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Original Research Paper

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A COMPARISON OF INSERTION SUCCESS RATE OF LARYNGEAL TUBE-S AND PROSEAL LARYNGEAL MASK AIRWAY IN ANAESTHETISED PATIENTS BY ANAESTHESIA RESIDENTS

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ABSTRACT Lots of study have been done previously with Laryngeal tube-S and Proseal LMA but study based on performance of anesthesia residents are few. The aim of this study was to compare insertion success rate, and hemodynamic changes after insertion of both the devices and associated complications. This is randomized, controlled, interventional study done in 58 American society of Anesthesiologist status I and II patients, divided into two groups undergoing elective short duration surgeries under general anesthesia. Appropriate size was chosen of LTS and Proseal LMA according to weight and height.

Primary objective was comparison of insertion success rate of both the devices which includes insertion time and number of attempts. Secondary objectives were to assess hemodynamic changes after device insertion and postoperative complications related to both devices. Insertion success rate of Laryngeal tube -S as compared to Proseal LMA is same with no hemodynamic changes after device insertion and minimum complications related to both the device with sore throat seen in recovery.

KEYWORDS : Laryngeal tube S(LTS) , Proseal LMA, insertion success rate, anesthesia,

INTRODUCTION

Over the years LMA has been designed which have improved safety and efficacy. Major advantages related to supraglottic airway devices (SGA) are easy to insertion, avoids sympathetic response caused by laryngoscopy and endotracheal intubation, less sore throat and less cough reflex. That is the reason most of the anesthesiologist nowadays prefer to use SGA instead of endotracheal tube for both spontaneous and mechanical ventilation. Now SGA devices are part of difficult airway algorithm and cardiopulmonary resuscitation guidelines in case of emergency airway management.

Our study included LT-S and Proseal LMA both are second generation SGA (supraglottic airway). Although studies have been done with LT-S and proseal LMA in terms of effectiveness of both the devices and in emergency cases for airway management, our study is going to assess the insertion success rate with hands on for anesthesia residents as primary objective and hemodynamic parameters and postoperative complications as secondary objective.

Present study was done to establish ease of insertion of both LTS and proseal LMA by anesthesia residents. Study includes 58 ASA I or II patients divided into group A (Laryngeal tube-S) and group B (Proseal laryngeal mask airway) posted for elective general surgery such as inguinal hernia repair, laparoscopic cholecystectomy and breast surgery.

METHODS:

After approval from hospital ethics committee, ASA I or II grade patients in between 20-60 years of either sex, weighing from 40-70 Kg, undergoing elective surgical cases of short duration were selected for study. Departmental review board approval was obtained initially. This study was conducted under good clinical practice standards. The period of study was one year. Exclusion criteria included patients who refuse consent for study, with risk of regurgitation (Examples; obese and pregnant patient, with previous history of aspiration or respiratory complication) or having any abnormality of neck or respiratory or alimentary tract, Laryngeal or pharyngeal malignancy and with difficult airway on pre-anesthetic examination.

After detailed pre-anesthetic evaluation and after taking written informed consent from all patients fulfilling criteria, all relevant investigation was done for all the patients posted in routine general surgery procedures. Under Randomized controlled trial, 58 patients would be distributed into group A (LTS group) and group B (Proseal LMA) by choosing sealed envelope, according to inclusion criteria and exclusion criteria. Resident doctors who had previous exposure of insertion of minimum 10 proseal LMA and 5 LTS were selected and with sealed envelope system they were distributed between two groups. Most of the cases were posted for short duration surgery such as breast surgery, inguinal hernia repair and laparoscopic cholecystectomy.

After confirming adequate starvation and checking consent, patients were taken inside the operation theatre, monitors attached like pulse oximeter, NIBP, ECG, capnography. Preoperative readings were noted. 18 G IV cannula secured and IV lactated ringer's solution started.

Anxiolytic IV midazolam 0.03 mg/kg used as premedication followed by IV fentanyl 2 mcg/kg for analgesia. Induction done with IV propofol 2mg/kg followed by check ventilation with mask. Injection IV atracurium 0.5mg/kg given. Preoxygenation continued with 100% oxygen with mask holding for 3 minutes. Size of the LTS was decided according to height of patient and for Pro-seal LMA weight was taken into consideration. After proper head positioning as in sniffing position LTS or Proseal LMA were introduced after lubricating both the devices with water-based jelly.

Figure 1.0

After insertion of device, breathing circuit connected and ventilation checked by manual ventilation. Airway secure confirmed with square wave pattern of capnography, auscultation of breath sounds and effective bilateral chest rise with manual ventilation. Ryle's tube insertion with gastric drainage was another confirmatory sign of proper placement of device. Maximum three attempts were allowed to residents,

in between attempts mask ventilation was continued and next attempt tried after achieving saturation of 99-100%. After three attempts it was declared as failure and airway were secured with endotracheal intubation. Failure of device was considered if three unsuccessful attempts occurred with inadequate ventilation and device is not going beyond oropharynx or significant leak was present.

The device was fixed with tape. Maintenance anesthesia was achieved with oxygen, nitrous oxide and inhalational agents. Insertion time (T1-time start from holding the mask till mask removed) +(T2- mask removed and securing the airway with device). Gastric tube placement of adequate size was also done. Maximum three attempts were allowed for gastric tube placement and was confirmed with epigastric auscultation. After placement of device parameters such as Heart rate, Blood pressure, ETCO2, and SPO2 readings were noted at 1, 5, 10- and 15-minutes interval.

At the end of the procedure device after checking spontaneous breathing of patients removed after anesthesia was stopped and residual neuromuscular blockade reversed with injection neostigmine and glycopyrrolate. Blood staining of the device and lip or dental injury was noted. If there was any incidence of laryngospasm was noted. Complications in recovery assessed such as sore throat, dysphonia, dysphagia, dental and lip injury.

RESULTS:

There was no statistical difference in demographic data between two groups.

Comparison of demographic parameters between Laryngeal tube-S and Proseal LMA.

PARAMETERS	GROUP A (LTS)(n=29)	GROUP B (PLMA)(n=29)
Age (years)	42.31 ± 13.68	36.21 ± 15.77
Gender (female/male)	10/19	12/17
ASA (I/II)	23/6	23/6
Weight (Kg)	59.28 ± 12.79	55.76 ± 13.43
Height (cm)	156.64 ± 6.79	160.14 ± 7.21
Size of device (3/4)	12/17	12/17

Mean insertion time for the effective placement of both the devices was same. Mean insertion time for LTS was 53.93 ± 34.50 and for proseal LMA was 60.24 ± 44.41. First, second and third pass insertion success rate of Laryngeal tube-S were 75.86%, 20.69% and 3.45% and for proseal LMA were 72.41%, 17.24% and 10.34% respectively.

Comparison of insertion time, number of attempts, gastric tube placement and complications between Laryngeal tube-S and Proseal LMA

PARAMETERS	GROUP A (LTS)	GROUP B (PLMA)
Insertion time (seconds)	53.93 ± 34.50	60.24 ± 44.41
Number of attempts (1^{st}/2^{nd}/3^{rd}/fail)	22/6/1	21/5/3
Gastric tube placement (1^{st}/2^{nd}/3^{rd})	16/12/1	15/14/0
Complications (dysphagia/dysphonia/injury/ Laryngospasm /sore throat	0/0/0/0/2	0/0/0/0/3

With regard to hemodynamic response no difference was found between pre-insertion and post-insertion parameters. Pre-insertion heart rate in LTS and PLMA group were 86.48 ±12.37 beats/minute and 87.93 ±10.69 beats/minute respectively. Post-insertion means heart rate in LTS group at 1, 5, 10- and 15-minutes interval were 81.86, 77.66, 75.38, and 72.24 beats/minute, whereas in Proseal LMA group were 84.72, 80.41, 77.41, and 73.28 beats/minute respectively. Similarly, mean systolic and diastolic blood pressures at pre-insertion in LTS group was 125.72/70.17 mm of Hg and in Pro-seal group it was 129.41/67.41 mm of Hg. Post-insertion hemodynamic responses caused by both the devices were minimal in our study there was no significant difference in blood pressure and heart rate after device insertion.

In our study ETCO2 and saturation monitoring was observed at pre-insertion and post insertion at 1, 5,10- and 15-minutes interval. However, among all surgeries although there were 4 laparoscopic surgeries there were no difference in pre-insertion and post-insertion ETCO2 and SPO2 monitoring till subsequent time interval.

DISCUSSION:

This study compared the insertion success rate of two different second generation supraglottic airway device (SAD) in elective surgical cases posted under general anesthesia. In Klaver et al study, insertion time was 55 and 53 seconds in LTS and PLMA, whereas in Chandrakar et al study time was 13.84 ± 2.38 seconds and 14.02 ± 1.72 seconds. In Klaver et al study insertion of device was done by first year anesthesia resident and Chandrakar et al study was done in pediatric age group so results may vary with performance of residents. In contrast to Bikramjit et al study, in present study, we found that there was no significance difference in insertion time between both the groups, as P value is 0.365. In our study insertion time is total of T1 and T2. Mean T1 in both LTS and Proseal LMA group is 3.00 with SD 0.00. whereas mean T2 with SD in LTS and proseal LMA group are 53.93 ± 34.50 seconds and 60.24 ± 44.41 seconds respectively. There is no difference in insertion time between two groups. However, insertion time required for device insertion is comparatively more in our study as device insertion was done by anesthesia residents and results may vary with performance and skills, but these values are not statistically significant. [2,3,4]

In Gaitini et al study first and second insertion attempt for PLMA were 76% and 20% versus for LTS were 80% and 16% respectively, F. Zand et al study first-time insertion success rate of LTS and PLMA were 86% and 88% whereas second time insertion success rate were 96% and 98% respectively. In Chandrakar et al study first, second and third pass insertion success rate in LTS and PLMA were 45/4/1 and 45/5/0 respectively whereas in Bikramjit et al study it was 41/4/2 and 44/4/0 respectively. In our study successful placement of LTS in first attempt was possible in 75.86% patients (22 patients) in LTS group and 72.41% patients in pro-seal LMA group. Second attempt was required in 20.695 in LTS group whereas 17.26% study subjects in pro-seal group needed two attempts. 3.45% of study subjects needed three insertion attempts to put LTS and 10.34% of pro-seal LMA group needed three attempts for insertion. There is no statistically significant difference as P value is 0.57.[1,3,4,5].

Insertion success rate in present study depends upon insertion time and number of attempts for device insertion. Mean insertion time for Laryngeal tube S and Proseal LMA group were 53.93 ± 34.50 seconds and 60.24 ± 44.41 seconds respectively. From this result it can be seen that insertion time required for pro-seal LMA was more than Laryngeal tube-S. On the other hand, first pass insertion success rate of LTS was more than Proseal LMA whereas 10.34% cases of Proseal LMA group needed three attempts which is more than LTS group in which only 3.45% of cases needed three attempts. From this data we can say that ease of insertion for device placement is better for Laryngeal tube-S as compared to Pro-seal LMA, but these values are not statistically significant.

Jarineshin et al study concluded that hemodynamic parameters not change significantly after LMA insertion. Dahaba et al study concluded that LTS causes sustained

hemodynamic stress response in comparison to PLMA. These results are comparable with our study as post-insertion hemodynamic responses caused by both the devices were minimal in our study and there was no significant difference in blood pressure, heart rate after device insertion between pre-insertion and post-insertion reading. [6,7]

Michael B. et al study reported, major complications such as excessive cuff pressure, tongue swelling, hypoxic cardiac arrest, massive stomach distension with ventilation difficulty, and bleeding from soft tissues of the upper airway with LTS. In our study complications were comparatively less. In present study 2 cases in LTS group reported with complains of sore throat in recovery and 3 patients with PLMA insertion. There were zero cases with dysphagia, dysphonia, lip/dental injury and laryngospasm.[8]

CONCLUSION:

Insertion success rate of Laryngeal tube-S as compared to Proseal LMA is same with no hemodynamic changes after device insertion and minimum complications related to both the device with sore throat seen in recovery.

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