ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

A Randomised comparison and evaluation of I-gel, Supreme laryngeal mask airway and Ambu Auragain in Laparoscopic surgeries under general anaesthesia with controlled ventilation

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Submission: 16-11-2020 Revision: 28-02-2021 Publication: 01-04-2021

ABSTRACT

Background: Supraglottic airway devices (SAD) are becoming increasingly popular for use in patients undergoing laparoscopic surgeries. In this prospective randomised study, we compared three supraglottic airway devices namely, I-gel, Supreme LMA and Ambu Auragain. **Aims and Objectives:** The study was undertaken to compare three supraglottic airway devices I-gel, Supreme LMA and Ambu Auragain in laparoscopic surgeries under general anaesthesia with controlled ventilation. **Materials and Methods:** This was a randomized comparative study in which 90 patients undergoing laparoscopic surgeries under general anesthesia were included. In group A Ambu AuraGain was used whereas in group I and Group S I-gel and Supreme LMA was used respectively. Primary outcome measures which were compared amongst the studied groups included time taken for insertion, ease of insertion, attempts required for insertion, ease of insertion of Ryles tube, fiberoptic bronchoscopic grading and Oropharyngeal leak pressure. **Results:** There was highly significant difference in the time taken for insertion of SAD in Group-A when compared to Group- I ($p<0.0001$) and Group-S ($p<0.0001$). Group-A had significantly increased grades of ease of insertion of SAD when compared to Group-I ($p=0.04$) and Group-S ($p=0.004$). 16.66% of patients in Group-A required 3 attempts for successful insertion of the SAD, while no patients in Group- I or Group A required more than two attempts for insertion($p<0.05$). **Conclusion:** Ambu AuraGain provides better oropharyngeal seal and has higher leak pressures as compared to I-gel and Supreme LMA with similar hemodynamic stability and post-operative outcome makingit a preferable SAD over I-gel and Supreme LMA.

Key words: Supraglottic airway devices; Laparoscopic surgeries; Airway leak pressure; Ease of insertion

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v12i4.32931

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

In 1981, Archie Brain developed the laryngeal mask airway (LMA), which resolved the problems of position instability and epiglottic obstruction occurring with the use of mask and other airways, while at the same time producing no greater gastric insufflation than Endotracheal tubes (ETT).[1] The development of the LMA can be considered a milestone in anaesthesiology. Over a period of time new supraglottic airway devices have been added to the anaesthesiologist's

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armamentarium. New modifications were done in Classic LMA (cLMA) model to incorporate second tube placed lateral to the airway channel to facilitate passage of nasogastric tube, separate respiratory and oesophageal pathways and permit escape of gastric contents to reduce risk of gastric insufflation, regurgitation and pulmonary aspiration.[2] Various such models are LMA Proseal, LMA Supreme, I-gel etc.[3]

A new variant of supraglottic airway device "I-gel" (Inter surgical Ltd., Wokingham, Berkshire, UK) has been developed, in January 2007; in London by Dr.Nasir.[4] I-gel is made up of thermoplastic elastomer, which is soft, transparent, gel like and designed to anatomically fit the perilaryngeal and hypopharyngeaI structures without an inflatable cuff.[5] It also has a port for gastric tube placement, which is placed lateral to airway channel intended to separate the alimentary and respiratory tracts.[6]

Supreme LMA was introduced in 2007. It undoubtedly is the most advanced laryngeal· airway developed by Archie Brain. The Supreme LMA has the advantage of having gastric access. The anatomically shaped airway tube allowseasy insertion and prevent kinking.[7] An effective and high seal pressure, built-in bite blocker, presence of fixation tab and drain tube for gastric aspiration are some of the attractive features of Supreme LMA.

Ambu AuraGain (Ambu, Ballerup, Denmark) is a novel cuffed supraglottic airway introduced in November 2015, which has a preformed curve and also a built-in gastric port.[8] It is marketed as having the capability of working as a conduit for intubation. Ambu AuraGain (AG) is made in such a way that it follows airway anatomy and aid in easy insertion. The airway tube of AG is broader thereby accommodatingcomparatively bigger endotracheal tube (ETT).[9,10]

Laparoscopic surgeries are becoming increasingly popular because of relatively less morbidity and quick recovery thereby reducing hospital stay. One of the disadvantages of laparoscopic surgery is that CO_2 insufflation is required during these surgeries whichcompromises respiratory system and also increases the risk of air leakage.[11] Pneumoperitoneum causes increasein airway pressure and increases the risk of regurgitation.[12]

To our knowledge, no previous trials have compared more than two SADs used in laparoscopic surgery under general anaesthesia with controlled ventilation. Therefore, in this prospective randomised study we compared three supraglottic airway devices namely, I-gel, Supreme LMA and Ambu Auragain on the basis of their ease of insertion, number of attempts, oropharyngeal leak pressure of each device, haemodynamic changes associated with insertion of airway device and incidence of any intra operative or post-operative complications associated with the SAD in laparoscopic surgeries under general anaesthesia with controlled ventilation.

MATERIALS AND METHODS

This was a randomized prospective single blinded comparative study conducted in a tertiary care medical college after due approval from Institutional Ethical Committee. Ninety patients of ASA grade I & II with age between 18 to 70 years, weighing between 30-100kgs, including both males and females posted for laparoscopic surgeries under general anesthesia were selected for the study after thorough history taking and clinical examination. 30 patients in each group were selected after sample size calculation. Patients were randomized by systematic random sampling using computer generated code into 3 groups.

Group I: Group of 30 patients in whom I-gel was inserted
Group S: Group of 30 patients in whom Supreme LMA was inserted
Group A: Group of 30 patients in whom Ambu AuraGain was inserted.

Demographic details were recorded in all cases. Pre-anesthetic evaluation was done. Basic Laboratory investigations (complete blood count, renal function and hepatic functions and ECG) necessary for General Anesthesia were carried out. An informed valid written consent was taken after the patient and relatives were explained about the whole procedure in their own language. All patients were reviewed the night before the proposed day of surgery and given Tab. Diazepam 10mg and Tab. Ranitidine 150mg before bed.

On arrival in operation room all patients were monitored for Oxygen saturation, Blood pressure, Heart rate, Respiratory rate and ECG. Intravenous line was set up and an infusion of lactated Ringers solution started. Patients were pre-medicated with intravenous Injection Midazolam 1mg and Injection Fentanyl 2 mcg/kg along with intravenous Ondansetron (4mg) and Ranitidine (50mg). After pre-oxygenation for 3 minutes, induction of anesthesia was done with Injection Propofol 2mg/kg. Neuromuscular blockade for insertion of airway device was achieved in the three groups with Injection Succinyl Choline 2mg/kg after confirmation of successful manual bag-mask ventilation. Adequate size of SAD was selected as per manufacturer guidelines. The airway device after lubrication was inserted on adequate relaxation and insertion was performed by expert anesthesiologist. The standard recommended insertion technique of pushing the device along the hard palate was tried for the first attempt. In case of resistance, adjusting maneuvers were

applied such as para-median approach by lateral rotation of cuff, jaw lift, head and neck extension etc. The ease of insertion was graded Grade1- Easy, Grade2- Acceptable, Grade3- Difficult and Grade 4- Impossible.

The cuff of Supreme LMA and Ambu Auragain were inflated with air to attain a cuff pressure of 60cm H_2O as measured with hand held aneroid manometer. Capnographic confirmation, absence of audible leak from drain tube, adequate chest expansion and auscultatory confirmation with gentle ventilation and absence of leak on auscultation of epigastrium and neck were considered to denote successful establishment of effective ventilation. Otherwise, the device was removed and reinserted. Three insertion attempts were allowed. Each 'attempt' was counted as reinsertion of airway into mouth. 'Insertion failure' was defined as more than three unsuccessful attempts. In case of Insertion failure, endotracheal intubation was carried out.

Hemodynamic parameters like heart rate, blood pressure and oxygen saturation before and after placement of SAD were noted.

Once the airway device was in place and fixed, the patients were maintained on 33%O_2, 66%N_2O and 0.5-1% Isoflurane. Ventilation was controlled mechanically and relaxation was achieved with incremental doses of Injection Vecuronium 0.08-012 mg/kg with subsequent top up doses of 0.03-0.05 mg/kg. The Gastric tube was then inserted through all the three devices after pre-lubrication. Ease of insertion of Ryles tube was noted and graded as follows: Grade1 (Easy), Grade2 (Acceptable), Grade3 (Difficult) and Grade4 Impossible.

Its position was confirmed by injecting air into the tube and auscultation of epigastrium. The stomach was then decompressed by aspiration of gastric contents. The anatomical position of airway device was then examined with fiberoptic bronchoscope positioned with tip just exiting the bowl of the airway. View was graded as Grade 1 (No laryngeal structures visible), Grade 2 (Cords and anterior epiglottis visible), Grade 3 (Cords and posterior epiglottis visible) and Grade 4(Vocal cords visible).

Oro-pharyngeal leak pressure was then measured after closing pressure limiting valve, with fresh gas flow of 3L/min, noting the airway pressure at equilibrium or when an audible leak from throat was heard. At the end of surgery patients were reversed using IV neostigmine and IV glycopyrrolate. At 1 hour and 24 hours following surgery, patients were inquired about sore throat, hoarseness of voice,cough, dysphonia, stridor or any other complaints.

At 95% confidenceinterval, p value < 0.05 was considered significant and p value <0.001 was considered highly significant.

Inclusion criteria

- Patients with normal investigations and blood parameters posted for laparoscopic surgery under general anesthesia.
- Age 18-70 years, both males and females
- Weight 30-70kg, BMI<35kg/m^2
- ASA grade I and II
- Mallampati Score I-II
- Anticipated duration of surgery < 2 hours

Exclusion criteria

- Patients without Valid informed written Consent
- Patients with a predicted difficult airway.
- Patients with a high risk of aspiration.
- Patients with Respiratory tract pathology or serious bleeding disorder.

RESULTS

The analysis of age and gender distribution of the studied cases showed that all 3 groups werecomparable in terms of age, sex distribution, ASA grades, Body Mass indices, Malampatti scores, type of surgery and duration of surgery with no statistically significant difference amongst all the 3 groups (Table 1).

The pre-insertion mean heart rate was 86±14.91bpm in Group- I, 82.27±15.49 bpm in Group-S and 84.07±13.32 bpm in Group-A. The pre-insertion mean systolic blood pressure was 117.6±10.74 mm Hg in Group- I, 122.7±10.76 mm Hg in Group-S and 121.9±13.23 mm Hg in Group-A.The pre-insertion mean diastolic blood pressure was 74.13±9.35 mm Hg in Group- I, 76.73±8.183 mm Hg in Group-S and 73.33±7.73 mm Hg in Group-A. The pre-insertion mean arterial pressure was 88.63±8.85 mm Hg in Group- I, 92.06±7.34mm Hg in Group-S and 89.51±7.48mm Hg in Group-A. The pre-insertion mean oxygen saturation was 99.67±0.60% in Group- I, 99.73±0.52% in Group-S and 99.93±0.25% in Group-A. The groups were found to be comparable in all these parameters with no statistically significant difference (P>0.05) (Table 2).

The time taken for insertion of SAD was 50.53±14.51 seconds in Group- I, 44.7±14.08 seconds in Group-S and 72.03±21.21 seconds in Group-A. There was a statistically significant difference between the three groups (p<0.05). There was highly significant difference in the time taken for insertion of SAD in Group-A when compared to

Group- I (p<0.0001) and Group-S (p<0.0001). There was no statistically significant difference between Group- I and Group-S (p>0.05) (Table 3).

Ease of Insertion of SAD in Group- I had a median grade of 1, Group-S had a median grade of 1 and Group –A had a median grade of 2. There is a statistically significant difference between the 3 groups (p<0.05). Group-A had significantly increased grades of ease of insertion of SAD when compared to Group-I (p=0.04) and Group-S (p=0.004). There was no statistically significant difference between Group- I and Group-S (Table 4).

There was a statistically significant difference in the number of attempts required for insertion of the SADs in the three groups, with 16.66% of patients in Group-A requiring 3 attempts for successful insertion of the SAD, while no patients in Group- I or Group A required more than two attempts for insertion(p<0.05) (Table 5).

Comparison of Preinsertion and postinsertion parameters including heart rate, systolic and diastolic blood pressures, mean arterial pressures and oxygen saturation showed that there was no statistically significant difference in pre-insertion and post-insertion parameters studied in all 3 groups (Table 6).

Comparison of postinsertion parameters including heart rate, systolic and diastolic blood pressures, mean arterial pressures and oxygen saturation showed that there was no statistically significant difference in pre-insertion and post-insertion parameters studied in all 3 groups (Table 7).

All 3 studied groups were found to be comparable in terms of ease of insertion of Ryles tube and Fiberoptic bronchoscopic grading. There was no statistically significant difference in any of these factors amongst the studied groups.There was highly significant difference in the Oropharyngeal Leak pressure of Group-A when compared to Group- I (p<0.001) and Group-S (p<0.001). There was no statistically significant difference between Group- I and Group-S (p>0.05) (Table 8)

The patients in the three groups were monitored for any intraoperative complications like displacement, leaks, regurgitation, aspiration, accidental removal and others if any. No complications were noted in all the three groups. The patients in the three groups were monitored for any postoperative complications like blood stain on removal, sore throat, cough, hoarseness, dysphonia, stridor and others if any within one hour of removal postoperatively. 5 patients of Group- I (16.66%), 6 patients of Group-S (20%) and 7 patients of Group-A (23.33%) had blood stains on the SAD. 3 patients of Group- I (10%), 6 patients

Table 1: Comparison of demographic profile and other parameters amongst studied groups

Factors	Distribution	Group- I(n=30)	Group-S(n=30)	Group-A(n=30)	P Value
Sex Distribution	Male	12 (40%)	12 (40%)	9 (30%)	0.65 (Not significant)
	Female	18 (60%)	18 (60%)	21 (70%)	
Age Distribution	Mean +/- SD	36.23±15.95	40.83±13.99	40.37±16.21	0.4772 (Not Significant)
ASA Grades	I	24 (80%)	24 (80%)	25 (83.33%)	0.93 (Not Significant)
	II	6 (20%)	6 (20%)	5 (16.66%)	
Body Mass Index	Mean +/- SD	21.3±3.40	22.75±4.10	22.43±3.48	0.2813 (Not Significant)
Malampatti Score	I	24 (80%)	24 (80%)	25 (83.33%)	0.93 (Not Significant)
	II	6 (20%)	6 (20%)	5 (16.66%)	
Types of Surgery	Laparoscopic Appendicectomy	25 (83.33%)	24 (80%)	22 (73.33%)	0.79 (Not Significant)
	Laparoscopic Cystectomy	3 (10%)	2 (6.67%)	4 (13.33%)	
	Diagnostic Laparoscopy	2 (6.67%)	4 (13.33%)	4 (13.33%)	
Duration of Surgery	Mean +/- SD (Min)	54.83±16.74	50.17±13.8	54.73±20.12	0.4846 (Not Significant)

Table 2: Comparison of pre-insertion parameters in studied cases

Preinsertion parameters	Statistics	Group- I (n=30)	Group-S (no=30)	Group-A (no=30)
Heart rate (in beats/ minute)	Mean±SD	86±14.91	82.27±15.49	84.07±13.32
	P value		0.6140 (Not Significant)	
Systolic blood pressure (mm Hg)	Mean±SD	117.6±10.74	122.7±10.76	121.9±13.23
	P value		0.2008 (Not Significant)	
Diastolic blood pressure (mm Hg)	Mean±SD	74.13±9.35	76.73±8.183	73.33±7.73
	P value		0.2703 (Not Significant)	
Mean arterial pressure (mm Hg)	Mean±SD	88.63±8.85	92.06±7.34	89.51±7.48
	P value		0.226 (Not Significant)	
Oxygen saturation (%)	Mean±SD	99.67±0.60	99.73±0.52	99.93±0.25
	P value		0.09 (Not Significant)	

of Group-S (20%) and 7 patients of Group-A (23.3%) complained of sore throat in immediate post-operative period and 1 patient in Group-S (3.33%) had hoarseness. We didn't find any statistical difference between the three groups (p>0.05). The patients in the three groups were monitored for any postoperative complications like sore throat, cough, hoarseness, dysphonia, stridor and others if any at 24 hours postoperatively. At 24 hours postoperatively, only 1 patient in Group-S (3.33%) complained of sore throat from all the 3 groups of patients and this was not found to be statistically significant (p>0.05) (Figure 1).

Table 3: Comparison of time taken for insertion of SAD

Study groups	Mean±SD (Seconds)	p-value	Significance
Group- I	50.53±14.51	0.3796	Not significant
Group-S	44.7±14.08		
Group-S	44.7±14.08	<0.0001	Significant
Group-A	72.03±21.21		
Group- I	50.53±14.51	<0.0001	Significant
Group-A	72.03±21.21		

Table 4: Comparison of ease of insertion of SAD in studied groups

Study Groups	Mean±SD	p-value	Significance
Group- I	1.46±0.59	>0.999	Non-significant
Group-S	1.33±0.55		
Group-S	1.33±0.55	0.0404	Significant
Group-A	1.86±0.62		
Group- I	1.46±0.59	0.0404	Significant
Group-A	1.86±0.62		

DISCUSSION

This prospective randomized single blinded comparative study was done to evaluate and compare the performance of three SADs, I-gel, Supreme LMA and Ambu Auragain in Laparoscopic surgeries under general anesthesia.

In our study, the time required for insertion of SAD was calculated from the time of picking up the SAD up to the establishment of successful ventilation as confirmed by capnographic square waveform along with absence of audible leak from drain tube, adequate chest expansion and auscultatory confirmation with gentle ventilation. The time taken for insertion of SAD was 50.53±14.51 seconds in Group- I (I-gel), 44.7±14.08 seconds in Group-S (Supreme LMA) and 72.03±21.21 seconds in Group-A (Ambu Auragain). The difference amongst the three groups was statistically significant (p<0.05). There was highly significant difference in time taken for insertion of SAD in Group-A when compared to Group- I (p<0.001) and Group-S (p<0.001).

There was no statistically significant difference between Group- I and Group-S (p>0.05). However, in a crossover comparison of the LMA Supreme and I-gel in anesthetized patients conducted by Theiler LG et al it was found that the time for insertion of Supreme LMA was significantly shorter (34 +/- 12 s) compared to I-gel (42 +/- 23 s, P = 0.024).[13] Similarly,Bhattacharjee Set al[14] did a comparison of LMA Supreme™ with I-gel™ and LMA ProSeal™ in children for airway management during general anesthesia and

Table 5: Number of attempts required for insertion of the SAD

Groups	Number of attempts			Total (n)	X^2 Test	p-value	Decision (based on p-value)
	I	II	III				
Group- I	24 (80%)	6(20%)	0	30	12.35	0.0149	Significant (p<0.05)
Group-S	26(86.66%)	4(13.33%)	0	30			
Group-A	18 (60%)	7 (23.33%)	5 (16.66%)	30			

Table 6: Comparison of pre-insertion and post-insertion parameters

	Statistics	Group- I (n=30)	Group-S (no=30)	Group-A (no=30)
Heart Rate	Pre-insertion	86±14.91	82.27±15.49	84.07±13.32
(in beats per minute)	Post-Insertion	87.27±14.77	82.07±15.33	84.4±13.61
Mean +/- SD	P Value	0.3767 (Not Significant)	0.4826 (Not Significant)	0.3702 (Not Significant)
Systolic blood pressure	Pre-insertion	117.6±10.74	122.7±10.76	121.9±13.23
(mm Hg)	Post-Insertion	116.3±11.7	122.1±9.56	122.2±12.52
	P Value	0.1969 (Not Significant)	0.5959 (Not Significant)	0.7106 (Not Significant)
Diastolic blood pressure	Pre-insertion	74.13±9.35	76.73±8.183	73.33±7.73
(mm Hg)	Post-Insertion	76.57±9.46	78.47±8.01	73.7±8.108
	P Value	0.0549	0.0832 (Not Significant)	0.7009 (Not Significant)
Mean arterial pressure	Pre-insertion	88.63±8.85	92.06±7.34	89.51±7.48
(mm Hg)	Post-Insertion	89.81±8.76	93.01±6.06	89.88±7.18
	P Value	0.201 (Not Significant)	0.247 (Not Significant)	0.673 (Not Significant)
Oxygen saturation (%)	Pre-insertion	99.67±0.60	99.73±0.52	99.93±0.25
	Post-Insertion	99.83±0.379	99.9±0.305	99.9±.30
	P Value	0.20(Not Significant)	0.06 (Not Significant)	0.66 (Not Significant)

Table 7: Comparison of post insertion parameters amongst the studied groups

Post-insertion Parameters	Statistic	Group- I (n=30)	Group-S (n=30)	Group-A (n=30)
Heart Rate (in beats per minute)	Mean±SD	87.27±14.77	82.07±15.33	84.4±13.61
	P value		0.8061 (Not Significant)	
Systolic Blood Pressure (mm Hg)	Mean±SD	116.3±11.7	122.1±9.56	122.2 ±12.52
	P value		0.0741 (Not Significant)	
Diastolic Blood Pressure (mm Hg)	Mean±SD	74.13±9.35	78.47 ±8.012	73.7±8.10
	P value		0.0617 (Not Significant)	
Mean Arterial Pressure (mm Hg)	Mean±SD	89.81±8.76	93.01±6.06	89.88±7.18
	P value		0.168 (Not Significant)	
Oxygen Saturation (%)	Mean±SD	99.83±0.379	99.9±0.305	99.9±0.305
	P value		0.66 (Not Significant)	

Table 8: Ease of insertion of Ryles tube, Fiberoptic bronchoscopic grading and Oropharyngeal leak pressure in studied groups

Factor	Study Groups			
	Statistic	Group-I (n=30)	Group-S (n=30)	Group- A (n=30)
Ease of insertion of Ryles Tube (RT)	Median	1	1	2
	Maximum	2	2	2
	Minimum	1	1	1
	Mean +/- SD	1.23±0.43	1.06±0.25	1.06±0.25
	P Value		0.0773 (Not Significant)	
Fiberoptic Bronchoscopic Grading	Median	4	0	4
	Maximum	4	0	4
	Minimum	3	0	3
	Mean±SD	3.76±0.43	-	3.73±0.44
	P value		>0.999 (Not Significant)	
Oropharyngeal Leak Pressure (cm H_2O)	Maximum	32	28	35
	Minimum	20	20	22
	Mean±SD	25.17±3.24	24.37±1.99	29.63±3.56
	P value		<0.0001 (Significant)	

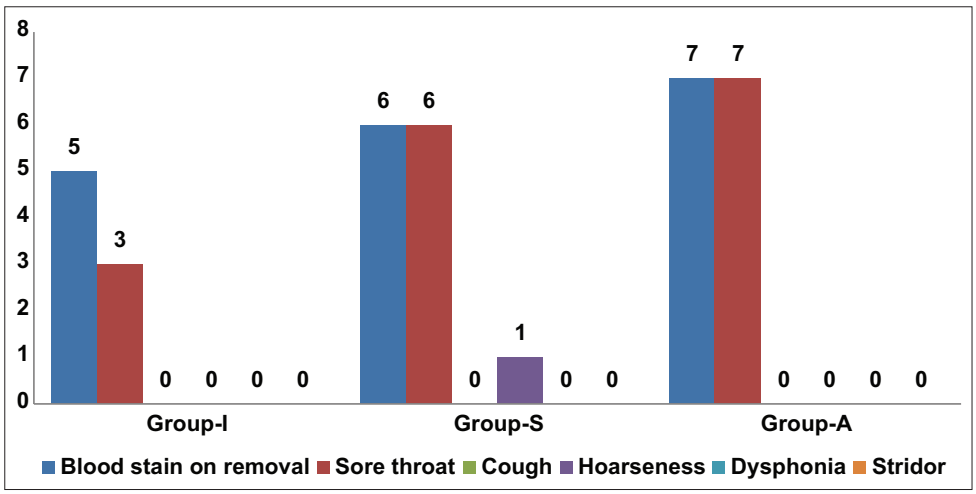

Figure 1: Post-operative complications in studied cases

found that device insertion was significantly faster with LMA Supreme™ than I-gel™ [mean difference (95% CI) 1.87 (0.93, 2.81) s; p<0.0001].

In the study by Jagannathan N they found no significant difference in the ease of insertion of Ambu Auragain and Supreme LMA.[15] In our study, we found significant difference in our study, with Ambu Auragain being comparatively difficult to insert. 86.6% cases in Group-S had SAD successfully inserted in the first attempt, while 80% of cases in Group- I and 60% cases in Group-A had single attempt successful insertion of respective SADs (p=0.010). 5% cases in Group-A required 3 attempts for successful insertion. None of the groups had insertion failure (failure with 3 attempts) or conversion to endotracheal intubation.

Wharton NM in the study of I-gel insertion by novices in manikins and patients noted that eighty-eight percent (44/50) were placed in the first attempt in manikins with a median insertion time of 14 seconds (range 7–45).[16] Success on the first attempt in healthy anaesthetized patients was 82.5% (33/40) and on the second attempt 15% (6/40). After three attempts there were no failures. This was similar to our study findings.

The pre-insertion mean heart rate was 86±14.91bpm in Group- I, 82.27±15.49 bpm in Group-S and 84.07±13.32 bpm in Group-A. There was no statistically significant difference between the three groups (p>0.05). Atef et al, compared between I gel and classical LMAin anaesthetized spontaneously ventilated patients. I-gel did not cause any significant alteration in thehemodynamic status, end tidal CO_2, and SpO_2 similar to our study.[17]

M. López, Rcompared LMA Supreme™ with the LMA Proseal™ for airway management in patients anaesthetized in prone position.[18] No cases of arterial oxygen desaturation<95% were detected during induction or maintenance or awakening from anesthesia for Supreme LMA which was similar to our study findings. The post-insertion mean oxygen saturation was 99.83±0.379% in Group-I, 99.9±0.305% in Group-S and 99.9±0.305 in Group-A. There was no significant difference amongst the three groups (p>0.05).

Ease of Insertion of Ryles Tube in Group- I had a median grade of 1, Group- S had a median grade of 1 and Group- A had a median grade of 2. Overall, there was no significant difference between the 3 groups (p>0.05). TeohWH, observed in their study that gastric tube insertion was easier and achieved more quickly with the LMA Supreme compared to the I-gel (9.0 (2.5) s vs. 15.1 (7.3) s, respectively; p=0.18) while there was no significant difference between Supreme LMA and I-gel in our study.[19]

As our Fiberoptic Bronchoscope couldn't pass through Supreme LMA (Group-S), fibreoptically determined positioning were compared between Group- I(I-gel) and Group-A (Ambu Auragain) only and both groups had a median Brimacombe grading of 4(cords visible), p>0.999.

Theiler LG in their study concluded that fiberoptic view through the I-gel showed less epiglottic downfolding compared to Supreme LMA.[13] The mean Oropharyngeal Leak Pressure was 25.17±3.24 cm H_2O in Group- I (I-gel), 24.37±1.99 cm H_2O in Group-S (Supreme LMA) and 29.63±3.56 cm H_2O in Group-A (Ambu Auragain). There was highly statistically significant difference between the 3 groups (p<0.001). Also, there was highly significant difference in the Oropharyngeal Leak pressure of Group-A when compared to Group-I (p<0.001) and Group-S (p<0.001). There was no statistically significant difference between Group- I and Group-S (p>0.05).

Wharton NM) in the study of I-gel insertionby novices in manikins and patients noted a median airway seal of 20 cm H_2O (range 13–40) with I-gel.[16] The patients in the three groups were monitored for any intraoperative complications like displacement, leaks, regurgitation, aspiration, accidental removal and others if any. No complications were noted in all the three groups.

A. M. López, R et al Compared LMA Supreme™ with the LMA Proseal™ for airway management in patients anaesthetized in prone position: The rate of intraoperative complications was low in both the groups.[18]

Jagannathan N et al compared Ambu® AuraGain™ and LMA® supreme in infants and children and no complications were observed in both the groups.[15] Shi Yang Li et al observed no clinical evidence of aspiration or regurgitation, no episodes of hypoxemia, laryngospasm or bronchospasm intra-operatively with LMA Supreme. The incidence of complications was low and good patient satisfaction was reported.[20]

The patients in the three groups were monitored for any postoperative complications like blood stain on removal, sore throat, cough, hoarseness, dysphonia, stridor and others if any within one hour of removal and at 24 hours postoperatively. At 24 hours postoperatively, only 1 patient in Group-S (3.33%) complained of sore throat from all the 3 groups of patients. Similar results were reported by Teoh WH who reported mild post-operative sore throat in 4 patients of LMA supreme group and 1 patient of I-gel group. The difference was statistically not significant (P=-0.001).[19]

CONCLUSION

Ambu AuraGain provides better oropharyngeal seal and has higher leak pressurescompared to I-gel and Supreme LMA with similar hemodynamic stability and post-operative outcome. Hence with routine usage, it could become a better alternative in laparoscopic surgeries under general anaesthesia. An additional bonus point in favor of Ambu AuraGain is that it can be used as a conduit for passage of adequately sized endotracheal tube to secure airway if required, which is not possible with Supreme LMA or I-gel.

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MP- Concept and design of the study; interpreted the results, prepared first draft of manuscript and critical revision of the manuscript; **NN-** Statistically analyzed and interpreted; reviewed the literature and manuscript preparation; **PL and NM-** Design of the study, statistically analyzed and interpreted, preparation of manuscript and revision of the manuscript; **SY and RP-** Concept and coordination of the overall study

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Source of Funding: None, **Conflict of Interest:** None