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ORIGINAL RESEARCH

The application value of laryngeal mask airway general anesthesia in painless bronchoscopy and its influence on the sense of comfort and satisfaction

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Abstract

This study explores the applicability of general anesthesia with a laryngeal mask airway in painless bronchoscopy and its impact on the sense of comfort and satisfaction. Using the random number table method, we divided 101 elderly patients with respiratory disease who underwent bronchoscopy into two groups, with one group receiving intravenous general anesthesia (IVGA) and the other group receiving laryngeal mask airway general anesthesia (LMAGA). Their vital signs, including heart rate (HR), mean arterial pressure (MAP) and oxygen saturation (SpO_2), were compared and we also examined their perioperative adverse effects and assessed the sense of comfort and satisfaction. There were no significant differences in vital signs, including HR, MAP and SpO_2, between the two groups before anesthesia (T_0). However, at T_1 and T_2, the HR of patients in the LMAGA group was significantly lower than that of the IVGA group. Additionally, the MAP and SpO_2 levels in the LMAGA group were significantly higher than those in the IVGA group. The LMAGA group also demonstrated significantly shorter surgical duration and faster recovery from anesthesia than the IVGA group. Furthermore, the LMAGA group exhibited a significantly lower incidence of adverse effects and a notable increase in comfort and satisfaction compared to the IVGA group. LMAGA demonstrates a significant anesthetic effect in painless bronchoscopy, effectively improving the patient's vital signs, reducing the duration of the operation and anesthetic recovery time, lowering the occurrence of perioperative adverse reactions, and enhancing the overall sense of comfort and satisfaction.

Keywords

Bronchoscopy; Laryngeal mask airway general anesthesia; Intravenous general anesthesia; Anesthetic effect; Comfort and satisfaction

1. Introduction

The elderly population is at a higher risk of respiratory diseases due to factors such as the gradual atrophy of respiratory mucosa, decreased secretion function and overall decline in bodily functions. Respiratory diseases are among the leading causes of mortality among the elderly [1, 2]. Fiberoptic bronchoscopy is an important diagnostic and therapeutic procedure for respiratory diseases, known for its high specificity, sensitivity, simplicity and safety [3, 4]. However, being an invasive procedure, fiberoptic bronchoscopy can lead to adverse reactions such as pharyngeal discomfort, choking, coughing, nausea and vomiting, which can be life-threatening in severe cases [5, 6]. Conscious patients during the procedure often exhibit fear and resistance towards fiberoptic bronchoscopy, resulting in situations such as breath-holding and asphyxiation, leading to interruptions in the examination process and hindering the diagnosis and treatment of the disease [7, 8]. To address this issue, anesthesia is commonly used during the procedure. In recent years, painless intravenous anesthesia for fiberoptic bronchoscopy has been widely adopted in clinical practice, effectively alleviating patients' stress response and anxiety and improving the diagnosis and treatment process [9]. However, since painless intravenous anesthesia shares the same airway with fiberoptic bronchoscopy, precise control of anesthetic agent dosage during the examination becomes challenging, potentially leading to respiratory depression and in severe cases, hypoxemia [10, 11]. Anesthesia by laryngeal mask airway has emerged as a significant topic in clinical research, with numerous studies confirming its use during fiberoptic bronchoscopy in effectively reducing the occurrence of hypoxemia, resulting in improved patient satisfaction [12, 13]. Although this technique is gaining maturity in China, studies on this subject are scarce. Hence, this study aims to investigate the anesthetic effect of laryngeal mask airway general anesthesia in painless bronchoscopy.

2. Materials and methods

2.1 General data

Middle-aged and elderly patients, aged between 43 and 89 years old, with a body mass index (BMI) less than 30 kg/m^2 and admitted to our hospital for bronchoscopy were selected. The elderly patients' respiratory disease was classified using the American Association of Anesthesiologists (ASA) as either Grade I (physically healthy, well developed and nourished, with normal organ functions) or Grade II (with comorbidities and functional compensation except for surgical diseases). Grade I and II patients have good anesthesia and surgical tolerance, with stable anesthesia procedures. The clinical data of the patients were comprehensive, and they displayed a high level of cooperation with the medical staff. Exclusion criteria were applied to patients who met any of the following conditions: (1) individuals with mental disorders or those taking relevant medications, (2) patients with severe heart, liver, kidney or other organ dysfunctions, (3) individuals with a history of alcohol or drug abuse, and (4) patients with known allergies to the anesthetic drugs used in the study. A total of 101 eligible patients were enrolled in the study, with 50 assigned to the intravenous general anesthesia (IVGA) group and 51 assigned to the laryngeal mask airway general anesthesia (LMAGA) group using the random number table method. Table 1 presents the general characteristics of all participants.

2.2 Research methodology

All patients followed routine fasting and drinking protocols before the microscopic examination. Routine monitoring, including blood pressure, heart rate and oxygen saturation, was performed after entering the bronchial chamber, and necessary preparations were made before administering general anesthesia. Patients in the routine intravenous general anesthesia group were given an intravenous infusion of propofol (1–2 mg/kg) (propofol injection, Sichuan Guorui Pharmaceutical Co., Ltd., Guoyao Zhunzi H20030115 200 mg × 5 doses), fentanyl (1–2 μg/kg) (Fentanyl Citrate Injection, Yichang Humanwell Pharmaceutical Co., Ltd., National Pharmaceutical Approval No. H42022076, 0.1 mg × 10 pieces) and midazolam (3 mg/kg) (Midazolam Injection, Jiangsu Enhua Pharmaceutical Co., Ltd., National Pharmaceutical Approval No. H19990027, 20 mg × 12 tubes). Once the patients lost consciousness, they continued to breathe autonomously while receiving continuous oxygen inhalation through nasal congestion. If their SpO_2 dropped below 90% during this period, the fiberoptic endoscope was withdrawn to the general branch trachea and assisted breathing was promptly provided. The examination was performed only when SpO_2 was higher than 90%. Patients in the LMA general anesthesia group laid flat and were given an intravenous drip comprising propofol (1~2 mg/kg), sufentanil (1~2 μg/kg) (sufentanil citrate injection, Yichang Humanwell Pharmaceutical Co., Ltd., GYZZ H20054171, 50 μg × 10 doses of and midazolam (3 mg/kg). Following muscle relaxation, a suitable laryngeal mask was inserted, and the anesthetist checked for air leakage and airway pressure. Once properly positioned, the mask was secured. Throughout the examination, the patients' anesthesia was maintained using intravenous propofol infusion, and the intravenous medication was discontinued near the end of the procedure. After awakening, the laryngeal mask was removed, and the patients were sent to the recovery room for monitoring.

2.3 Observational indices

The vital signs of the patients, including heart rate (HR), mean arterial pressure (MAP) and SpO_2, were observed and documented at three specific time points: before anesthesia (T_0), when the bronchoscope entered the voice portal (T_1), and at the end of the examination (T_2). The time required for awakening and perioperative adverse effects (intraoperative choking and coughing, breath-holding, laryngospasm, *etc.*) were recorded in both groups. Additionally, a satisfaction survey was conducted to assess whether the patients had postoperative recollections of pain as well as to compare the sense of comfort and overall satisfaction between the two groups.

2.4 Statistics

The raw data were tabulated and analyzed using the statistical software SPSS 23.0 (SPSS Inc., Chicago, IL, USA). Independent sample *t*-test was used to analyze the quantitative data ($\bar{x} \pm s$), and the chi-square test was used for categorical data (%). Statistical significance was determined for p values less than 0.05.

3. Results

3.1 Comparison of vital signs in perioperative patients

As shown in Table 2, the vital signs, including HR ($t = 0.803$, $p = 0.424$), MAP ($t = 1.692$, $p = 0.094$) and SpO_2 ($t = 1.510$, $p = 0.134$), showed no significant difference between the two groups at T_0 moment. The HR of patients in the LMAGA group at T_1 and T_2 was significantly lower than that of the IVGA group ($t = 7.140$ for T1, $t = 8.149$ for T2, $p < 0.001$ for both), while the MAP ($t = 2.359$ for T1, $t = 2.336$ for T2, $p = 0.020$ for T1, $p = 0.022$ for T2) and SpO_2 ($t = 8.612$ for T1, $t = 2.578$ for T2, $p < 0.001$ for T1, $p = 0.011$ for T2) in the LMAGA group were significantly higher than those in the IVGA group.

3.2 Comparison of surgical duration and time required for anesthetic recovery between the two groups

As shown in Table 3, the surgical duration and time required for anesthetic recovery were significantly shorter in the LMAGA group than in the IVGA group ($p < 0.05$).

3.3 Comparison of incidence of adverse effects and sense of comfort and satisfaction between the two groups

The adverse reactions in the two groups are shown in Table 4. The results indicated that the incidence of adverse effects was significantly higher in the IVGA group than in the LMAGA group ($p < 0.05$). Specifically, eight out of

TABLE 1. Comparison of general data of 101 patients between the two groups.

Variables	No. of cases	Male-female ratio (male/female)	Average age (yr)	ASA (I/II)	BMI (kg/m^2)	Bronchitis/lung cancer/tuberculosis
IVGA	50	30/20	66.00 ± 10.26	9/41	23.46 ± 2.50	23/16/11
LMAGA	51	30/21	65.84 ± 9.21	11/40	23.17 ± 2.58	21/14/16
t/χ^2 value		0.014	0.081	0.202	0.572	1.140
p value		0.904	0.936	0.653	0.569	0.565

Note: The patients' general data were comparable and showed no significant difference between the two groups. IVGA: intravenous general anesthesia; ASA: American Association of Anesthesiologists; BMI: body mass index; LMAGA: laryngeal mask airway general anesthesia.

TABLE 2. Vital signs in perioperative patients.

Indices	Group	T_0	T_1	T_2
HR (beats/min)				
	IVGA	73.56 ± 7.37	90.46 ± 8.50	87.09 ± 8.43
	LMAGA	74.93 ± 9.68	78.82 ± 7.88	73.81 ± 7.96
MAP (mmHg)				
	IVGA	95.57 ± 5.93	83.96 ± 5.65	88.41 ± 3.64
	LMAGA	93.47 ± 6.49	86.62 ± 5.67	90.35 ± 4.62
SpO_2 (%)				
	IVGA	97.82 ± 1.19	94.03 ± 2.26	97.32 ± 1.92
	LMAGA	97.40 ± 1.59	97.52 ± 1.79	98.18 ± 1.39

HR: heart rate; IVGA: intravenous general anesthesia; LMAGA: laryngeal mask airway general anesthesia; MAP: mean arterial pressure; SpO_2: oxygen saturation.

TABLE 3. Comparison of surgical duration and time required for anesthetic recovery between the two groups.

Group	Number of Case	Surgical duration	Time required for anesthetic recovery
IVGA	50	8.19 ± 0.70	7.87 ± 0.60
LMAGA	51	6.32 ± 0.87	7.02 ± 0.89
t value		11.880	5.597
p value		<0.001	<0.001

IVGA: intravenous general anesthesia; LMAGA: laryngeal mask airway general anesthesia.

TABLE 4. Comparison of the incidence of adverse effects between the two groups.

Group	Number of Cases	Intraoperative choking and coughing	Intraoperative suffocation	Intraoperative laryngospasm	Total incidence of adverse effects
IVGA	50	2 (4.00%)	4 (8.00%)	2 (4.00%)	16.00%
LMAGA	51	0	1 (1.96%)	1 (1.96%)	3.92%
χ^2 value					4.129
p value					0.042

IVGA: intravenous general anesthesia; LMAGA: laryngeal mask airway general anesthesia.

50 patients (16.00%) in the IVGA group experienced adverse reactions, while only two out of 51 patients (3.92%) in the LMAGA group experienced adverse effects. Furthermore, all patients in the LMAGA group reported a sense of comfort and satisfaction, achieving a rate of 100%, which was significantly higher than the 82.35% satisfaction rate in the IVGA group ($p < 0.05$).

4. Discussion

It is evident that China's population is experiencing an aging trend, with a growing proportion of elderly individuals [14]. As the body functions of the elderly gradually decline and they are often affected by various chronic cardiovascular diseases, their tolerance to anesthetic agents diminishes, making them more susceptible to severe stress reactions that can endanger their lives. According to incomplete statistics, 2% of surgical deaths among the elderly are associated with anesthesia [15, 16]. Fiberoptic bronchoscopy is a procedure used in the clinical treatment of the respiratory system that can improve the diagnosis and treatment of difficult respiratory diseases and refractory lung conditions, which has demonstrated considerable potential and promising prospects. Anesthesia methods for bronchoscopy mainly include local anesthesia, local anesthesia with sedation and general anesthesia. Local anesthesia requires patient cooperation, skilled operators and swift action. However, many patients have fear and anxiety, potentially related to the pain they might experience, towards bronchoscopy, leading to hesitancy in undergoing the procedure. Their inability to cooperate during the examination results in physical movement and hypoxia, which may significantly prolong the examination time [17, 18]. Currently, intravenous anesthesia is the primary method of anesthesia in painless fiberoptic bronchoscopy, with propofol and fentanyl being the commonly used drugs [19]. Propofol is a short-acting intravenous anesthetic with rapid onset and recovery. It is considered safe for use in the elderly and children and is widely used to facilitate bronchial procedures, especially to soften the bronchus [20, 21]. However, studies have found that propofol does not possess intrinsic analgesic properties, so it is often administered in combination with other analgesic medications in clinical practice [22, 23]. Comparatively, fentanyl is a potent analgesic that acts rapidly and has minimal impact on the cardiovascular system. However, in some patients, it can cause muscle rigidity of the chest wall, potentially affecting respiratory and oxygenation functions and leading to varying degrees of hypoxemia. If not administered properly, it can also induce respiratory depression [24–26]. Nevertheless, when used in conjunction with a low dose of midazolam, fentanyl can effectively address these limitations and is widely employed in painless fiberoptic bronchoscopy procedures [27].

Laryngeal mask general anesthesia is a method to establish a secure airway between the mask and the patient's airway without causing damage to the trachea or vocal cords. This technique ensures effective intraoperative ventilation while exerting minimal impact on the patient's vital signs, such as blood pressure and heart rate. The laryngeal mask features a central respiratory channel that connects directly to the laryngeal cavity and extends distally to the ventilator, thereby maintaining adequate ventilation with a reduced risk of hypoxia and shorter procedure duration [28]. Related studies have demonstrated a high success rate (approximately 98%) and low complication rate associated with the initial placement of the laryngeal mask. Furthermore, it has been found to have significant anesthetic efficacy, particularly in patients with comorbidities such as hypertension and cardiovascular diseases [29, 30]. In this study, the impact of two anesthesia methods, IVGA and LMAGA, in regard to patients' vital signs, procedure duration, time required for awakening from anesthesia during fiberoptic bronchoscopy and the incidence of perioperative adverse effects were investigated, with the objective to determine the effectiveness of LMAGA in achieving painless fiberoptic bronchoscopy.

Our results showed no significant differences in the vital signs, including HR, MAP and SpO_2, between the two groups before anesthesia (T_0). At T_1 and T_2, significant differences were observed in these indicators. The HR of patients in the LMAGA group was significantly lower than that of the IVGA group, while the MAP and SpO_2 were significantly higher in the LMAGA group compared to the IVGA group. These findings suggest that LMAGA could be more effective in maintaining stable vital signs during painless fiberoptic bronchoscopy than IVGA. Additionally, the duration of the procedure and the time required for awakening from anesthesia were shorter in the LMAGA group, indicating that patients in this group resumed spontaneous breathing and awakened more quickly. The reduced postoperative discomfort could be attributed to the absence of memory of the entire examination, as evidenced by the higher levels of comfort and satisfaction reported by the patients in the LMAGA group. Moreover, the incidence of adverse reactions during the perioperative period was significantly lower in the LMAGA group, specifically regarding intraoperative choking, coughing, breath-holding and laryngospasm, which might be attributed to factors such as reduced physiological stimulation during the placement of the laryngeal mask, avoidance of airway damage and irritation to the vocal cords.

5. Conclusions

LMAGA was associated with a significant anesthetic effect in painless bronchoscopy, leading to improved vital signs, reduced operation and anesthetic recovery time, decreased occurrence of perioperative adverse reactions and enhanced sense of comfort and satisfaction. However, it is important to note that the sample size in this study was limited, and the study population was restricted to a specific age range of elderly individuals. Thus, in the future, it would be beneficial to conduct more comprehensive studies with larger sample sizes and longer time spans to further investigate anesthesia protocols for painless fiberoptic bronchoscopy to provide a stronger theoretical basis for clinical practice.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

XQY, YL—designed the study and carried them out; YL—supervised the data collection, YL—analyzed the data, XY, YL—interpreted the data, XQY, YL—prepare the manuscript for publication and reviewed the draft of the manuscript. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of the First People's Hospital of Fuyang Hangzhou (Approval no. 2023-LW006). Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] GBD Chronic Respiratory Disease Collaborators. Prevalence and attributable health burden of chronic respiratory diseases, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet Respiratory Medicine. 2020; 8: 585–596.

[2] Xie M, Liu X, Cao X, Guo M, Li X. Trends in prevalence and incidence of chronic respiratory diseases from 1990 to 2017. Respiratory Research. 2020; 21: 49.

[3] McLaughlin CW, Skabelund AJ, Easterling ER, Morris MJ. The safety and utility of fiberoptic bronchoscopy in the very elderly. Journal of Bronchology & Interventional Pulmonology. 2018; 25: 300–304.

[4] Tang H, Yuan Z, Li J, Wang Q, Fan W. The application of ambroxol hydrochloride combined with fiberoptic bronchoscopy in elderly patients with severe pneumonia. Medicine. 2022; 101: e28535.

[5] Thiam K, Ndiaye EHM, Touré NO, Dia Kane Y, Mbaye FBR, Cissé MF. Contribution of fiberoptic bronchoscopy in the diagnosis of pulmonary dragging. Clinical Pulmonary Disease Review. 2016; 72: 281–287. (In French)

[6] Ma W, Hu J, Yang M, Yang Y, Xu M. Application of flexible fiberoptic bronchoscopy in the removal of adult airway foreign bodies. BMC Surgery. 2020; 20: 165.

[7] Geyik FD, Dogruyol T, Kahraman S, Arslan G, Saracoglu KT, Demirhan R. Short-term outcomes of fiberoptic bronchoscopy-guided resection and anastomosis control in thoracic surgery. Surgical Laparoscopy, Endoscopy & Percutaneous Techniques. 2022; 32: 673–676.

[8] Biciusca V, Popescu IAS, Trasca DM, Olteanu M, Stan IS, Durand P, *et al.* Diagnosis of lung cancer by flexible fiberoptic bronchoscopy: a descriptive study. Romanian Journal of Morphology and Embryology. 2022; 63: 369–381.

[9] Wang J, Yang S, Chen J, Chen Z. Painless fiberoptic bronchoscopy in patients with COVID-19: analysis of 33 cases. Journal of Southern Medical University. 2021; 41: 562–566. (In Chinese)

[10] Jiang NN, Wang DY, Xi MM, Luan XG, Jiang MJ, Li F, *et al.* Retrospective study of fiberoptic bronchoscopy airway lavage in the treatment of extremely severe burn patients with severe inhalation injury. Chinese Journal of Burns. 2020; 36: 252–259. (In Chinese)

[11] Zhang J, Liu JB, Zeng FN, Ren Q, Lin HL, Jian LL, *et al.* Safety and efficacy of dexmedetomidine hydrochloride combined with midazolam in fiberoptic bronchoscopy in children: a prospective randomized controlled study. Chinese Journal of Contemporary Pediatrics. 2021; 23: 981–986.

[12] Alon D, Pertzov B, Gershman E, Frishman M, Rahman NA, Rosengarten D, *et al*. The safety of laryngeal mask airway-assisted bronchoscopy versus standard nasal bronchoscopy. Respiration. 2017; 93: 279–284.

[13] Xu K, Zhang Y, Cui Y, Tian F. Patient-reported outcomes of laryngeal mask anesthesia in thoracoscopic pulmonary wedge resection: a randomized controlled study. Thoracic Cancer. 2022; 13: 3192–3199.

[14] Bao J, Zhou L, Liu G, Tang J, Lu X, Cheng C, *et al*. Current state of care for the elderly in China in the context of an aging population. BioScience Trends. 2022; 16: 107–118.

[15] Bhushan S, Huang X, Duan Y, Xiao Z. The impact of regional versus general anesthesia on postoperative neurocognitive outcomes in elderly patients undergoing hip fracture surgery: a systematic review and meta-analysis. International Journal of Surgery. 2022; 105: 106854.

[16] Qanash S, Hakami OA, Al-Husayni F, Gari AG. Flexible fiberoptic bronchoscopy: indications, diagnostic yield and complications. Cureus. 2020; 12: e11122.

[17] Alhomary M, Ramadan E, Curran E, Walsh SR. Videolaryngoscopy *vs.* fibreoptic bronchoscopy for awake tracheal intubation: a systematic review and meta-analysis. Anaesthesia. 2018; 73: 1151–1161.

[18] Ozturk MC, Kucuk M, Ugur YL, Comert B, Gokmen AN, Ergan B. The safety of fiberoptic bronchoscopy in airway pressure release ventilation mode in critically ill patients with severe acute respiratory distress syndrome: a preliminary study. Turkish Thoracic Journal. 2022; 23: 403–408.

[19] Cobo P, Vetter-Laracy S, Beltran E, Peña-Zarza JA, Figuerola J, Osona B. Utility of fiberoptic bronchoscopy for difficult airway in neonates. The Journal of Maternal-Fetal & Neonatal Medicine. 2021; 34: 2754–2757.

[20] Pertzov B, Krasulya B, Azem K, Shostak Y, Izhakian S, Rosengarten D, *et al*. Dexmedetomidine versus propofol sedation in flexible bronchoscopy: a randomized controlled trial. BMC Pulmonary Medicine. 2022; 22: 87.

[21] Gautam G, Khera D, Lodha R, Kabra SK. Sedation in pediatric bronchoscopy: propofol versus fentanyl. Indian Pediatrics. 2020; 57: 483–484.

[22] Yu H, Chen L, Yue C, Xu H, Cheng J, Cornett EM, *et al*. Effects of propofol and sevoflurane on T-cell immune function and Th cell differentiation in children with SMPP undergoing fibreoptic bronchoscopy. Annals of Medicine. 2022; 54: 2573–2579.

[23] Tekeli AE, Oğuz AK, Tunçdemir YE, Almali N. Comparison of dexmedetomidine-propofol and ketamine-propofol administration during sedation-guided upper gastrointestinal system endoscopy. Medicine. 2020; 99: e23317.

[24] Zhu H, Sun Y, Wang T, Wu Z. Alfentanil and propofol induced anesthesia for patients with huge endotracheal tumor undergoing fiberoptic bronchoscopic interventional therapy: case report. Translational Cancer Research. 2022; 11: 2946–2952.

[25] Zhou Y, Wu W, Zhu Y, Lv X, Liu J. Inhibition of stress and spontaneous respiration: efficacy and safety of monitored anesthesia care by target-controlled infusion remifentanil in combination with dexmedetomidine in fibreoptic bronchoscopy for patients with severe tracheal stenosis. Frontiers in Medicine. 2022; 9: 972066.

[26] Samal S, Kumar M, Patro M, Panigrahy S, Kartheek B. Comparison between intravenous dexmedetomidine and spray as you go with 4% lignocaine versus intravenous fentanyl and transtracheal injection of 4% lignocaine for awake nasotracheal intubation with flexible vedioscope—a randomized single-blind prospective study. Anesthesia: Essays and Researches. 2021; 15: 213.

[27] López Castilla JD, Sánchez Fernández N, Charlo Molina MT, Vázquez Florido A, Murillo Pozo MA, Sánchez Ganfornina I, *et al*. Midazolam/fentanyl *vs.* propofol/remifentanil in immediate postoperative with short-term mechanical ventilation. Pediatric Yearbook. 2022; 96: 115–121.

[28] Chilkoti G, Agarwal M, Mohta M, Saxena A, Sharma C, Ahmed Z. A randomised preliminary study to compare the performance of fibreoptic bronchoscope and laryngeal mask airway CTrach (LMA CTrach) for

visualisation of laryngeal structures at the end of thyroidectomy. Indian Journal of Anaesthesia. 2020; 64: 704.

[29] Karaaslan E, Akbas S, Ozkan AS, Colak C, Begec Z. A comparison of laryngeal mask airway-supreme and endotracheal tube use with respect to airway protection in patients undergoing septoplasty: a randomized, single-blind, controlled clinical trial. BMC Anesthesiology. 2021; 21: 5.

[30] Li X, Wang X, Zhao Y, Jiang Z, Lv X, Nie X, *et al*. Incidence of postoperative sore throat after using a new technique of insertion of a second generation laryngeal mask airway. European Journal of Anaesthesiology. 2021; 38: 285–293.

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