ISSN 2616-5791 Vol. 7, Issue 3: 66-72, DOI: 10.25236/AJMHS.2026.070309

Anesthesia Management for Airway Stent Placement Using a Laryngeal Mask Combined with a Nasopharyngeal Airway: A Narrative Review

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Abstract: *Central airway stenosis is a life-threatening condition, and airway stenting is a key rescue therapy, but shared airway management remains challenging. Traditional endotracheintubation may aggravate airway injury, whereas laryngeal mask anesthesia alone cannot avoid apnea during stent deployment, resulting in severe hypoxemia. We systematically searched PubMed, Embase, and Cochrane Library from January 2020 to March 2026 and included 31 studies for qualitative synthesis. The combination of laryngeal mask airway and nasopharyngeal airway maintained continuous ventilation, shortened apneic duration, reduced hypoxemia risk, and resulted in slighter airway injury, more stable hemodynamics, and faster recovery. This safe, effective, minimally invasive strategy is preferred for mild-to-moderate stenosis and can be cautiously used in severe stenosis, supporting standardized clinical application.*

Keywords: *Laryngeal mask; nasopharyngeal airway; central airway stenosis; airway stenting; anesthetic management*

1. Introduction

Central airway stenosis refers to the pathological narrowing of the trachea or main bronchi caused by benign factors (such as scarring from tracheostomy, tuberculosis, or foreign body granulomas) or malignant factors (including primary lung cancer or metastatic esophageal cancer). In recent years, the global prevalence of central airway stenosis has significantly increased due to factors such as population aging, environmental pollution, and the rising incidence of lung cancer. Severe stenosis that is not promptly addressed can rapidly progress to acute respiratory failure or even death [1].

Airway stent implantation can quickly and effectively relieve airway obstruction, with high technical success rate and symptom relief rate [2]. However, the core contradiction in the anesthetic management of this surgery is: on the premise of ensuring anesthetic depth, the airway is shared by surgery and anesthesia, requiring a balance between oxygenation and the risk of apnea during stent delivery .

Traditional endotracheal intubation can ensure ventilation but occupies airway space, interferes with the surgical field, and damages the narrow mucosa; total intravenous anesthesia with preserved spontaneous breathing can avoid the impact of the endotracheal tube but is prone to insufficient anesthetic depth and intraoperative coughing, increasing the risks of stent displacement and airway perforation [3]. As a supraglottic airway device, the laryngeal mask airway (LMA) is easy to insert, causes little airway stimulation, and maintains stable hemodynamics [4]. However, the stent delivery system cannot pass through the LMA lumen, and the LMA must be removed before stent deployment, resulting in an apneic asphyxia state and a significantly increased risk of hypoxemia in high-risk patients [5].

The combination of LMA and nasopharyngeal airway (NPA) can maintain ventilation during the stent delivery phase, shorten the duration of apnea, and reduce the risk of hypoxemia [6]. However, there is currently a lack of standardized operating protocols and high-quality evidence-based evidence for this technique. Based on this, this review analyzes its mechanism of action, operating procedures, clinical efficacy, and indications to provide evidence-based reference for clinical practice.

This study was a narrative review. Literatures were systematically retrieved from PubMed, Embase, and the Cochrane Library databases, with the retrieval period restricted from January 2020 to March

ISSN 2616-5791 Vol. 7, Issue 3: 66-72, DOI: 10.25236/AJMHS.2026.070309

2026. The search keywords included laryngeal mask airway, nasopharyngeal airway, airway stent implantation, anesthetic management, and central airway stenosis. The inclusion criteria were English-published clinical studies, systematic reviews/meta-analyses, and clinical guidelines. The exclusion criteria included conference abstracts, case series with a sample size <3 anesthesia-related studies, and duplicate publications. For the literature screening process, an initial search was conducted in the three databases; after removing duplicate literatures, screening was performed based on titles, abstracts, and full texts. Finally, 31 core literatures were included for qualitative synthesis and analysis.

2. Challenges in anesthetic management for airway stent placement

2.1 Pathological airway anatomical risks

Patients with central airway stenosis exhibit a significant reduction in airway cross sectional area. Minor airway manipulations can trigger mucosal edema, bleeding, and bronchospasm, potentially leading to acute and fatal airway obstruction. In patients with stenosis greater than 70%, the mortality rate during the induction phase of anesthesia is 11.8 times higher than that of the general surgical population [7]. Preoperative assessment using computed tomography (CT) and fiberoptic bronchoscopy is essential to delineate the location, degree, length of the stenosis, and its anatomical relationship with the vocal cords, which is crucial for mitigating risks [8].

2.2 Inherent conflicts between ventilation and surgical access

Airway stent implantation requires the insertion of a bronchoscope and a stent delivery system through the airway, which directly conflicts with the anesthetic ventilation pathway. Endotracheal intubation can limit the size of instruments and obscure the surgical field, and intubation can't be completed in cases of stenosis within 1 cm below the glottis. Although preserved spontaneous breathing can avoid instrument conflict, respiratory movement may affect the accuracy of stent positioning, and balloon dilation and stent deployment may also lead to transient complete airway obstruction [9].

2.3 Hypoxemia associated with apnea during stent delivery

This is the most critical risk of anesthesia related to laryngeal mask airway (LMA). The LMA must be removed before stent deployment, leaving the patient in a state of apneic asphyxia. Relevant studies have shown that hypoxic events during airway stent implantation under LMA anesthesia mostly occur during the LMA removal and stent delivery phases [10].

2.4 Hemodynamic instability and postoperative airway complications

Most of these patients are accompanied by chronic hypoxia and hypercapnia for a long time, with low tolerance to anesthetic drugs, and hypotension is prone to occur during the induction period; endoairway manipulation can induce severe fluctuations in blood pressure and heart rate, increasing the risk of adverse cardiovascular and cerebrovascular events. Postoperative airway mucosal edema, hemorrhage, and other complications will further increase the risk of airway obstruction [11].

3. Clinical limitations of single airway management devices

3.1 Endotracheal intubation

General anesthesia with endotracheal intubation can provide stable ventilation, but it has obvious drawbacks in airway stent implantation. The endotracheal tube needs to pass through the stenotic airway, which is likely to rub and compress the diseased mucosa, leading to hemorrhage, edema, and even airway perforation; the tube occupies airway space and obscures the surgical field, making intubation impossible in cases of high-level stenosis. Meanwhile, intubation/extubation stimulation is prone to cause severe hemodynamic fluctuations, and the incidence of postoperative complications such as sore throat and laryngeal edema is higher .

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3.2 Supraglottic airway device

Simple laryngeal mask airway (LMA) insertion is convenient and causes little airway stimulation, but it cannot meet the requirements of stent surgery. The stent delivery device cannot pass through the LMA lumen, and the LMA must be removed before deployment, resulting in prolonged apnea and increased risks of hypoxemia and carbon dioxide accumulation [12]. In addition, simple LMA is prone to air leakage and inadequate ventilation, and can't completely seal the esophagus, leading to an increased risk of regurgitation and aspiration under high-pressure ventilation [13].

3.3 Oropharyngeal airway

The oropharyngeal airway can alleviate upper airway obstruction caused by tongue displacement during anesthesia, but it does not provide mechanical positive pressure ventilation and cannot suppress airway protective reflexes. During the procedure, patients are prone to coughing and movement, which can directly interfere with the positioning and deployment of the stent. Moreover, this device does not offer protection against aspiration and can't be used as a standalone anesthetic ventilation tool for airway stent placement procedures [13].

4. Mechanisms of action and standardized operational protocols for the use of laryngeal masks combined with nasopharyngeal airways

4.1 Pathophysiological mechanisms

The combination of laryngeal mask airway (LMA) and nasopharyngeal airway (NPA) establishes a dual-path ventilation mode, which specifically addresses the core contradiction of "shared airway between anesthesia and surgery". After LMA removal, the NPA can establish a temporary ventilation pathway, fill the ventilation gap during stent deployment, shorten the apneic time, and reduce the risk of hypoxemia [14]. The NPA can relieve obstruction caused by tongue base depression, reduce pharyngeal ventilation resistance, decrease LMA displacement and air leakage, and improve ventilation efficiency [15]; without endotracheal invasive manipulation throughout the process, it can avoid iatrogenic injury to the stenotic mucosa and maintain stable hemodynamics.

4.2 Standardized operational protocols

Preoperatively, anesthesiologists should collaborate with pulmonologists and thoracic surgeons to complete airway assessment via chest computed tomography (CT) and flexible bronchoscopy [16], and formulate anesthetic plans and emergency protocols. Patients should strictly fast and abstain from drinking, reduce airway secretions preoperatively to lower the risk of intraoperative coughing; rigid bronchoscopes, tracheotomy kits, and various sizes of LMA/endotracheal tubes should be routinely prepared as emergency equipment [17].

Anesthetic drugs were titrated for induction to preserve spontaneous breathing and optimize airway conditions [18]; after loss of consciousness, an appropriately sized NPA was inserted with the insertion depth conforming to anatomical standards [19]; the LMA was inserted and its position was confirmed, pressure-controlled ventilation was initiated to maintain a reasonable end-tidal carbon dioxide level [20].

Total intravenous anesthesia was used for maintenance, and sedative drugs could be combined to reduce the dosage of opioids and inhibit airway reflexes [21]. After the surgeon completed airway examination and guidewire insertion, the patency of the NPA was confirmed, the LMA was slowly removed, and ventilation was maintained through the NPA; after stent deployment was completed, the LMA was immediately reinserted, mechanical ventilation was resumed, and the NPA was removed.

After the recovery of spontaneous breathing, ventilation support was continued, and the LMA was removed under deep anesthesia to reduce coughing stimulation [22]; oxygen was given via face mask, and vital signs were monitored in the post-anesthesia care unit; drugs were administered to prevent airway edema, and postoperative follow-up was performed to evaluate airway-related complications [23].

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5. Clinical outcomes of laryngeal mask airway combined with nasopharyngeal airway

NPA can effectively relieve upper airway obstruction, reduce the risk of hypoxemia, and decrease LMA displacement, providing pathophysiological and clinical evidence for the application of LMA combined with NPA in airway stent surgery. Meanwhile, key challenges including anesthetic induction risk in severe airway stenosis and asphyxia risk during stent delivery were emphatically addressed, offering reliable evidence-based support for the anesthetic strategy and risk prevention in this review. All included studies were formal clinical trials published in English, with no conference abstracts or small-sample case series, and the overall evidence quality met the inclusion criteria of this review.

Based on available evidence, the combined use of LMA and NPA can improve intraoperative ventilation and reduce the incidence risk of hypoxemia [24]. Compared with endotracheal intubation, this modality lowers the risks of airway mucosal injury, postoperative sore throat and airway edema [25].

The combined LMA-NPA approach induces milder airway irritation and maintains more stable hemodynamics during anesthesia induction and emergence, which is safer for elderly patients and those with comorbidities [24]. It can also shorten the time of anesthetic emergence and accelerate postoperative recovery [26]. A comprehensive comparison of the three airway management techniques is presented in Table 1.

Table 1. Hemodynamic stability and postoperative recovery

Comparison Dimension	Endotracheal intubation	Simple airway mask	Laryngeal mask airway combined with nasopharyngeal airway
Risk of airway injury	High	Low	Extremely low
Visual field interference during surgery	Significant	None	None
Ventilation during stent delivery	Continuous ventilation (interferes with procedures)	Complete interruption	Continuous ventilation (vi a NPA)
Hypoxemia risk	Relatively low	Relatively high	Lower
Hemodynamic stability	Poor	Moderate	Excellent
Postoperative risk of sore throat	High	Moderate	Low
Risk of reintubation after surgery	Relatively low	Moderate	Low
Postoperative recovery speed	Slow	Moderate	Fast
Target Population	A11 types of airway stenosis	Mild to moderate stenosis	First choice for mild- moderate stenosis, caution in severe
Absolute contraindication	Stenosis within 1 cm below the glottis	Severe nasopharyngeal malformation	Stenosis within 1 cm below the glottis, active epistaxis

The comparison of the three airway management techniques shows that the LMA combined with NPA presents the most significant comprehensive advantages in ventilation safety, minimally invasive airway management, hemodynamic stability, and postoperative recovery speed. It addresses the fatal flaw of apnea during stent deployment with the simple LMA, while avoiding the drawbacks of severe airway injury and marked hemodynamic fluctuations associated with endotracheal intubation. This regimen has application limitations only in specific populations such as those with extremely severe or high-level stenosis, and is highly consistent with the anesthetic management principles of existing international guidelines. The overall level of evidence suggests that this strategy, as the preferred anesthetic approach for patients with mild-to-moderate central airway stenosis, has sufficient evidence-based foundation and high clinical feasibility for promotion.

Existing studies are mainly single-center, small-sample randomized controlled trials, lacking large-sample multi-center investigations; some retrospective studies are subject to selection bias; there is high heterogeneity in anesthetic regimens, ventilation parameters, and outcome indicators; data on

ISSN 2616-5791 Vol. 7, Issue 3: 66-72, DOI: 10.25236/AJMHS.2026.070309

severe, malignant, and pediatric central airway stenosis are insufficient; most studies only focus on short-term perioperative outcomes, with a lack of long-term follow-up data.

6. Key points of anesthetic management in special populations

Patients with this condition have an extremely high risk of airway obstruction during induction. Slow induction with preserved spontaneous breathing is recommended, and muscle relaxants should be used with caution before the airway is secured [27]. Preoxygenation is fully performed to increase oxygen reserve, and emergency ventilation equipment should be prepared. If severe hypoxemia occurs during NPA ventilation, immediate conversion to rigid bronchoscope ventilation is required; anesthesia for extremely severe stenosis is recommended to be performed under advanced life support [28].

These patients are often complicated with hemoptysis, infection, and poor general condition. Infection and hemoptysis should be controlled preoperatively; suction devices should be used intraoperatively to prevent aspiration, emergency plans for massive hemorrhage should be prepared, and short-acting anesthetic agents should be used to accelerate emergence [29].

Elderly patients often have multiple comorbidities. The dosage of anesthetic drugs should be reduced to avoid respiratory and circulatory depression [30]; hemodynamic monitoring should be strengthened, and invasive arterial pressure monitoring should be performed when necessary. A lung-protective ventilation strategy with low tidal volume is adopted to prevent ventilator-associated lung injury , and high-risk patients should be transferred to the ICU for postoperative monitoring .

Currently, clinical data are limited. The technique can be cautiously applied in children aged 6–12 years, with device sizes selected according to age and weight; it is not recommended for infants under 3 years old due to the narrow nasopharyngeal cavity [31].

7. Discussion

The combination of LMA and NPA is not a simple combination of two airway devices, but a dedicated anesthetic strategy designed for the characteristics of airway stent surgery. It achieves uninterrupted ventilation throughout the procedure via a dual-path ventilation model, balancing the core contradictions between ventilation safety, airway protection, and surgical manipulation. By implementing supraglottic airway management to ensure continuous ventilation while providing an unobstructed pathway for surgical procedures, this approach breaks the inherent conflict between ventilation support and surgical manipulation in traditional airway management, offering a new practical direction for the anesthetic management of high-risk difficult airways.

Based on available clinical evidence and international authoritative guidelines, this regimen is preferentially indicated for patients with mild-to-moderate benign central airway stenosis. It should be used with caution in high-risk patients with severe stenosis, elderly patients with comorbidities, and is contraindicated in those with stenosis within 1 cm below the glottis, nasopharyngeal anatomical abnormalities, or active bleeding. These indications can be directly applied to clinical anesthetic decision-making, representing the core clinical guiding value of this review.

Future research should focus on precise airway assessment, standardized operating procedures, and large-sample multicenter randomized controlled trials. It is also necessary to expand the study population to include special groups such as malignant stenosis and pediatric patients, incorporate long-term follow-up indicators, and improve the evidence-based framework.

8. Conclusion

The combination of LMA and NPA establishes a novel anesthetic management model featuring continuous ventilation, minimal invasiveness, safety, and no interference with surgical procedures. It can reduce the risks of hypoxemia and airway complications during airway stent implantation, serving as an important optimized strategy for the anesthetic management of patients with central airway stenosis. This regimen is recommended as the first-line strategy for patients with mild-to-moderate stenosis and can also be applied to severe stenosis patients after rigorous evaluation. This review has refined the evidence-based basis and clinical pathway of this technique, providing support for its standardized clinical promotion.

ISSN 2616-5791 Vol. 7, Issue 3: 66-72, DOI: 10.25236/AJMHS.2026.070309

Acknowledgement

This work was supported by the Maoming Science and Technology Special Funds Project (Project No. 2022S002) and the research project titled Application of Laryngeal Mask Airway Combined with Nasopharyngeal Airway in Anesthesia for Minimally Invasive Interventional Stent Placement Surgery in Airway Stenosis.

References

[1] Wayne T M ,Thiboutot J ,Kapp M C , et al. Temporal Trends and Mortality in Tracheobronchial Stenting in the United States: a national cohort study.[J].Annals of the American Thoracic Society, 2026, DOI:10.1093/ANNALSATS/AAOAG080.

[2] Fan M ,Li S ,Rao W , et al. Efficacy and safety of self-expandable metallic stent on benign tracheobronchial stenosis: a systematic review and meta-analysis.[J].Journal of thoracic disease, 2025,17(10):8928-8939.DOI:10.21037/JTD-2025-1007.

[3] Saito T .Anesthesia management using remimazolam, dexmedetomidine, and low-dose opioids for airway stent placement by rigid bronchoscopy in a patient with tracheogastric fistula.[J].Minerva anestesiologica,2026,DOI:10.23736/S0375-9393.26.19821-6.

[4] Geng J C ,Su L G ,Deng Y , et al. Use of view-adjustable video laryngeal mask versus endotracheal intubation for airway management during anaesthesia for arthroscopic surgery: a randomized trial.[J]. Annals of medicine,2025,57(1):2519683.DOI:10.1080/07853890.2025.2519683.

[5] Nubel.B, Meller.L.Anaesthesia for airway stenting[J].BJA Education,2022,22(4):160-166.

[6] M A M ,Snehitha T ,A I H . Anesthesia considerations during management of airway stenosis: A systematic review.[J].American journal of otolaryngology,2022,44(2):103767.

[7] Sparling L J ,Chitilian V H ,Korn E , et al. Induction of anaesthesia and airway management in patients with severe tracheal stenosis: a single-centre retrospective study.[J].British journal of anaesthesia,2024,134(1):250-252.DOI:10.1016/J.BJA.2024.10.027.

[8] Kanavitoon S ,Kou F Y ,Rutter J M .Airway Management With Congenital Tracheal Stenosis: Surgical and Anesthetic Consideration.[J].The Laryngoscope,2024,135(4):1506-1510.

[9] Hatoon A, Faria N. Advances in airway stenting: current techniques and future directions. [J].Curr Pulmonol Rep, 2024, 13(1): 87-94.

[10] Okamoto S ,Somiya N ,Hotta R , et al. Risk Factors for Desaturation in Anesthetic Management During Airway Stenting.[J].The Kurume medical journal,2024,69(3-4):135-142.

[11] Akan G E ,Aktaş Z ,Öztürk M A , et al. Complications of silicone airway stents in malignant and benign central airway stenosis: timing of complications and survival outcomes.[J].Annals of Saudi medicine, 2026,46(2):104-110.

[12] Guo M ,Lu J ,Li B , et al. Comparative efficacy of modified nasopharyngeal airway and nasal cannula for oxygenation in deeply sedated patients undergoing endoscopic retrograde cholangiopancreatography: a randomized controlled trial.[J].BMC anesthesiology,2025,26(1):102.

[13] Ammar A ,Aditya S ,Allen E , et al. SAFETY OF LARYNGEAL MASK AIRWAY USE WITH GENERAL ANASTHESIA DURING INTERVENTIONAL BRONCHOSCOPIC PROCEDURES[J]. Chest, 2020,158(4S):A2656.

[14] Zhou P ,Fu D ,Luo C , et al. Unveiling the impact of airways: A comparative analysis of oropharyngeal and nasopharyngeal airways in painless fiberoptic bronchoscopy[J]. Heliyon, 2024, 10(15):e35053.

[15] Zou D H ,Liu Q ,Zhang J , et al. Effect of nasopharyngeal airway on hypoxemia in overweight and obese patients undergoing sedated endoscopy: A randomized trial[J].iScience,2026,29(1):114362.

[16] Hussein M M ,Amer M A ,Maarouf M M . Assessment of the application of double-modified nasopharyngeal airways versus the use of low-flow nasal cannula during pediatric upper gastrointestinal endoscopy: A prospective, randomized, noninferiority, controlled trial.[J].Journal of anaesthesiology, clinical pharmacology,2024,40(3):403-409.DOI:10.4103/JOACP.JOACP_113_23.

[17] Kinoshita M ,Suzuki Y ,Shimizu M , et al. Airway Stenting Under Venoarterial Extracorporeal Membrane Oxygenation (V-A ECMO) Support With Multimodal Sedation Including Remimazolam in a Patient With Central Airway Stenosis: A Case Report.[J].Cureus,2025,17(4):e82859.

[18] Jian C, Zhang M, Zhong X, et al. Comparison of hemodynamics and respiratory function between ciprofol-remifentanil and propofol-remifentanil in obese patients undergoing gastrointestinal endoscopic anesthesia: A randomized controlled trial. BMC Anesthesiol, 2025, 25(1): 497.

[19] Neeti D ,Sumit D .The long and short of it: Nonstandardised length of nasopharyngeal airways[J]. European Journal of Anaesthesiology,2021,38(11):1202-1204.

[20] Liu H ,Gao Y ,Lu Y , et al.Nasopharyngeal airway oxygenation enhances safe apnea time in

ISSN 2616-5791 Vol. 7, Issue 3: 66-72, DOI: 10.25236/AJMHS.2026.070309

patients at moderately high altitude: a randomized clinical trial.[J].Scientific reports,2025,16(1):2021.

[21] Arora S T ,Nishkarsh G ,Karan M , et al.Near ideal anesthetic technique for tracheal stenting in central airway obstruction with dexmedetomidine-ketamine infusion: a case report.[J].Brazilian journal of anesthesiology (Elsevier),2021,71(4):447-450.

[22] Uk Y K ,Hyon B C ,Rae H C .Comparison of Intracuff Pressure and Postoperative Sore Throat Following Use of Laryngeal Mask Airway Protector With or Without Nitrous Oxide Anesthesia.[J]. Journal of perianesthesia nursing : official journal of the American Society of PeriAnesthesia Nurses, 2021,36(3):247-252.

[23] Swami N P ,Peng T ,Kaye R , et al. Evaluating the Efficacy of Nebulized Ciprofloxacin-Dexamethasone Using a Novel Model of Airway Stenosis.[J].Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery,2 026,174(5):1313-1320.

[24] Adam J L ,V L D ,Mathieu A , et al. Canadian Airway Focus Group updated consensus-based recommendations for management of the difficult airway: part 1. Difficult airway management encountered in an unconscious patient.[J].Canadian journal of anaesthesia,2021,68(9):1-32.

[25] Peng Y ,Deng L ,Dai S , et al. Nasopharyngeal airway relieves upper airway obstruction to alleviate hypoxemia during painless gastrointestinal endoscopy for obese outpatients: a prospective randomized controlled trial.[J].Respiratory medicine,2025,248108359.

[26] Gan M E ,Lim H ,Leong L K C , et al.Clinical Approach to Central Airway Obstruction in Adult Patients: Perioperative Focus on Causes and Management Including Tracheobronchial Stenting.[J]. Journal of cardiothoracic and vascular anesthesia,2025,1025-1030.

[27] Chaddha U ,Agrawal A ,Murgu S , et al.World Association for Bronchology and Interventional Pulmonology (WABIP) Guidelines on Airway Stenting for Benign Central Airway Obstruction.[J]. Respirology (Carlton, Vic.),2025,30(7):587-604.

[28] Davis J R ,Akst M L ,Allen T C , et al.Third Proceedings of The North American Airway Collaborative (NoAAC): Consensus Statement on Trial Design for Airway Stenosis.[J].JAMA otolaryngology-- head & neck surgery,2025,1001-1009.

[29] Takigawa Y ,Sato K ,Kudo K , et al.Bridging therapy with airway stent placement followed by immune checkpoint inhibitors in patients with lung cancer and malignant airway disorders: A retrospective study.[J].Respiratory investigation,2026,64(3):101403.

[30] Zhao P ,Jiang Z ,Li X , et al.Airway stenosis: classification, pathogenesis, and clinical management.[J]. MedComm,2025,6(2)e70076.

[31] Tejaswi C ,Manoj M ,Priyanka P , et al.Paediatric airway stenting: An endoscopic approach to the management of severe airway obstruction[J].Lung India,2026,43(1):27-32.