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Comparison of Lma Supreme and I-Gel In Short Surgical Procedures Under General Anaesthesia

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ABSTRACT

Background –

I-GEL and LMA supreme are single-use 2nd generation supraglottic airway devices. The objectives of this study are to compare the number of attempts, ease, and time taken for insertion and complications during usage of these devices.

Material and methods-

The randomized single-blinded prospective study was conducted with 60 patients of ASA Grade 1 and 2 assigned into 2 groups undergoing short surgical procedures under general anesthesia. The device was chosen according to the weight of the patient. We assessed the mean time of insertion (in seconds), ease of insertion, no. of attempts of insertion, ease of insertion of a gastric tube, and complications.

Results-

The mean time of placement of I-gel was greater than LMA supreme. LMA supreme was easily inserted in comparison to I-gel. Also, no. of attempts were more with I-GEL. There was no incidence of desaturation, dental trauma, or laryngospasm in both groups.

Conclusion –

Both I-gel and LMA supreme provided a satisfactory and secure airway during short surgical procedures under general anesthesia. LMA supreme has an edge over I-gel in being superior to I gel in terms of shorter time taken for insertion, no. of attempts during anesthesia.

Keywords-Laryngeal masks, airway management, short surgical procedures

Study Design: Randomized single-blinded prospective study

1. INTRODUCTION

Laryngoscopy and intubation stimulate the sympathetic system reflexly and may provoke laryngospasm and bronchospasm in a person having reactive airway [1]. In the past several decades, a variety of supraglottic airway devices have been introduced with the goal of a more convenient replacement of tracheal intubation.

LMA Supreme (SLMA)is a new, single-use, latex-free, laryngeal mask airway with gastric access. The anatomically shaped airway tube permits easy insertion without placing fingers in the patient's mouth. The cuff is designed to provide higher seal pressures than the LMA Classic.[2]

I-Gel is a latex-free SAD with a non-inflatable cuff and medical-grade thermoplastic elastomer. The design creates a more intimate interface for interlacing with supraglottic tissue. The I-Gel offers a good seal during anesthesia for both controlled and spontaneous ventilation.[3]

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In our study, we are comparing two supraglottic devices I-gel and LMA supreme for their attempt, ease and time of insertion, and complication during their use.

AIM -To compare the number of attempts, ease, and time taken for insertion and complications during usage of these devices.
INCLUSION CRITERIA - ASA Grade I & II. • Age 18-45 years. • Surgeries with a duration of less than one hour.
EXCLUSION CRITERIA- Patients with a difficult airway. • Presence of acute or chronic airway diseases. • Patients with other illnesses like DM, hypertension, cardiac and pulmonary disease, and GERD. • Procedure that requires more than one hour.

2. MATERIAL AND METHOD

This study was a randomized single-blinded prospective study comparing two supraglottic devices. Sixty patients under ASA grade I & II undergoing short surgical procedures under general anaesthesia were enrolled in the study. Patients were randomized into 2 groups; monitors were connected and i. v. cannulation was done. Premedication was done with Inj.Ondansetron 4mg i.v, Inj. Ranitidine 50 mg, Inj. glycopyrrolate 0.2 mg i.v., Inj. Midazolam 1mg, Inj. Fentanyl 1 mcg/kg. Patient induced with Inj.Propofol 2mg/kg i.v. and Inj. Succinylcholine (1.5mg/kg)given. An appropriate supraglottic airway device based on patients' weight was inserted, proper insertion and correct placement were assessed by chest expansion, presence of Co2 waveform, absence of audible leak, and ability to achieve an expiratory tidal volume of 6 ml/kg. Ease of insertion was graded as easy, difficult, failure even with adjustment of the device, 2 insertion attempts were allowed. Insertion failed even after 2 attempts were followed by intubation, insertion time was measured from picking off the supraglottic device in hand until the first stroke in capnography. Maintenance with nitrous oxide and oxygen mixture with atracurium intermittent doses, ease of insertion of device, number of insertion attempts, time taken for insertion were noted. Heart rate, NIBP was noted at 1,3,5 minutes post-insertion, at the end of surgery patient reversed with neostigmine and glycopyrrolate. Incidence of blood staining of the device, laryngospasm, dental trauma, saturation less than 95%, and sore throat was noted.

Statistical analysis- The mean insertion time for LMA supreme has been reported to be 24 ±3.1 secand for I-gel, it was 15.91 ± 2.2 in our pilot study with 10 patients. To detect a projected difference of 10% between the groups with respect to insertion time of devices, a Type I error of 0.05 and a power of 0.8, a total of 60 patients were required in each group 30 patients(n=30).
Parametric data was expressed as mean ± SD and analyzed using the student's *t*-test. Nonparametric data was expressed as median and interquartile range was analyzed using the Mann–Whitney U-test. Count data was compared using the Chi-square test. $P < 0.05$ was considered as statistically significant**.**

3. RESULTS

Sixty patients of in ASA I &II status undergoing elective procedures under general anaesthesia were studied. The parameters observed are LMA insertion time in seconds, mean time of placement of I-GEL was around 24.3 seconds and for LMA SUPREME was 16.7 seconds. LMA SUPREME was easily inserted in most of the patients compared to I-gel. LMA SUPREME is superior to i-gel in comparison to no. of attempts and ease of insertion.

TABLE-1

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Patient Characteristics	i-gel	LMA Supreme	P-value
Age	34.47±7.104	35.23±6.611	0.667
Height	160.10±6.855	161.57±8.016	0.449
Weight	62.47±6.872	61.60±6.750	0.624
BMI	24.298±2.7816	23.582±2.0253	0.259
ASAI/II	20/10	23/7	0.567

TABLE-1.describes that age, height, weight, BMI, were not statistically significant between the two groups.

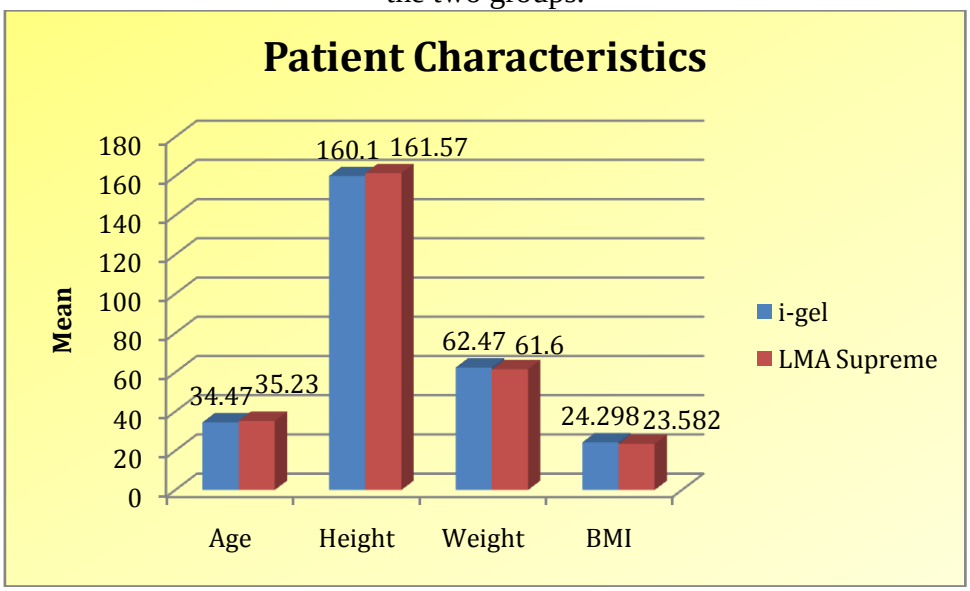

TABLE-2

Parameter	i-gel	LMA Supreme	P-value
Insertion time (secs.)	24.3±2.961	16.57±3.329	0.0001
Ease of insertion of the supraglottic device	17/13	28/2	0.002
Number of attempts for placement 1/2	22/8	29/1	0.026

TABLE-2. Summarizes the comparative data between i-gel and LMA Supreme regarding insertion time, ease of insertion, and no. of attempts for placement and it was found that there was a significant difference in insertion time in the I-Gel group(24.3+/-2.961) than in the SLMA group(16.57+/-3.329)($p<0.0001$). It was also observed that ease of insertion was better in the SLMA group(28/2)than the I-Gel group(17/13)and also no. of attempts for placement were less in the SLMA group.

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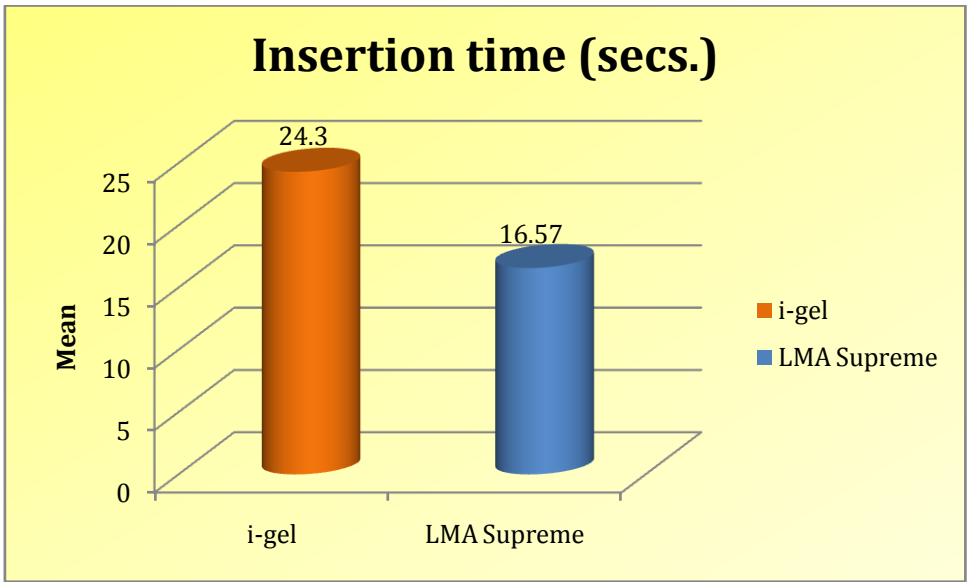

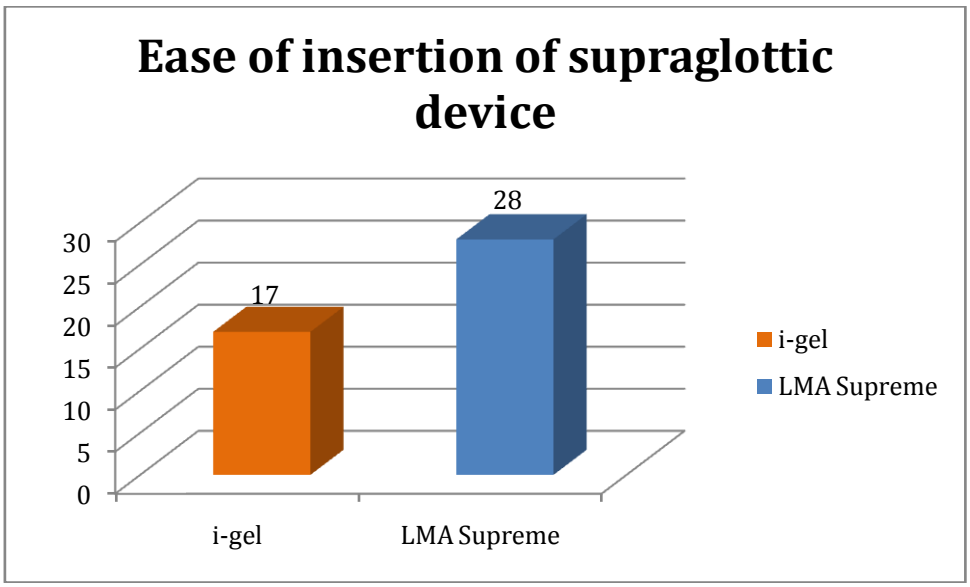

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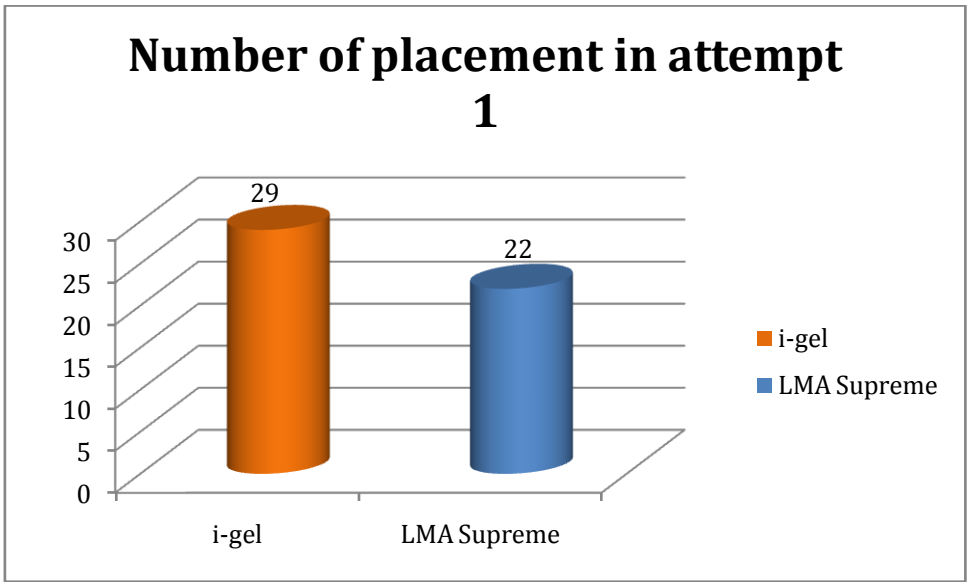

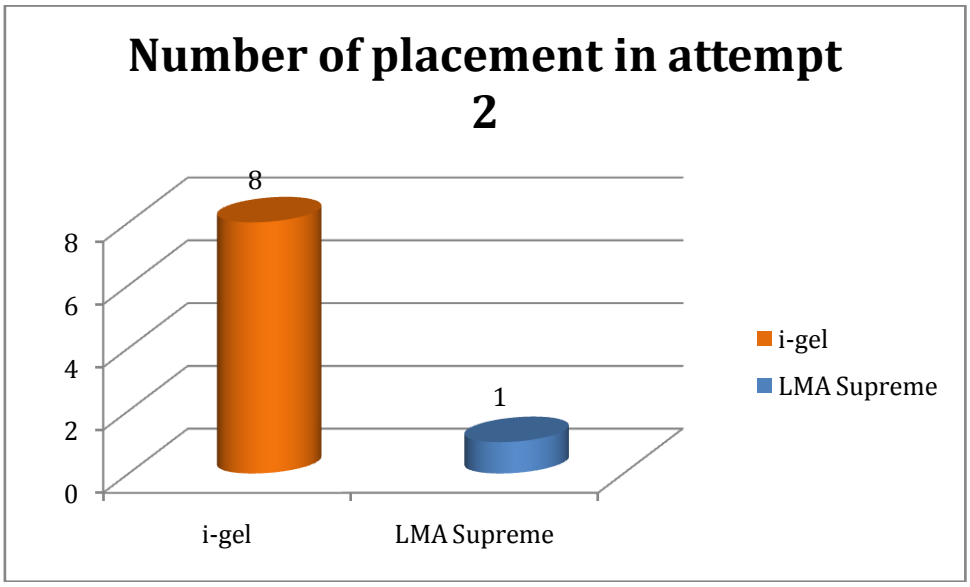

TABLE-3

Complications	i-gel	LMA Supreme
Blood staining of device	3	0
Dental trauma	0	0
Desaturation <95%	0	0
Postoperative sore throat	0	2
Laryngospasm	0	0

TABLE-3.describes the comparative data for complications of I-GEL and SLMA groups. Blood staining of the device was found more with I-GEL and post-operative sore throat was seen more with SLMA.

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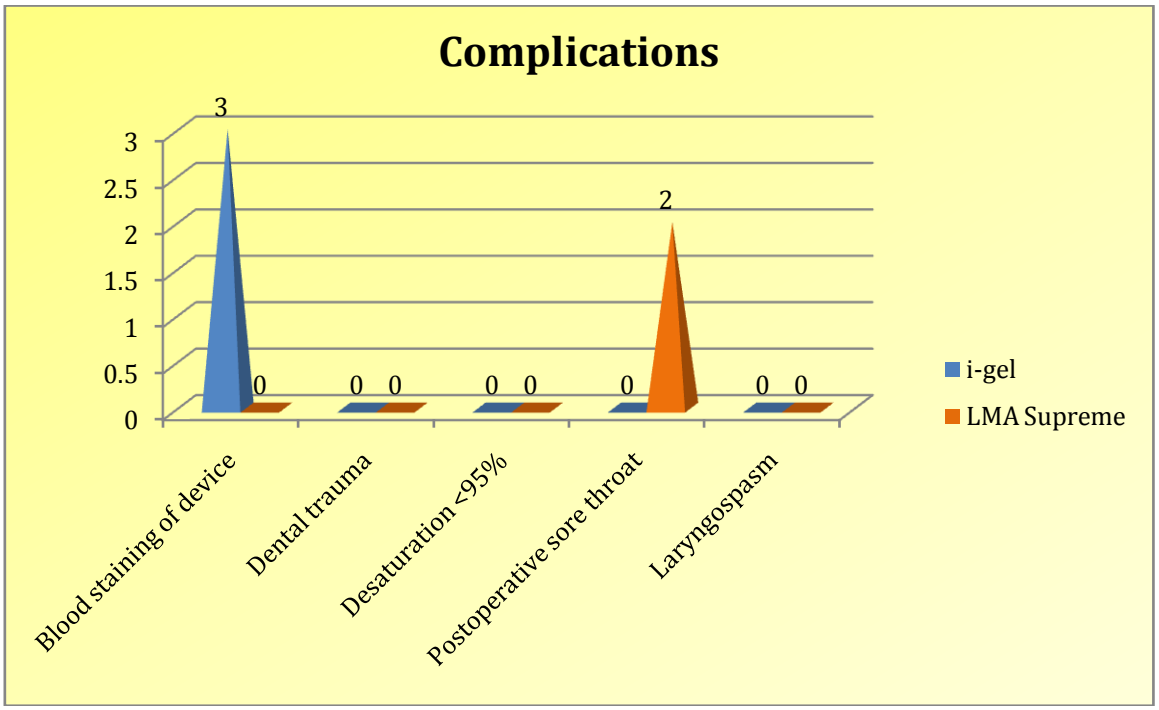

TABLE-4

	Heart rate i-gel	LMA P	Supreme	Systolic BP i-gel	LMA P	Supreme	Diastolic BP i-gel	LMA P	Supreme	Mean BP i-gel	LMA P Supreme	
Preinduction	74.7±10.991	77.03±14.33	0.495	123.13±10.67	119.47±12.686	0.231	74.13±9.57	72.83±9.66	0.603	90.78±9.96	88.3±10	0.35
Induction	72.07±10.91	81.3±15.177	0.009	97.50±8.641	99.50±10.75	0.43	64.73±8.509	61.80±8.07	0.176	75.64±7.61	74.14±8	0.466
1st min.	84.27±13.383	87.43±14.766	0.388	105.60±8.645	104.63±10.516	0.699	69.5±8.17	66.8±8.38	0.212	81.493±7.45	79.44±8.4	0.324
3rd min.	87.93±13.988	88.50±16.328	0.886	112.0±8.03	112.37±11.248	0.885	71.5±8.11	71.83±7.87	0.885	85.14±7.30	85.33±8.0	0.923
5th min.	75.07±10.875	80.47±13.475	0.093	110.83±8.346	112.37±10.905	0.543	72.03±8.11	71.57±8.05	0.824	85.13±7.49	85.14±8.0	0.997

TABLE-4 compares heart rate, systolic B.P, diastolic B.P, and mean B.P in both the groups. There was no significant difference in heart rate and blood pressure between the two groups.

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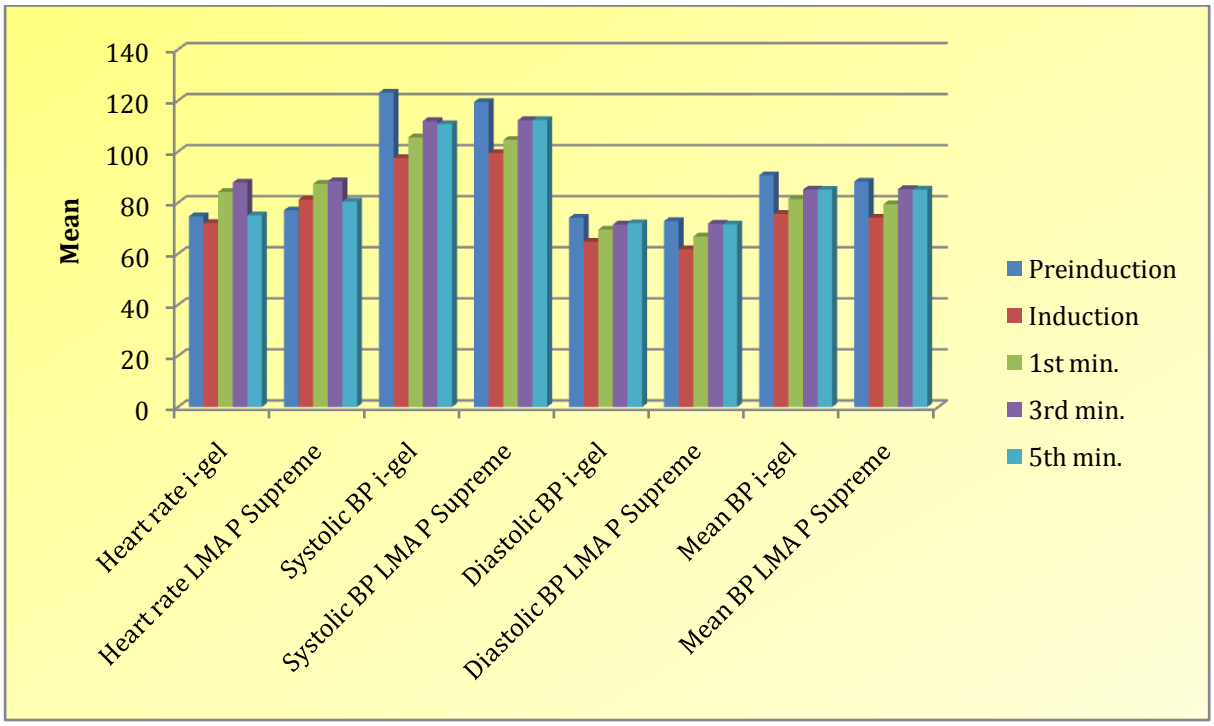

TABLE-5

	I-gel	LMA Supreme	
	Mean ± Sd	Mean ± Sd	P-value
Pre induction	74.7±10.991	77.03±14.33	0.495
Induction	72.07±10.91	81.3±15.177	0.009
1st min.	84.27±13.383	87.43±14.766	0.388
3rd min.	87.93±13.988	88.50±16.328	0.886
5th min.	75.07±10.875	80.47±13.475	0.093

TABLE-5 compares the Heart rate between the two groups during pre-induction, induction,1st,3rd, and 5th min after insertion, and it was found that there was no significant difference between the two groups as confirmed by the P values.

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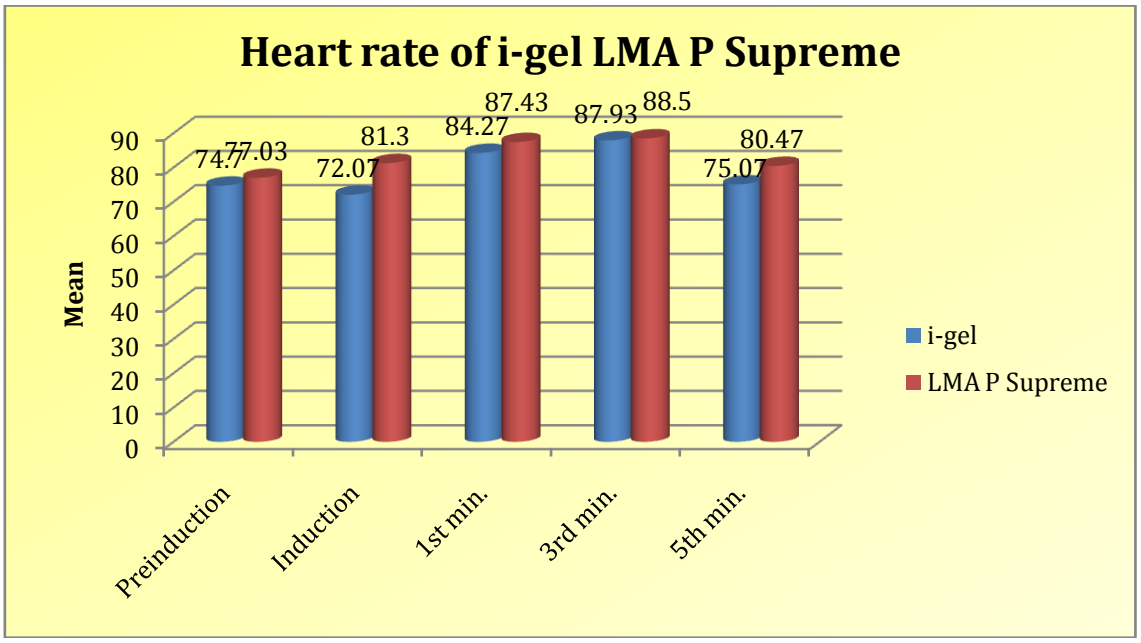

TABLE-6

Systolic blood pressure	I-gel	LMA Supreme	
	Mean ± Sd	Mean ± Sd	P-value
Pre induction	123.13±10.67	119.47±12.686	0.231
Induction	97.50±8.641	99.50±10.75	0.43
1st min.	105.60±8.645	104.63±10.516	0.699
3rd min.	112.0±8.03	112.37±11.248	0.885
5th min.	110.83±8.346	112.37±10.905	0.543

TABLE-6 compares systolic B.P between the two groups during pre-induction, induction,1st,3rd, and 5th min after insertion, and it was found that there was no significant difference between the two groups as confirmed by the P values.

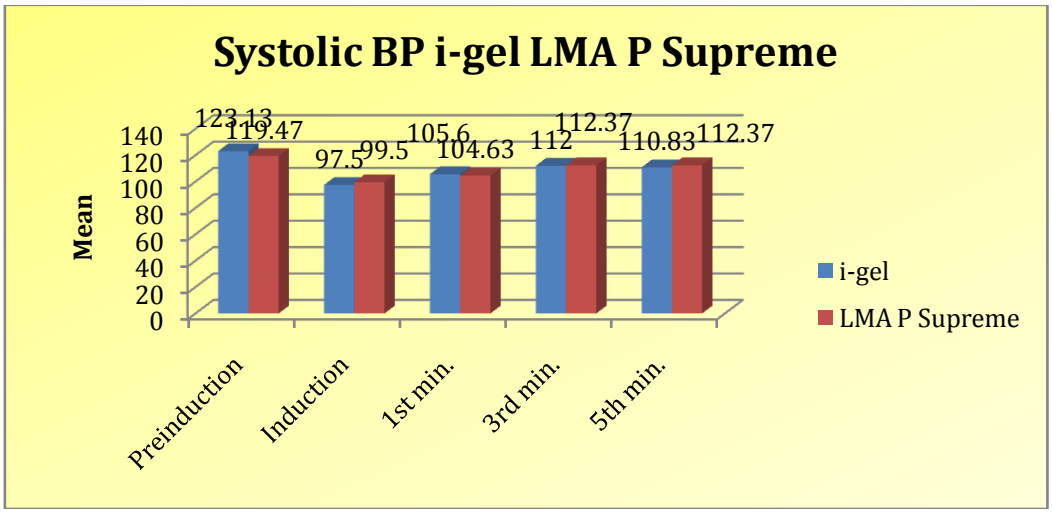

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TABLE-7

Diastolic BP	I-gel	LMA Supreme	
	Mean ± Sd	Mean ± Sd	P-value
Preinduction	74.13±9.57	72.83±9.66	0.603
Induction	64.73±8.509	61.80±8.07	0.176
1st min.	69.5±8.17	66.8±8.38	0.212
3rd min.	71.5±8.11	71.83±7.87	0.885
5th min.	72.03±8.11	71.57±8.05	0.824

TABLE-7. compares Diastolic B.P between the two groups during pre-induction, induction,1st,3rd, and 5th min after insertion and it was found that there was no significant difference between the two groups as confirmed by the P values.

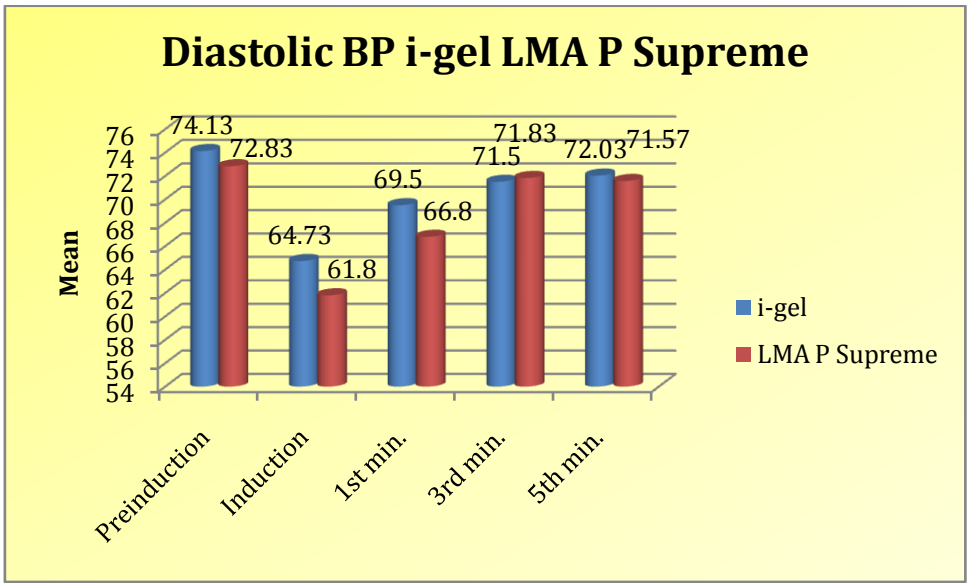

TABLE-8

Mean BP	I-gel	LMA Supreme	
	Mean ± Sd	Mean ± Sd	P-value
Preinduction	90.78±9.96	88.3±10	0.35
Induction	75.64±7.61	74.14±8	0.466
1st min.	81.493±7.45	79.44±8.4	0.324
3rd min.	85.14±7.30	85.33±8.0	0.923
5th min.	85.13±7.49	85.14±8.0	0.997

TABLE-8 compares Mean B.P between the two groups during pre-induction, induction,1st,3rd, and 5th min after insertion and it was found that there was no significant difference between the two groups as confirmed by the P values.

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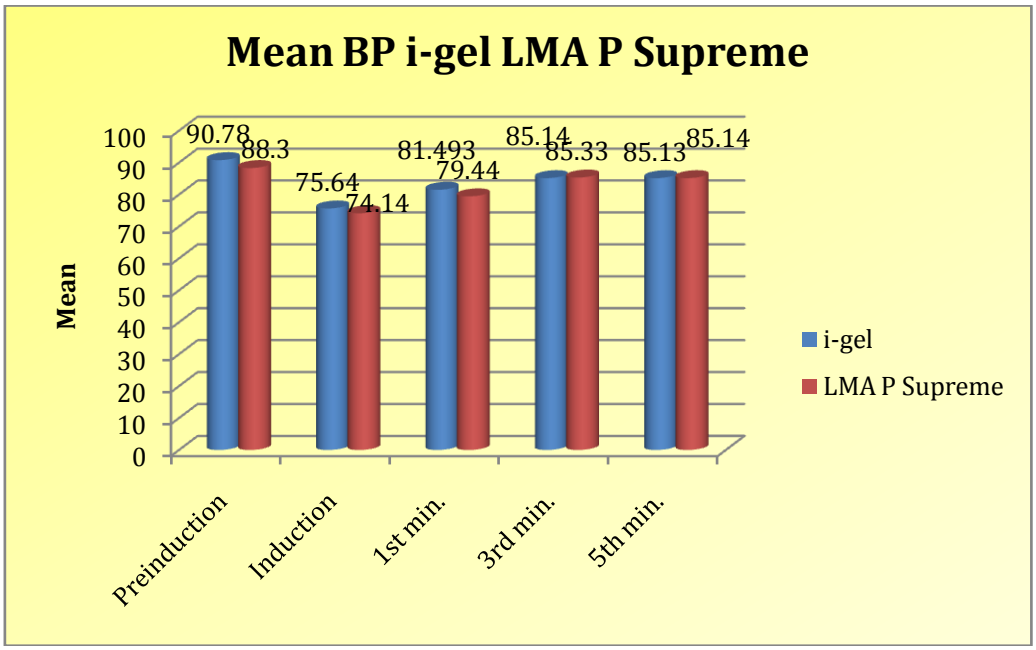

4. DISCUSSION

The present clinical study illustrated that both I-GEL and LMA SUPREME were used successfully to secure a good airway with a low rate of complications.

The first attempt success rate of LMA supreme was 96% in our study which was comparable with that of Lopez Gil et al &Cremar et al where the success rate was 94%. [4]

The mean insertion time for LMA supreme was 16 seconds and I-Gel was 24 seconds which is comparable with the study by Ramaswami et al where the mean insertion time was 15 seconds.[2]

Recently, Chen et al reported a meta-analysis that included 10 studies comparing SLMA and I-GEL devices. They concluded that both SADs were good and there was a short insertion time with SLMAs.[5]

The SADs offer greater hemodynamic stability to insertion, both during maintenance and extubation, when compared with tracheal tubes. [6,7] In this study, there was a similar trend of changes in heart rate and blood pressure for both groups.

On removal of I-GEL and LMA SUPREME, postoperative complications were observed like blood staining of the device and post-operative sore throat but those were not clinically important.

There was no incidence of severe airway trauma, such as laryngeal stridor, laryngospasm, bronchospasm, hypoxia, or aspiration.

There are several important limitations to this study. Data was collected by the unblinded investigator; thus, we were unable to ensure that there would not be an element of bias. Secondly, all insertions were performed by a single experienced anaesthesiologist, hence, these results may not apply to non-experienced users.

Finally, this study also used a muscle relaxant before device insertion. The use of neuromuscular blocking drugs can change laryngeal mask airway leak pressure.

Irrespective of the limitations, the study compared that LMA SUPREME had short and easy insertion than I-GEL.

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5. CONCLUSION

In conclusion, we found that both the LMA supreme and I-Gel provided a satisfactory and secured airway during short surgical procedures. LMA supreme has a slight edge over I- Gel being superior to I-Gel in terms of ease of insertion & number of attempts.

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