

The Accuracy of the Esophageal Detector Bulb in the Aeromedical Setting

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Introduction

◆ Clinical confirmation of endotracheal intubation in the aeromedical setting is especially challenging due to poor lighting, intense noise, and vibration. Additionally, a large proportion of prehospital intubations are performed in victims of cardiac arrest, where ETCO_2 is not always detectable. The Esophageal Detector Bulb (EDB) has been shown to be highly accurate in the controlled setting of the operating room, but much less reliable in one prehospital study. The EDB seems especially well-suited to the helicopter setting because it is small, accurate, and does not depend upon auscultation.



Objective

◆ To determine the sensitivity, specificity and accuracy of the EDB in the aeromedical setting.

Methods

Design: Prospective, observational.

Setting: Helicopter program in central California.

Population: All intubated patients transported by SkyLife between 1995 and 1997.

Protocol: Flight personnel recorded the EDB results and other means of determining ETT position including clinical exam, pulse oximetry, and capnography.

Tube position was assessed at one or more of the following times: immediately after intubation, initial patient contact, after patient movement, suspicion of dislodgement.

The gold standard for confirmation of ETT position was either prehospital quantitative capnography (ETCO_2) or determination of tube position by the Emergency Physician at the receiving hospital.

Statistics: Descriptive statistics were calculated, as were the sensitivity, specificity, accuracy, and 95% confidence intervals.



After intubation . . .



the EDB is deflated and attached to the endotracheal tube.

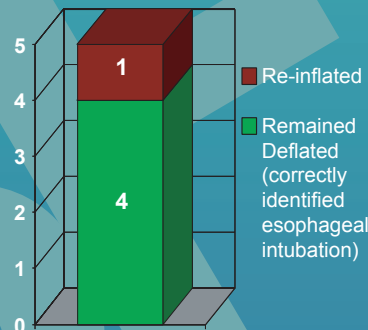


Complete re-inflation indicates tracheal intubation.

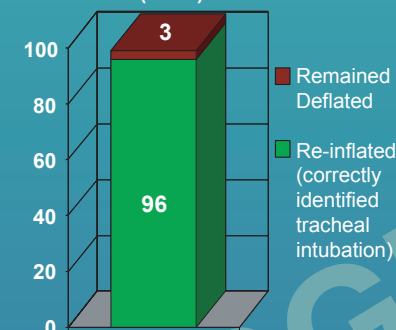
Results

- ◆ 104 uses of the EDB were included
 - 99 tracheal intubations
 - 5 esophageal intubations
- ◆ The EDB correctly identified
 - 4 of the 5 esophageal intubations
 - 96 of the 99 tracheal intubations
- ◆ In the detection of an esophageal intubation, the EDB had a
 - sensitivity of 80% (95% CI, 28-99%) and
 - specificity of 97% (95% CI, 91-99%), and
 - overall accuracy was 96% (95% CI, 90-99%)

Esophageal Intubation (N=5)



Tracheal Intubation (N=99)



Limitations

- ◆ Gold standard was not uniform.
- ◆ Small number of esophageal intubations to detect.
- ◆ Crew was not blinded to results of other means of confirmation.
- ◆ Assessments were performed in various locations in and out of the helicopter.

Conclusions

- ◆ The EDB is a simple, inexpensive device which augments the ability of an aeromedical crew to determine ETT position.
- ◆ However, it is not infallible in this setting, and therefore should complement rather than replace other means of ETT confirmation.

Acknowledgements

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