Should Paramedics Intubate?

Corey M. Slovis, M.D.
Dept. of Emergency Medicine, Vanderbilt University
Metro Nashville Fire Department
and International Airport
Nashville, TN
THE DISAPPEARING ENDOTRACHEAL TUBE

When paramedics were first introduced in the 1970s, one of the most controversial aspects of their training program was endotracheal intubation (ETI). Prior to that, the skill of intubating the trachea was purely the domain of physicians and nurse anesthetists. Thus, it was difficult to secure time when paramedic students could practice their intubations skills on live patients. In actuality, many paramedics of that era were graduated without ever having the opportunity to perform an ETI on a living patient.
Should ALL Paramedics Intubate?
Should ALL Physicians Intubate?
Intubation takes practice
• 825 attempted intubations and transports
• 74.8% successful ETT (617/825)
• 20.6% failed ETT
• 5.2% malpositioned tubes
- 98 Paramedics, 909 Intubations
- Averaged 10 per Paramedic
- 19.4% failed ETT
- No Correlation to Months of Experience
- Significant Correlation To: Number of Pts. Attempted vs. Success
• Evaluated pt outcomes vs. EMS experience
• Linked 25,718 ETTs to 5,433 paramedics
• Increased Paramedic experience improves patient survival
Total intubations vs. total paramedics

If only paramedics with > 5 intubations/yr were allowed to intubate, then 32% ↓ in total intubations.

If ≥ 10 was minimum then 79% ↓

Many paramedics do not intubate 1 pt/yr
• Retrospective Canadian study (2003-2005)
• 300 paramedics; 100,000 calls; 69,000 transports
• Two Tiered System; no RSI
• Each EMT-P allowed 2 attempts/patients
• 150 paramedics; 1065 airway attempts over 25 mos.
• 93% were medical airways attempts
½ of all paramedics did not intubate one patient over a two year period!!!
Intubation requires rules for performance including number of attempts.
How Many Attempts Are Required to Accomplish Out-of-hospital Endotracheal Intubation?
Henry E. Wang, MD, MPH, Donald M. Yealy, MD

Abstract
Background: An important goal of emergency airway management is to complete endotracheal intubation (ETI) correctly, safely, and quickly, and repeated ETI attempts can increase patient morbidity and mortality. Clinical protocols limiting the number of ETI attempts may minimize harm, but this strategy also may

• 1,941 cases, 30% more than 1 attempt
• Multicenter study, 42 EMS services, 18 mos
• Arrested pts: 70% → 85% → 90%
• Non Arrest pts: 58% → 70% → 72.7%
• No Significant ↑ in success post 3 attempts
Intubation requires rules for performance including requiring ETCO$_2$ use.
Experienced MDs intubate the esophagus up to 8% of time.

At least 1/100 esophageal intubations will go unnoticed by MDs.

ETCO$_2$ detection prevents clinical mishaps.
132 patients, NYC

9% misplacement rate
11/12 in esophagus

15% Right Main Intubations

ETCO₂ not routinely used
• 167 Endotracheal Intubation Attempts, Maine
• 81% Successful
• 12% Misplaced
• 10/13 Esophageal
• ETCO₂ Detectors Not Mandated
Misplaced Endotracheal Tubes by Paramedics in an Urban Emergency Medical Services System

Steven H. Katz, MD
Jay L. Falk, MD

Study objective: To determine the incidence of unrecognized, misplaced endotracheal tubes inserted by paramedics in a large urban, decentralized emergency medical services (EMS) system.

- 108 Patients, Orlando
- 25% Misplacement Rate
- 18/27 in Esophagus
- ECTO$_2$ Not Routinely Used
The Effectiveness of Out-of-Hospital Use of Continuous End-Tidal Carbon Dioxide Monitoring on the Rate of Unrecognized Misplaced Intubation Within a Regional Emergency Medical Services System

Salvatore Silvestri, MD
George A. Ralls, MD

From the Departments of Emergency Medicine, Orlando Regional Medical Center, Orlando, FL (Silvestri, Ralls, Thundyiyil, Rothrock, Senn, Carter, Falk); University of Florida College of Medicine, Gainesville, FL (Silvestri, Rothrock, Falk); Office of the Medical...
278 Intubation, Denver

84% Success Rate

1/120 Oral Tubes Misplaced

ETCO₂ Detectors Used
Does Intubation make a difference in Pediatric Care?
• ETT does NOT improve survival

• ETT does NOT improve Neuro outcomes

• May decrease survival in respiratory arrest

• ETT can NOT be routinely recommended in pediatric patients
Does Intubation make a difference in Trauma Care?
Endotracheal Intubation in the Field Does Not Improve Outcome in Trauma Patients Who Present without an Acutely Lethal Traumatic Brain Injury

Grant V. Bochicchio, MD, MPH, Obeid Ilahi, MD, Manjari Joshi, MD, Kelly Bochicchio, RN, and Thomas M. Scalea, MD

J Trauma 2003;54:307-311

Prehospital Endotracheal Intubation for Trauma Does Not Improve Survival over Bag-Valve-Mask Ventilation

Zsolt T. Stockinger, MD, and Norman E. McSwain, Jr., MD

J Trauma 2004;56:531-536

Pre-Hospital Endotracheal Intubation and Positive Pressure Ventilation Is Associated with Hypotension and Decreased Survival in Hypovolemic Trauma Patients: An Analysis of the National Trauma Data Bank

Shahid Shafi, MD, MPH, and Larry Gentilello, MD

J Trauma 2005;59:1140-1147

Endotracheal Intubation Increases Out-of-Hospital Time in Trauma Patients

Michael T. Cudnik, MD, Craig D. Newgard, MD, MPH, Henry Wang, MD, MPH, Christopher Bangs, MS, Robert Herrington IV, MD

Prehosp Emerg Care 2007;11:224-229
Miami Fire Rescue 2003-2006

- 203 prehospital intubation attempts
- 69% ETT successful: 31% failure to ETT
- 12% (n=25) unrecognized esophageal intubations
- Authors note no difference in survival if ETT or Bag Valve Mask
ETT has not been proven to benefit Trauma Victims.
“The results obtained suggest that paramedics with less exposure to a difficult procedure, such as intubation, will likely have more difficulty performing it, increasing the incidence of failure.”
Prehospital Endotracheal Intubation: Rationale for Training Emergency Medical Personnel

Endotracheal intubation by emergency medical services (EMS) personnel in the prehospital setting decreases morbidity and helps to improve the outcome of critically ill patients, especially those with cardiac or respiratory arrest, multiple injuries, or severe head trauma. The endotracheal tube facilitates better oxygenation and ventilation because it enhances lung inflation.

Paul E Pepe, M.D.*
Michael K Copass, MD†
Thomas H Joyce, MD‡
Houston, Texas
Seattle, Washington

• “ETT by paramedics decreases mortality and helps to improve outcomes in critically ill patients.”

• “Properly instructed, well supervised paramedics can be trained to perform this procedure safely…”
5 Rules for EMS ETT

• Involved Medical Director is required to ensure training, performance review and mentoring.

• ETCO$_2$ use required and understood

• Rescue Airway (Combitube or King) readily available, used, and audited.

• No more than 2-3 attempts total per patient

• Pediatric and Trauma Intubations separately considered
Prehospital Intubation: The Right Tools in the Right Hands at the Right Time

In this issue of the journal, Cobas et al.\(^1\) report that paramedics in the metropolitan area of Miami, Florida, had problems in 31% of all intubations.


**GOLD STANDARD**

For Daily Airway Expert - ETT

**SILVER STANDARD**

Less than Daily Airway Expert - King Airway or Combitube

**BRONZE STANDARD**

For Occasional Airway Expert - Bag Valve Mask
Only some paramedics, not all, intubate in each system.

An earned privilege, not a right.
Prehospital Intubation: The Right Tools in the Right Hands at the Right Time

* In this issue of the journal, Cobas et al. report that paramedics in the metropolitan area of Miami, Florida, had problems in 31% of all intubation attempts.

- **Gold Standard**  
  - Daily Airway Experience  
  - ETT

- **Silver Standard**  
  - Less than Daily Experience  
  - King Airway or Combitube

- **Bronze Standard**  
  - Occasional Airway Experience  
  - Bag Valve Mask
“In trauma and pediatric patients, the current evidence base provides no imperative to extend the practice of prehospital intubation in urban systems.”
“It would be ethical and pertinent to initiate a large, high quality randomized trial comparing the efficacy of competently practiced emergency intubation with basic bag-valve-mask maneuvers (BVM) in urban adult out-of-hospital non-traumatic cardiac arrest.”
SECURE THE ABC’S... Correctly!