

To the Editor:

Attached is a brief study of the use of nebulized lidocaine as an adjunct for endotracheal intubation that may interest your readers.

Nebulized Lidocaine as an Adjunct to Endotracheal Intubation in the Prehospital Setting

Introduction

Effective management of a compromised airway is one of the most important tasks performed by prehospital care providers (PCP). Several techniques may be used to maintain the airway in critically ill or injured prehospital patients, but successful endotracheal intubation remains the cornerstone of definitive airway management. Several studies have shown that PCPs can learn endotracheal intubation and intubate patients in cardiac arrest with success rates of about 90%.¹⁻³

However, the patient not in cardiac arrest who requires invasive airway management remains a challenge to most PCPs. A 3-year analysis of invasive airway management in the prehospital setting by Krisanda et al⁴ indicates that PCPs can intubate a "high, but improvable" proportion of noncardiac-arrest patients. The authors proposed pharmacologic adjuncts might improve intubation success rates.

We studied the effects of allowing PCPs the option of administering nebulized lidocaine to the airways of noncardiac-arrest patients who were judged to require intubation before performing advanced airway management, and compared orotracheal intubation success rates by PCPs in patients given nebulized lidocaine with those of a control group for whom the option of giving lidocaine was not available.

Hypothesis

In the prehospital setting, the use of nebulized lidocaine will improve the success rate of endotracheal intubation by paramedics in patients who are not in cardiac or respiratory arrest.

Methods

Staten Island University Hospital emergency medical service (EMS) provides advanced life support (ALS) and basic life support (BLS) prehospital care to Staten Island, a large suburban section of New York City.

The PCPs operate under protocols stipulated by the New York City Emergency Medical Services. In this service, direct off-line medical control is provided by the medical director of Staten Island University Hospital Emergency Medical Services. The ALS squad responds to approximately 3,600 calls per year. All of the PCPs who participated in the study had at least 3 years of experience as a full-time paramedic.

During 1992 and 1993, data were collected for the "control group" via 100% Ambulance Call Report (ACR) review by one physician reviewer. The following data were obtained: 1) the number of non-cardiac-arrest patients where intubation was attempted; and 2) the success rate.

During 1994, the following protocol was developed and approved as a demonstration project by the ALS Subcommittee of the Regional EMS Council of New York City:

- 1) Identify a potential candidate for the study. The patient might require endotracheal intubation in the field and must not be in cardiac or ventilatory arrest;
- 2) Administration of the treatment in no way obligates the paramedic to intubate the patient if she or he improves clinically;
- 3) Treatment consists of 3 ml of 2% cardiac lidocaine (already stocked on ALS bus for "cardiac" injection) via nebulizer to be delivered at 10 L/min, high-flow oxygen during a 3- to 5-minute period;
- 4) The patient will be monitored continuously with pulse oximetry before, during, and after the nebulized lidocaine treatment;
- 5) On completion of the treatment, the paramedic will attempt to intubate the patient;
- 6) Contraindications to the use of nebulized lidocaine including vomiting, allergy to local anesthetics, or cardiac/respiratory arrest.

Candidates were chosen in the field by paramedics based on their clinical judgment.

At the end of 1994, the following data were collected via a 100% ACR review: 1) the number of cases for whom intubation was attempted in patients given nebulized lidocaine; and 2) the success rate.

Results

A *z*-test was used to test statistical significance. Before nebulized lidocaine was available to the PCPs, they successfully performed endotracheal intubation in 37 of 60 (62%) noncardiac-arrest patients in the field. In the 24 patients in whom nebulized lidocaine was used, 21 (87%) had successful intubation in the field. This difference was statistically significant ($p < 0.05$).

Discussion

The use of topical anesthesia for in-hospital airway management by physicians has been associated with higher success rates in conscious patients.^{5,6} In addition, there is substantial evidence that the use of preintubation lidocaine reduces vomiting, suppresses coughing, minimizes bucking, attenuates adverse cardiovascular responses to intubation, depresses increased intracranial pressure responses to intubation, and has an inherent antidysrhythmic effect.^{5,6} Moreover, its use makes invasive airway maneuvers more comfortable for the patient.

The technique used was modified from one described by Morris.⁶ It used a drug and equipment already familiar to the paramedics, thereby minimizing training time and cost.

A major concern was whether local anesthesia of the airway would predispose patients to an increased risk for aspiration. A review of the literature indicated that the risks were minimal, especially in the patients who were conscious and could indicate to the paramedics whether they were nauseated or were going to vomit.^{5,6} In such cases, the paramedic easily could turn the patient to the side to prevent aspiration. In spite of this caveat, a detailed ACR review indicated that there were no complications in the patients treated with nebulized lidocaine; there were no cases of

reported vomiting or aspiration. Moreover, there were no cases of traumatic complications reported in the patients treated with nebulized lidocaine.

There were limitations to this study. The study was not blinded, but the participants for the "experimental" group were selected for inclusion by the paramedics. It is possible that the group of patients who received nebulized lidocaine is a different population from the "control" group. It is possible that they selected a group of "easy-to-intubate" patients, thereby falsely elevating the success rate in the "experimental" group. However, it is not likely that this phenomenon occurred. A weekly call review was conducted by the medical director, during which all cases involving the use of nebulized lidocaine were discussed retrospectively. During these sessions, the paramedics indicated the most common reasons that they "chose" not to use the treatment protocol were: 1) "too close to the hospital;" and 2) the patient had

previously had "easy" intubation by paramedics and "didn't need it."

Conclusion

When nebulized lidocaine is used as an adjunct to endotracheal intubation in the prehospital setting, it is associated with significantly higher intubation success rates by paramedics. The technique is taught to paramedics readily, and uses drugs and equipment already available to them. This study indicates that nebulized lidocaine can be used safely and efficaciously in the critically ill or injured patients in the prehospital setting.

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To the Editor:

The following is in response to the critique of our article on Firefighter/Paramedic (FF/PM) Burnout by the EMS Journal Club in the *Research Review* section of the June issue of the *Journal of Emergency Medical Services (JEMS)*. We offer the following clarifications and rebuttals in response to the criticisms offered by the "Facts" (Heramba), "Truth" (Rick), "Real Truth" (Lawrence), and the "Ultimate Truth" (Jack) team from the Department of Emergency Medicine at East Carolina University School of Medicine in Greenville, North Carolina.

In response to "The Facts' According to Heramba" . . .

The "Facts" cited by Heramba pretty well summarize our research. Heramba states, "There is no doubt in my mind that certain common personality traits exist among those who choose to be rescue/health care workers. Whether the ones chosen by the authors are good representations of these I do not know." We, of course, think they are, though, we also agree there may be others.

In response to "The Truth' According to Rick" . . .

Rick was stunned that our article implied, "that paramedics are more authoritarian than police officers." Our article did not imply, it factually com-

pared the research available concerning the authoritarian scores of *one* sample of police officers to *one* sample of FF/PMs.

In response to our pointing out that other studies have shown that highly authoritarian individuals are less comfortable in highly autocratic organizations, Rick states: "Many EMS organizations are pretty autocratic. It seems like a setup for a no-win situation." In our discussion, we suggest that this autocratic style of management perhaps is part of the problem, should be studied further, and should be changed if found to be a contributor to practitioner burnout.

Rick has made a good point in his statement that what we "fail to do is talk at all about the interactions between the 'authoritarian' FF/PMs and medical 'control.'" We chose not to address medical control. However, we agree this may be an important factor related to authoritarianism for this population and deserves attention in future studies.

In response to "The Real Truth' According to Lawrence" . . .

Lawrence's first point is that in research, "a correlation does not necessarily mean 'cause and effect,' and lack of correlation does not rule out 'cause and effect.'" We couldn't agree more. However, we