TITLE: Oral Endotracheal Tube Placement in Neonates, Pediatric, and Adult Patients: A Review of the Guidelines

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CONTEXT AND POLICY ISSUES:

Airway management is critical to the care of patients who are given anesthesia during surgery, or who appear in trauma centers for acute myocardial infarction, respiratory distress, or removal of foreign bodies. Tracheal intubation is the most common procedure for airway management. It is indicated for patients who need a patent airway to be maintained and to control pulmonary ventilation. This procedure may be carried out on adult or pediatric patients. Oral endotracheal intubation is a method for placing the tube into the trachea via the oral route. It is frequently performed because of familiarity, speed, and ease of technique. Once the tube is successfully inserted and secured in place, it should be reassessed periodically because the tube can migrate over time due to coughing, suctioning, and movement.

One convenient method to assess any displacement of the tube after the procedure is to estimate and monitor the depth of oral endotracheal tube insertion. For example, the depth of OET should be 9cm at the lips for neonates who weigh 3kg. Various points are used as a reference to determine the tube depth, such as lips, teeth, and gums.

This report intended to examine the evidence on options for point of reference for the placement of an oral endotracheal tube (OET) in patients in different age groups.

RESEARCH QUESTION:

What evidence exists for location of oral endotracheal tube placement (i.e., lips, gums, or teeth) in neonates, pediatric, and adult patients?
METHODS:

A limited literature search was conducted on key health technology assessment resources, including OVID Medline, The Cochrane Library (Issue 1, 2009), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international health technology agencies, and a focused Internet search. Results include articles published between 2004 and February 2009, and are limited to English language publications only. Filters were applied to limit the retrieval health technology assessments, systematic reviews, meta-analyses, and guidelines.

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 evidence-based guidelines.

SUMMARY OF FINDINGS:

From this limited literature search, there were no health technology assessments, systematic reviews, or meta-analyses about OET placement identified.

Three practice manuals developed by local health care facilities provide guidance on recording the location of OET after endotracheal tube insertion.

Health technology assessments
No health technology assessments were identified.

Systematic reviews and meta-analyses
No systematic reviews or meta-analyses were identified.

Guidelines and recommendations

A practice manual developed by County of Ventura Emergency Medical Services (California, 2008) defined the indications, and went through each step of the procedure and documentation for OET insertion by paramedics. There was no description on how the document was prepared or how the recommendations were generated. The report stated that paramedics may utilize oral endotracheal intubation on patients older than eight years of age. It also stated that the following information must be included in intubation documentation: number of attempts, position of tube at teeth, confirmation devices used and results, auscultation results, how the tube is secured, head/neck immobilization, and size of the tube.

A manual prepared by Playford (2006) described the process required to apply OET to adult or pediatric patients in an intensive care unit (ICU) in a hospital in Sydney, Australia. Although this document labeled itself as an evidence-based guideline, no details were provided regarding data retrieval and synthesis. Strength of evidence and recommendations were also not reported. The author stated that the qualified personnel to perform the insertion should be a trained medical officer, or an untrained medical officer under direct supervision of a trained and qualified medical officer. After the tube has been appropriately placed, the point at which the tube meets the lips should be recorded on the flow chart, to assess any displacement of the tube in the future.

A respiratory therapy manual developed by Sudbury Regional Hospital (Ontario, 2005) provided guidance to registered respiratory therapists in performing oral endotracheal intubation on adult...
patients in emergency or non-emergency situations. No details about the development process of this document were provided. In this manual, it stated that after the tube passes the vocal cords and the cuff just disappears, the performer should note the depth of insertion as determined by the centimeter markings on the tube at the patient’s lips.

Limitations

- There were no systematic reviews or health technology assessments evaluating the location of OET in the target population identified from 2004 to date.
- There are a limited number of manuals/guidelines developed by local health care facilities.
- The documents did not provide sufficient data regarding the process of guideline development; therefore it is difficult to assess their quality.
- There is no information provided for location of OET on gums.
- The included documents are all developed by local health care facilities, which may limit their generalizability to other organizations. In addition, different types of health care workers (paramedic, medical officer, respiratory therapist) conducting the intubation makes it difficult to assess the comparability.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:

Published evidence for answering the research question is very limited. Different health care workers in different settings perform intubation in the three guidelines. One guideline indicated using teeth as a point of reference, while the other two used lips as a point of reference. These documents simply noted the location of OET placement, without providing detailed justification. Gums were not mentioned in any of these documents. In summary, various medical personnel are able to perform OET placement, and teeth and lips are recommended to be used as the point of reference to detect tube displacement after the procedure.

In the future, more well-developed evidence-based clinical practice guidelines are warranted, to provide more comprehensive and convincing guidance on the procedure of OET insertion (including documentation of reference point for early detection of tube displacement) for patients in different age groups.

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