



Successful Airway Management Using Awake Videolaryngoscopy for a Rare Thyroid Cancer with Grade III Goitre and Intra-Tracheal Invasion

Faisal Shamim¹ , Iqra Jangda¹ , Mubasher Ikram² 

¹Department of Anaesthesiology, Aga Khan University Hospital, Karachi, Pakistan

²Section of Otorhinolaryngology and Head and Neck Surgery, Department of Surgery, Aga Khan University Hospital, Karachi, Pakistan

Cite this article as: Shamim F, Jangda I, Ikram M. Successful Airway Management Using Awake Videolaryngoscopy for a Rare Thyroid Cancer with Grade III Goitre and Intra-Tracheal Invasion. *Turk J Anaesthesiol Reanim* 2020; 48(2): 156-9.

Abstract

In the present report, we described a case of anticipated difficult intubation in which the access to airway was limited due to external and internal factors. Our patient presented with a large goitre, shortness of breath and mild stridor. A clinical examination and investigations were performed. An intra-tracheal subglottic mass visible on a positron emission tomography scan was nearly occluding the lumen. The clinical diagnosis was thyroid cancer with intra-tracheal invasion. For patients with a large thyroid cancer, airway management can be complicated, using both regional invasion and intrathoracic extension, due to the effect of the mass on the airway and major vessels. This approach has a great potential for leading to complete airway obstruction after the induction of general anaesthesia. Here, we aimed to discuss the meticulous planning and preparation for the intubation of a conscious patient using different procedures of airway management, especially when the fiberoptic intubation failed and awake videolaryngoscopy salvaged the situation.

Keywords: Airway, awake, goitre, thyroid cancer, videolaryngoscopy

Introduction

This case highlights a particular group of patients who were very difficult to intubate. Thyroid cancer is not uncommon, and it carries a 1%-13% chance of complication with tracheal invasion (1). The most common manifestation is airway obstruction, and it is the major cause of mortality in such a population (2). Various procedures for airway management for endotracheal tumours in patients under anaesthesia have been described. We have reported the airway management in the case of very large multinodular goitre with an intra-tracheal subglottic mass causing significant stridor.

Case Presentation

A 58-year-old female, with a body mass index of 34 kg m⁻², presented to the ear, nose and throat clinic with progressive painless neck swelling felt for the past 10 years. It had increased in size rapidly in the 8 months. The goitre was 5×5 cm in size, mobile, nodular, and diffuse (Figure 1). The patient was scheduled for total thyroidectomy and laser-assisted excision of the intra-tracheal lesion.

During pre-operative anaesthesia assessment, the patient complained of shortness of breath when lying down and of dysphagia. She had diabetes, hepatitis C, depression, and Functional Class II. On examination, a very large goitre was noted (Grade III), and an inspiratory stridor was audible on auscultation. It worsened on lowering the head of the bed below 45°. Pemberton's sign was mildly positive. An airway assessment revealed a

two-fingerbreadth mouth opening, Mallampati Score III, and limited neck flexion. Baseline laboratory investigations including thyroid function tests, electrocardiography and a chest X-ray were normal. The positron emission tomography scan revealed a large soft-tissue mass in the anterior neck, measuring 74×44×77 mm and extending from the infrahyoid till thoracic inlet (Figure 2) into the larynx in the upper trachea, occupying 80% of the lumen (Figure 3). Following discussion with consultant otorhinolaryngologists, tracheostomy under local anaesthesia was deemed as not possible due to distorted anatomy caused by goitre. Considering all the factors that could worsen the airway obstruction on the induction of general anaesthesia, the patient was explained the details and counselled to opt for awake fiberoptic intubation. We also discussed the possibility of a brief postoperative ventilation and intensive care stay. Written informed consent was obtained from the patient.

A difficult airway cart with a fiberoptic bronchoscope (FOB), videolaryngoscope and all ancillary equipment for intubation was made available in the operating room. A dose of a local anaesthetic (4% and 10% lignocaine) for airway topical anaesthesia was prepared. The patient preparation was commenced in the pre-operative area via intravenous access. The summary of local anaesthesia for the airways is presented in Figure 4. The standard American Society of Anesthesiologists monitoring (ECG, non-invasive blood pressure, SpO₂) was applied, which showed the baseline oxygen saturation of 85%-88% and an end-tidal carbon dioxide (ETCO₂) of 50-55 mmHg. Supplemental oxygen at 10 L/min was delivered through special nasal prongs with an ETCO₂ attachment. The arterial line was placed in the left radial artery for invasive haemodynamic monitoring. The patient's position was maintained at 45° head-up sitting because the stridor would worsen on lying down. A fiberoptic bronchoscope was prepared for the spray-as-you-go (SAYG) technique using a 20-G epidural catheter.

A specialised oral airway was inserted, and its tolerance indicated an adequate topical anaesthesia of the airway. Fibre-

optic bronchoscopy was performed, and the SAYG technique was used with 1 mL of 4% lignocaine sprayed twice through the epidural catheter on the glottis. The vocal cords were visualised with ease along with a subglottic intra-tracheal mass almost completely occluding the lumen of the trachea (See Video 1. <https://doi.org/10.5152/TJAR.2019.13333>). An attempt to advance the 7.0-mm endotracheal tube (ETT) was made, but it did not pass through the vocal cords. We applied a gentle force, but the ETT continued abutting the intra-tracheal lesion, and for safety reasons we withdraw the scope.



Figure 1. Large goitre in the supine position

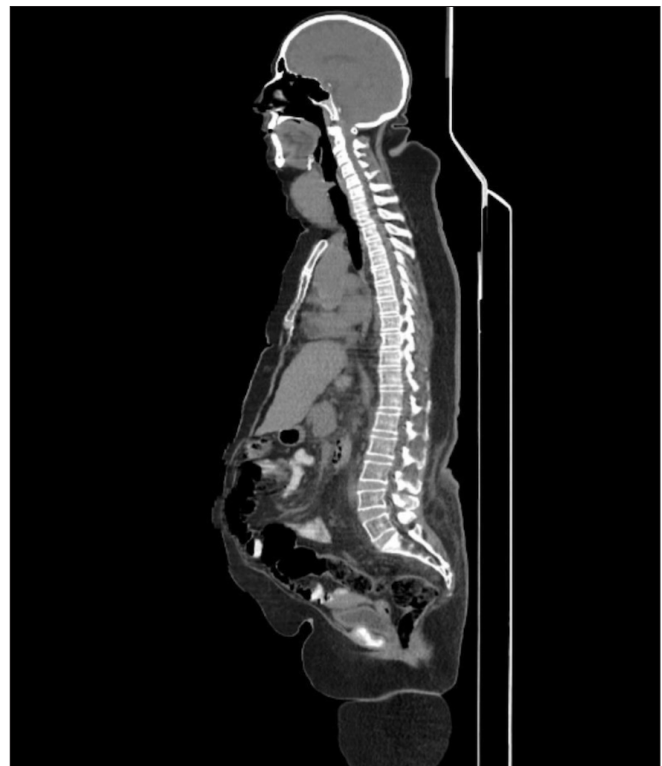


Figure 2. Positron emission tomography scan showing a large anterior neck mass extending from the infrahyoid to the thoracic inlet

Main Points:

- Thyroid cancer rarely invades the trachea, but if it does, airway bleeding and obstruction can lead to death.
- The fundamental responsibility of an anaesthesiologist is to ensure adequate gas exchange for the patient.
- Management of the difficult airway is a crucial patient safety issue, and Fiberoptic intubation is a well-established and versatile tool for airway management in patients with known or suspected difficult airways.
- Videolaryngoscopes offers better laryngeal exposure and permits a significantly higher percentage of visualized, controlled endotracheal intubations.

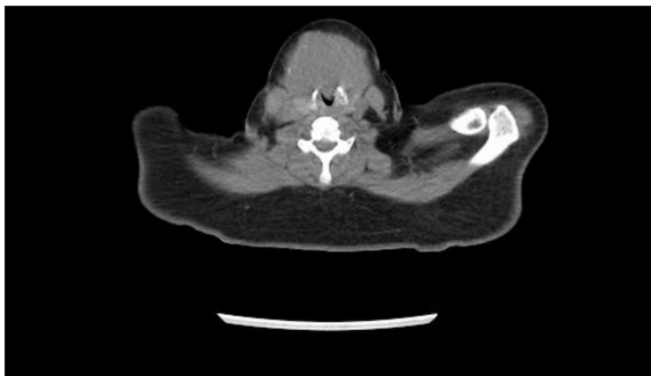


Figure 3. Another view of a positron emission tomography scan showing tracheal invasion by thyroid cancer and occupying 80% of the lumen

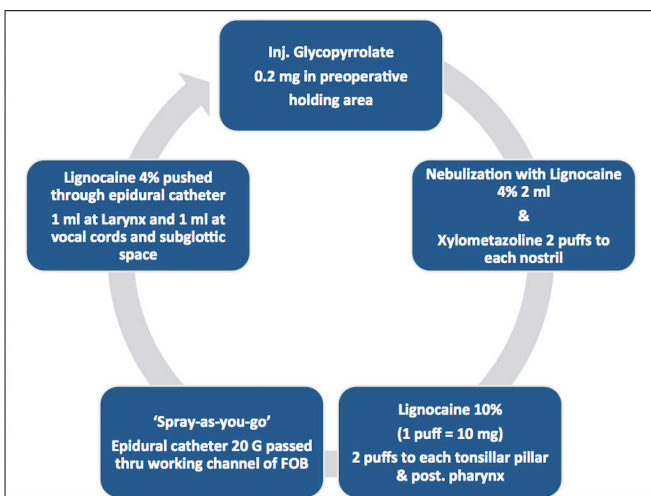


Figure 4. Summary of the preparation for the local anaesthesia of airway

This is when we had a revelatory moment regarding awake videolaryngoscopy that we should use a smaller diameter and a longer-cuffed ETT. Thus, a Karl Storz C-MAC Videolaryngoscope (Karl Storz, Tuttlingen, Germany) size 4 blade was inserted. The vocal cords and subglottic mass were visualised, and a bougie was passed from side of the lesion (See Video 2. <https://doi.org/10.5152/TJAR.2019.13333>). The size 6.0 microlaryngoscopy tube was gently passed over the bougie, after which it was attached to ETCO₂. Its position was confirmed by bilateral chest auscultation.

After securing the airway, propofol was administered for inducing anaesthesia. Anaesthesia was maintained with 1%-1.5% isoflurane. First, total thyroidectomy was performed, and then a laser-assisted intra-tracheal lesion was excised. The patient remained haemodynamically stable, and her blood loss was 500 mL. Due to a long-standing disease causing a significant risk of tracheomalacia and low normal platelet count that was a risk for postoperative hematoma, surgical

and anaesthetic teams mutually decided to perform tracheostomy. Ondansetron (8 mg) was administered for the postoperative nausea vomiting prophylaxis. When the patient started spontaneous breathing and fully recovered from anaesthetics, she was shifted to the post-anaesthesia care unit. The patient was discharged following tracheal decannulation on the 5th postoperative day.

The tissue histopathology of the primary tumour was later reported. The morphological and immuno-histochemical features were suggestive of spindle epithelial tumour with thymus-like differentiation. Fragments of respiratory epithelium were noted to be involved in the intra-tracheal tumour.

Discussion

The regional invasion of thyroid cancer accounts for 5%-15% of all intra-tracheal tumours, and two-thirds of these cases occur in women. The tissue from the regional invasion may occupy the tracheal, oesophageal or even atrial areas (2). It can cause progressive dyspnoea, airway obstruction, stridor, cough, difficulty in swallowing, and haemoptysis. The National Audit Project in the United Kingdom has identified a sub-group of patients at a higher risk of difficulties during the airway management, and those were the patients with upper airway pathology (3). Our patient had orthopnoea and dysphagia. The treatment of choice for intra-tracheal thyroid cancer invasion is surgical excision. A variety of surgical techniques have been applied in the management as follows: the removal of the lesion via an open-cricoid procedure, or removal via an endoscopic laser-assisted approach, as we did in this case (4). Most reported cases are isolated, with tracheostomy performed under local anaesthesia to secure the airway first, and then, the lesion is removed via a laryngotracheal fissure under general anaesthesia. Our patient had a very large goitre, and tracheostomy was not possible. This warrants an awake approach to airway management because the airway is threatened both due to the presence of goitre and the subglottic mass.

It is well established that any sedation or induction of general anaesthesia in patients with laryngotracheal lesions may lead to complete airway obstruction (5).

The relaxation resulting from anaesthetic drugs and muscle relaxants may lead to an obstruction of the airway that can present with a marked stridor initially during the induction of anaesthesia and an inability to partially or completely ventilate with a facemask after general anaesthesia (6). The fibreoptic intubation is the first technique that comes to mind, and most authors agree that elective fibreoptic intubation of the awake, spontaneously breathing patient

is the gold standard for management of a compromised airway (7). Initially, we also opted for this modality as a first choice in our case. Sometimes, the railroading of ETT poses problems because it may impinge on the aryepiglottic fold. In our case, we did navigate FOB through vocal cords and the tumour, but there was a high chance of the ETT eroding the subglottic mass if we put too much pressure on it. Videolaryngoscopy has been undoubtedly one of the major advances in practical anaesthesia in recent years. The role of videolaryngoscopy in difficult intubations has recently been recognised in the Difficult Airway Society 2015 guidelines, which recommend that all anaesthetists have immediate access to a videolaryngoscope at all times (8).

Conclusion

Anaesthesiologists directly face such a clinical challenge of obstructed airway and anticipated difficult intubation. We successfully managed a case of thyroid cancer with tracheal invasion and resultant stridor. FOB intubation is the first choice in anticipated difficult airways, but it also carries a low failure rate. The presence of video-assisted airway devices has greatly increased the safety profile during anaesthesia, if prepared in advance.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – F.S., I.J., M.I.; Design – I.J., F.S.; Supervision – F.S., M.I.; Data Collection and/or Processing – I.J.; Analysis and/or Interpretation – F.S., M.I.; Literature

Search – I.J., F.S.; Writing Manuscript – I.J., F.S.; Critical Review – M.I., F.S.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Cody HS, Shah JP. Locally invasive, well-differentiated thyroid cancer. 22 years' experience at Memorial Sloan-Kettering Cancer Center. *Am J Surg* 1981; 142: 80. [\[CrossRef\]](#)
2. Sugimoto S, Doihara H, Ogasawara Y, Aoe M, Sano S, Shimizu N. Intraatrial extension of thyroid cancer: a case report. *Acta Med Okayama* 2006; 60: 135-40.
3. Cook TM, Woodall N, Frerk C. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. *Br J Anaesth* 2011; 106: 617-31. [\[CrossRef\]](#)
4. Wong P, Wong J, Mok MUS. Anaesthetic management of acute airway obstruction. *Singapore Med J* 2016; 57: 110-7. [\[CrossRef\]](#)
5. Bajwa SJS, Sehgal V. Anesthesia and thyroid surgery: The never ending challenges. *Indian J Endocrinol Metab* 2013; 17: 228-34. [\[CrossRef\]](#)
6. Leslie D, Stacey M. Awake intubation. *BJA Educ* 2015; 15: 64-7. [\[CrossRef\]](#)
7. George J, Kader JA, Arumugam S, Murphy A. Successful intubation of a difficult airway due to a large obstructive vocal cord polyp augmented by the delivery of a transtracheal injection of local anaesthetic. *BMJ Case Rep* 2015; 2015: bcr2015210905.
8. Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. *Br J Anaesth* 2015; 115: 827-48. [\[CrossRef\]](#)