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Original Research Article

A STUDY TO COMPARE THE INTUBATING LARYNGEAL MASK AIRWAY BLOCKBUSTER AND THE LARYNGEAL MASK AIRWAY FASTRACH AS AN AIRWAY TOOL IN GENERAL ANAESTHESIA

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Abstract

Background: A more recent supraglottic airway tool, the BlockBuster® Laryngeal Mask Airway, claims it is a more efficient conduit for endotracheal intubation. A well-known tool for this is intubating Fastrach laryngeal mask airway (LMA). This controlled trial study compared the efficiency of these two airway management tools during general anaesthesia. **Materials and Methods:** Total of 80 patients of age group 18-60 years and ASA status I or II undergoing general anaesthesia were randomised into 2 groups, of 40 patients each, for tracheal intubation using either BlockBuster® LMA (Group B) or the Intubating LMA Fastrach® (Group F). Both groups received standard anaesthetic care. The cuff was inflated, and ventilation was tried after airway device placement (maximum 2 attempts). **Result:** In the current study, ease of LMA insertion was recorded in most patients of both B (95%) and F (82.5%). During LMA device insertion, Group F observed 7 (17.5%) two attempts, whereas Group B recorded only 1 (2.5%) reattempt. Ease of ETT intubation was found to be comparable in both groups. The ETT ease of intubation was also similar in both B and F groups, but the number of two attempts was slightly higher in Group F 8(20%) compared to Group B with 2 (5%) patients. Postoperatively, there was a higher incidence of sore throat and blood stains in Group F as compared to Group B. **Conclusion:** Blockbuster LMA had a higher first-time success rate for SAD insertion and ETT intubation than Fastrach LMA. Both devices have a 100% overall intubation success rate. In Blockbuster LMA, fewer post-operative complications were noted.

INTRODUCTION

In anaesthesia and resuscitation, airway care is crucial. The traditional airway management method involves using a rigid direct laryngoscope to direct an endotracheal tube. In contrast, the fibreoptic bronchoscope has long been the gold standard for gaining access and intubating patients with difficult airways. However, its limited availability, high cost, and more difficult learning curve prevent it from being widely used in many institutions. As a result, supraglottic airway devices (SAD) and video laryngoscopes have been developed to help with difficult intubations.[1]

The laryngeal mask airway (LMA), which Dr Archie Brain initially introduced in 1988, was the first significant invention. The LMA's fundamental design has changed throughout time to integrate a stomach drainage tube to reduce the likelihood of aspiration. Some devices additionally contain an additional intubation channel that may be used to secure the airway by passing the endotracheal tube through it.[2] To improve anaesthesia quality and safety, a more recent LMA named BlockBuster® LMA, developed in 2012 (Tuoren Medical Instrument co, Ltd, Changyuan city, China), has gained popularity. It was developed by Professor Ming Tian and offered ventilation and a larger green channel for intubation.[3] One such LMA focused on intubation is

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the 1997-created Fastrach® LMA (Teleflex Medical, Dublin, Ireland). According to research, there are fewer difficulties after successful intubation in both predicted and unforeseen airways, with a rate of about 90–95%.[4-5].

The effectiveness of intubation using the BlockBuster® LMA has been researched extensively.[3,5]

The design of both devices permits the passage of a tracheal tube without obstruction, and earlier research has shown that they are aligned favourably with the glottis inlet. Therefore we decided to employ tracheal intubation. This research compared the success rates of tracheal intubation with BlockBuster® LMA and Fastrach® LMA. The study hypothesised that, because of higher airway seal pressure, lesser angle of emergence (30°) of an endotracheal tube through the cuff of BlockBuster® LMA and the unique tip of the Parker Flexi tip tube to prefer nonresistant areas, we assumed a better success rate during tracheal intubation with BlockBuster® LMA.[5]

The primary aim of this study was to compare the BlockBuster® LMA with LMA Fastrach® in terms of the first-attempt success rate of intubation after insertion of the device during general anaesthesia.

MATERIALS AND METHODS

A prospective double-blind, randomized controlled study was carried out at Government Kilpauk medical college hospital. The sample size was calculated with the help of the OPENEPI software by comparing the requirement of cricoid manipulation for endotracheal intubation between 2 given groups. In our study, 80 subjects were chosen and divided into Group B (n=40) and Group F (n=40). The written consent and Institutional ethical committee approval were taken before the start of the study.

Materials: Anaesthesia machine, Supraglottic airway device blockbuster ILMA and ILMA fastrach. The ETT of size 7, 7.5 and 8 mm ID and Laryngoscope with different blade sizes.

Inclusion criteria: Patients aged 18 to 60 undergo elective surgeries under general anaesthesia, and patients with MPC I & II belong to ASA classes 1 and 2 and have given valid informed consent.

Exclusion criteria: Patients not satisfying inclusion criteria. Patients with anticipated difficult airway (mallampatti scores >3), Trissmus, TMJ pathology and limited mouth opening with inter incisor gap <2 cm), and difficult or limited neck extension. Patients with morbid obesity, Hiatus hernia, Airways surgeries, pregnant women, GERD, and Hiatus hernia patients. Patients with respiratory tract infections and at risk of regurgitating.

Methodology:

All patients were fasted from 10 pm the night before the day of surgery and given Tab. Diazepam 10mg, Tab. Metoclopramide 10mg, and Tab. Ranitidine 150 mg on the night before surgery and premedication with Inj. Ranitidine 50mg and Inj. Ondansetron 4mg intravenously 30 minutes before induction, and the patient was shifted to the operation theatre.

Ringer lactate solution was started in the operation theatre after securing the IV line. Monitors were connected to ECG, SPO_2, NIBP, and $ETCO_2$. Premedication with Inj. Glycopyrrolate 0.2mg IV, Inj. Midazolam 1mg IV, Inj. Fentanyl 2mcg/kg IV was given 10 minutes before induction. Preoxygenation with 100% O_2 for 5 minutes and induction done with appropriate inducing agents and nondepolarising muscle relaxants, and mask ventilation was continued for 3 minutes with a mixture of oxygen, Nitrous oxide and volatile anaesthetics. Depending upon the body weight, appropriate SAD and ETT were chosen.

SAD and ETT are lubricated with lignocaine gel before insertion, positioning the patient in a neutral head and neck position. While inserting, coughing, laryngospasm, ease of insertion, several attempts, and adequacy of ventilation are to be recorded. Adequacy of ventilation after SAD insertion is confirmed by bilateral equal chest rise, auscultation of breath sounds, capnography and no oropharyngeal leak with peak airway pressure ≥20 cm H_2O.

If the above criteria were not met, SAD was repositioned, removed, reinserted, or changed to a different size. If ventilation continued to be a problem, the patient was excluded from this study. After the successful placement of SAD, a lubricated ETT is inserted via the SAD, and the patient is intubated. Correct placement of ETT is confirmed by bilateral equal chest rise, auscultation of breath sounds, and capnography. After the successful intubation, SAD is removed using the standard technique, and the ETT is connected to the anaesthesia machine.

In all patients, insertion of SAD and intubation through the SAD were limited to three attempts.

Intubation was considered successful on the 1st attempt if ETT could be passed without resistance. If any resistance was encountered, different manoeuvres were used, like twisting the ETT and Chandys manoeuvre to align the bevel, which was considered a 2nd attempt. If still, ETT intubation was not successful, up and down movement of ETT was tried, and this was considered as 3rd attempt. When the ETT intubation failed after three attempts, the procedure was abandoned, and ETT intubation was performed using direct laryngoscopy.

Post-operative complications like sore throat, hoarseness of voice, and presence or absence of blood on the device were recorded in the immediate post-operative period. All recorded data were collected, and statistical analyses were done.

Data were presented as Mean and Standard deviation for continuous variables and percentages for categorical variables. A Chi-square test was done to find out any association between categorical variables. In addition, an ANOVA test was done to compare the three groups' mean. A p-value of less than or equal to 0.05 was considered significant.

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RESULTS

In the present study, 80 patients were enrolled and divided into the Blockbuster group (Group B) with 40 patients and the Fastrach group (Group F) with 40 patients. The maximum number of patients was reported in the age group of 31 to 40 years in both B (22.5%) and F (27.5%) groups. Female predominance was reported in both groups. The mean weight and height were reported to be comparable in both B and F groups. The same number of patients (60%) were found with ASA 1 status in both B and F groups.No laryngospasm and desaturation were reported among patients of both groups [Table 1].

Table 1: Demographic variable of patients in both B and F groups

Variables		Group B	Group F
Gender	Male	15 (37.5%)	18 (45%)
	Female	25 (62.55)	22 (55%)
Age Group	11-20 years	7(17.5%)	2 (5%)
	21-30 years	7 (17.5%)	10 (25%)
	31-40 years	9 (22.5%)	11 (27%)
	41-50 years	7 (17.5%)	9 (22.5%)
	51-60 years	10 (25%)	8 (20%)
ASA Class	ASA I	24 (60%)	24 (60%)
	ASA II	16 (40%)	16 (40%)
Laryngospasm Status	No	40 (100%)	40 (100%)
	Yes	0 (0%)	0 (0%)
Weight (kg) Mean ± SD		67.13 ±10.8	68.00 ± 9.11
Height (cm) Mean ± SD		158.58 ± 4.32	158.83 ± 3.98

In the present study, ease of LMA insertion was reported in most patients of both B (95%) and F (82.5%). During LMA device insertion, Group F observed 7 (17.5%) reattempts, whereas Group B recorded only 1 (2.5%) reattempt. Ease of ETT intubation was found to be comparable in both groups. The ETT ease of intubation was also similar in both B and F groups, but the number of two attempts was slightly higher in Group F 8 (20%) compared to Group B with 2 (5%) patients. Successful intubation was observed in all patients of both groups [Table 2].

Table 2: Comparative evaluation of different parameters between Group BB and Group FT

Variables		Group B	Group F	p-value
Ease of Passage of LMA Status	Easy	38 (95%)	33 (82.5%)	0.077
	Moderate	2 (5%)	7 (17.5%)	
Adequacy of Ventilation Status	Yes	40 (100%)	40 (100%)	>0. 999
	No	0 (0%)	0 (0%)	
Supraglottic Device Insertion - Number of Attempts Status	One	39 (97.5%)	33 (82.5%)	0.025
	Two	1 (2.5%)	7 (17.5%)	
Tracheal Intubation - Ease of Passage of ETT Status	Easy	38 (95%)	35 (87.5%)	0.235
	Moderate	2 (5%)	5 (12.5%)	
Tracheal Intubation - Number of Attempts for ETT Status	One	38 (95%)	32 (80%)	0.043
	Two	2 (5%)	8 (20%)	
Tracheal Intubation - Successful Intubation Status	Yes	40 (100%)	40 (100%)	>0.999
	No	0 (0%)	0 (0%)	

The post-operative complications, such as the incidence of sore throat in Group B and Group F, were recorded compared with moderate sore throat slightly higher 5 (12.5%) in Group F than in group B 4 (10%) occurrences. In addition, the incidence of blood staining in Group B and Group F was found to be 4 (10%) and 5 (12.5%), respectively.

Table 3: Comparison of complications between both groups

Complication		Group B	Group F	p-Value
Sore Throat/Hoarseness of Voice Status	Nil	30 (75%)	30 (75%)	0.764
	Mild	6 (15%)	5 (12.5%)	
Blood on Device Status	Moderate	4 (10%)	5 (12.5%)	0.723
	Absent	36 (90%)	35 (87.5%)	
	No	0 (0%)	0 (0%)	

DISCUSSION

Traditional SAD have a well-established place in the treatment of failed intubations and as a rescue airway in situations where it is impossible to intubate and ventilate. SADs have been suggested five times in the ASA task force methodology for managing the difficult airway, either as a ventilatory device or as a route for endotracheal intubation. However, the effectiveness of a device to enable successful intubation varies significantly depending on the device structure.

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The two groups were comparable for demographic variables like age, gender, weight, height, and ASA physical status, which is ideal for the comparative evaluation of both groups. In addition, Modi et al. reported similar findings in their investigations where demographic parameters were comparable in both B and F groups.[6] In the current study, both devices allowed for successful intubation in all 100 instances with a maximum of two attempts. However, BlockBuster LMA had a first-attempt success percentage that was much higher (95%) than Fastrach LMA's (82.5%). The outcomes of intubation with BlockBuster LMA were consistent with the study conducted by Endigeri.[7] et al., in which the first attempt success rate was 90%, and the overall success rate of intubation was 96.6%. The results of the overall success rate of intubation via Fastrach LMA in our study were found to be higher when compared with the study done by Anand8et al., with the overall success rate of intubation with Fastrach being 92%. Halwagi9et al. with the overall success rate of intubation in their study, with Fastrach LMA being 90%. The structural variations between the two devices can explain the discrepancy between the first-attempt and second-attempt success rates. With the aid of the ETT directing ramp in the LMA mask, the airway channel of the BlockBuster LMA is angulated at a greater than 95° angle and facilitates tube insertion at a 30° sharp angle from the LMA bowl. In contrast, the airway tube in a fastrach LMA creates a 128° arc that helps enter the tube's laryngeal entrance at a 40° angle. It was possible to ventilate all the patients after insertion of either Blockbuster or Fastrach LMA, and there was no incidence of intraoperative complications like laryngospasm. Ferson10et al. also reported similar findings in their study. In the present study, the first attempt success rate of tracheal intubation was 95% in Group B, similar to Yunluo.[11] et al. Unlike in our study; they did not mention the attempts for intubation. The first attempt success in Group F was 80%, similar to Liu .[12] et al. However, the difference was that they did not do a fibreoptic assessment of the LMA position as in our study. Postoperatively, Group F had a greater incidence of sore throat and blood stains, which can be linked to the device's stiff metallic construction, leading to more mucosal damage than Blockbuster LMA's comparatively flexible body. These findings from the current investigation are comparable to those from the study by Endigeri.[7] et al.

CONCLUSION

There is no significant difference between the Blockbuster ILMA and the LMA-Fastrach in terms of adequacy of ventilation, the incidence of adverse response, and successful intubation status. However, supraglottic device insertion and ETT intubation were superior using the Blockbuster ILMA rather than the LMA- Fastrach in terms of success in the first attempt. In addition, post-operative complications were reported more with Fastrach LMA than Blockbuster LMA, with insignificant effects.

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