EDITORIAL

Advancing Airway Management through Innovations in Supraglottic Airway Devices

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The introduction of supraglottic airway devices (SGAs) by Dr Archie Brain marked a major advancement in the field of airway management. This simplified airway management for routine and both anticipated and unanticipated difficult airway. It has been more than 40 years since the Dr Archie Brain described the laryngeal mask airway (LMA).[1] Supraglottic airways have now become an indispensable part of the anesthesiologist's armamentarium, and their use has surpassed endotracheal intubation United Kingdom.[2] The basic concept of LMA has been modified and advanced by several researchers and device manufacturing companies. Currently there are numerous SGAs available for airway management. These newer devices generally have better airway sealing pressure and have design features to potentially reduce regurgitation and aspiration of the gastric contents. These devices often have a high success rate of insertion, indicating a good efficacy for airway management. But the safety part is often not investigated as well in the clinical studies.[3]

Esophageal seal pressure (ESP) is a measure of the effectiveness of the seal formed by an SGA at the esophageal inlet.[4] Esophageal seal pressure reflects the ability of the SGA to prevent regurgitation of gastric contents into the airway. Various patient-related factors like intra-abdominal mass, gastric outlet obstruction, and abdominal compartment syndrome and surgery specific factors like laparoscopic surgeries in steep Trendelenburg position can cause an increase in the intragastric pressure high enough to cause the regurgitation of the gastric contents into the upper airway, predisposing the patient to aspiration gastric contents.

However, ESP of SGAs are rarely investigated and reported in the scientific literature. This is because it is not possible to measure the ESP in alive subjects, as modification of esophageal pressure from the cephalad end of esophagus alters the esophageal seal of the SGA. Hence, the ESP can only be measured in a cadaver and high-fidelity manikin.

In this issue, Yadav et al. describe an innovative method for measuring the ESP of a newly introduced SGA- I-gel plus.[5] They have compared the ESP of I-gel plus with commonly used I-gel. The comparison of ESP between the I-gel and I-gel plus, as presented in this study, is a landmark in the field of airway management, particularly for trauma and emergency care settings. This detailed investigation into the performance characteristics of these two SGAs provides critical insights into how design innovations can enhance their clinical efficacy. Using high-fidelity manikins, the study highlights the importance of ESP, a parameter not commonly evaluated in previous research but crucial in preventing aspiration-a significant risk in trauma patients.

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Esophageal seal pressure, though often overlooked in clinical trials, is pivotal in preventing aspiration—a major concern in trauma patients who frequently exhibit reduced consciousness or compromised airway reflexes. By modifying a manikin to facilitate ESP measurements, the researchers have provided a robust framework for evaluating SGA performance under controlled conditions. The results reveal that the I-gel Plus achieves substantially higher ESP than the original I-gel, likely due to its innovative design features, such as a longer cuff and improved anatomical fit. These enhancements also contributed to its superior oropharyngeal seal pressure (OLP) and reduced insertion times, emphasizing the importance of continuous device innovation.

A noteworthy aspect of the study is its focus on secondary outcomes, including the success rates and efficiency of blind and fiberoptic-guided endotracheal intubation. The I-gel plus outperformed the original I-gel in all metrics, particularly in blind intubation scenarios, where design modifications like the intubation ramp proved advantageous. While the manikin-based methodology provides consistency and reproducibility, the study acknowledges its limitations, noting that manikin models may not fully replicate the anatomical complexities encountered in clinical practice.

The implications of these findings extend beyond the immediate comparison of two devices. By highlighting ESP as a critical evaluation metric, the study calls for its integration into future research and device design. For clinicians, the improved performance of I-gel plus offers a compelling case for its adoption in scenarios requiring rapid and reliable airway management. Further clinical studies involving diverse patient populations will be essential to validate these findings and optimize the use of SGAs in practice.

In summary, this research not only advances our understanding of SGA performance but also underscores the potential of device

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innovation to enhance patient safety and outcomes in critical care settings. The I-gel plus emerges as a promising tool, setting new benchmarks for airway management in high-stakes environments.

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