

Video Available on:  
www.ijaweb.org

Access this article online

Website: www.ijaweb.org

DOI: 10.4103/ija.IJA\_164\_18

Quick response code



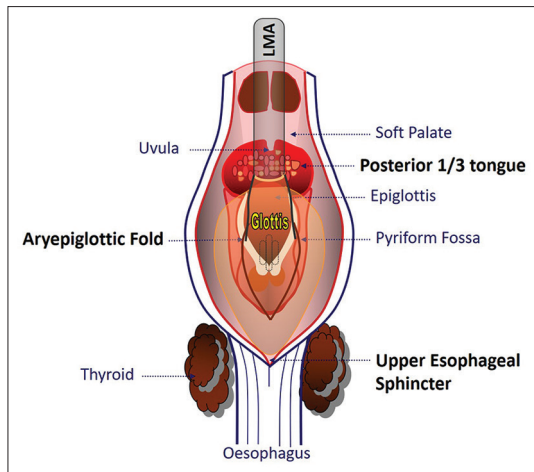
## Securing of supraglottic airway devices during position change and in prone position

Supraglottic airway devices (SADs) are now routinely used for elective airway management. Like regional anaesthesia, anaesthesiologists rule out contraindications for SAD use rather than seek an indication. The flexible laryngeal mask airway (LMA) found its popularity in oral surgeries as the incidence of adverse events were reduced during removal of SAD when compared to endotracheal tube extubation.<sup>[1]</sup> Recently, the LMA has been used for airway management in cervical tracheal resection and reconstruction.<sup>[2]</sup> However, despite the expanding horizons in the use of SADs, their use in the prone position still happens to raise a few concerns. Eight retrospective case series and six prospective studies that involved 1600 patients were identified on Medline search where SADs were electively used for airway management in the prone position. Investigators were able to successfully ventilate all patients and the reported adverse events were managed successfully.<sup>[3]</sup> In a study published in this issue of the Indian Journal of Anaesthesia, Hegde *et al.* demonstrated that Streamlined Liner of the Pharynx Airway™ (SLIPA) and LMA-ProSeal (Proseal™) can be safely used in prone position in adults, but the endotracheal tube was the most efficacious.<sup>[4]</sup> Use of SADs in the prone position is a challenge, and there is a possibility of airway dislodgement, obstruction, desaturation or hypercapnoea. Nevertheless, with the advent of new third-generation SAD (Baska mask) the use of SADs will be even more common, and the airway will be better secured than with the older generation SADs.<sup>[5]</sup>

Whenever supraglottic devices (SADs) are used in positions other than supine, measures must be undertaken to safeguard against possible ventilation failure. The most likely cause of inadequate ventilation

and leak around the SAD is displacement of the SAD when the patient position is changed. Hence, it is imperative to ensure the device is in correct position and the soft seal is intact at 20 cmH<sub>2</sub>O airway pressure. Certain preemptive measures such as choosing the correct type of SAD, size, insertion technique, fixation technique and easy passage of the nasogastric tube through the drain channel can help in preventing SAD displacement during position change.

Perilaryngeal sealer type of SADs (PLS-SAD) form a soft seal around the larynx which is likely to be compromised during patient position change from supine to lateral or prone. Head movements, in addition, can also alter the efficacy of this soft seal. Appropriate seating of the SAD is an important parameter that would determine its dislodgement from its original position [Figure 1]. After insertion, it is a good practice to apply the Tug test to the PLS-SAD [Video 1, online article]. In Tug test, after the PLS-SAD is inserted and the cuff is inflated, controlled gentle upward traction is applied to the shaft/tube of the PLS-SAD till the device meets resistance and does not come out any further. The PLS-SAD tends to come out by 1–2 cm, but as soon as it comes in contact with the base of the tongue, it will not move out any further. The PLS-SAD should now be secured in this position. The Tug test not only ensures that the tip of the PLS-SAD lies above the upper oesophageal sphincter but also releases epiglottis downfolding if it has occurred. In addition, it assures that the cuff of the PLS-SAD has gone past the base of the tongue. The base of the tongue holds the PLS-SAD in position and does not allow the PLS-SAD to slip out into the mouth. In the supine posture with the effect of gravity and muscle relaxation, the tongue sags down towards the pharynx (posteriorly)



**Figure 1:** The correct placement of the laryngeal mask airway. The rim of the laryngeal mask airway cuff lies just below the base of the tongue, sides of the cuff against the aryepiglottic folds and the tip of the cuff above the upper oesophageal sphincter

and the bulge on the base of the tongue becomes more prominent, thereby keeping PLS-SAD in position. If the PLS-SAD is not seated appropriately (cuff has not gone beyond the base of the tongue), it is very likely to slip out when the patient position is changed. In the prone position, both the PLS-SAD and tongue tend to move out in the same direction with gravity and the advantage offered by the bulge on the base of the tongue may become ineffective. Hence, to maintain the satisfactory position of PLS-SAD in the prone position, the device should be effectively taped. Taping the device to the lower lip/chin may not be effective since the mandible is a mobile structure and tends to stoop downwards along with the tongue when the patient is turned prone. On the contrary, the maxilla is a fixed bony structure; hence, taping the PLS-SAD to the maxilla is a better option. In addition, if a neck collar is applied after SAD is inserted and secured, it will help to maintain the SAD in position during a change of position of the patient. The neck collar can then be removed once the patient has been given the position.

I-gel (cuffless sealer) has been successfully used in the prone position, but the evidence is scarce to recommend its use in prone position.<sup>[6]</sup> In the current study by Hegde *et al.*, SLIPA required significantly more frequent head manipulations to correct increased leak.<sup>[4]</sup> The soft seal formed by cuffless sealers is more vulnerable to leak with patient position change than other SADs.<sup>[7]</sup>

SADs are best avoided in children (especially <2 years of age) when unconventional position changes are required. The base of the tongue in children is not

bulky to hold the SAD in position and the leak can develop even with minor changes in head position. The oxygen reserve in children is low and predisposes them to hypoxia in a short time when ventilation is unsatisfactory. Selection of an appropriate size is mandatory if the SAD has to remain in position during posture change. Smaller size SADs can readily slip out into the mouth or develop leaks after a change in patient position. Weight-based size selection is not always reliable, especially when the patient is obese. Auricle-based method or ideal body-weight based method for determining the appropriate size of the Proseal™ is useful compared with the manufacturer's weight-based formula.<sup>[8,9]</sup>

Downfolding of LMA tip remains a concern and occurs during insertion of the device using digital method of insertion. This complication is uncommon with preformed LMAs. Using the bougie-guided insertion technique or mounting the Proseal™ over the introducer reduces the incidence of downfolding.<sup>[10]</sup>

A wide variety of airway devices are available, but it is important to choose the correct device. It must not be forgotten that the endotracheal tube is valuable and provides a secure airway while supraglottic devices are of immense help in the management of difficult airway and when endotracheal intubation is difficult or impossible. Depending on the patient and the condition of the airway and type of surgery, SADs are used as a conduit for the endotracheal intubation. The choice should be made in accordance to the airway, surgery, training and circumstances.

**Pankaj Kundra**

Department of Anaesthesiology and Critical Care,  
JIPMER, Puducherry, India  
E-mail: p\_kundra@hotmail.com

## REFERENCES

1. Kundra P, Supraja N, Agrawal K, Ravishankar M. Flexible laryngeal mask airway for cleft palate surgery in children: A randomized clinical trial on efficacy and safety. *Cleft Palate Craniofac J* 2009;46:368-73.
2. Schieren M, Egyed E, Hartmann B, Aleksanyan A, Stoelben E, Wappler F, *et al.* Airway management by laryngeal mask airways for cervical tracheal resection and reconstruction: A Single-center retrospective analysis. *Anesth Analg* 2017; Dec 12. doi: 10.1213/ANE.0000000000002753. [Epub ahead of print].
3. Lopez AM, Valero R. Use of supraglottic airway devices in patients positioned other than supine. *Trends in Anaesthesia and Critical Care* 2012;2:65-70.
4. Hegde HV, Bandi J, Mudakanagoudar MS, Honnannavar KA. Evaluation of performance of Streamlined liner of the pharynx airway™, Laryngeal mask airway-ProSeal and endotracheal

- tube in prone position: A prospective, randomised study. *Indian J Anaesth* 2018;62:173-81.
5. Alexiev V, Ochana A, Abdelrahman D, Coyne J, McDonnell JG, O'Toole DP, *et al.* Comparison of the Baska(®) mask with the single-use laryngeal mask airway in low-risk female patients undergoing ambulatory surgery. *Anaesthesia* 2013;68:1026-32.
  6. Taxak S, Gopinath A. Insertion of the I-gel airway in prone position. *Minerva Anesthesiol* 2010;76:381.
  7. Banerjee G, Jain D, Bala I, Gandhi K, Samujh R. Comparison of the ProSeal laryngeal mask airway with the I-gel™ in the different head-and-neck positions in anaesthetised paralysed children: A randomised controlled trial. *Indian J Anaesth* 2018;62:103-8.
  8. Haliloglu M, Bilgen S, Uztüre N, Koner O. Simple method for determining the size of the ProSeal laryngeal mask airway in children: A prospective observational study. *Braz J Anesthesiol* 2017;67:15-20.
  9. Solanki SL, Doctor JR, Shekhawat KK, Myatra SN, Joshi M, Divatia JV. Comparison of actual and ideal body weight for selection of appropriate size of ProSeal™ laryngeal mask airway in overweight and obese patients: A prospective, randomised study. *Indian J Anaesth* 2017;61:398-403.
  10. Brimacombe J, Keller C, Judd DV. Gum elastic bougie-guided insertion of the ProSeal laryngeal mask airway is superior to the digital and introducer tool techniques. *Anesthesiology* 2004;100:25-9.

---

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Kundra P. Securing of supraglottic airway devices during position change and in prone position. *Indian J Anaesth* 2018;62:159-61.