



Anaesthesiology

A COMPARATIVE ASSESSMENT OF CLINICAL PARAMETERS AND EASE OF INSERTION FOR ENDOTRACHEAL INTUBATION USING BLOCKBUSTER LMA VERSUS I-GEL AS A CONDUIT IN ABDOMINAL SURGERIES UNDER GENERAL ANAESTHESIA

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ABSTRACT **Introduction:** Endotracheal intubation is frequently referred to as the "gold standard" for airway management in an emergency. The present study is an attempt to compare the BlockBuster LMA with I-Gel regard to first-attempt success rate of blind tracheal intubation. We also have tried to study Time of insertion, Ease of insertion, Number of attempts, Success of device placement. **Methodology:** The patients who were fulfilling the inclusion criteria were randomly divided into two groups -Group B (BlockBuster LMA) and Group I (I-GEL), with 40 patients in each group. The appropriate size of LMA was selected according to body weight as per the manufacturers' guidelines. Time required for insertion of LMA is defined as time in seconds from removal of face mask where adequate ventilation as established through LMA with normal square wave capnogram. Soon after the insertion, LMA cuff was inflated with air.ETT intubation was done through blockbuster LMA/I-gel. **Results:** First attempt success rate was 90% in Group B and 70% in Group I respectively. Mean (SD) of time of insertion (in seconds) was 14($\pm$ 1.4) and 36($\pm$ 1.5) among group1 and Group I respectively. And insertion was difficult in 15% of group1 and 65% of Group I respectively. This is found to be significant (p value <0.05) And insertion was difficult in 15% of group1 and 65% of Group I respectively. Mean (SD) of time of insertion (in seconds) was 14($\pm$ 1.4) and 36($\pm$ 1.5) among group1 and Group I respectively. **Conclusion:** The present study was able to prove that the mean time of insertion of ET tube is much lesser in groupB compared Group I, Mean (SD) of time of insertion (in seconds) was 14($\pm$ 1.4) and 36($\pm$ 1.5) among groupB and Group I respectively. First attempt success rate was 90% in BlockBuster LMA and 70% in I-Gel.

KEYWORDS :

INTRODUCTION:

One of the primary requirements for appropriate therapy in emergency patients is to secure and monitor the airway. Without intermediate ventilation and oxygenation, the total amount of time needed to secure the airway in an emergency is only 30 to 40 seconds. Endotracheal intubation is frequently referred to as the "gold standard" for airway management in an emergency, repeated failed intubation attempts put the patient at risk by prolonging hypoxia and injuring the upper airways rather than maintaining oxygenation.¹ As a bridge connecting ventilation and intubation in all patient types, supraglottic airway devices with a conduit for blind tracheal intubation are growing in popularity. Guidelines from the 2016 "All India Difficult Airway Association" are helpful and also recommend laryngeal mask airways with intubation conduits.² According to studies, the success rate of blind intubation in both expected and unexpected airways is about 90–95%, with a lower incidence of complications.³ The success rate of blind intubation using the BlockBuster LMA has been researched extensively.^{4,5} In difficult airway algorithms, supraglottic airway devices play a key role as common airway adjuncts during anaesthesia or resuscitation.^{6,7} In the current situation, they serve as a conduit for both planned blind intubation and fiberoptic guided intubation in anticipated or unanticipated difficult laryngoscopies.⁸ The intubating LMA (ILMA) is frequently used as a conduit for fiberoptic-guided ETI and blind ET.^{9,10} The present study is an attempt to compare the BlockBuster LMA with I-Gel regard to first-attempt success rate of blind tracheal intubation. We also have tried to study Time of insertion, Ease of insertion, Number of attempts, Success of device placement, Ease of removal of the device after successful tracheal intubation, Perioperative hemodynamic changes.

METHODS AND METHODOLOGY:

This study was conducted in GSVM Anaesthesiology department with 80 co-operative patients undergoing elective abdominal surgery under general anaesthesia requiring endotracheal intubation aged between 18 to 60 years belonging to American Society of Anaesthesiologists (ASA) physical status I–II and Modified mallampati classification (MMT) I–III. Patients with Mouth opening less than 2 cm, Patients with Oropharyngeal pathology/facial deformities, Patients with Morbid obesity (BMR $\geq$ 35), Patients who had Emergency surgery/NPO status unknown, Patients who were Pregnant were excluded.

All the necessary information regarding the study were explained and Informed written consent was taken, the patients who were fulfilling the inclusion criteria were included in the study were randomly divided into two groups - Group B (BlockBuster LMA) and Group I (I-GEL),

with 40 patients in each group. Group allocations were placed in sealed, opaque envelopes on initial randomisation. An anaesthesiologist with an experience of at least 25 successful insertions and intubations with both the devices performed blind tracheal intubation using either of the LMAs. Observation and data collection was done by an independent observer. Randomisation of the device assignment was revealed to anaesthesiologist just prior to the device placement. Patients were kept nil by mouth (NBM) for 6 hours prior to surgery. Tablet alprazolam 0.5 mg was given for all patients orally one night before surgery. Standard multichannel monitoring was used throughout the procedure, including non-invasive blood pressure (NIBP), electrocardiograph (ECG), pulse oximetry (SPO2) and end tidal carbon dioxide (ETCO₂). Pre-medication with intravenous glycopyrrolate 0.2 mg, ondansetron 4mg, midazolam 0.02 mg/kg, fentanyl 2 μ g/kg. All patients were pre-oxygenated with 100% oxygen for 3 minutes and anaesthesia induce with intravenous propofol 2 mg/kg in slow incremental dose with adequacy of mask ventilation. After confirming adequate mask ventilation, inj. vecuronium 0.1mg/kg was administered for neuromuscular blockade. After 3 minutes, either of the devices were inserted using a midline insertion technique in neutral neck position for both the groups. The appropriate size of LMA was selected according to body weight as per the manufacturers' guidelines.

Anesthesia was maintained with controlled intermittent positive pressure ventilation using oxygen and nitrous oxide (50-50%) isoflurane, injection vecuronium. Time required for insertion of LMA is defined as time in seconds from removal of face mask where adequate ventilation as established through LMA with normal square wave capnogram. Soon after the insertion, LMA cuff was inflated with air using Smiths cuff pressure manometer. ETT intubation was done through blockbuster LMA/I-gel. After confirming proper ventilation comparison between both devices was done for Each of insertion (easy or no resistance, moderate or minimal resistance, difficult or significant resistance), Number of attempts (maximum of 3 attempts was allowed before considering the device a failure), Success of device placement divided into two parts First pass successful intubation and 2nd pass successful intubation, Ease of removal of device (easy or no resistance, moderate or minimal resistance, difficult or significant resistance). Hemodynamic changes were noted throughout the surgery. Serial HR, MAP, SPO2, EtCO₂ monitoring was done every 30 second at time of insertion of device till successful intubation then every 15 minutes till end of procedure. All the data collected were entered into a spread sheet on Micro Soft Office Excel Sheet and later transferred to SPSS IBM version 21.0 for analysis. Data analysis was done with Statistical Package for Social Sciences (SPSS IBM) version 21.0. Per protocol analysis was done.

RESULTS:

The baseline characteristics of both groups were comparable and no difference exist between the group as evidenced by p values with sex, age and ASA grades in table 1. The weight (in kg) of the participants ranged from 45.1 to 91.4 kg with a mean (SD) of 24(±4.7) in group I and 46.8-92.5kg with mean (SD) of 24(±4.1) in Group I in table 2. First attempt success rate was 90% in Group B and 70% in Group I respectively. Mean (SD) of time of insertion (in seconds) was 14(±1.4) and 36(±1.5) among group I and Group I respectively. And insertion was difficult in 15% of group I and 65% of Group I respectively. This is found to be significant (p value <0.05). First attempt successful insertion of ET tube was found in 90% of Group B and 70% of Group I. Independent t test was applied to find difference in insertion time of ET tube among the groups. It was found from the analysis that the mean time of insertion time of ET tube in group I was lower when compared to Group I. This was found to be statistically significant. (p value =0.005). (Table 3) Among the study participants, in Complications such as trauma, cough, and sore throat were much higher in Group I compared to Group B. This was found to be statistically significant. (p value <0.05) (Table 4)

Table 1: Baseline Characteristics Of Study Participants

S. No		Group B N=40 N(%)	Group I N=40 N(%)	P value
1	Age <30 years 30-45 years 46-60 years	18(45) 13(32.5) 9(22.5)	19(47.5) 10(25) 11(27.5)	0.888
2	Sex Male Female	28(70) 12(30)	30(75) 10(25)	0.251
3	Comorbidities Yes No	40(100) 0	40(100) 0	No comorbidities were found in both group 1 and group 2
4	ASA grade 1 2	25(62.5) 15(37.5)	20(50) 20(50)	0.519
5	Mallampatti grading 1 2	34(85) 6(15)	33(82.5) 7(17.5)	
6	Mouth opening (in cm)	5.5(0.37)	5.6(0.38)	

Table 2 : Anthropometric And Vital Parameters

S. No.		Group B N=40 N(%)	Group I N=40 N(%)
1	Weight (kg)	64.6(±12.5)	60.6(±13.1)
2	Height (cm)	160.8(±9.1)	161.9(±10.3)
3	BMI (kg/m ²)	24(±4.7)	24(±4.1)
4	Heart rate (per min)	83(±8)	83(±6)
5	Respiratory rate (per min)	13(±0.5)	14(±0.4)
6	Temperature (F)	98.7(±1.1)	98.1(±1.2)
7	Systolic blood pressure (mmHg)	131(±14)	128(±10)
8	Diastolic blood pressure (mmHg)	78(±6)	78(±7)

Table 3: Evaluation Of Parameters

S. No.		Group B N(%)	Group I N(%)	P value
1	Success rate First attempt success rate	36(90)	36(90)	0.456
2	Time of insertion of ET tube	14(±1.4)	36(±1.5)	
3	Attempts of insertion of ET tube I attempt II attempt Successful ET insertion	36(90) 4(10) 40(100)	28(70) 12(30) 40(100)	
4	Ease of insertion Easy Difficult	34(85) 6(15)	14(35) 26(65)	0.04

Table 4 : Complications Of The Procedure

S. No.	Complications	Group 1 N(%)	Group 2 N(%)	P Value
1.	Trauma (bleeding)	1(2.5)	3(7.5)	0.305
2.	Esophageal intubation	0	0	-
3.	Sore throat	1(2.5)	3(7.5)	0.305

4.	Cough/ gagging	1(2.5)	3(7.5)	0.305
5.	Regurgitation	2(5)	1(2.5)	0.556

DISCUSSION:

The present study was a randomized controlled trial which was conducted to compare the BlockBuster LMA with I-Gel regard to first-attempt success rate of blind tracheal intubation. Group B patients had endotracheal intubation through blockbuster LMA. Group I patients had endotracheal intubation through I-Gel. The mean (SD) age of study participants in Group B and Group I was 35(±14.3) and 35(±14) respectively. There were 28(70%) males and 12(30%) females in group B and 30(75%) males and 10(25%) females in Group I. Among the study participants, ASA grades were grade 1 in 53.3% and grade 2 in 46.6% among Group B participants. In Group I, grades were in grade 1(53.3%) and grade 2(46.7%). Mean (SD) of time of insertion (in seconds) was 14(±1.4) and 36(±1.5) among group B and Group I respectively and insertion was difficult in 15% of group B and 65% of Group I respectively. The mean time of insertion time of ET tube in group B was higher when compared to Group I. (p value =0.005). Kapoor S et al¹¹ reported that the time taken for successful tracheal intubation through LMA Fastrach was lesser (20.96 s) when compared to i-gel (24.04 s). Complication rates were statistically similar in both the groups and Tosh P et al¹² reported that the time taken for securing airway and number of attempts taken were significantly higher in Group B. Incidence of trauma was comparable. Oropharyngeal leak pressure (OLP) was significantly higher in Group B (36.33±5.68 vs 25±5.79), percentage of patients with Grade I-III score on fiberoptic assessment was also significantly higher in Group B. Hashemian SMR et al¹³ reported that Regarding duration of insertion attempts, the difference between groups was significant (P < 0.05); while the number of insertion attempts was insignificant (P = 0.265). There was no significant difference between both groups regarding postoperative complications (cough, sore throat, and blood on the cuff) (P > 0.05). Thus the time of insertion of SGD was much lower in blockbuster LMA compared to iGel. It was found that first attempt success rate was 90% in Group B and 70% in Group I respectively. Second attempt was 100% in both groups as in study done by Bhandari G et al¹⁴ reported that achieved a 100% success rate in insertion of i-gel and in 171 out of 180 patients; i-gel was inserted in the 1st attempt itself. The authors also were able to achieve an overall success rate for blind endotracheal intubation via i-gel in 78.33% cases, and successful gastric tube placement was possible in 92.22%. Anuradha et al¹⁵ reported that the overall success rate, as well as the first attempt success rate for blind endotracheal intubation, was high with LMA Fastrach and were 95% and 87.5%, respectively. The mean time for successful first-attempt tracheal intubation was equal in both the groups. Overall success rate for supraglottic device placement and hemodynamic changes were comparable in both groups. The failure rate for blind endotracheal intubation through the supraglottic airway device was significantly high in i-gel (27.5%) with the high incidence of esophageal intubation when compared to LMA Fastrach (P < 0.05). Verma B et al¹⁶ reported that an average of 0.90 attempts and 0.93 attempts for insertion of devices was recorded for Group I and Group II respectively (p value = 0.647). Mean time taken for insertion of devices was 6.60 seconds and 6.70 seconds for Group I and Group II respectively (p value=0.865).

Endigeri N et al¹⁷ reported that the first-attempt success rate of tracheal intubation was 90% in Group B and 66.6% in Group F (P=0.028), while the overall success rate of intubation was 96.6% in Group B and 89.9% in Group F (P=0.3). In the present study, among the study participants, complications such as trauma, cough, sore throat were much higher in Group I compared to Group B was found to be statistically significant (p value <0.05). Endigeri N et al¹⁷ reported that the complications such as sore throat and blood stain were reduced with BlockBuster® LMA and Hashemian SMR et al¹³ reported that there was no significant difference between both groups regarding postoperative complications (cough, sore throat, and blood on the cuff) (P > 0.05). Thus it can be concluded that the complications were much higher in iGel group compared to blockbuster LMA.

CONCLUSION :

The present study was able to prove that the mean time of insertion of ET tube is much lesser in group I compared Group I, Mean (SD) of time of insertion (in seconds) was 14(±1.4) and 36(±1.5) among group I and Group I respectively. And insertion was difficult in 15% of group I and 65% of Group I respectively, First attempt success rate was 90% in BlockBuster LMA and 70% in I-Gel. Group respectively, Complications such as trauma, cough, sore throat were much higher in I-Gel compared to BlockBuster LMA.

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