

MISPLACED ENDOTRACHEAL TUBES

A COMMON PROBLEM

ORLANDO, FLA—Endotracheal tube misplacement by paramedics is more common than previously believed, suggests a study of the emergency medical services (EMS) system in Orange County, Florida.[1] Of the 108 intubated patients studied, 25% were found to have an improperly placed endotracheal tube when they arrived at the emergency department.

"That rate is alarmingly high," said Jay L. Falk, MD, one of the study authors. "The medical literature places the occurrence of misplaced endotracheal tubes at around only 1% to 5%." The high incidence in Orange County may reflect a ubiquitous problem, suggested Dr. Falk, who is the Academic Chairman of the Department of Emergency Medicine at Orlando Regional Medical Center in Florida. "I have presented this study around the country, and its results ring true with many colleagues," he told PULMONARY REVIEWS.

Patients intubated by Orange County paramedics and admitted to the emergency department were eligible for the study, which ran from May 1 to December 31, 1997. Each patient's endotracheal tube was assessed on arrival, starting with auscultation of the chest and epigastrium. Epigastric sounds or vomiting from the tube were considered signs of obvious misplacement in the esophagus. Those tubes were removed.

When misplacement was not apparent, the tube was assessed with end-tidal carbon dioxide (ETCO₂) monitoring and direct laryngoscopy. A tube was considered correctly placed if it passed between the vocal cords or if the patient had bilateral breath sounds and a positive ETCO₂ waveform and the tube was at an appropriate depth.

All other tubes were categorized as misplaced, either in the hypopharynx (if the tip of the tube was visible above the vocal cords) or the esophagus. "Our study did not assess the intubation skills of the paramedic," stressed Dr. Falk. "It is certainly possible that misplaced tubes were correctly inserted and then became misplaced by movement on the way to the emergency department."

Slightly more than half the study subjects were medical patients, and the remainder were trauma patients requiring cervical spine immobilization. The rate of tube misplacement was significantly higher in the latter group (37% vs 14% in the medical patients).

Two thirds of the misplaced tubes were in the esophagus and one third were in the hypopharynx. Esophageal and hypopharyngeal placements were associated with mortality rates of 56% and 33%, respectively. Tube misplacement was much more common in this study than in the literature because intubation research is usually done by well-run EMS systems that exercise tightly controlled oversight of paramedic training and practice, speculated Dr. Falk. Good medical direction, quality assurance, and regular intubation training for paramedics may markedly reduce tube misplacement rates, he suggested.

Continuous ETCO₂ monitoring from the time of intubation is also essential, Dr. Falk added. "Routine use of these monitors to verify tube position has virtually eliminated tube misplacement in some EMS systems," he said. "But the monitors have yet to be embraced by emergency medicine."

—Deborah L. O'Connor

Reference

1. Katz SH, Falk JL. Misplaced endotracheal tubes by paramedics in an urban emergency medical services system. *Ann Emerg Med.* 2001;37:32-37.