



Medical Direction and Practices Board
White Paper

Cuffed Endotracheal Tubes for the Pediatric Patient

Background

Cuffed endotracheal tubes (ETTs) have been available in pediatric sizes for approximately 10 years. As of the 2017 protocol revision the MDPB had only allowed for un-cuffed ETTs, sized by weight, age, or length-based formulas, as this was the standard practice in pediatrics. However, un-cuffed ETTs are difficult to size, and because they rely on a friction seal with the patient's trachea, sizing these devices is of the utmost importance. Many studies have since shown that these devices do leak gas & body fluids significantly more than their cuffed counterparts.

Purpose

For the 2019 protocols, the MDPB has approved cuffed ETTs for use in pediatric patients. This white paper will serve as guidance for prehospital providers. Numerous studies have demonstrated that cuffed ETTs achieve a seal without the need to re-intubate the patient if the initial estimate of ETT size is inaccurate. Furthermore, the inflated cuff prevents gas leakage and helps decrease the incidence of aspiration.

Procedure

Intubation should be accomplished in the usual manner consistent with the **Airway Algorithm** protocol. When selecting tube size, use a length-based device with cuffed ETT sizes on it, or you may use the formula $[(age/4) + 3.5]$ for cuffed tubes, or $[(age/4) + 4]$ for un-cuffed tubes. Inflate the cuff with **only** enough air to make the pilot balloon feel full.

Caution

You must monitor the cuff pressure frequently! Numerous studies have demonstrated that pre-hospital providers do not *adequately* measure cuff pressures. It is imperative that you only inflate the cuff enough to create a seal. Too much pressure will cause tissue damage/necrosis. This complication is more profound in the pediatric patient. Pressure monitoring is accomplished using the pilot balloon, as with adult ETTs. Never inflate the cuff with more than the amount of air specified on the device, though you will frequently use less air in the cuff than allowed by the device.

Under no circumstances should one assume that the cuff will prevent the tube from being dislodged. The cuff does not prevent the tube from being dislodged, as you all know from your experience with adult ETTs. You must use ETCO₂, and you must re-assess ETT placement with every transfer/movement of the patient. Further, in children

and adults, consider placing a cervical collar to prevent movement of the patient's head to reduce the risk of the ETT becoming dislodged.

Citations:

1. University of Maryland School of Medicine Emergency Medicine: Pediatrics
https://umem.org/educational_pearls/1400/
2. *Ochsner Journal: Corsino et al 2011 Spring; 11(1): 52–56. Pediatric cuffed endotracheal tubes: an evolution care.*
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096176/#i1524-5012-11-1-52-Khine1>
3. *JEMS 3/2017, Habarat DO, 'An overview of EMS pediatric airway management.'*
<https://www.jems.com/articles/print/volume-42/issue-3/features/an-overview-of-ems-pediatric-airway-management.html>