

Should Paramedics Intubate?

Corey M. Slovis, M.D.

Dept. of Emergency Medicine, Vanderbilt University

Metro Nashville Fire Department

and International Airport

Nashville, TN



>> BY BRYAN E. BLEDSOE, DO, FACEP, EMT-P,
& WILLIAM E. GANDY, JD, LP, NREMT-P

**HISTORIC SKILL
THREATENED BY
LACK OF PRACTICE
& NEW DEVICES**

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.

PHOTO: SHUTTERSTOCK

Should ALL Paramedics be trained?

Should ALL Physicians be trained?

Intubation takes practice

**A PROSPECTIVE MULTICENTER EVALUATION OF PREHOSPITAL AIRWAY
MANAGEMENT PERFORMANCE IN A LARGE METROPOLITAN REGION**

Denver Metro Airway Study Group*

- 825 attempted intubations and transports
- 74.8% successful ETT (617/825)
- 20.6% failed ETT
- 5.2 % malpositioned tubes

**EFFECT OF PARAMEDIC EXPERIENCE ON OROTRACHEAL INTUBATION
SUCCESS RATES**

Alex G. Garza, MD,*† Matthew C. Gratton, MD,*† Darryl Coontz, EMT-P, MBA,‡ Elizabeth Noble, PhD,§
and O. John Ma, MD*

*Department of Emergency Medicine, Truman Medical Center, University of Missouri—Kansas City School of Medicine, Kansas City, Missouri, †EMS Section, Missouri Health Department, Kansas City, Missouri, ‡Emergency Providers, Inc., Kansas City, Missouri, and §University of Missouri—Kansas City School of Education, Kansas City, Missouri

Reprint Address: O. John Ma, MD, Department of Emergency Medicine, Truman Medical Center, 2301 Holmes Street, Kansas City, Missouri 64108

- 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

ABSTRACTS

ABSTRACTS FOR THE 2009 NAEMSP SCIENTIFIC ASSEMBLY

1. BYSTANDER CPR AND SHOCKABLE RHYTHMS OCCUR LESS OFTEN DURING OUT-OF-HOSPITAL CARDIAC ARREST IN SOUTHERN ONTARIO NEIGHBORHOODS WITH LOWER SOCIOECONOMIC STATUS. **Joseph Choi, Lau-**

response time was 19.2 seconds longer in the highest income quintile compared with the lowest income quintile ($p = 0.02$) **Conclusions.** OHCA's occurring in neighborhoods with lower median household in-

- Evaluated pt outcomes vs. EMS experience
- Linked 25,718 ETTs to 5,433 paramedics
- Increased Paramedic experience improves patient survival

How Would Minimum Experience Standards Affect the Distribution of Out-of-Hospital Endotracheal Intubations?

Henry E. Wang, MD, MS

Benjamin N. Abo, BS, NREMT-P

Judith R. Lave, PhD

Donald M. Yealy, MD

From the Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA (Wang, Abo, Yealy); and the Department of Health Policy and Management, University of Pittsburgh, Pittsburgh, PA (Lave).

- 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

**REVIEW OF ENDOTRACHEAL INTUBATIONS BY OTTAWA ADVANCED CARE
PARAMEDICS IN CANADA**

Ronald K. Tam, MD, Justin Maloney, MD, Isabelle Gaboury, PhD (C), Jeannette M. Verdon,
MLT, BScApp (MAB), John Trickett, RN, BScN, Shannon D. Leduc, ACP,
Pierre Poirier, ACP, MBA

ABSTRACT

Objectives. In the last several years, the National Association of EMS Physicians (NAEMSP) has called for better reporting on prehospital endotracheal intubation (ETI)

were found not to be related to the overall intubation success. **Conclusions.** This study reported the success rate of non-drug-assisted, prehospital ETI by ACPs in the Ottawa region. Our findings emphasize the importance of quality assessment for individual emergency medical services sys-

- 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

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**1/2 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.

■ COMMENTARIES

Inadvertent Esophageal Intubation in the Field: Reliance on a Fool's "Gold Standard"

Steven J. White, MD, Corey M. Slovis, MD

■ The "gold standard" for ensuring correct endotracheal tube (ETT) placement has been to visualize the

the patient" is unlikely in adults. Neck extension, and to a lesser degree lateral rotation, can move a tube

esophageal intubation with equal bilateral breath sounds, normal epigastric auscultation, symmetric chest expansion, cuff palpation in the neck, and even "normal" chest radiography.² In a controlled OR study, Anderson and Hald intentionally esophageally intubated 40 patients.³ They

- Experienced MDs intubate the esophagus up to 8% of time.
- At least 1/100 esophageal intubations will go unnoticed by MDs
- ETCO₂ detection prevents clinical mishaps

FOCUS ON ENDOTRACHEAL INTUBATION

UNRECOGNIZED MISPLACEMENT OF ENDOTRACHEAL TUBES BY GROUND PREHOSPITAL PROVIDERS

David D. Wirtz, MD, MPH, Christine Ortiz, MD, David H. Newman, MD,
Inna Zhitomirsky

- 132 patients, NYC
- 9% misplacement rate
11/12 in esophagus
- 15% Right Main Intubations
- ETCO_2 not routinely used

Unrecognized Misplacement of Endotracheal Tubes in a Mixed Urban to Rural Emergency Medical Services Setting

Michael E. Jemmett, MD, Kevin M. Kendal, MD, Mark W. Fourre, MD,
John H. Burton, MD

Abstract

Objective: To determine the rate of unrecognized endotracheal tube misplacement when performed by emergency medical services (EMS) personnel in a mixed urban and rural setting. **Methods:** The authors conducted a prospective, observational analysis of out-of-hospital endotracheal in-

patients who arrived intubated to the emergency department. Of the studied patients, 12% (13 of 109) were found to have misplaced endotracheal tubes. For the patients with unrecognized improperly placed tubes, 9% (10 of 109) were in the esophagus, 2% (2 of 109) were in the right main stem

- 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*

See editorial, p. 62.

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
- ECTO₂ 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, Thundiyil, Rothrock, Senn, Carter, Falk); University of Florida College of Medicine, Gainesville, FL (Silvestri, Rothrock, Falk); Office of the Medical

- 153 ETT, Orlando
- 23% unrecognized esophageal if ETCO₂ NOT used
- 0/93 unrecognized esophageal if ETCO₂ used

CLINICAL PRACTICE

An Evaluation of Out-of-hospital Advanced Airway Management in an Urban Setting

Christopher B. Colwell, MD, Kevin E. McVaney, MD, Jason S. Haukoos, MD, MS,
David P. Wiebe, MD, Craig S. Gravitz, EMT-P, RN, Will W. Dunn, EMT-P,
Tamara Bryan, EMT-P

Abstract

Objectives: To determine the success and complication rates associated with endotracheal intubation in an urban

attempted, 234 (84%, 95% CI = 77% to 88%) were reported by paramedics to be successfully intubated. Of 114 nasal

- 278 Intubation, Denver
- 84% Success Rate
- 1/120 Oral Tubes Misplaced
- ETCO₂ Detectors Used

Does Intubation make a difference
in Pediatric Care?

Effect of Out-of-Hospital Pediatric Endotracheal Intubation on Survival and Neurological Outcome

A Controlled Clinical Trial

JAMA 2000;283:783-790

Should EMS-paramedics perform paediatric tracheal intubation in the field?☆

Bastiaan M. Gerritse^{a,*}, Jos M. Th Draaisma^b, Annelies Schalkwijk^c,

Resuscitation 2008;79:225-229

- 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

Prehospital Intubations and Mortality: A Level 1 Trauma Center Perspective

Miguel A. Cobas, MD*

Maria Alejandra De la Peña, MD*

Ronald Manning, RN, MSPH†

BACKGROUND: Ryder Trauma Center is a Level 1 trauma center with approximately 3800 emergency admissions per year. In this study, we sought to determine the incidence of failed prehospital intubations (PHI), its correlation with hospital mortality, and possible risk factors associated with PHI.

METHODS: A prospective observational study was conducted evaluating trauma

- 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.

Prehospital Intubations and Mortality: A Level 1 Trauma Center Perspective

Miguel A. Cobas, MD* **BACKGROUND:** Ryder Trauma Center is a Level 1 trauma center with approximately 3800 emergency admissions per year. In this study, we sought to determine the incidence of failed prehospital intubations (PII) in correlation with hospital

“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.
- ETCO₂ 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 intubation

Anesth Analg 2009;109:303-305

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**

A Sixth Rule

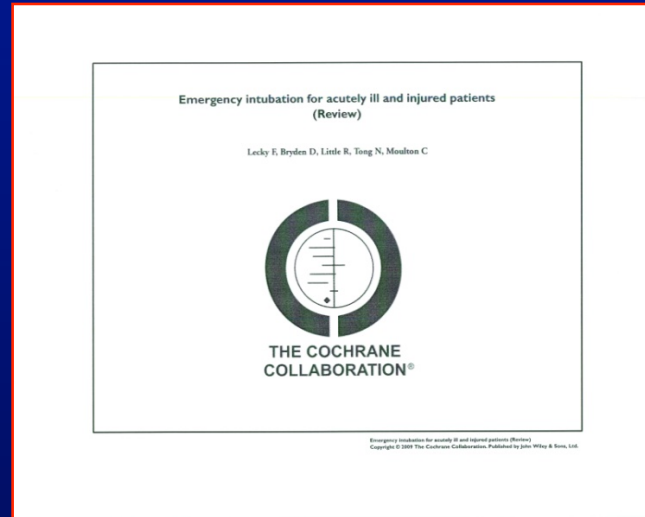
Only some paramedics, not all,
intubate in each system.

An earned privilege, not a right.

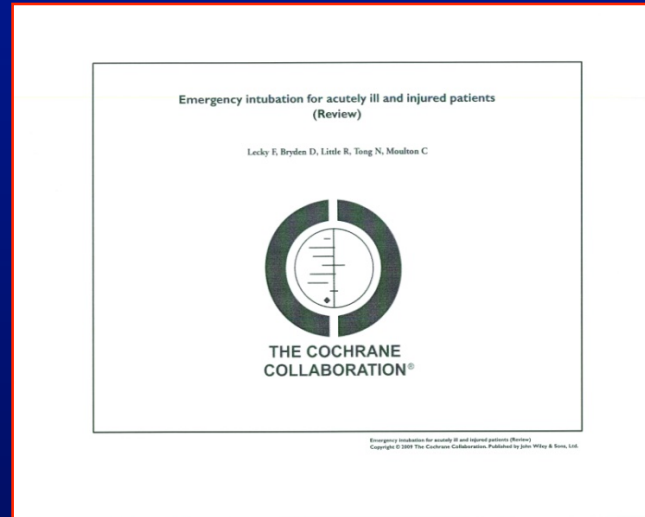
Prehospital Intubation: The Right Tools in the Right Hands at the Right Time

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

- **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!