

CLINICAL SUMMARY

Prospective Crossover Study Comparing Six Current Generation Supraglottic Airway Device's Ability to Seal During CPR in Human Cadavers

Authors: Joe Holley, MD., Robert Dunne, MD., Heather Robinson, MD., Richard Williams, RRT., and Andisheh Motealleh, PHD.

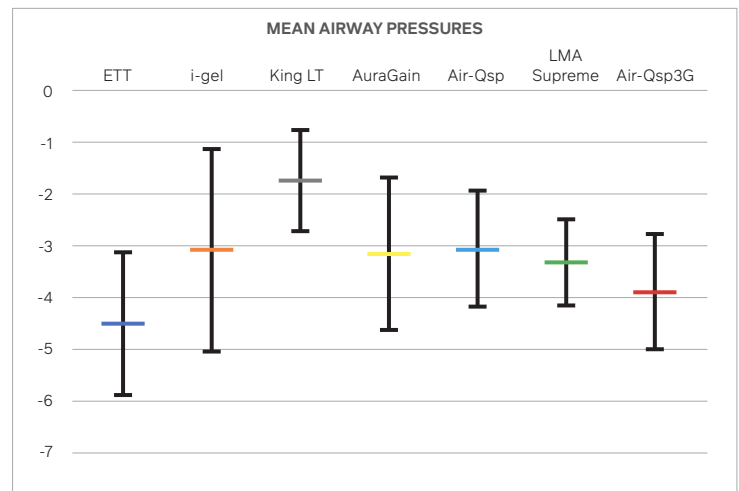
OVERVIEW:

Supraglottic airway (SGA) devices are commonly utilized during CPR, yet their effectiveness in maintaining a reliable airway seal is not well understood. A study involving human cadavers was performed to compare the intrathoracic pressures generated during automated CPR (aCPR) using an Impedance Threshold Device (ITD, Zoll™) across six different SGAs and a standard endotracheal tube (ETT). The SGAs evaluated included the King LTS-D, LMA® Supreme™ (Teleflex®), Air-Q®sp (Cookgas®), Air-Q®sp3G (AirLife®), i-gel® (Intersurgical), and AuraGain™ Disposable Laryngeal Mask (Ambu®). The ETT was used as the benchmark for maintaining a consistent airway seal. In the study, each airway was inserted, and CPR was conducted following AHA guidelines with an automated CPR device and manual positive pressure ventilation using a resuscitation bag. The negative pressures within the airway and the negative intrathoracic pressures generated during CPR were recorded. **Higher negative pressures during the chest recoil phase are linked to improved cardiac output and a better chance of survival with intact neurological function.**

The results demonstrated that the ETT achieved the highest mean negative airway pressures, indicating its superior airway-sealing capability, reinforcing its gold-standard status in airway management. Among the SGAs, the Air-Qsp3G emerged as a notable performer. Although it did not match the ETT in pressure generation, the Air-Qsp3G produced the highest mean intrathoracic pressures among the SGAs tested. This marks an improvement over the Air-Qsp and positions the Air-Qsp3G as a strong option in scenarios requiring rapid SGA deployment. Other SGAs, such as the King LTS-D and AuraGain, generated lower pressures and displayed limitations in creating a sufficient airway seal compared to the ETT and the Air-Qsp3G.

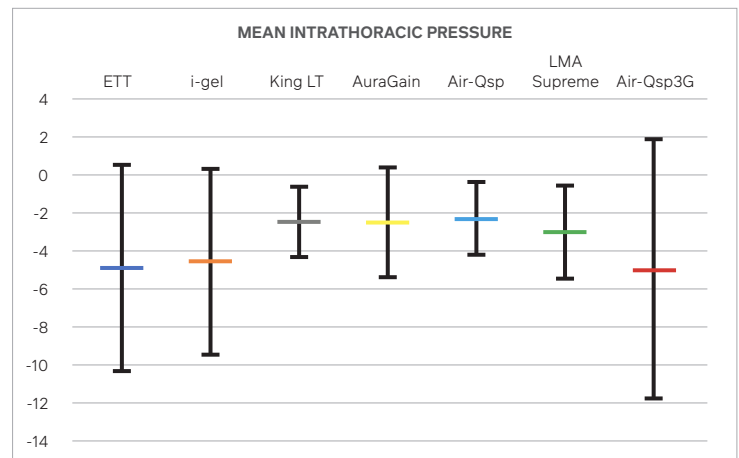
Overall, this study highlights the variability in performance among SGAs during CPR. The findings suggest that the Air-Qsp3G offers a compelling balance between convenience and performance, providing clinicians with a reliable tool that approaches the effectiveness of an ETT in enhancing cardiac output and improving patient outcomes during CPR.

TABLE 2B: MEAN NEGATIVE AIRWAY PRESSURES (CM H₂O)



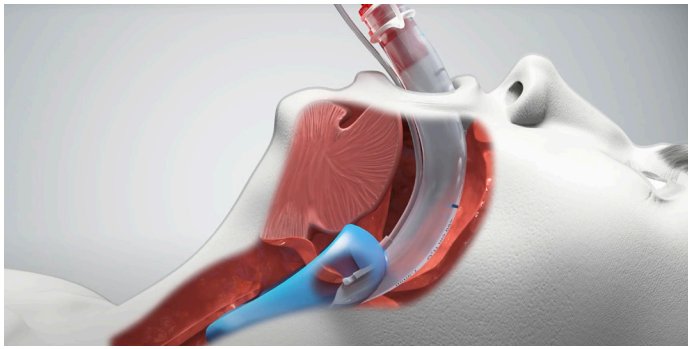
The black whisker bars show the pressure data points collected that fall within one standard deviation above and below the mean data point.

TABLE 3B: MAXIMUM NEGATIVE INTRATHORACIC PRESSURE ON CHEST RECOIL (CM H₂O)



The black whisker bars show the pressure data points collected that fall within one standard deviation above and below the mean data point.





WHAT IS AIR-Q®3?

The Air-Q®3 is an advanced, silicone supraglottic airway designed to help deliver safety and confidence in airway management, no matter the challenges. The anatomically designed tube and cuff allow for improved sealing from the original Air-Q generation. Other features like the ET tube ramp and epiglottis elevator aid in fast, easy, and safe intubations. Air-Q3 comes in four different versions, including self-pressurizing and gastric access options.



AIR-Q®3

Provides exceptional ease of ETT placement when unexpected intubation is required.



AIR-Q®SP3

Uses positive pressure ventilation to self-pressurize the cuff. Cuff pressures cycle between peak airway pressure and PEEP levels.



AIR-Q®3G

Features an extra wide gastric inlet that accommodates O.G. tubes up to 18 Fr and two gastric channels.



AIR-Q®SP3G

Uses positive pressure ventilation to self-pressurize the cuff. Cuff pressures cycle between peak airway pressure and PEEP levels. Features a self-pressurizing cuff with an extra wide gastric inlet that accommodates OG tubes up to 18 Fr and two gastric channels.

Take home message

- **Superior Intrathoracic Pressure Generation:** The Air-Qsp3G demonstrated the highest mean negative intrathoracic pressures among the supraglottic airway devices tested. It is a top-performing SGA that generates the critical pressures needed to enhance cardiac output during CPR.
- **Enhanced Airway Seal Compared to Other SGAs:** The Air-Qsp3G provided a more effective airway seal than other SGAs such as the King LTS-D and AuraGain, reducing leakage and ensuring more reliable ventilation during resuscitation efforts.
- **Improved Design for Rapid Deployment:** With significant design improvements from the Air-Qsp predecessor, the Air-Qsp3G offers an optimal balance of quick insertion, ease of use, and high performance, making it ideal for emergency settings where speed and reliability are paramount. The Air-Qsp3G was statistically equivalent to an ETT for sealing during CPR to allow gas exchange during the upstroke.