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Case Report

Successful awake fibreoptic nasotracheal intubation in a patient with a large thyroid mass undergoing total thyroidectomy

Sunil H. Mokashi [a,*], Jennifer Daniel [a]

[a] *Department of Anaesthesiology, S. Nijalingappa Medical College and H.S.K. Hospital & Research Centre, Bagalkot, India*

ABSTRACT

Long-standing large thyroid masses can distort airway anatomy through tracheal deviation and compression and restrict neck mobility. These changes may make conventional tracheal intubation difficult. Awake fibreoptic intubation offers an alternative by maintaining spontaneous ventilation and airway tone during airway instrumentation. We describe the perioperative airway management of a 50-year-old woman with a large papillary thyroid carcinoma scheduled for total thyroidectomy. Airway assessment revealed restricted neck movements, while imaging demonstrated tracheal deviation and narrowing. Awake fibreoptic nasotracheal intubation was planned, with preparation of a difficult airway cart and backup strategies. Following topical airway anaesthesia, the bronchoscope was advanced through the right nostril, and a cuffed endotracheal tube was positioned under direct fibreoptic guidance. General anaesthesia was induced after confirmation of tube placement. Surgery lasted eight hours. Elective postoperative ventilation was continued because of prolonged surgery, laryngeal oedema and anticipated tracheomalacia. The patient underwent ventilator weaning and extubation the following morning. This case illustrates the importance of individualized airway assessment, adequate topical anaesthesia, maintenance of spontaneous ventilation during intubation, and a planned postoperative airway strategy. Clear communication and readiness for alternative techniques remain essential.

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1. Introduction

Thyroid malignancies can distort the airway leading to difficulty in tracheal intubation. They render conventional intubation techniques difficult due to tracheal compression and difficult Cormack–Lehane grades with non-visualization of the glottic opening. Awake fiberoptic intubation has been reported to be the safest alternative in such cases. We present one such case scenario managed with the help of fiberoptic intubation. This was a thyroid malignancy with significant neck movement restriction with no evidence of retrosternal extension with left IJV thrombosis, unlike other case reports where they had a multinodular goiter with few cases having retrosternal extension with insignificant neck movement restriction.

2. Case Presentation

Informed written consent was obtained from the patient for the procedure, as well as for publication of clinical data and imaging. A 50-year-old female patient, weighing 40 kg with a height of 150 cm, a BMI of 17.78 kg/m^2, with no known comorbidities presented with complaints of gradually increasing swelling in front of the neck for the past 4 years. She had no compressive symptoms. The swelling was diagnosed to be papillary carcinoma of the thyroid, and the patient was posted for total thyroidectomy.

On pre-anaesthetic evaluation, the patient was conscious, co-operative with a pulse rate of 80 bpm, blood pressure of 110/70 mmHg, room-air saturation of 97%. On airway examination, she had Mallampati grade 2, 3

* Corresponding author. E-mail address: drsunilmksh@gmail.com (S. H. Mokashi)
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finger breadth mouth opening, with an inter-incisor distance of 4 cm, and upper lip bite test grade 1. Neck circumference was 38 cm. The patient had restricted neck movements. Sternomental and thyromental distance could not be estimated. The upper border of thyroid swelling was extending from around 2 cm behind the mentum till the sternal notch. The lateral borders were extending to the posterior border of sternocleidomastoid. The trachea was neither visible nor palpable. There were no compressive symptoms even in the supine position. Neck examination showed remarkably large multiple thyroidal swellings extending from below the jaw to the sternal notch with non-palpation of tracheal position. Pemberton's test was negative, clinically ruling out retrosternal extension of the tumor (Fig. 1). There were no distended veins on the chest. Routine blood investigations and surgical profile were done. Thyroid function tests revealed a euthyroid state. Other blood biochemical reports, electrocardiogram, and echocardiography were within normal limits. Chest x-ray revealed tracheal deviation to the right side. Lateral neck x-ray revealed calcification of the mass (Fig. 2). Ultrasound of the neck revealed multiple cystic swellings, largest measuring 11×9.3×7.1 cm with adjacent structures and carotid vessels displaced laterally. Computed tomography (CT) scan revealed a soft tissue mass lesion with irregular margins and chunky calcifications arising from the left hemithyroid gland in keeping with neoplastic etiology, projecting into a massive metastatic numerous cystic neck mass predominantly along the deep cervical lymph node chain. There was mild tracheal narrowing in the postcricoid area. Left IJV showed no contrast flow (compressed/thrombosed). Bilateral vocal cords were mobile on indirect laryngoscopy.

Considering anticipated difficult laryngoscopy and tracheal intubation due to the considerable size of the tumor, fiberoptic intubation was planned using topical anaesthetization technique. Safe lidocaine dose was considered as 9 mg/kg (total of 360 mg). The patient was counselled regarding awake intubation technique. The patient was kept nil by mouth for 6 hours for solids and 2 hours for liquids prior to surgery.

In the preoperative room, airway anaesthesia was done with nebulization of lidocaine 4% 2 mL with gargling using lidocaine 2% 2 mL. Xylometazoline nasal drops were administered in bilateral nostrils for vasoconstriction of nasal passage for facilitation of fiberoptic bronchoscope (FOB) without mucosal injury. Intravenous Inj. Ondansetron 0.15 mg/kg and Inj. Glycopyrrolate 0.01 mg/kg were given. ASA standard monitoring - ECG, Pulse oximetry, Non-Invasive Blood Pressure were attached after shifting the patient inside OT. Supplemental oxygen was given using nasal prongs at a rate of 4 L/min in the left nostril - contralateral to the one used for scope. Airway nerve block was deferred due to distorted anatomy of the neck. Topical anaesthesia of the tongue, epiglottis and oropharynx was achieved with 2% lidocaine spray. Lox 2% jelly 2 pinches were applied over the nostrils. Total lidocaine dose administered for airway anaesthesia in all formulations was 330 mg, which was well below the toxic dose. Difficult intubation cart was kept standby as per DAS (Difficult Airway Society) guidelines. The fibreoptic bronchoscope (FOB) was loaded with a 7.0 mm cuffed armored endotracheal tube. The FOB was negotiated through the right nostril and gradually advanced through the laryngeal inlet. Simultaneous laryngeal, glottic and tracheal mucosal anaesthesia was done with small aliquots of 4% lidocaine (total volume: 4 mL) loaded in a disposable sterile syringe via 18G epidural catheter inserted into the bronchoscope working channel, using Spray-As-You-Go (SAYGO) technique to achieve effective airway anaesthesia while avoiding toxicity. The FOB was inserted through the vocal cords and positioned above the carina. The flexo-metallic tube was advanced over the fiberoptic bronchoscope into position, after which the bronchoscope was carefully withdrawn, and the tube was fixed after confirming equal air entry bilaterally and end-tidal capnography (Figs. 3 and 4). The patient tolerated the awake intubation technique well. Intravenous general anaesthetic induction was done with Inj. Midazolam 0.05 mg/kg, Inj. Propofol 2 mg/kg, Inj. Fentanyl 2 μg/kg and Inj. Vecuronium 0.1 mg/kg as muscle relaxant. Anaesthesia was maintained with 50% Oxygen, 50% Nitrous oxide, Sevoflurane 1 MAC and Inj. Vecuronium boluses. Intraoperative hemodynamic parameters were within normal limits. The surgery lasted for 8 hours (Fig. 5).

Fig. 1. Preoperative image of thyroid swelling.

Fig. 2. Lateral neck x-ray of thyroid swelling showing calcification with mild antero-posterior compression.

Fig. 3. Awake nasotracheal fiberoptic bronchoscope procedure.

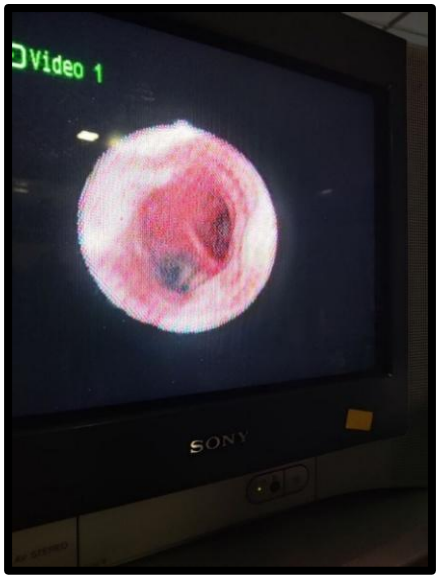

Fig. 4. Fiberoptic image of the carina with right and left main bronchus openings.

Fig. 5. Post-excision of the thyroid tumor.

In view of prolonged surgical hours, laryngeal edema, and anticipated tracheomalacia as the surgeon reported a floppy trachea intraoperatively, elective positive pressure ventilation with the Maquet Servo-S Ventilator (Maquet Critical Care AB, Solna, Sweden) was continued postoperatively with ICU sedation using Inj. Fentanyl 0.5 μg/kg/hr and Inj. Dexmedetomidine 0.3 μg/kg/hr and neuromuscular paralysis with intermittent boluses of Inj. Vecuronium 0.05 mg/kg. Overnight, the patient was on Volume Control Ventilation (VCV) mode with FiO_2 50%, tidal volume 350 mL, respiratory rate 12, PEEP of 5 cm of H_2O. VAP care bundle (Ventilator Associated Pneumonia) was followed prophylactically. After stopping sedative hypnotics, at 6 am the next morning, orotracheal suction was done, and a positive cuff leak test was demonstrated on VCV mode. The patient was weaned off to SIMV (VC with PS) for 1 hour. Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT) on CPAP were done for 30 minutes. The patient was weaned to CPAP with PEEP 5 cm H_2O and down setting PS above PEEP to 5 cm H_2O followed by T-piece trial with endotracheal cuff deflated. Inj. Dexamethasone 0.1 mg/kg was given postoperatively and prior to extubation to reduce any laryngeal edema. Under C-MAC video laryngoscope visualization, oral and tracheal suctioning was done followed by cuff deflation and extubation. Inhaled bronchodilator nebulization was given post-extubation with Ipratropium Bromide, Levosalbutamol and Budesonide. Integrity of bilateral vocal cord mobility was tested by 'E' phonation and cough test.

3. Discussion

Large thyroid masses commonly produce tracheal deviation, compression, or both; they can also limit neck extension and distort anatomy, making mask ventilation and direct laryngoscopy unreliable [1]. A focused airway assessment clinically, combined with cross-sectional imaging, is invaluable in such patients. Imaging quantifies tracheal narrowing, length of compression, and mediastinal extension, which help decide whether conventional endotracheal intubation is feasible or alternative strategies such as awake tracheostomy, rigid bronchoscopy, or extracorporeal oxygenation should be kept as standby options [2].

Awake fibreoptic bronchoscopic intubation is often considered one of the safest strategies in such a scenario of anticipated difficult airway [3]. Establishing a secure airway while the patient remains awake and breathing spontaneously helps maintain the airway tone, reducing the risk of tracheal collapse that leads to "Can'*t* intubate, can'*t* oxygenate" scenarios during the induction of anaesthesia [4].

In our patient, the imaging and bedside assessment pointed toward a high likelihood of difficult direct laryngoscopy but a potentially passable endoluminal path suitable for the awake fibreoptic approach. Hence, we proceeded with adequate airway topicalization with avoidance of nerve blocks given the altered anatomy. The procedure was well tolerated by the patient with hemodynamic parameters maintained throughout. Current difficult airway management guidelines emphasize the

importance of preformulated airway strategies, availability of alternative devices, and preparedness for emergency invasive airway access [5]. These principles were strictly followed in our case, with a difficult airway cart and surgical backup readily available.

Tracheomalacia is a predictable but uncommon complication that may be seen post-thyroidectomy, particularly in those with long-standing, large goiters [6]. Chronic external compression from the enlarged thyroid can weaken and soften the tracheal cartilages over time. As a result, once the endotracheal tube is removed, the unsupported tracheal wall may collapse, leading to airway obstruction. In thyroid neck surgeries, evidence of laryngeal edema, laryngomalacia, laryngospasm, postoperative stridor leading to upper airway obstruction with possible negative pressure pulmonary edema have been reported in the literature [7]. In cases where clinical assessment raises strong concerns about such complications, it is prudent to electively maintain the endotracheal tube until airway stability is assured, ensuring the safest means of maintaining a secure airway [8]. Hence, elective ventilation was done overnight postoperatively. Weaning protocol was followed with the patient maintaining normal arterial blood gases on T-piece trial. Difficult intubation cart was kept standby. Following the demonstration of a leak around the tracheal tube after deflation, it was considered safe to extubate the patient.

4. Conclusions

When dealing with a difficult airway, the choice of intubation technique should be individualized after weighing the risks and benefits of each available option, guided by current evidence and clinical judgment. No single approach fits all patients, especially in cases involving thyroid enlargement where airway anatomy may be significantly distorted. This case highlights the clinical utility of awake fibreoptic intubation in anticipated difficult airway scenarios with anatomical distortion. Meticulous planning and clear communication with both the patient and the surgical team regarding anticipated challenges and backup plans are essential to ensure a safe and successful outcome while minimizing morbidity and mortality.

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Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author upon reasonable request.

AI Assistance

No AI-based tools were used in the preparation of this manuscript.

Ethics Approval and Consent to Participate

Informed written consent was obtained from the patient, for the procedure, as well as for publication of clinical data and imaging.

Author Contributions

Sunil H. Mokashi: *conceptualization, data curation, formal analysis, validation, visualization, writing – original draft, writing – review and editing.*

Jennifer Daniel: *conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, supervision, validation, visualization, writing – original draft, writing – review and editing.*

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