additional exclusion criteria, leaving 94 for analysis. There were 386 patients with outcomes in phase 2: 85 of 94 (90.4%) in arrest at presentation had a definitive airway established, and 65 had additional exclusion criteria, leaving 227 for analysis. The oral intubation success rate was improved for phase 2 study versus phase 1 control patients (53.3% versus 14.9%); total definitive airway rate was also greater (39.5% versus 40.4%). RSI was used in 112 patients; 11 were excluded. Oral intubation success for RSI patients was 87.5%; 91.1% had definitive airways established. Survival for patients with oral intubation without RSI was similar for both phases (42.4% versus 42.9%). Survival for study patients was improved during phase 2 (78.0% versus 67.3%). Survival for study RSI patients was 85.1%. The survival for study patients was improved during phase 2 (78.0% versus 67.3%). Survival for study RSI patients was 85.1%.

Conclusion: Ems protocols for paramedic RSI resulted in improved intubation success rates and improved survival to hospital discharge.

Emergency Physicians Cannot Inflate or Estimate Endotracheal Tube Cuff Pressure Using Standard Techniques

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Objectives: Tracheal necrosis and stenosis may result from an overinflated endotracheal tube cuff. Safe, appropriate pressure in endotracheal tube cuffs is considered to be between 15 and 25 cm H2O pressures below normal capillary perfusion pressure. We seek to determine the ability of emergency medicine residents and attending physicians in accredited emergency medicine residency training programs to inflate an endotracheal tube cuff to appropriate pressure using standard syringe technique and assess appropriateness of pressure of previously inflated endotracheal tube cuffs by palpating the pilot balloon.

Methods: This institutional review board–approved descriptive survey of resident and attending physicians in accredited emergency medicine residency training programs in New York City used a previously tested, tracheal simulation model with a 7.5-mm endotracheal tube with a high-volume low-pressure cuff (Mallinckrodt, St. Louis, MO). Using their choice of a 3-ml or 10-ml plastic syringe with standard Luer Lock (Becton-Dickson, Franklin Lakes, NJ), participants inflated the endotracheal tube cuff by standard method of injecting air as they deemed appropriate in conjunction with palpating the pilot balloon to estimate cuff pressure. Subsequently, the endotracheal tube cuff pressure was measured using a highly sensitive and accurate analog manometer (Boehringer Laboratories, Norristown, PA). Later, participants palpated the pilot balloon of 9 endotracheal tubes with cuffs previously inflated to known pressures ranging from 0 to 120 cm H2O and reported whether the pressure was low, appropriate, or high.

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Results: There was no change in patient demographics during the 3 periods, but there was a change in the patient diagnoses in period 2, with decreases in the proportion of respiratory and cardiac cases and increases in neurology and trauma cases. These changes reverted to the previous distribution in period 3. The alarming discovery was that whereas in period 1 (pre-SARS), resident medical officers attempted intubations 4% of the time, this figure went down to 3% in period 2 (SARS) and 2% in period 3 (post-SARS). Anesthesiologists performed 1.2%, 8%, and 0% of emergency intubations in periods 1, 2, and 3, respectively. Attending emergency physicians performed 54%, 56%, and 77% of intubations in periods 1, 2, and 3, respectively. The complication/per-intubation event rates were 10.5%, 9.9%, and 9.4% in periods 1, 2, and 3, respectively. The success rate for residents was 80.8%, 89%, and 86.2% in periods 1, 2, and 3, respectively.

Conclusion: The wearing of PPE and positive airway pressure respirator is thought to make intubation more difficult, as seen by the increase in proportion of intubations performed by anesthetists in period 2 and by attending emergency physicians in periods 2 and 3. The infection control policy that restricts the number of health care staff attending to each patient may have influenced the department’s decision to allow only the most confident or experienced personnel to manage the airway. The exposure of junior residents in emergency airway management during SARS and the immediate post-SARS period was decreased. This trend should be further monitored, and intervention may be necessary should it continue to decline.