

DOGMA DETECTIVES CASE #03-17-13-01: SUPRAGLOTTIC AIRWAY ROUNDTABLE

There has been a paradigm shift recently towards alternative (supraglottic) airways in lieu of ET placement. What are the known downsides to these devices? Do they protect against aspiration? Can they make placement of an ET tube in the hospital more complicated? What physiologic effects do they have in cardiac arrest resuscitation? Should these devices take the place of ET placement in the out-of-hospital arena?

The question as to whether or not supraglottic airways will take the place of endotracheal (ET) intubation is still in flux at this time. There is no question that an endotracheal tube is the gold-standard definitive airway. However, maintenance of this skill does require continual training and practice, and ET placement is not always ideal in a tactical or austere environment, and may interrupt chest compressions during high-performance CPR.

It is important to understand that no airway control device is without risks or complications.

Most supraglottic airways do not have complete protection against aspiration. This research experiment published in *Anesthesia and Analgesia* examined a cadaver model of elevated esophageal pressure that would be expected in a vomiting / aspiration situation. The Combitube, Easytube (a dual lumen device similar to the Combitube), and intubating laryngeal mask airway (LMA) showed complete aspiration protection to pressures > 120 cm H₂O. The ProSeal LMA, the King LT (laryngeal tube), and King LTS II showed partial aspiration protection, and were able to block the esophagus until 72–82 cm H₂O. The classic LMA showed leakage at 48 cm H₂O and had the least airway protection.

<http://www.anesthesia-analgesia.org/content/106/2/445.long>

An important note is that a new addition to the airway market – the SALT (supraglottic airway laryngopharyngeal tube) has no aspiration protection, as there is no balloon to occlude the esophagus. This airway has been suggested as an option to facilitate blind intubation, but experiences in a cadaver model show this to be suboptimal.

<http://www.paems.org/pdfs/online-ce/Can-EMS-Personnel-Effectively-Place-and-Use-the-SALT-Airway.pdf>

There have been case reports of angioedema as a result of supraglottic airway placement that have complicated attempts to place an ET tube after placement of the King-LT airway. This is thought to be from obstruction of venous drainage from the tongue by the oropharyngeal balloon.

<http://www.sciencedirect.com/science/article/pii/S0196064409012347>

This recent study published in *Resuscitation*, evaluated the cerebral blood flow in a porcine model of cardiac arrest. The King, LMA, and Combitube all were found in this study to compress the internal and external carotid vessels and decrease carotid blood flow (and ostensibly cerebral perfusion). The exact physiological effects of this in a human model are still unclear.

<http://www.ncbi.nlm.nih.gov/pubmed/22465807?dopt=AbstractPlus>

Supraglottic airways certainly have a role in a difficult airway algorithm, and offer an alternative to ventilate a patient when ET tube placement is difficult due to physiologic or anatomic limitations. They can be placed quicker than an ET tube under most circumstances.

<http://www.ncbi.nlm.nih.gov/pubmed/20405470>

Also, there is a large body of literature that has been recently published that indicates that in cardiac arrest, prevention of interruption of compressions and good high quality CPR is much more important than ventilation.

<http://jama.jamanetwork.com/article.aspx?articleid=186668>

<http://www.nejm.org/doi/full/10.1056/NEJM200005253422101>

http://www.ccjm.org/content/74/Suppl_1/S105.full.pdf

<http://www.sciencedirect.com/science/article/pii/S0735109708034049>

This is a very good article that provides a meta-analysis of ET placement by EMS providers. It discusses a number of important points. Pooled success rates for ET placement were in the upper 80s for EMS providers. RSI (rapid sequence intubation using paralytics and sedatives) showed a trend towards increased success in ET placement, with placement rates reaching towards the upper 90s. In a subgroup analysis, there was much lower success rate for trauma patients, and pediatric patients. Conversely, the highest placement rates were seen in cardiac arrest patients. As an interesting comparison, in the European model, most field intubations are done by physicians using RSI, and their rates of ET placement are very high. As noted by the authors of this article, "This suggests that the intubation difficulties encountered by paramedics are related to the training and experience of the paramedics and the availability of sedatives and neuromuscular-blocking agents, rather than being related to the complicating factors of the field setting itself."

<http://www.paems.org/pdfs/online-ce/Prehospital-airway-oro-tracheal-and-naso-tracheal-intubation-success-rates.pdf>

With the proper training and skill maintenance, and with the right tools, ET placement rates can be maximized in the pre-hospital setting. The best balance of the use of supraglottic airways compared to ET placement should be based on a systems analysis, and likely will have a different "answer" based on the challenges and characteristics of each individual system in which these devices are employed.