TITLE: Failures and Defects with Endotracheal Tubes and Cuffs: Clinical Evidence

DATE: 27 August 2010

RESEARCH QUESTIONS:

1. What is the incidence of failures or defects with endotracheal tubes and cuffs?
2. What is the impact of endotracheal tube and cuff failures or defects on patient safety?
3. What is the comparative incidence of failures or defects with different brands of endotracheal tubes and cuffs?
4. What is the comparative safety of different brands of endotracheal tubes and cuffs?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 8, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between January 01, 2005 and August, 17 2010. Filters were applied to limit the retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials and non-randomized studies. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

The literature search identified three randomized controlled trials and two non-randomized studies pertaining to failures and safety of endotracheal tubes and cuffs. No health technology assessments, systematic reviews, or meta-analyses were identified. Additional articles of potential interest are included in the appendix.

OVERALL SUMMARY OF FINDINGS:

Three randomized controlled trials compared different types of endotracheal tubes. Lorenz et al. compared the EasyTube with conventional endotracheal tubes (ETTs) for adult patients. They found that leak pressure and arterial saturation were not significantly different between the different tubes, and that the end-tidal carbon dioxide was lower with ETTs. Weiss et al. compared cuffed and uncuffed ETTs in small children. One outcome of interest was the number of ETT exchanges needed to find an appropriate sized tube. The exchange rate was 2.1% in the cuffed group and 30.8% in the uncuffed group, and the cuffed ETTs did not increase the risk for post-extubation stridor compared with uncuffed ETTs. The authors concluded that cuffed ETTs were reliable for small children and reduced the need for tube exchanges. Parravicini et al. performed a pilot study comparing ultrathin-walled two-stage twin endotracheal tubes with conventional endotracheal tubes in very premature infants. No significant differences were found for insertion complications, traumatic injury of the upper airway, accidental extubations, number of re-intubations after attempted extubation, or prevalence of air-leak syndrome.

Two non-randomized studies focused on ETT failure. Cobas et al. studied the incidence of failed prehospital intubations in trauma patients. Although the study showed a 31% incidence of failed prehospital intubations, there was no difference in mortality between patients who were properly intubated and those who were not. Kusumaphanyo et al. studied the failure or malfunction of anesthetic equipment in Thailand for one year. ETT failure occurred in 3.3% of 92 cases of equipment failure or malfunction. No details on the repercussions of these failures were reported.

None of the included studies compared different brands of endotracheal tubes or cuffs, with the exception of the Lorenz study which compared the EasyTube with conventional ETTs, and no studies provided information on endotracheal tube or cuff defects.
REFERENCES SUMMARIZED:

Health technology assessments
No literature identified.

Systematic reviews and meta-analyses
No literature identified.

Randomized controlled trials


Non-randomized studies


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APPENDIX – FURTHER INFORMATION:

Randomized controlled trials


Non-randomized studies


Review articles


Additional references