Topic Brief: Complication of Endotracheal Intubation

Date: 1/27/2021
Nomination Number: 0946

Purpose: This document summarizes the information addressing a nomination submitted on January 26, 2021 through the Effective Health Care Website. This information was used to inform the Evidence-based Practice Center (EPC) Program decisions about whether to produce an evidence report on the topic, and if so, what type of evidence report would be most suitable.

Issue: The nominator is concerned that people may develop subglottic stenosis after endotracheal intubation. They are requesting the development of standards for endotracheal intubation to promote practice change and prevent complications such as subglottic stenosis.

Program Decision:
The EPC program synthesizes and appraises existing evidence and does not develop clinical standards or guidance. As such, this nomination does not fit within the purview of the program. Quality improvement and dissemination efforts may be more useful in promoting practice change.

Background

According to an assessment of World Health Organization data from 192 member states, approximately 230 million major surgical procedures, typically requiring general anesthesia or sedation, are carried out annually.[1] In the 1940s, deaths from anesthesia occurred at a rate of 6.4 per 10,000 operations. However, as of 2011, that rate had decreased to 0.4 per 100,000 due to improved safety standards and training.[2] While the risk of death and/or severe adverse events due to anesthesia are now rare, the American Society of Anesthesiologists lists postoperative delirium, malignant hyperthermia, and breathing problems during or after surgery, as potential risks of which patients should be aware.[3]

Tracheal intubation, or placement of a tube in the trachea, is performed for patients requiring mechanical ventilation. Recent guidelines on the management of tracheal intubation provide recommendations for cuff pressure, guidance on the selection of the appropriately sized tube and the use of proper technique, and highlight the importance of experienced, skilled physicians performing intubation.[4, 5] In cases of prolonged or traumatic intubation, or cases of excessive endotracheal tube cuff pressure, subglottic stenosis (a narrowing of the larynx below the vocal cords and just above the trachea) can occur.[6] Subglottic stenosis related to intubation is more prevalent in children due to the anatomy of the pediatric airway.[7] In adults, the risk of subglottic stenosis is higher with prolonged (>7 days) intubation,[5] obesity, diabetes, infection, or gastroesophageal reflux disease.[8] The rate of subglottal stenosis is estimated at 4.9 per million in adults.[9]
The nominator asks for development of clinical standards to prevent complications related to endotracheal intubation, particularly subglottic stenosis. Two particular areas of focus in the

nomination are on the maintenance of the cuff pressure within range; and use of appropriately sized endotracheal tube. There appears to be a wide variation in clinical practices about how often to measure the endotracheal cuff pressure and ways to monitor cuff pressure, such as a cuff manometer, in the intensive care unit as well as during anesthesia.[10]

These factors are noted in multiple guidance documents, and an investment in dissemination to promote practice change may be more useful than an evidence review or guidance document. As the nominator has noted, their personal advocacy in this topic has resulted in changes at healthcare facilities with use of a cuff manometer to monitor cuff pressure.

Assessment Methods

We assessed nomination for priority for a systematic review or other AHRQ EHC report with a hierarchical process using established selection criteria. Assessment of each criteria determined the need to evaluate the next one.

1. Determine the *appropriateness* of the nominated topic for inclusion in the EHC program.
2. Establish the overall *importance* of a potential topic as representing a health or healthcare issue in the United States.
3. Determine the *desirability of new evidence review* by examining whether a new systematic review or other AHRQ product would be duplicative.
4. Assess the *potential impact* a new systematic review or other AHRQ product.
5. Assess whether the *current state of the evidence* allows for a systematic review or other AHRQ product (feasibility).
6. Determine the *potential value* of a new systematic review or other AHRQ product.

Resources

While the proposed action, the development of clinical guidance or standards, falls outside of the purview of the EPC Program, these resources may be useful for the nominator.

- Higgs et al. Guidelines for the management of tracheal intubation in critically ill adults. Br J Anaesth. 2018 Feb;120(2):323-52. doi: https://doi.org/10.1016/j.bja.2017.10.021. PMID: 29406182.[4]
- Turner et al. Improving Endotracheal Cuff Inflation Pressures: An Evidence-Based Project in a Military Medical Center. AANA Journal ν June 2020 ν Vol. 88, No. 3. [11]
- Kumar et al. Measuring endotracheal tube intracuff pressure: no room for complacency. Journal of Clinical Monitoring and Computing. https://doi.org/10.1007/s10877-020-00501-2.[10]

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11. Turner MA, Feeney M, Deeds JL. Improving Endotracheal Cuff Inflation Pressures: An Evidence-Based Project in a Military Medical Center. American Association of Nurse Anethetists. 2020;88(3). doi: https://www.aana.com/docs/default-source/aana-journal-web-documents-1/improving-endotracheal-cuff-inflation-pressures-an-evidence-based-project-in-a-military-medical-center-aana-journal-june-2020.pdf?sfvrsn=4564298_6.

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