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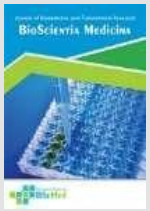

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# Awake Intubation for a Predicted Difficult Airway in a Patient with Giant Goiter-Induced Tracheomalacia: A Case Report

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**A B S T R A C T**

**Background:** The management of a predicted difficult airway in patients with giant goiters presents a significant anesthetic challenge. Chronic tracheal compression can lead to secondary tracheomalacia, a condition characterized by tracheal weakness that can precipitate catastrophic airway collapse upon induction of general anesthesia. We present a case where a high index of suspicion for tracheomalacia guided the decision to perform awake tracheal intubation. **Case presentation:** A 22-year-old female presented with a massive, non-toxic nodular goiter that had been growing for eight years, causing significant positional dyspnea. Airway assessment revealed a 10x10 cm neck mass with tracheal deviation, indicating a high risk for difficult intubation and ventilation. Preoperative suspicion of tracheomalasia was high due to symptoms and chronicity. The airway was secured using awake intubation with topical and intravenous lidocaine prior to the induction of general anesthesia. The patient underwent a total thyroidectomy. Intraoperative palpation confirmed flaccid tracheal rings, supporting the diagnosis. The endotracheal tube was retained postoperatively, and the patient was monitored in the intensive care unit. She was successfully extubated on the third postoperative day without complications. **Conclusion:** This case underscores the critical importance of maintaining a high index of suspicion for tracheomalacia in patients with long-standing, giant goiters. Awake tracheal intubation is a cornerstone technique, providing a safe and effective method to secure the airway while preserving spontaneous ventilation, thereby mitigating the risk of life-threatening airway obstruction. A meticulous, multidisciplinary perioperative plan is paramount for optimal patient outcomes.

## 1. Introduction

The management of the human airway is the most critical responsibility of an anesthesiologist.[1] While advancements in pharmacology, technology, and technique have made anesthesia remarkably safe, the difficult airway remains a primary source of anesthesia-related morbidity and mortality.[2] A difficult airway is a clinical situation in which a conventionally trained physician experiences difficulty with facemask ventilation of the upper airway, difficulty with tracheal intubation, or both.[3] The incidence of difficult intubation in the general surgical population is estimated to be between 1.5% and 13%, but this risk is amplified substantially in the presence of specific anatomical abnormalities, particularly those involving the head and neck.

Neck masses, especially giant thyroid goiters, represent a classic and formidable airway challenge. Non-toxic nodular goiter is a prevalent thyroid condition globally, characterized by the enlargement of the thyroid gland without associated hyperthyroidism.[4] While many goiters remain asymptomatic and are managed conservatively, giant goiters, often defined as those weighing over 100

grams or extending substernally, can cause significant compressive symptoms. These symptoms arise from the mass effect on adjacent structures, leading to dysphagia from esophageal compression, jugular vein compression causing thoracic inlet syndrome, and, most critically, airway compression. The anatomical distortion can include severe tracheal deviation, luminal narrowing, and physical obstruction, making direct laryngoscopy and tube placement mechanically challenging.[5]

Beyond the immediate anatomical obstruction, a more insidious and dangerous complication of long-standing giant goiters is the development of secondary tracheomalacia.[6] Tracheomalacia is a pathological condition defined by excessive flaccidity of the tracheal wall, resulting from weakness in the tracheal cartilage.[7] This leads to an exaggerated dynamic collapse of the trachea, particularly during expiration or coughing. It can be classified as primary (congenital) or secondary (acquired). Secondary tracheomalacia, the focus of this report, results from external factors that damage the structural integrity of the tracheal rings after normal organ development. The most common cause of localized secondary tracheomalacia in adults is chronic external compression from tumors, cysts, or, as in this case, a massive goiter. The pathophysiology is believed to involve a combination of direct pressure-induced cartilage atrophy, chondromalacia, and impaired blood supply to the tracheal cartilage, leading to a gradual loss of rigidity over months or years.

The clinical presentation of tracheomalasia can be subtle, often mimicking other respiratory conditions like asthma or chronic obstructive pulmonary disease.[8] A hallmark symptom, however, is expiratory stridor or a characteristic barking cough. Dyspnea that is exacerbated by changes in position, particularly lying supine, is highly suggestive of the condition, as gravity can worsen the compressive effect of an anterior neck mass. The true danger of tracheomalacia in the perioperative setting lies in its potential for complete, irreversible airway collapse upon the induction of general anesthesia. The administration of anesthetic agents and neuromuscular blocking drugs abolishes the patient's respiratory drive and eliminates the positive pressure of spontaneous breathing, which helps to "stent" open the weakened trachea. The loss of this tone, combined with the positive pressure from mask ventilation, can lead to a "can't intubate, can't oxygenate" (CICO) emergency.

Given this profound risk, the preoperative identification of patients at risk for tracheomalacia is paramount. Standard airway assessment tools, such as the Mallampati classification, thyromental distance, and the LEMON score (Look externally, Evaluate 3-3-2 rule, Mallampati score, Obstruction, Neck mobility), are essential for identifying a potentially difficult anatomical airway but may fail to predict the physiological difficulty of a collapsible trachea. Therefore, clinical history, specifically symptoms of positional dyspnea or stridor, and imaging studies showing significant tracheal compression are vital clues.[9]

In cases of a predicted difficult airway, particularly with suspected tracheomalacia, awake tracheal intubation (ATI) is widely considered the gold-standard technique for securing the airway. ATI involves intubating the patient while they are still conscious and breathing spontaneously. This approach maintains the natural airway tone and respiratory drive, keeping the trachea patent and allowing the patient to assist in their own oxygenation throughout the procedure. Successful ATI relies on meticulous preparation, including thorough topical anesthesia of the airway, judicious use of sedation to ensure patient comfort and cooperation, and clear communication with the patient. The use of agents like lidocaine, both topically and intravenously, is crucial for suppressing airway reflexes without compromising respiratory function.[10]

This case report describes the anesthetic management of a young female patient with a giant non-toxic goiter and high clinical suspicion for secondary tracheomalacia who was scheduled for total thyroidectomy. It highlights the clinical decision-

making process, from preoperative assessment and suspicion to the selection and execution of awake intubation, and the postoperative considerations dictated by the intraoperative findings. The aim of this study is to present a comprehensive account of the successful management of a predicted difficult airway in a patient with a giant goiter and suspected tracheomalacia, thereby reinforcing the pivotal role of preoperative suspicion and the safety profile of awake intubation. This report serves as a practical guide and reinforces best-practice principles for anesthesiologists, surgeons, and emergency physicians who may encounter similar challenging scenarios, particularly emphasizing the thought process that can prevent a potential airway catastrophe.

**2. Case Presentation**

The patient was a 22-year-old female who presented to the surgical outpatient clinic with the chief complaint of a large mass in her neck and progressively worsening shortness of breath. She first noticed the neck swelling eight years prior, but it had remained stable and asymptomatic for the first five years. Over the last three years, the mass had grown significantly, causing cosmetic disfigurement and, more alarmingly, the onset of respiratory symptoms. She reported experiencing significant dyspnea and a loud snoring sound, particularly when lying flat on her back (orthopnea). This would be relieved by sitting up or sleeping propped up on several pillows. She denied any history of hoarseness, difficulty swallowing (dysphagia), or pain associated with the mass. Her past medical, surgical, and family histories were unremarkable. She was not on any regular medication and had no known allergies.

On physical examination, the patient appeared calm and in no acute distress while seated. Her vital signs were recorded as follows: blood pressure of 118/72 mmHg, heart rate of 84 beats per minute, respiratory rate of 16 breaths per minute, and oxygen saturation of 99% on room air. The patient's detailed clinical findings are summarized in Table 1. The comprehensive airway assessment, a critical component of the preoperative evaluation, revealed a predicted difficult airway primarily due to the large, obstructive neck mass. While certain parameters were favorable, the overall picture, combining physical findings with the patient's history, mandated a cautious and specialized approach. The combination of a massive external anatomical distortion with a compelling history of dynamic airway compromise led to a high index of suspicion for underlying tracheomalacia.

The perioperative management was meticulously planned to address the anticipated challenges. Given the high probability of a difficult airway and the risk of complete airway collapse upon induction, the anesthetic plan was centered around performing an awake tracheal intubation. The plan, including risks and benefits, was discussed in detail with the patient and the surgical team. All necessary equipment for a difficult airway was prepared and immediately available. The procedural and follow-up details are outlined in Table 2.

In the operating room, standard ASA monitors were applied. The patient was placed in a semi-upright, "ramped" position to alleviate any supine-induced dyspnea and to facilitate intubation. The crucial phase of airway anesthetization was performed meticulously, followed by gentle direct laryngoscopy and intubation while the patient remained conscious and breathing spontaneously. Only after confirming successful and secure placement of the ETT did the induction of general anesthesia commence.

The surgical procedure was a total thyroidectomy. The intraoperative course was uneventful, with minimal blood loss. During the dissection, the surgeon carefully palpated the anterior tracheal wall after the thyroid gland was removed. The surgeon noted that the tracheal rings in the area of previous compression were markedly soft and pliable, collapsing easily with gentle pressure. This intraoperative finding confirmed the preoperative suspicion of severe, localized tracheomalacia. This critical finding dictated the postoperative plan, leading to the decision to keep the

patient intubated to stent the weakened airway. The postoperative management was executed as planned. The patient was transferred to the Intensive Care Unit (ICU) for close monitoring and ventilatory support. She was successfully weaned and extubated on the third postoperative day, with no complications. After a 24-hour period of uneventful observation, she was transferred to the surgical ward and subsequently discharged home in good condition.

Table 1. Summary of patient's clinical findings.

| Parameter | Finding |
|---|---|
| **Demographics** | 22-year-old female |
| **Chief complaints** | Large neck mass, progressive dyspnea, snoring when supine. |
| **History** | Mass present for 8 years, significant growth in last 3 years. |
| **Vital signs** | BP: 118/72 mmHg; HR: 84 bpm; RR: 16/min; $SpO_2$: 99% on RA. |
| **Physical examination** | |
| General | Alert, cooperative, no distress at rest. |
| Neck mass | Approx. 10x10 cm, firm, non-tender, mobile with swallowing. |
| **Airway assessment** | |
| LEMON score | Predicted difficult airway due to 'O' for Obstruction. |
| Mallampati class | Class II. |
| Neck mobility | Normal range of motion. |
| Tracheal position | Palpable deviation, confirmed on imaging. |
| **Laboratory findings** | |
| TSH | 2.1 µIU/mL (Normal: 0.4-4.0) |
| Free T4 | 1.4 ng/dL (Normal: 0.8-1.8) |
| Free T3 | 3.2 pg/mL (Normal: 2.3-4.2) |
| CBC, coagulation | Within normal limits. |
| **Radiological findings** | |
| Cervical X-Ray | Large soft tissue mass causing tracheal narrowing and deviation (Figure 1). |
| **Preoperative diagnosis** | Giant non-toxic nodular goiter with predicted difficult airway and suspected tracheomalasia. |

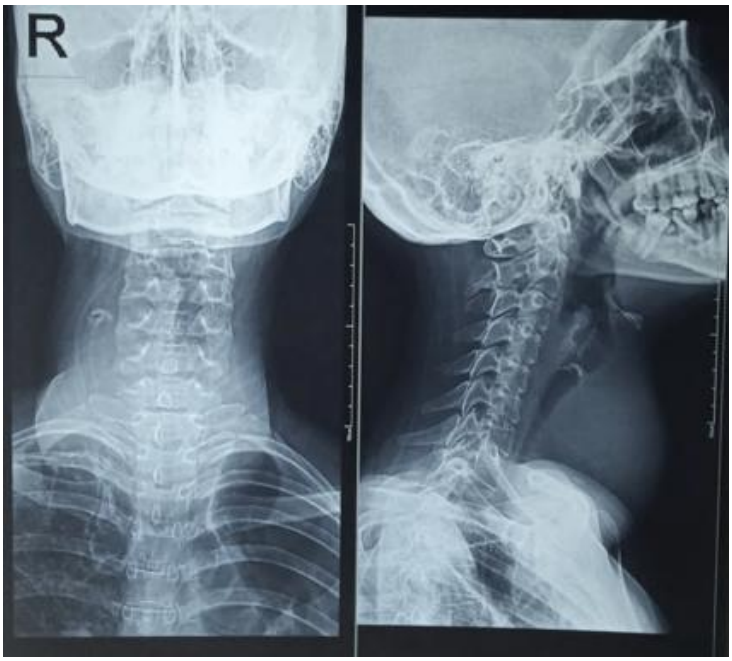


Figure 1. Cervical X-ray imaging.

Table 2. Summary of treatment procedure and follow-up.

| Phase | Intervention / Finding |
|---|---|
| **Anesthetic plan** | |
| Primary technique | Awake Tracheal Intubation. |
| Premedication | Ondansetron 4 mg IV, Ranitidine 150 mg IV. |
| Airway anesthesia | Xylocaine spray (topical), Lidocaine 40 mg (intravenous). |
| Induction agents | Propofol 100 mg, Fentanyl 100 mcg. |
| Muscle relaxant | Atracurium 25 mg. |
| Maintenance | Sevoflurane 2 Vol% in $O_2$ at 5 LPM. |
| **Airway equipment** | |
| Endotracheal tube | Size 6.0, non-kinking, reinforced. |
| **Surgical procedure** | |
| Operation | Total Thyroidectomy. |
| Intraoperative finding | Palpation of weak, flaccid tracheal rings. |
| **Postoperative care** | |
| Initial plan | Planned ETT retention and ICU admission. |
| ICU course | Mechanical ventilation followed by gradual weaning. |
| Extubation | Performed on Postoperative Day 3 after successful SBT and cuff leak test. |
| Follow-up | 24-hour post-extubation observation in the ICU, then transfer to the ward. |
| Outcome | No post-extubation stridor or distress. Discharged in good condition. |

**3. Discussion**

This case of a young woman with a giant goiter and secondary tracheomalacia represents a convergence of pathologies that creates a formidable anesthetic challenge. The successful outcome was not a matter of fortune but the direct result of a chain of astute clinical reasoning, beginning with a high index of suspicion and culminating in a meticulously executed, multidisciplinary perioperative plan.[11] This discussion aims to dissect the core components of this case—the pathophysiology of the disease, the nuances of the diagnostic process, the technical and pharmacological mastery required for the intervention, and the strategic postoperative management—all viewed through the lens of current medical science and theory.

The story of this patient's airway challenge began eight years prior with the insidious growth of her thyroid gland. Goitrogenesis in non-toxic multinodular goiters is a multifactorial process, often initiated by factors such as iodine deficiency or genetic predisposition, leading to a heterogeneous response of follicular cells to thyroid-stimulating hormone (TSH).[12] Some follicles become hyper-responsive, leading to clonal expansion and nodule formation. Over the years, this process of growth, hemorrhage, and cystic change results in the massive, asymmetrical gland seen in this patient.

The anatomical consequences of this growth are profound due to the thyroid's intimate relationship with the trachea. The gland is encapsulated by the visceral fascia of the neck and lies anterolateral to the trachea. As it enlarges, it has nowhere to go but to envelop, compress, and displace the trachea.[13] This patient's 10x10 cm mass exerted a chronic, relentless force upon her airway. The mechanical effects can be categorized into three primary patterns of distortion. First is tracheal deviation, which was evident both on palpation and on her cervical X-ray. While deviation alone may not cause obstruction, it elongates and complicates the path for intubation. Second, and more critically, is direct tracheal compression. This can occur in an anteroposterior direction, reducing the tracheal lumen to a slit-like opening, or circumferentially, creating what is known as a "scabbard trachea." This luminal narrowing is the direct cause of the patient's dyspnea, as the work of breathing increases exponentially with a reduction in

airway radius, a principle dictated by Poiseuille's law. Third is the potential for substernal extension, where the goiter grows inferiorly into the thoracic inlet. While not explicitly detailed, a goiter of this size often has an inferior component, further complicating ventilation and surgical access.

The most telling symptom described by the patient was orthopnea—a significant worsening of dyspnea in the supine position. This is not merely a subjective feeling; it is a direct result of physics and physiology. When the patient is upright, gravity pulls the goiter slightly inferiorly and anteriorly. When she lies supine, the full weight of the massive gland presses directly downward, maximally compressing the already compromised tracheal lumen. This positional dynamic is a cardinal sign that the obstruction is severe and that the patient is reliant on positioning and the tone of her accessory respiratory muscles to maintain a patent airway.[14] It is this single piece of historical data that should alert the clinician that the induction of anesthesia, which involves paralysis and the loss of this compensatory tone, is an activity fraught with extreme danger.

If mechanical compression is the visible enemy, tracheomalacia is the unseen saboteur. The human trachea owes its rigidity to approximately 16 to 20 C-shaped rings of hyaline cartilage.[15] These rings are living tissue, supplied by a delicate segmental microvasculature derived from the inferior thyroid and bronchial arteries. The perichondrium, a dense connective tissue membrane surrounding the cartilage, is vital for nutrient delivery and cartilage repair. Secondary tracheomalacia, as seen in this case, is the pathological end-stage of chronic ischemic injury.

The process is insidious. The relentless external pressure from the giant goiter, likely exceeding the capillary perfusion pressure within the perichondrium, initiates a state of chronic ischemia.[16] The chondrocytes, the specialized cells responsible for maintaining the cartilage matrix, are exquisitely sensitive to hypoxia. Deprived of oxygen and nutrients, they undergo apoptosis, or programmed cell death. The intricate matrix of collagen and proteoglycans that gives the cartilage its strength begins to degrade. The body's attempt at repair is often maladaptive; the damaged hyaline cartilage is not replaced by new, functional cartilage but rather by disorganized, pliable fibrous tissue. This process, occurring over the years, transforms the strong, supportive C-rings into weak, flaccid structures incapable of resisting the negative intrathoracic pressure generated during expiration.

The result is a trachea that is dynamically collapsible. During inspiration, the airway may be pulled open, but during expiration—or, more forcefully, during a cough—the positive intrathoracic pressure causes the weakened anterior wall to collapse inward toward the posterior membranous wall, leading to near-total obstruction.[11] This is the physiological basis of the expiratory stridor or barking cough often associated with the condition. The diagnosis of tracheomalacia is, therefore often clinical, based on a high index of suspicion in a patient with a long-standing compressive lesion and suggestive symptoms. While dynamic flexible bronchoscopy is the gold standard for diagnosis, showing the characteristic >50% reduction in cross-sectional area during exhalation, the clinical evidence in this patient was so compelling that proceeding with a plan that assumed its presence was the only safe course of action. The intraoperative palpation of "markedly soft and pliable" tracheal rings was the final, tactile confirmation of this destructive pathological process, validating the entire preoperative strategy.

The preoperative airway assessment is a cornerstone of anesthetic safety. A plethora of scoring systems, with the LEMON score being a prominent example in emergency and anesthetic settings, have been developed to stratify the risk of difficult intubation.[10] In this patient, the assessment yielded mixed results. Her Mallampati class was a reassuring II, and her neck mobility was normal. However, the 'O' for Obstruction in the LEMON framework, represented by the giant goiter, immediately catapulted her into a high-risk category.

This case, however, powerfully illustrates the limitations of relying solely on static, anatomical scores. These scores are designed to predict the difficulty of achieving a view of the larynx with a laryngoscope.[11] They are not designed to predict the physiological response of the airway to the induction of anesthesia. A clinician could be falsely reassured by a good Mallampati score or thyromental distance, believing that intubation will be straightforward, only to find that upon induction, the entire airway architecture collapses, making both ventilation and intubation impossible.

Therefore, the assessment must evolve from a checklist of scores to a clinical synthesis. The most critical data points in this patient's assessment were not her measurements, but her history. The eight-year duration of the mass and the three-year history of progressive, positional dyspnea were far more predictive of the true danger than any physical measurement. This represents a required paradigm shift in thinking about the difficult airway. The assessment must be four-dimensional, incorporating the element of time (chronicity) and physiology (symptoms under stress or with positional change).[15] The physical examination and imaging serve to confirm and quantify the anatomical basis for the symptoms described in the history. In this light, the anesthesiologist's role is not merely as a technician who performs intubation, but as a diagnostician who interprets the complete clinical picture to foresee and preempt a physiological catastrophe.

The choice of awake tracheal intubation was the central, life-saving decision in this case. The delicate balance of forces keeping the weakened trachea open would have been eliminated, likely leading to the immediate collapse of the malacic segment.[17] The result would be an inability to ventilate by mask and, given the distorted anatomy, a high probability of being unable to intubate the now-obstructed trachea—a classic CICO scenario. Similarly, an inhalational induction would have been equally perilous, as the deepening plane of anesthesia would have progressively relaxed airway tissues, leading to a gradual and then complete obstruction.

ATI stands in stark contrast by preserving the very physiological functions that the other techniques abolish: consciousness and spontaneous ventilation. The patient's own respiratory efforts continue to stent the airway open from within, providing a stable, albeit narrowed, target for intubation. The successful execution of ATI is an art form grounded in science, requiring a deep understanding of airway neuroanatomy and pharmacology.[18]

The sensory innervation of the airway is complex, supplied by branches of the glossopharyngeal (CN IX) and vagus (CN X) nerves. The posterior third of the tongue and oropharynx are supplied by CN IX, responsible for the gag reflex. The larynx above the vocal cords is supplied by the internal branch of the superior laryngeal nerve (a branch of the vagus), while the larynx below the vocal cords and the trachea are supplied by the recurrent laryngeal nerve. A successful ATI requires blocking these pathways to allow the passage of an instrument without triggering a violent cough or gag reflex.

The technique used in this case—a combination of topical and intravenous agents—is a common and effective approach. The application of Xylocaine (lidocaine) spray to the oropharynx addresses the glossopharyngeal component, reducing the gag reflex. The intravenous administration of lidocaine is a key adjunct.[18] While it has some topical effect as it is excreted by the salivary glands, its primary role in this context is its central action on the brainstem's cough center, raising the threshold for a cough reflex. This systemic effect provides a blanket of suppression that is difficult to achieve with topical agents alone.

The procedure itself must be one of supreme gentleness and communication. The patient must be a partner in the process, coached and reassured throughout. While the report details the use of lidocaine, in many contemporary practices, light, titratable sedation is used to improve patient tolerance. Dexmedetomidine is an ideal agent for this purpose, providing sedation and analgesia with minimal respiratory depression.[13] It allows for a state

of "cooperative sedation" where the patient is calm but can still respond to commands and maintain their own airway.

The choice of a non-kinking, reinforced ETT was also a critical detail. The tortuous path created by the deviated trachea puts any standard tube at risk of kinking, which would cause an obstruction even after a successful intubation. The wire reinforcement in these tubes ensures the lumen remains patent regardless of the curvature it must assume. This case, therefore, is a masterclass in selecting the right technique and the right tools, based on a deep understanding of the patient's unique pathology. The anesthetic challenge does not end with successful intubation. In cases of tracheomalacia, the removal of the compressive goiter can paradoxically precipitate an airway emergency.[15] The trachea, which has been externally supported for years by the very mass that was destroying it, may now be too weak to support itself. The sudden removal of this external splint can lead to collapse.

The intraoperative confirmation of severe tracheomalacia made the decision for postoperative ETT retention and ICU admission unequivocal. The endotracheal tube, having served its purpose for delivering anesthetic gases, was now repurposed as an internal stent, physically holding the weakened tracheal walls apart. This strategy provides the trachea with a period of rest, allowing for some reduction in inflammation and edema from the surgical manipulation, and giving the clinical team time to assess the patient's neurological and respiratory recovery.[16]

The transfer to an ICU is not merely for observation but for active, expert management. The patient requires careful sedation and ventilator management, followed by a structured weaning process. The decision to extubate is perhaps as critical as the initial decision to intubate. Premature extubation can lead to respiratory distress and the need for a harrowing re-intubation, which may be impossible due to swelling and collapse.[17] The team in this case wisely used objective criteria to guide their decision. A successful spontaneous breathing trial (SBT) demonstrates that the patient's respiratory muscles are strong enough to support the work of breathing. The cuff leak test is a crucial maneuver; by deflating the ETT cuff, clinicians can assess for an audible air leak around the tube, which suggests that the airway lumen is not critically narrowed by swelling or collapse. A positive leak, as was seen in this patient, is highly predictive of a successful extubation.

Even with these positive signs, extubation in such a patient must be treated as a high-risk procedure. It must be performed in a controlled environment, with all difficult airway equipment, including personnel skilled in performing a surgical airway, immediately at hand. The 24-hour period of close observation in the ICU following extubation is a vital safety net, ensuring that any delayed-onset stridor or distress can be managed immediately. The patient's smooth transition from extubation to ward transfer is a testament to this cautious, evidence-based, and stepwise approach to de-escalating care.[19]

It would be a disservice to analyze this case solely through an anesthetic lens. The successful outcome was the product of a symphony of interprofessional collaboration. This began with the surgeon's recognition of a potentially challenging case and an early consultation with the anesthesia team. The preoperative huddle, where the plan was discussed and roles were defined, was essential. Intraoperatively, the surgeon's tactile feedback confirming the tracheomalacia was a critical piece of data that directly informed the anesthetic plan for the postoperative period. In the ICU, the intensivists and nurses executed the weaning and extubation strategy formulated in collaboration with the primary teams. At every step, from clinic to discharge, seamless communication and a shared mental model of the patient's risks and the plan to mitigate them were the foundation upon which this successful outcome was built. This case is a powerful affirmation that in complex medicine, the most important safety tool is not a device or a drug, but a functional, respectful, and collaborative team.[20]

## 4. Conclusion

This case report provides a powerful and informative narrative on the successful management of a life-threatening airway challenge. It demonstrates that in a patient presenting with a giant, long-standing goiter and symptoms of positional dyspnea, the anesthesiologi1st's role transcends technical skill and becomes one of a clinical detective. A high index of suspicion for the hidden danger of tracheomalacia is the essential first step that informs all subsequent decisions. The choice of awake tracheal intubation was not merely an option but a clinical and ethical imperative, representing the safest possible passage through a perilous perioperative period. The procedure's success was rooted in a profound understanding of airway pharmacology and anatomy, patient psychology, and meticulous preparation. Finally, the seamless, multidisciplinary collaboration from the preoperative phase through the critical postoperative period highlights that a well-orchestrated team is the ultimate guarantor of patient safety in high-stakes medicine. This case should serve as a compelling educational tool, reinforcing the principle that a proactive, intellectually rigorous, and team-based approach can transform a potential catastrophe into a controlled and successful clinical outcome.

## 5. References


1. Parks A, Law JA, Kovacs G. Wake up!: a novel, cadaver-based approach to training emergency physicians in awake intubation. CJEM. 2025; 27(2): 107–10.
2. Ponthus S, Odiakosa M, Gautier B, Dumont L. Successful awake intubation using Airtraq® in a low-resource setting for a patient with severe post-burn contractures. BMC Anesthesiol. 2025; 25(1): 12.
3. Chen F, Tan Z, He Q, Li Q. Guideline recommendations on the assessment and management of awake airway intubation: a systematic review. BMC Anesthesiol. 2025; 25(1): 79.
4. Priya HGB, Chaurasiya MK, Shukla A, Singh MK, Kohli M. Comparative study of spray-as-you-go technique using 2% versus 4% lignocaine for awake fibre-optic nasotracheal intubation in adult oral carcinoma patients: a randomised controlled study. J Onco-Anaesthesiol Perioper Med. 2025; 2(2): 68–73.
5. Popal Z, Sieg H-H, Müller-Wiegand L, Breitfeld P, Dankert A, Sasu PB, et al. Decision-making tool for planning camera-assisted and awake intubation in head and neck surgery. JAMA Otolaryngol Head Neck Surg. 2025.
6. Tavşanoğlu ZY, Yüksek A, Kavaklı AS, Arslan Ü, Yılmaz M. Severe intestinal distension following HFNC-assisted awake intubation with conversion to open Nissen fundoplication: a case report. BMC Anesthesiol. 2025; 25(1): 286.
7. Abdulkadir AY, Rahman GA, Kolawole IK, Bolaji BO. Tracheal configuration as a radiographic predictor of difficult tracheal intubation in goiters. Aluta Dig Mag. 2011; 10(2).
8. Bartolek D, Frick A. Huge multinodular goiter with mid trachea obstruction: indication for fiberoptic intubation. Acta Clin Croat. 2012; 51(3): 493–8.
9. Spadaro S, D'Agata M, Verri M, Ragazzi R, Volta CA. Successful nasal intubation with a laryngeal nerve monitoring tube using bronchoscopy in a patient with plunging goiter: a case report. BMC Res Notes. 2013; 6(1): 467.
10. Loftus PA, Ow TJ, Siegel B, Tassler AB, Smith RV, Schiff BA. Risk factors for perioperative airway difficulty and evaluation of intubation approaches among patients with benign goiter. Ann Otol Rhinol Laryngol. 2014; 123(4): 279–85.
11. El-Farra S, Radovanović D, Stokić A, Manić D. Goiter-related predictors of difficult intubation: Case report. Serb J Anesth Intensive Ther. 2019; 41(3–4): 21–6.

12. Heinz E, Quan T, Nguyen H, Pla R. Intubation of a patient with a large goiter: The advantageous role of videolaryngoscopy. Case Rep Anesthesiol. 2019; 2019: 1327482.
13. Seydou, Department of Thoracic Surgery of Mali Hospital, Bamako, Mali. Clinical application of upper airways topical anesthesia in endotracheal intubation in awake patients of giant goiters. Int J Anesthesiol Res. 2019; 565–71.
14. Bhardwaj R, Chauhan V, Tuli I, Gupta A, Ponnusamy S. Elective short-term nasotracheal intubation for postthyroidectomy tracheomalacia due to a long-standing large goiter: an experience at tertiary care center. Saudi J Otorhinolaryngol Head Neck Surg. 2020; 22(1): 32.
15. Lin P-A, Wu Z-F, Lee J-C, Huang T-W, Lin B-F, Lai H-C. Extracorporeal membrane oxygenation and awake fiberoptic intubation for the anesthetic management in a patient with a large intrathoracic goiter-induced severe tracheal stenosis. J Med Sci. 2021; 41(3): 158–60.
16. Amin T, Figueroa J, Cheng J, Parhar A, Rivera S. ODP470 compressive goiter with COVID-19: an unusual etiology of respiratory distress requiring endotracheal intubation with surgical resection. J Endocr Soc. 2022; 6(Suppl_1): A761–A761.
17. Kim J-Y, Yeom J-Y, Youn S-J, Lee J-E, Oh J-Y, Byun S-H. Fiberoptic-guided nerve integrity monitoring tube intubation assisted by video-laryngoscope with external laryngeal manipulation in a patient with anteriorly displaced larynx due to huge goiter with retropharyngeal involvement: a case report. Medicine (Baltimore). 2022; 101(10): e29041.
18. Tan D, Zhang X. Awake fiberoptic nasotracheal intubation and anesthetic management of a patient with a compressed and deviated airway from a massive thyroid goiter: a case report. Cureus. 2023; 15(2): e35278.
19. Rinaldi P, Eziandio C, Coletta F, Porcelli ME, Lauro G, Tomasello A, et al. Combined awake intubation technique for predicted difficult airways in a patient with thyroid goiter. Minerva Anestesiol. 2024; 90(11): 1056–7.
20. Booth LE, Banyi N, Rose P, Karmali S, Stojkova BJ, Anderson DW, et al. Awake versus asleep intubation for mediastinal goiters: a systematic review and meta-analysis. J Otolaryngol Head Neck Surg. 2025; 54: 19160216251333352.