A Study to Evaluate Suction Catheter Guided Insertion of Proseal™ Laryngeal Mask Airway.

**KEYWORDS**

Proseal laryngeal mask airway; suction catheter technique; Airway management

**ABSTRACT**

**Purpose:** The aim of the present study was to evaluate the feasibility of suction catheter guided insertion of Proseal Laryngeal Mask Airway (PLMA) as an alternative to conventional techniques of insertion.

**Methods:** After informed consent, fifty ASA I-II adults with normal airways undergoing elective surgery under general anesthesia were allocated to undergo suction catheter guided insertion of PLMA.

**Results:** PLMA insertion was successful in all 50 (100%) patients [48(96%) in first attempt and 2(4%) in second attempt]. The mean time for successful placement of PLMA was 16.14 ± 3.02 sec. The mean oropharyngeal sealing pressure was 32.54 ± 5.37 cm H2O. Majority of the patients had fibreoptic score of I and II [45(90%)].

**Conclusion:** Suction catheter guided insertion of PLMA is an easy technique with high first time and overall success rate of placement, short insertion time and high oropharyngeal seal pressure. We suggest that it is a useful alternative to conventional techniques of insertion of PLMA.

## Introduction:
Airway management is one of the key responsibilities of the anaesthesiologists. Difficulty in tracheal intubation and maintenance of a patent airway remains an important cause of anaesthetic morbidity and mortality. The incidence of immediately life threatening “cannot intubate, cannot ventilate” scenario is approximately 1:10,000.[2] The introduction of laryngeal mask airway (LMA) by AIJ Brain in 1981, acted as a savior in changing this scenario to “cannot intubate but able to ventilate”.[2]

The classic LMA falls short of being an ideal airway device because its low oropharyngeal seal pressure may be inadequate for positive pressure ventilation and it does not protect against aspiration of gastric contents regurgitated into pharynx.[3] The ProSeal laryngeal mask airway (PLMA; Laryngeal Mask Company, Henley-on-Thames, UK) overcame these shortcomings by having a modified cuff to improve the seal, a drain tube to help prevent aspiration and gastric insufflation, facilitate passage of gastric tube and provide information about possible malposition.[3]

The manufacturer recommends digital and introducer tool technique for insertion of PLMA but both these techniques have lower success rate than classic LMA.[4] Several alternative techniques involving the use of gum elastic bougie,[4] fibreoptic scope,[5] gastric tube,[6] suction catheter,[7] acting as a guide through drain tube have been suggested in literature to improve the success rate of insertion of PLMA. The gum elastic bougie has undergone a number of randomized clinical trials and has shown superiority over the conventional digital technique.[6] The suction catheter has certain advantages over bougie for PLMA insertion which includes less trauma, blind insertion without laryngoscope guidance and wide availability of this cheap device.[8] With this in mind, we planned to study the feasibility of suction catheter guided insertion of PLMA as alternative to conventional techniques.

## Methods:
After Institutional Review Board approval and patient’s written informed consent, fifty patients of either sex, between the age of 18-60 years, having physical status of American Society Of Anaesthesiologists grade I & II, scheduled for elective surgery under general anaesthesia in supine position were enrolled for the study. Exclusion criteria were patients with known or predicted difficult airways, mouth opening < 2.5 cm, body mass index > 35 kg m⁻² or at risk of aspiration. All the patients were examined during pre-operative visit. They were kept fasting for 6 hours prior to scheduled time of surgery. They were premedicated with oral ranitidine 150 mg and alprazolam 0.01mg kg⁻¹ the night before and in the morning 2 hours before surgery along with tablet metoclopramide 10 mg orally in the morning at the same time.

Intravenous cannula was inserted and standard monitors [HR, ECG, SpO₂, NIBP] were applied in operating room. Anaesthesia was in supine position with patient’s head on standard pillow, 7 cm in height. Induction was performed with intravenous glycopyrrolate 0.2 mg, propofol 2.5 mg kg⁻¹, fentanyl 2 µg kg⁻¹ followed by vecuronium 0.1 mg kg⁻¹ for neuromuscular blockade. Then after ventilating with 50% nitrous oxide in oxygen for 3 min via face mask using Bain’s circuit, suction catheter (SC) guided insertion of PLMA was done as follows: 1) Priming the drain tube of PLMA with 16 G SC well lubricated with water based gel so that it’s tip protruded beyond the distal aperture of drain tube. 2) opening the mouth and blindly inserting the SC into the oropharynx followed by insertion of well lubricated PLMA along the palatopharyngeal curve. In all patients, a size 3 (in females) and 4 (in males) PLMA was

## Key Points

- **Proseal Laryngeal Mask Airway (PLMA)**
- **Suction Catheter Technique**
- **Airway Management**

---

**Keywords**

Proseal laryngeal mask airway; suction catheter technique; Airway management

---

**ABSTRACT**

**Purpose:** The aim of the present study was to evaluate the feasibility of suction catheter guided insertion of Proseal Laryngeal Mask Airway (PLMA) as an alternative to conventional techniques of insertion.

**Methods:** After informed consent, fifty ASA I-II adults with normal airways undergoing elective surgery under general anesthesia were allocated to undergo suction catheter guided insertion of PLMA.

**Results:** PLMA insertion was successful in all 50 (100%) patients [48(96%) in first attempt and 2(4%) in second attempt]. The mean time for successful placement of PLMA was 16.14 ± 3.02 sec. The mean oropharyngeal sealing pressure was 32.54 ± 5.37 cm H2O. Majority of the patients had fibreoptic score of I and II [45(90%)].

**Conclusion:** Suction catheter guided insertion of PLMA is an easy technique with high first time and overall success rate of placement, short insertion time and high oropharyngeal seal pressure. We suggest that it is a useful alternative to conventional techniques of insertion of PLMA.

---

**Dr. Jatin Lal**

Associate Professor, Department of Anaesthesiology and Critical Care, Pt. B. D. Sharma PGIMS, Rohtak.

**Dr. Susheela Taxak**

Professor, Department of Anaesthesiology and Critical Care, Pt. B. D. Sharma PGIMS, Rohtak.

**Dr. Manu Smriti**

Associate Professor, Department of Microbiology, PDM Dental College and Research Institute, Bahadurgarh.
used. All insertions were in sniffing position with the cuff fully deflated and using midline approach. Once the PLMA was inserted into the pharynx, the cuff was inflated to 60 cm H₂O using manometer. Fixation was as per manufacturer instructions. Anesthesia was maintained with 50% nitrous oxide in oxygen and sevoflurane. Successful placement was judged on the basis of the absence of oropharyngeal air leaks (detected by listening over the mouth), gastric air leaks (detected by listening with a stethoscope over the epigastrium), drain tube air leaks (detected by placing a lubricant over the proximal end of the drain tube), or an end-tidal CO₂ < 45 mm Hg. A total of three attempts were allowed before insertion was considered a failure. An attempt was considered when the device was removed and reinserted in the event of failed passage into the pharynx, significant air leak or ineffective ventilation. In case of failure, alternative airway management strategy was used. An easy insertion was defined as insertion without resistance in a single attempt. A difficult insertion was the one where more than one attempts were required to seat the device. The time between picking up the prepared PLMA (cuff deflated, lubricated, SC attached) and successful placement was recorded. Oropharyngeal seal pressure was measured by recording the circuit pressure at which gas was first heard to escape around the seal pressure was measured by Perilli V et al (38.8 ± 28.3 sec) probably because their study was conducted in nonparalysed patients in contrast to our study on paralysed patients.

**Results:**

Demographic data are presented in table 1. PLMA insertion by the SC-guided technique was successful in all 50 (100%) patients [48(96%) in first attempt and 2(4%) in second attempt]. There was no failure of the insertion of PLMA (Table 2). The mean time for SC-guided insertion of PLMA was 16.14 ± 3.02 sec (Table 2). SC-guided insertion of PLMA was easy in 48(96%) and difficult in 2(4%) patients. The mean oropharyngeal seal pressure was 32.54 ± 5.37 cm H₂O (Table 2). Fibreoptic scoring (1/2/3/4) was measured by Perilli V et al (36 ± 24 sec) probably because their study was conducted in nonparalysed patients in contrast to our study on paralysed patients. Our time is less than that found by García-Aguado et al (36 ± 24 sec) probably because their study was conducted in nonparalysed patients in contrast to our study on paralysed patients. We time is also less than that measured by Perilli V et al (38.8 ± 28.3 sec) probably because PLMA insertion in their study were performed by untrained physicians on non paralysed patients in contrast to our study performed by expert anaesthesiologists. Nagata T et al in their study on sixty anaesthetised non paralysed adults assessed the efficacy of oral gastric tube guided insertion of PLMA over digital technique by less experienced users and found 100% first time and overall success rate. The results are in concurrence to our study.

The mean oropharyngeal sealing pressure in our study was 32.54 ± 5.37 cm H₂O. This is in concurrence with the previous studies who reported high oropharyngeal sealing pressures with suction catheter guided technique.

45(90%) patients in our study had good fibreoptic scores (Grade 1 and 2) suggesting optimal anatomical positioning. This is because the SC guides the distal cuff through the oropharyngeal inlet towards the oesophagus. It also makes the drain tube stiffer reducing the possibility of distal cuff folding.

There are certain limitations in our study. Firstly, we only studied the feasibility of SC guided insertion technique. This technique cannot be as claimed superior to other methods of PLMA insertion because we did not compare it with them. Secondly our patient group had normal airways. Results may vary in patients with difficult airways.
Conclusion:
We conclude that Suction catheter guided insertion of PLMA is suitable alternative to other conventional techniques because of high first time and overall success rate of placement, short insertion time, ease of insertion and high oropharyngeal seal pressure with optimal anatomical PLMA positioning.

Table 1:
Demographic data of the study group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measured Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr</td>
<td>39.44 ± 11.76</td>
</tr>
<tr>
<td>Sex, M/F, n (%)</td>
<td>31/19 (62/38)</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>59.72 ± 8.35</td>
</tr>
<tr>
<td>Height, cm</td>
<td>165.24 ± 8.65</td>
</tr>
<tr>
<td>BMI, kg m⁻²</td>
<td>21.80 ± 2.12</td>
</tr>
<tr>
<td>ASA, I/II, n (%)</td>
<td>42/8 (84/16)</td>
</tr>
</tbody>
</table>

Data are expressed as mean ± SD or number of patients (%). BMI: Body mass index

Table 2:
Number of attempts, Time of insertion and Oropharyngeal seal pressure

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measured Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Attempts, n (%)</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>48 (96%)</td>
</tr>
<tr>
<td>Two</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Three</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Failure</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Time of insertion, sec</td>
<td>16.14 ± 3.02</td>
</tr>
<tr>
<td>Oropharyngeal leak pressure, (cm H₂O)</td>
<td>32.54 ± 5.37</td>
</tr>
</tbody>
</table>

REFERENCE