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Original Research Article

Comparison of Ambu Aura Gain Versus Block Buster LMA during Laparoscopic Appendicectomy under General Anaesthesia

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Abstract

Background: Second-generation supraglottic airway devices are increasingly used during laparoscopic surgery. This study compared the clinical performance of the Ambu AuraGain™ and BlockBuster™ laryngeal mask airways in patients undergoing laparoscopic appendicectomy under general anaesthesia.

Methods: In this prospective randomized comparative study, 100 adult ASA physical status I–II patients were allocated equally to the Ambu AuraGain™ group (Group AG, n=50) or BlockBuster™ group (Group BB, n=50). Device insertion characteristics, oropharyngeal leak pressure, gastric tube insertion, ventilatory parameters and airway-related complications were recorded.

Results: Mean insertion time was significantly shorter in Group BB than in Group AG (15.6 ± 3.5 vs. 18.9 ± 4.2 seconds, p<0.001). First-attempt success was higher with the BlockBuster™ (94% vs. 82%, p=0.046). Oropharyngeal leak pressure was significantly higher before and after pneumoperitoneum in Group BB (30.7 ± 3.9 and 29.8 ± 3.7 cmH_2O) than in Group AG (25.8 ± 3.6 and 24.9 ± 3.5 cmH_2O; both p<0.001). Gastric tube insertion was faster and easier with the BlockBuster™. After pneumoperitoneum, peak airway pressure was lower and expired tidal volume was higher in Group BB. Overall airway-related complications were significantly lower with the BlockBuster™ (16% vs. 38%, p=0.013).

Conclusion: The BlockBuster™ provided superior insertion characteristics, airway seal, ventilation and safety compared with the Ambu AuraGain™.

Keywords: Ambu AuraGain, BlockBuster LMA, Supraglottic Airway Device, Laparoscopic Appendicectomy, Oropharyngeal Leak Pressure, General Anaesthesia.

Introduction

Airway management is an essential component of general anaesthesia and is crucial for maintaining adequate oxygenation and ventilation throughout surgery. Endotracheal intubation has traditionally been considered the standard airway technique for laparoscopic procedures because it provides reliable controlled ventilation and protection against pulmonary aspiration. However, tracheal intubation requires laryngoscopy, technical expertise, and frequently neuromuscular blockade. It may also cause sympathetic stimulation, haemodynamic fluctuations, airway trauma, coughing, sore throat, and discomfort during emergence from anaesthesia.[1] These limitations have encouraged the use of supraglottic airway devices in appropriately selected patients.

Supraglottic airway devices are positioned above the glottic opening and provide a less invasive method of maintaining airway patency. Compared with endotracheal tubes, they are generally easier and quicker to insert, cause less haemodynamic stimulation, reduce airway manipulation, and may result in fewer postoperative airway complaints.[2] Studies evaluating their use during laparoscopic surgery have demonstrated satisfactory ventilation and favourable recovery characteristics when suitable patients and appropriate devices are selected.[3]

Second-generation supraglottic airway devices provide improved oropharyngeal sealing pressures and usually include a separate gastric drainage channel. These features permit more effective positive-pressure ventilation, facilitate gastric tube insertion, reduce gastric insufflation, and provide a pathway for drainage of regurgitated contents.[4] Nevertheless, these devices do not provide the same degree of airway protection as a cuffed endotracheal tube, and complications such as

inadequate ventilation, displacement, regurgitation, aspiration, sore throat, and mucosal trauma may occur.[5]

Laparoscopic appendicectomy creates specific airway-management challenges. Carbon dioxide pneumoperitoneum increases intra-abdominal pressure, elevates the diaphragm, decreases functional residual capacity and pulmonary compliance, and increases peak airway pressure. Patient positioning may further alter respiratory mechanics and increase the risk of regurgitation. However, appropriately selected second-generation supraglottic airway devices can provide effective ventilation during pneumoperitoneum and Trendelenburg positioning.[6] Therefore, an ideal device should provide a reliable airway seal, maintain ventilation at increased airway pressures, permit gastric drainage, and minimise leakage and airway complications.

The Ambu AuraGain is a second-generation, single-use supraglottic airway device with a preformed anatomical curvature, inflatable cuff, integrated bite-absorption area, and separate gastric drainage channel. It can also serve as a conduit for fibreoptic-guided tracheal intubation. Its design facilitates insertion, airway sealing, gastric tube placement, and stability during controlled ventilation.[7] Previous studies have reported acceptable insertion characteristics, ventilation, leak pressure, and gastric access compared with other second-generation devices.[8,9]

The BlockBuster laryngeal mask airway is also designed for ventilation, gastric drainage, and tracheal intubation. It includes a curved airway tube, inflatable cuff, independent gastric channel, and integrated bite block.

Its short, wide airway tube may reduce airflow resistance, while its curvature facilitates alignment with the laryngeal inlet. Studies have demonstrated high oropharyngeal leak pressure, favourable fibreoptic views, and high first-attempt insertion success.[10] It has also shown favourable performance as a conduit for tracheal intubation compared with conventional intubating laryngeal mask airways.[11,12]

Clinical performance may be assessed using insertion time, ease and success of insertion, oropharyngeal leak pressure, ventilation, gastric tube placement, haemodynamic changes, fibreoptic view, and airway-related complications.

As direct comparisons between the Ambu AuraGain and BlockBuster LMA during laparoscopic appendicectomy remain limited, the present study was undertaken to compare their insertion characteristics, airway sealing, ventilation, haemodynamic stability, and perioperative complications.

Materials and Methods

This prospective, randomized, comparative study was conducted in the Department of Anaesthesiology at a tertiary care teaching hospital after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all patients before enrolment.

Study Population: A total of 100 adult patients scheduled to undergo elective laparoscopic appendicectomy under general anaesthesia were included in the study. The patients were randomly allocated into two groups of 50 patients each:

- **Group AG (n = 50):** Patients in whom the Ambu AuraGain™ laryngeal mask airway was used.
- **Group BB (n = 50):** Patients in whom the BlockBuster™ laryngeal mask airway was used.

Inclusion Criteria: Patients aged 18–60 years, belonging to the American Society of Anesthesiologists physical status I or II, scheduled for elective laparoscopic appendicectomy under general anaesthesia, and willing to provide written informed consent were included in the study.

Exclusion Criteria: Patients with an anticipated difficult airway, mouth opening of less than 2.5 cm, cervical spine disease, upper airway pathology, increased risk of aspiration, gastro-oesophageal reflux disease, hiatus hernia, pregnancy, body mass index greater than 30 kg/m², severe cardiopulmonary disease, or known allergy to any study medication were excluded. Patients requiring conversion to open surgery or endotracheal intubation were also excluded from the final analysis.

Randomization and Allocation: Patients were randomly allocated to either Group AG or Group BB using a computer-generated randomization sequence. Group allocation was concealed using sequentially numbered, opaque, sealed envelopes. The envelope was opened immediately before induction of anaesthesia by the anaesthesiologist responsible for airway device insertion.

Preanaesthetic Assessment: All patients underwent a detailed preanaesthetic evaluation one day before surgery. Demographic data, medical history, previous anaesthetic exposure, airway assessment, and relevant laboratory investigations were recorded. Airway assessment included the modified Mallampati class, mouth opening, thyromental distance, neck movements, and dentition. Patients were advised to remain fasting for at least 6 hours for solid food and 2 hours for clear fluids before surgery. An oral anxiolytic, as per institutional protocol, was administered on the night before surgery.

Anaesthetic Technique: On arrival in the operating room, standard monitoring was established, including electrocardiography, non-invasive blood pressure, pulse oximetry, end-tidal carbon dioxide, and neuromuscular monitoring. Baseline heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, and peripheral oxygen saturation were recorded. An intravenous line was secured, and intravenous fluid was started. Patients were preoxygenated with 100% oxygen for 3 minutes. General anaesthesia was induced with intravenous fentanyl 2 µg/kg and propofol 2–2.5 mg/kg. Neuromuscular blockade was achieved with intravenous atracurium 0.5 mg/kg or rocuronium 0.6 mg/kg. After achieving adequate jaw relaxation, the allocated supraglottic airway device was inserted according to the manufacturer's recommendations.

Airway Device Selection and Insertion: The size of the supraglottic airway device was selected according to the patient's body weight and the manufacturer's guidelines. The cuff was completely deflated before insertion. A water-based lubricant was applied to the posterior surface of the device, avoiding the ventilation aperture. In Group AG, the Ambu AuraGain™ was inserted using the standard midline insertion technique. In Group BB, the BlockBuster™ laryngeal mask airway was inserted according to the manufacturer-recommended technique. After insertion, the cuff was inflated with the minimum volume of air required to achieve an effective seal. Cuff pressure was measured using a cuff manometer and maintained below 60 cmH_2O. Correct placement was confirmed by visible chest expansion, bilateral equal air entry, absence of audible air leak, and the appearance of a square-wave capnographic trace.

Number of Insertion Attempts: An insertion attempt was defined as the introduction of the supraglottic airway device into the oral cavity. Successful insertion within one attempt was considered first-attempt success.

A maximum of three insertion attempts was allowed. If insertion failed, the device was removed, and mask ventilation was performed before the next attempt. Minor manoeuvres such as jaw thrust, head extension, neck flexion, adjustment of device position, or change in device size were permitted. Failure to establish effective ventilation after three attempts was considered device failure, and the airway was secured with an endotracheal tube.

Insertion Time: The insertion time was defined as the interval from picking up the supraglottic airway device to the appearance of the first square-wave capnographic trace. The insertion time was recorded in seconds using a stopwatch.

Ease of Device Insertion

The ease of insertion was graded as follows:

- **Easy:** Device insertion was successful without resistance or additional manoeuvres.
- **Difficult:** Device insertion required resistance to be overcome or additional airway manoeuvres.
- **Failed:** Effective ventilation could not be achieved after three attempts.

Oropharyngeal Leak Pressure: Oropharyngeal leak pressure was measured after successful placement of the device. The adjustable pressure-limiting valve of the breathing circuit was closed at a fixed fresh gas flow of 3 L/min. The airway pressure at which an audible leak was heard over the mouth or the manometer pressure reached equilibrium was recorded as the oropharyngeal leak pressure. For patient safety, airway pressure was not allowed to exceed 40 cmH_2O. The adjustable pressure-limiting valve was reopened immediately after the measurement.

Gastric Tube Insertion: A lubricated gastric tube of an appropriate size was inserted through the gastric drainage channel of the supraglottic airway device. Correct placement was confirmed by aspiration of gastric contents or auscultation over the epigastrium during air insufflation. The ease of gastric tube insertion was graded as easy, difficult, or failed. Gastric tube insertion time was measured from the introduction of the tube into the drainage channel until confirmation of correct placement.

Maintenance of Anaesthesia: Anaesthesia was maintained with oxygen and nitrous oxide or oxygen and air, along with sevoflurane or isoflurane. Intermittent doses of neuromuscular blocking agent were administered as required. Controlled ventilation was adjusted to maintain end-tidal carbon dioxide between 35 and 45 mmHg. Pneumoperitoneum was created using carbon dioxide, and intra-abdominal pressure was maintained between 12 and 14 mmHg. Patients were placed in the surgical position required for laparoscopic appendicectomy. Peak airway pressure, tidal volume, respiratory rate, and end-tidal carbon dioxide were recorded before pneumoperitoneum, after pneumoperitoneum, and at predetermined intraoperative intervals.

Haemodynamic Monitoring: Heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, peripheral oxygen saturation, and end-tidal carbon dioxide were recorded at baseline, immediately after device insertion, after creation of pneumoperitoneum, and subsequently at 5-, 10-, 15-, 30-, 45-, and 60-minute intervals until the end of surgery.

Ventilatory Parameters: Peak airway pressure, expired tidal volume, respiratory rate, end-tidal carbon dioxide, and oxygen saturation were recorded after device insertion, after pneumoperitoneum, and at regular intervals during surgery. Any episode of inadequate ventilation, significant air leak, gastric insufflation, hypoxaemia, or displacement of the device was documented.

Removal of the Airway Device: At the end of surgery, neuromuscular blockade was reversed with intravenous neostigmine and glycopyrrolate after adequate spontaneous respiration had returned.

The supraglottic airway device was removed when the patient was fully awake, obeying verbal commands, and breathing adequately. The device was inspected for the presence of visible blood immediately after removal. The oral cavity was also examined for any evidence of trauma.

Postoperative Assessment: Patients were assessed for airway-related complications immediately after removal of the device and at 1, 2, and 24 hours postoperatively. The following complications were recorded:

- Sore throat
- Hoarseness of voice
- Dysphagia
- Coughing
- Laryngospasm
- Bronchospasm
- Nausea and vomiting
- Blood staining of the device
- Lip, tongue, or dental trauma
- Regurgitation or aspiration

Postoperative sore throat was graded as absent, mild, moderate, or severe according to the patient's symptoms.

Outcome Measures

Primary Outcome: The primary outcome was the oropharyngeal leak pressure achieved with the Ambu AuraGain™ and BlockBuster™ laryngeal mask airways during laparoscopic appendicectomy.

Secondary Outcomes

The secondary outcomes included:

- First-attempt insertion success rate
- Overall insertion success rate
- Time required for device insertion
- Ease of device insertion
- Number of insertion attempts
- Ease and time of gastric tube insertion
- Peak airway pressure during pneumoperitoneum
- Haemodynamic changes
- Quality of ventilation
- Requirement for airway manoeuvres
- Device displacement or failure
- Blood staining of the device
- Postoperative airway-related complications

Statistical Analysis: The collected data were entered into Microsoft Excel and analysed using Statistical Package for the Social Sciences software, version 26. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, depending on the distribution of the data. Categorical variables were expressed as frequency and percentage. The normality of continuous data was assessed using the Shapiro–Wilk test. Normally distributed continuous variables were compared using the independent-samples Student's t-test, whereas non-normally distributed variables were compared using the Mann–Whitney U test. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Repeated haemodynamic and ventilatory measurements were analysed using repeated-measures analysis of variance or an appropriate non-parametric test.A p-value of less than 0.05 was considered statistically significant.

Results

A total of 100 patients undergoing laparoscopic appendicectomy under general anaesthesia were included in the study. The patients were equally allocated to the Ambu AuraGain™ group (Group AG, n=50) and the BlockBuster™ group (Group BB, n=50). All enrolled patients completed the study and were included in the final analysis. The baseline demographic, airway and perioperative characteristics were comparable between the two groups. The mean age was 31.8 ± 9.4 years in Group AG and 32.5 ± 8.9 years in Group BB ($p=0.70$). No statistically significant differences were observed between the groups in terms of sex distribution, body mass index, ASA physical status, modified Mallampati class, duration of surgery or duration of anaesthesia (all $p>0.05$) (Table 1).The BlockBuster™ LMA demonstrated superior device insertion characteristics compared with the Ambu AuraGain™. The mean insertion time was significantly shorter in Group BB than in Group AG (15.6 ± 3.5 vs. 18.9 ± 4.2 seconds, $p<0.001$). First-attempt insertion success was significantly higher in Group BB than in Group AG (94.0% vs. 82.0%, $p=0.046$). Easy insertion was observed in 92.0% of patients in Group BB compared with 78.0% in Group AG ($p=0.049$). The requirement for additional airway manoeuvres was also significantly lower in Group BB (6.0% vs. 20.0%, $p=0.037$). Overall insertion success was 100% in both groups (Table 2, Figure 1).The oropharyngeal leak pressure was significantly higher with the BlockBuster™ LMA both before and after pneumoperitoneum. Before pneumoperitoneum, the mean oropharyngeal leak pressure was 30.7 ± 3.9

cmH_2O in Group BB compared with 25.8 ± 3.6 cmH_2O in Group AG ($p<0.001$). After pneumoperitoneum, the corresponding values were 29.8 ± 3.7 cmH_2O and 24.9 ± 3.5 cmH_2O, respectively ($p<0.001$). Audible airway leak during surgery occurred significantly less frequently in Group BB than in Group AG (4.0% vs. 16.0%, p=0.046). Effective ventilation throughout surgery was achieved in 98.0% of patients in Group BB compared with 88.0% in Group AG (p=0.050). Gastric insufflation and device repositioning were also less frequent in Group BB, although these differences were not statistically significant (Table 3, Figure 2).Gastric tube insertion was significantly faster and easier with the BlockBuster™ LMA. The mean gastric tube insertion time was 12.8 ± 3.4 seconds in Group BB compared with 16.7 ± 4.1 seconds in Group AG ($p<0.001$). First-attempt gastric tube insertion success was significantly higher in Group BB than in Group AG (96.0% vs. 84.0%, p=0.046). Easy gastric tube insertion was observed in 94.0% of patients in Group BB compared with 80.0% in Group AG (p=0.037). Gastric tube insertion failed in one patient in Group AG, whereas no failure was observed in Group BB (Table 4).The intraoperative ventilatory parameters showed better performance with the BlockBuster™ LMA after creation of pneumoperitoneum. Peak airway pressure before pneumoperitoneum was comparable between the groups (p=0.18). However, after pneumoperitoneum, the mean peak airway pressure was significantly lower in Group BB than in Group AG (22.9 ± 2.8 vs. 24.8 ± 3.1 cmH_2O, p=0.002). The expired tidal volume after pneumoperitoneum was significantly higher in Group BB than in Group AG (462.3 ± 43.5 vs. 437.6 ± 45.8 mL, p=0.007). End-tidal carbon dioxide and peripheral oxygen saturation remained comparable between the groups. The requirements for intraoperative ventilation adjustment and episodes of inadequate ventilation were lower in Group BB, although these differences did not reach statistical significance (Table 5).Airway-related complications were less frequent in the BlockBuster™ group. Blood staining of the device occurred in 14.0% of patients in Group AG and 4.0% in Group BB (p=0.080). Sore throat at 1 hour was reported in 24.0% of patients in Group AG compared with 10.0% in Group BB (p=0.062). At 24 hours, sore throat was significantly less frequent in Group BB than in Group AG (2.0% vs. 12.0%, p=0.050). Other complications, including hoarseness, dysphagia, coughing during device removal and laryngospasm, were less common in Group BB, although the differences were not statistically significant. No episode of regurgitation or pulmonary aspiration was observed in either group. The overall incidence of airway-related complications was significantly lower in Group BB than in Group AG (16.0% vs. 38.0%, p=0.013) (Table 6, Figure 3).

Table 1: Baseline Demographic and Clinical Characteristics

Variable	Group AG: Ambu AuraGain™ (n=50)	Group BB: BlockBuster™ (n=50)	p-value
Age (years), Mean ± SD	31.8 ± 9.4	32.5 ± 8.9	0.70
Male, n (%)	28 (56.0)	27 (54.0)	0.84
Female, n (%)	22 (44.0)	23 (46.0)	
BMI (kg/m^2), Mean ± SD	23.9 ± 2.8	24.2 ± 2.6	0.58
ASA physical status I, n (%)	34 (68.0)	36 (72.0)	0.66
ASA physical status II, n (%)	16 (32.0)	14 (28.0)	
Modified Mallampati class I, n (%)	20 (40.0)	21 (42.0)	0.95
Modified Mallampati class II, n (%)	24 (48.0)	23 (46.0)	
Modified Mallampati class III, n (%)	6 (12.0)	6 (12.0)	
Duration of surgery (minutes), Mean ± SD	68.6 ± 12.4	67.9 ± 11.8	0.77
Duration of anaesthesia (minutes), Mean ± SD	82.3 ± 13.6	81.5 ± 12.9	0.76

Table 2: Device Insertion Characteristics

Parameter	Group AG: Ambu AuraGain™ (n=50)	Group BB: BlockBuster™ (n=50)	p-value
Insertion time (seconds), Mean ± SD	18.9 ± 4.2	15.6 ± 3.5	<0.001*
First-attempt success, n (%)	41 (82.0)	47 (94.0)	0.046*
Second-attempt success, n (%)	7 (14.0)	3 (6.0)	
Third-attempt success, n (%)	2 (4.0)	0 (0.0)	
Overall insertion success, n (%)	50 (100.0)	50 (100.0)	1.00
Easy insertion, n (%)	39 (78.0)	46 (92.0)	0.049*
Difficult insertion, n (%)	11 (22.0)	4 (8.0)	
Additional airway manoeuvre required, n (%)	10 (20.0)	3 (6.0)	0.037*

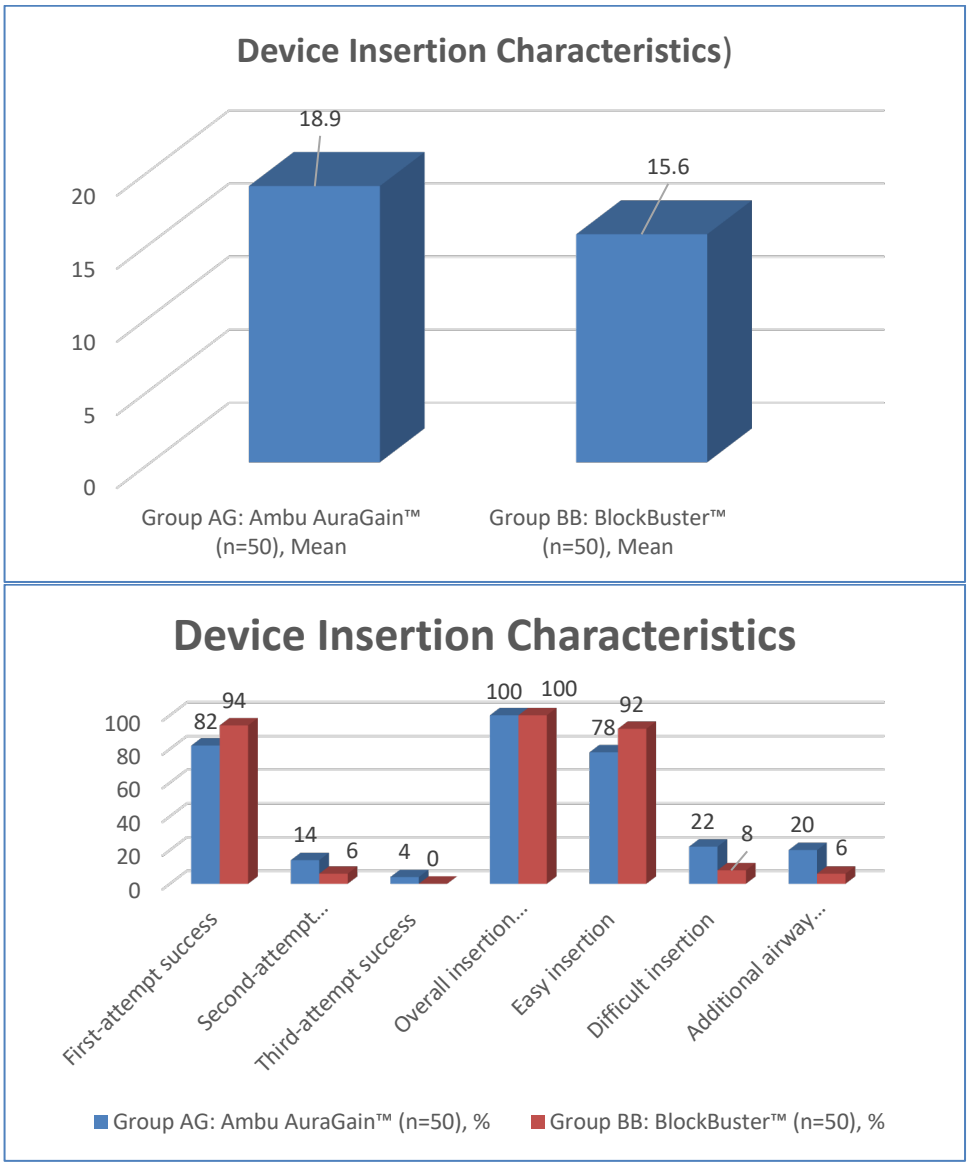

Figure 1: Device Insertion Characteristics

Table 3: Oropharyngeal Leak Pressure and Airway Seal Characteristics

Parameter	Group AG: Ambu AuraGain™ (n=50)	Group BB: BlockBuster™ (n=50)	p-value
Oropharyngeal leak pressure before pneumoperitoneum (cmH_2O), Mean ± SD	25.8 ± 3.6	30.7 ± 3.9	<0.001*
Oropharyngeal leak pressure after pneumoperitoneum (cmH_2O), Mean ± SD	24.9 ± 3.5	29.8 ± 3.7	<0.001*
Audible airway leak during surgery, n (%)	8 (16.0)	2 (4.0)	0.046*
Gastric insufflation, n (%)	5 (10.0)	1 (2.0)	0.092
Device repositioning required, n (%)	7 (14.0)	2 (4.0)	0.080
Effective ventilation throughout surgery, n (%)	44 (88.0)	49 (98.0)	0.050*

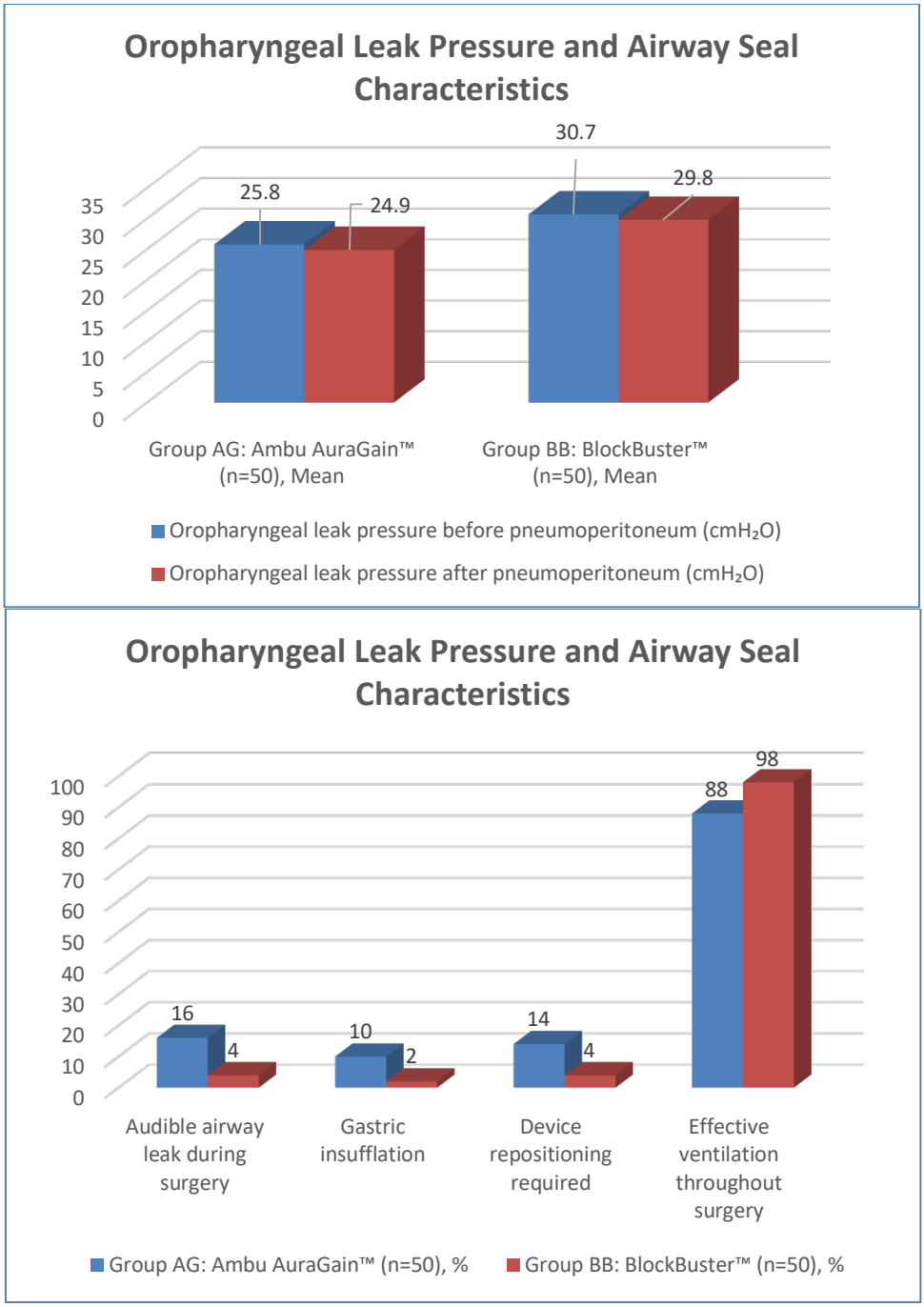

Figure 2: Oropharyngeal Leak Pressure and Airway Seal Characteristics

Table 4: Gastric Tube Insertion Characteristics

Parameter	Group AG: Ambu AuraGain (n=50)	Group BB: BlockBuster (n=50)	p-value
Gastric tube insertion time (seconds), Mean ± SD	16.7 ± 4.1	12.8 ± 3.4	<0.001*
First-attempt gastric tube insertion, n (%)	42 (84.0)	48 (96.0)	0.046*
Second-attempt gastric tube insertion, n (%)	7 (14.0)	2 (4.0)	
Failed gastric tube insertion, n (%)	1 (2.0)	0 (0.0)	
Easy gastric tube insertion, n (%)	40 (80.0)	47 (94.0)	0.037*
Difficult gastric tube insertion, n (%)	9 (18.0)	3 (6.0)	
Gastric tube insertion failure, n (%)	1 (2.0)	0 (0.0)	

Table 5: Intraoperative Ventilatory Parameters

Parameter	Group AG: Ambu AuraGain (n=50)	Group BB: BlockBuster (n=50)	p-value
Peak airway pressure before pneumoperitoneum (cmH_2O), Mean ± SD	17.4 ± 2.3	16.8 ± 2.1	0.18
Peak airway pressure after pneumoperitoneum (cmH_2O), Mean ± SD	24.8 ± 3.1	22.9 ± 2.8	0.002*
Expired tidal volume after pneumoperitoneum (mL), Mean ± SD	437.6 ± 45.8	462.3 ± 43.5	0.007*
End-tidal carbon dioxide after pneumoperitoneum (mmHg), Mean ± SD	39.2 ± 3.4	38.6 ± 3.1	0.36
Peripheral oxygen saturation during surgery (%), Mean ± SD	98.5 ± 0.8	98.7 ± 0.7	0.19
Intraoperative ventilation adjustment required, n (%)	9 (18.0)	3 (6.0)	0.065
Inadequate ventilation episode, n (%)	5 (10.0)	1 (2.0)	0.092

Table 6: Airway-Related Complications

Complication	Group AG: Ambu AuraGain (n=50)	Group BB: BlockBuster (n=50)	p-value
Blood staining of device, n (%)	7 (14.0)	2 (4.0)	0.080
Sore throat at 1 hour, n (%)	12 (24.0)	5 (10.0)	0.062
Sore throat at 24 hours, n (%)	6 (12.0)	1 (2.0)	0.050*
Hoarseness of voice, n (%)	5 (10.0)	1 (2.0)	0.092
Dysphagia, n (%)	4 (8.0)	1 (2.0)	0.169
Coughing during device removal, n (%)	7 (14.0)	3 (6.0)	0.182
Laryngospasm, n (%)	1 (2.0)	0 (0.0)	0.315
Regurgitation, n (%)	0 (0.0)	0 (0.0)	—
Pulmonary aspiration, n (%)	0 (0.0)	0 (0.0)	—
Any airway-related complication, n (%)	19 (38.0)	8 (16.0)	0.013*

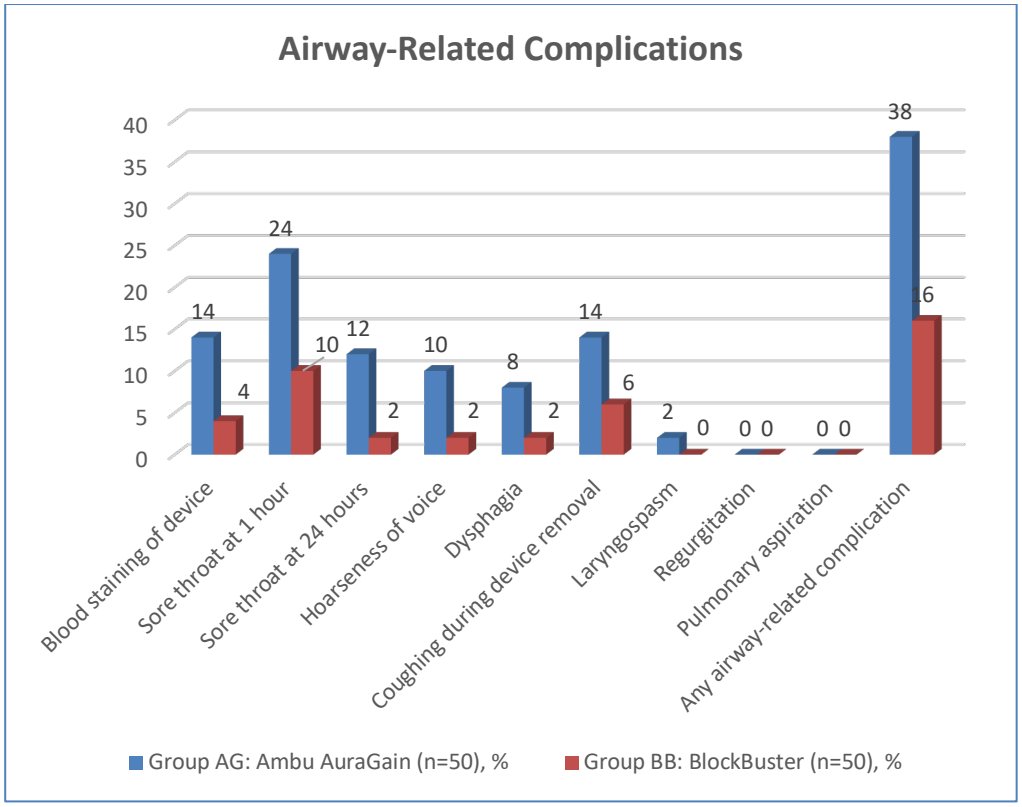

Figure 3: Airway-Related Complications

Discussion

The present study compared the Ambu AuraGain™ and BlockBuster™ laryngeal mask airways in 100 adults undergoing laparoscopic appendicectomy under general anaesthesia. Both devices achieved 100% overall insertion success and maintained satisfactory oxygenation and carbon dioxide elimination. However, the BlockBuster demonstrated faster insertion, higher first-attempt success, greater oropharyngeal leak pressure, easier gastric tube placement, more efficient ventilation after pneumoperitoneum and fewer airway-related complications.

Baseline demographic and perioperative characteristics were comparable between the groups, suggesting that the observed differences were primarily related to device performance. Mean insertion time was significantly shorter with the BlockBuster than with the AuraGain (15.6 ± 3.5 versus 18.9 ± 4.2 seconds; $p<0.001$), while first-attempt success was higher (94% versus 82%; $p=0.046$). Easy insertion occurred in 92% of BlockBuster patients compared with 78% of AuraGain patients, and fewer additional airway manoeuvres were required. Kumar et al.[4] similarly reported significantly shorter insertion time and easier placement with the BlockBuster in paediatric patients. Chhabra et al.[13] also observed longer insertion time with the AuraGain than with the i-gel, partly because of the additional cuff-inflation step.The principal finding was the superior sealing pressure of the BlockBuster. Mean oropharyngeal leak pressure before pneumoperitoneum was 30.7 ± 3.9 cmH_2O with the BlockBuster and 25.8 ± 3.6 cmH_2O with the AuraGain, while post-pneumoperitoneum values were 29.8 ± 3.7 and 24.9 ± 3.5 cmH_2O, respectively (both $p<0.001$). Kumar et al.[4] and Gaur et al.[15] also reported significantly higher seal pressures with the BlockBuster than with the AuraGain. Similarly, Das et al.[14] found a higher leak pressure with the BlockBuster than with the i-gel. Although the AuraGain provided clinically acceptable sealing pressures, the BlockBuster offered a greater safety margin during pneumoperitoneum, when reduced lung compliance and elevated airway pressures increase ventilatory demands. Gastric tube insertion was faster with the BlockBuster (12.8 ± 3.4 versus 16.7 ± 4.1 seconds; $p<0.001$), with higher first-attempt success (96% versus 84%; $p=0.046$). Kumar et al.[4] reported comparable gastric tube passage between the devices in children; differences from the present findings may reflect adult anatomy, larger device sizes and operator-related factors. After pneumoperitoneum, peak airway pressure was significantly lower with the BlockBuster (22.9 ± 2.8 versus 24.8 ± 3.1 cmH_2O; $p=0.002$), while expired tidal volume was higher (462.3 ± 43.5 versus 437.6 ± 45.8 mL; $p=0.007$). Both devices maintained adequate oxygen saturation and end-tidal carbon dioxide, but fewer ventilator adjustments and episodes of inadequate ventilation occurred with the BlockBuster. Thus, both devices were effective for laparoscopic appendicectomy, but the BlockBuster offered clinically relevant advantages in insertion characteristics, airway sealing, gastric tube placement, ventilation and postoperative airway morbidity. It may therefore be preferable for adult laparoscopic procedures requiring controlled positive-pressure ventilation.

Conclusion

Both the Ambu AuraGain™ and BlockBuster™ laryngeal mask airways provided effective airway management during laparoscopic appendicectomy under general anaesthesia. However, the BlockBuster™ demonstrated shorter and easier insertion, a higher first-attempt success rate, greater oropharyngeal leak pressure, and easier gastric tube placement. It also provided better ventilatory performance after pneumoperitoneum and was associated with fewer airway-related complications. Therefore, the BlockBuster™ appeared to be a more favourable supraglottic airway device for appropriately selected patients undergoing laparoscopic appendicectomy.

Limitations

This study was conducted at a single centre with a relatively small sample size, which may limit the generalizability of the findings. Blinding of the anaesthesiologist inserting the airway device was not possible, introducing potential observer bias. Fibreoptic assessment of device position was not performed, and rare complications such as regurgitation and pulmonary aspiration could not be adequately evaluated. Further multicentre studies with larger sample sizes are required to confirm these findings.

References

1. Ramachandran SK, Kumar AM. Supraglottic airway devices. Respir Care. 2014;59(6):920-931.
2. Nicholson A, Cook TM, Smith AF, Lewis SR, Reed SS. Supraglottic airway devices versus tracheal intubation for airway management during general anaesthesia in obese patients. Cochrane Database Syst Rev. 2013;(9):CD010105.
3. Yoon SW, Kang H, Choi GJ, Ryu C, Park YH, Baek CW, et al. Comparison between supraglottic airway devices and endotracheal tubes in patients undergoing laparoscopic surgery: a systematic review and meta-analysis. J Clin Anesth. 2019;55:52-66.
4. Kumar T, Saxena A, Anand R. Supraglottic airway devices versus endotracheal intubation

for laparoscopic surgeries: a systematic review and meta-analysis. Anesth Essays Res. 2023;17(1):22-31.
5. Michalek P, Donaldson W, Vobrubova E, Hakl M. Complications associated with the use of supraglottic airway devices in perioperative medicine. Biomed Res Int. 2015;2015:746560.
6. Lai CJ, Liu CM, Wu CY, Tsai FF, Tseng PH, Fan SZ, et al. I-Gel is a suitable alternative to endotracheal tubes in the laparoscopic pneumoperitoneum and Trendelenburg position. BMC Anesthesiol. 2017;17:3.
7. Sudheesh K, Chethana GM, Chaithali H, Nethra SS, Devikarani D, Shwetha G, et al. A new second-generation supraglottic airway device, Ambu AuraGain, versus intubating laryngeal mask airway as conduits for blind intubation: a prospective, randomised trial. Indian J Anaesth. 2019;63(7):558-564.
8. Joshi R, Rudingwa P, Kundra P, Panneerselvam S, Mishra SK. Comparison of Ambu AuraGain and LMA ProSeal in children under controlled ventilation. Indian J Anaesth. 2018;62(6):455-460.
9. Raman R, Prabha R, Rampal S, Tiwari T, Gautam S, Prakash R, et al. Comparison of clinical performance of Baska mask and Ambu AuraGain in patients undergoing surgery: a single-blinded, randomised comparative trial. Indian J Anaesth. 2023;67(Suppl 4):S227-S231.
10. Gao X, Xue FS, Sun C, Liu GP. Comparison of the supraglottic airway device BlockBuster and LMA Supreme in anaesthetised and paralysed adult patients: a randomised controlled trial. Expert Rev Med Devices. 2022;19(10):799-806.
11. Yuvaraj V, Desai N, Rahate P, Borkar N. Randomized clinical trial comparing the success rate of BlockBuster intubating laryngeal mask airway versus Fastrach intubating laryngeal mask airway during blind endotracheal intubation. Cureus. 2023;15(5):e38669.
12. Kaur K, Bhanupreet, Singh A, Bala R, Aujla KS. Comparison of the LMA BlockBuster and intubating laryngeal mask airway for blind tracheal intubation in adult patients: a randomised controlled study. J Anaesthesiol Clin Pharmacol. 2024;40(1):55-61.
13. Anupma, Chhabra S, Mohammed S, Kamal M, Kumar R, Bhatia P, et al. Comparison of oropharyngeal leak pressure and insertion characteristics of Ambu AuraGain and i-gel in patients undergoing laparoscopic inguinal hernia repair: a randomized control trial. J Anaesthesiol Clin Pharmacol. 2025;41(3):516-522.
14. Das S, Sethi S, Malhotra SK, Samra T, Maitra S, Saini V, et al. Clinical performance of I-gel® and BlockBuster™ laryngeal mask airway in adult patients during general anesthesia: a randomized comparison. J Anaesthesiol Clin Pharmacol. 2024;40(2):279-284.
15. Gaur A, Kumar D, Kumar A. Comparison of clinical performance of Ambu® AuraGain™ and BlockBuster® in anaesthetised preschool children: a randomised controlled trial. Indian J Anaesth. 2023;67(5):430-435.