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CASE REPORT

Awake Fibreoptic Intubation for Airway Management in Massive Thyroid Enlargement: A Case Report

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ABSTRACT

Massive thyroid enlargement can significantly distort upper airway anatomy by causing tracheal compression, lateral deviation, and restricted neck mobility, thereby increasing the risk of difficult mask ventilation and tracheal intubation. Induction of general anaesthesia before securing the airway in such patients may precipitate airway collapse and catastrophic hypoxia. We report the case of a 55-year-old female presenting with a progressively enlarging anterior neck swelling and mild dyspnoea, with clinical features suggestive of an anticipated difficult airway. Preoperative assessment revealed distorted airway anatomy, limited neck extension, and possible tracheal compression. A planned strategy of awake fibreoptic intubation (FOI) was adopted following comprehensive airway topicalisation using lignocaine nebulisation and targeted superior laryngeal and transtracheal nerve blocks. Awake oral fibreoptic intubation was successfully performed while preserving spontaneous ventilation. General anaesthesia was subsequently induced, and thyroid surgery proceeded uneventfully. The patient was extubated after full recovery and monitored postoperatively without airway complications. This case highlights the importance of meticulous airway assessment. It demonstrates awake fibreoptic intubation as a safe and reliable technique in patients with massive thyroid enlargement and an anticipated difficult airway.

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KEYWORDS

• Awake fibreoptic intubation • Difficult airway • Massive thyroid enlargement
• Tracheal deviation • Airway topicalisation • Thyroid surgery

INTRODUCTION

Massive thyroid enlargement may cause significant anatomical distortion of the airway through tracheal compression, deviation, and restricted cervical mobility, thereby increasing the likelihood of difficult ventilation and intubation.[1-3] Loss of airway following induction of general anaesthesia in such cases can result in life-threatening hypoxia and "cannot intubate, cannot ventilate" scenarios. Current difficult airway guidelines emphasise the importance of securing the airway while maintaining spontaneous ventilation in anticipated difficult airway situations.[7,8] Awake fibreoptic intubation remains the gold standard technique in such circumstances due to its ability to provide continuous visualisation and controlled tube placement while preserving spontaneous breathing.[7,14]

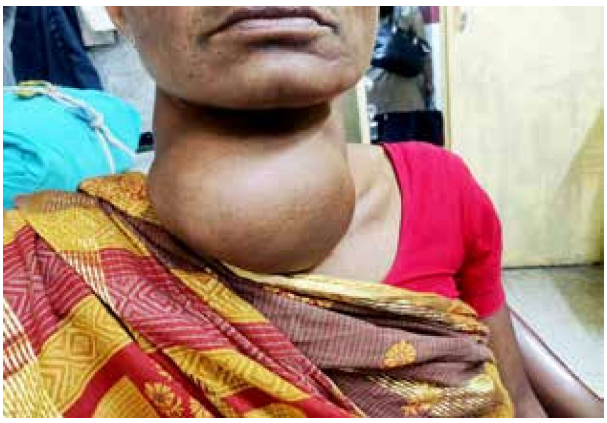

Figure 1: Massive anterior neck swelling consistent with large thyroid enlargement causing visible tracheal deviation

Case Presentation

A 55-year-old female presented with a progressively enlarging anterior neck swelling associated with mild dyspnoea and discomfort in the supine position. There was no history of dysphagia, voice change, or thyroid dysfunction. Clinical examination revealed a massive anterior neck swelling with restricted neck extension and features suggestive of tracheal deviation, raising concern for an anticipated difficult airway.

Preoperative airway assessment demonstrated distorted airway anatomy, limited neck mobility, and suspected tracheal compression. Thyroid function tests were within normal limits. Radiological imaging confirmed an enlarged thyroid gland with tracheal deviation without critical luminal narrowing.

After multidisciplinary discussion, elective thyroidectomy was planned in accordance with the 2022 American Society of Anesthesiologists (ASA) Difficult Airway Guidelines.[7]

In the operating room, standard ASA monitoring was instituted. Supplemental oxygen was administered via nasal cannula at 2 L/min. Intramuscular glycopyrrolate was administered to reduce secretions. Airway topicalisation was performed using 4% lignocaine nebulisation, bilateral superior laryngeal nerve blocks with 2% lignocaine, and a transtracheal recurrent laryngeal nerve block with 4% lignocaine.

Awake oral fibreoptic intubation was performed while maintaining spontaneous ventilation. The bronchoscope was advanced under direct visualisation to just above the carina, and the endotracheal tube was railroaded smoothly into the trachea. Correct placement was confirmed by fibreoptic visualisation, capnography, and bilateral chest auscultation.

General anaesthesia was induced with fentanyl 100µg, propofol 120mg, and atracurium 25 mg. Surgery proceeded uneventfully with stable haemodynamics. Neuromuscular blockade was reversed at the conclusion of surgery, and the patient was extubated after confirming adequate recovery and airway patency. She was shifted to the High Dependency Unit for close postoperative monitoring. The postoperative course remained uneventful, with no evidence of airway oedema, hematoma, or tracheomalacia.

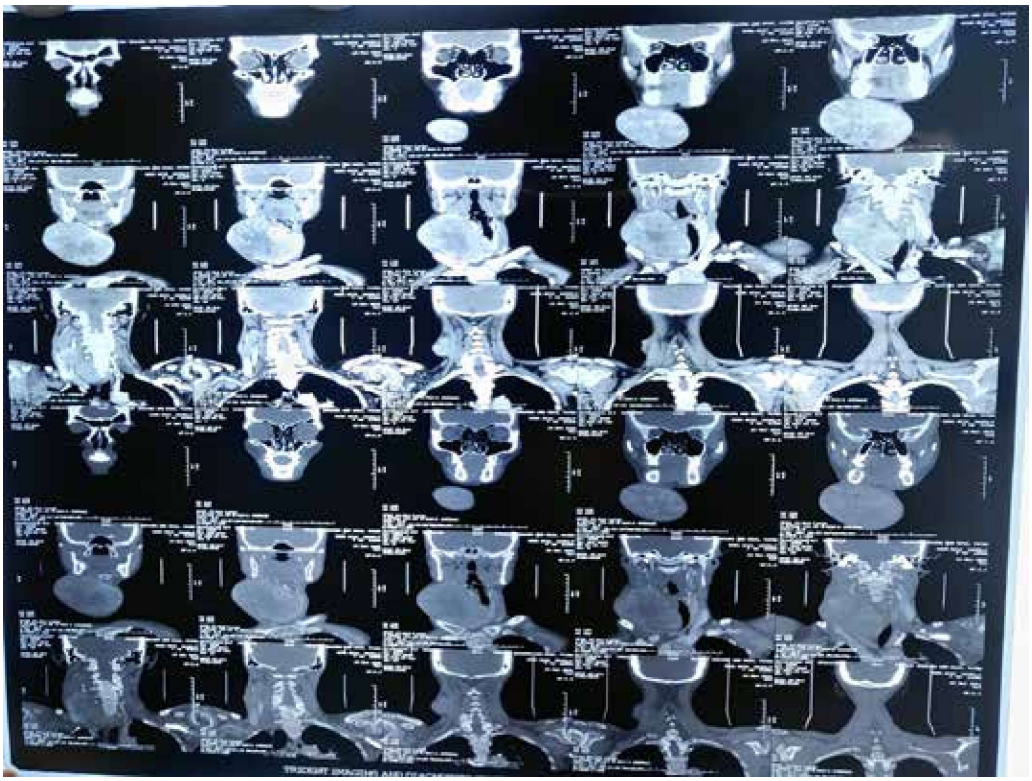

Figure 2: Contrast-enhanced CT scan of the neck showing massive thyroid enlargement with significant tracheal deviation and compression

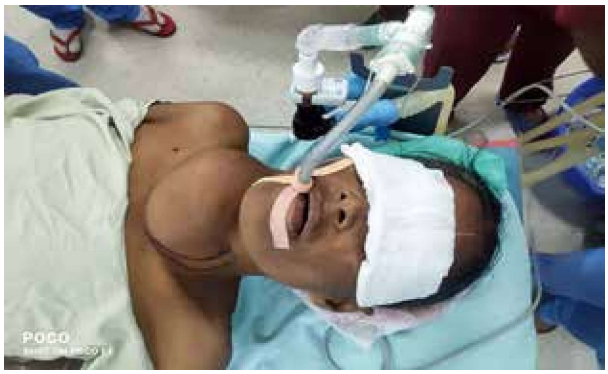

Figure 3: Awake oral fibreoptic intubation under topical anaesthesia in anticipated difficult airway

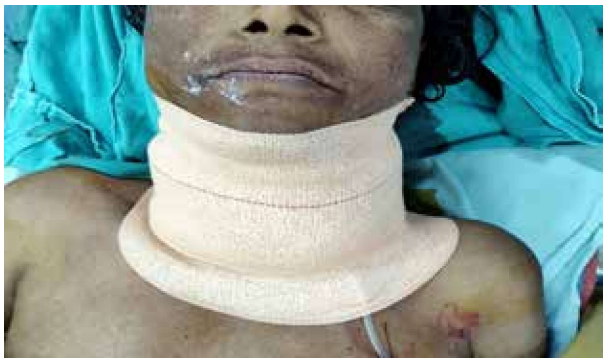

Figure 4: Post-operative image showing neck pressure dressing following thyroidectomy with surgical drain in situ

DISCUSSION

Airway management in patients with massive thyroid enlargement presents significant anaesthetic challenges due to tracheal compression, deviation, and restricted cervical mobility. Ran et al. described successful awake fibreoptic intubation in a patient with a large thyroid tumour invading the trachea, emphasising that anatomical distortion increases the likelihood of difficult laryngoscopy and airway compromise if induction precedes airway control.[1] Similarly, Patil et al. reported challenges in managing huge thyroid swellings with marked tracheal deviation and highlighted the unpredictability of direct laryngoscopic views in such patients.[2] Ladha et al. further demonstrated that retrosternal extension of thyroid masses increases the risk of airway collapse after induction, reinforcing the need for awake intubation techniques to maintain spontaneous ventilation.[3]

The importance of securing the airway before induction in anticipated difficult airway scenarios is strongly supported by contemporary guidelines. Apfelbaum *et al.*, in the 2022 American Society of

Anesthesiologists (ASA) Difficult Airway Guidelines, recommend awake intubation when difficulty is anticipated and when failure to secure the airway could result in severe adverse outcomes.[7] Likewise, Frerk *et al.,* in the Difficult Airway Society (DAS) guidelines, emphasised maintaining oxygenation and spontaneous ventilation in predicted difficult airway situations.[8] These recommendations align closely with the management strategy adopted in the present case.

Awake fibreoptic intubation remains widely regarded as the gold standard technique for anticipated difficult airway management. Ovassapian described fibreoptic endoscopy as particularly valuable in anatomically distorted airways because it permits continuous visualisation and controlled endotracheal tube placement while preserving spontaneous breathing.[14] Heidegger further highlighted that awake techniques reduce the risk of "cannot intubate, cannot ventilate" scenarios in high-risk airway patients.[13] In the context of thyroid surgery, Rosenblatt and Sukhupragarn noted that airway distortion from goitre may necessitate advanced airway techniques, particularly when tracheal compression or deviation is present.[10]

Although Amathieu et al. questioned whether difficult intubation in thyroid surgery is overestimated, they acknowledged that large goitres with tracheal deviation significantly increase intubation difficulty compared to routine cases.[11] Therefore, individualised risk stratification remains essential.

Sedation strategies also influence procedural success during awake fibreoptic intubation. Abdelmalak et al. demonstrated in a randomised controlled trial that dexmedetomidine provided effective sedation with minimal respiratory depression compared to propofol.[4] Mondal *et al.* reported improved patient comfort and stable haemodynamics with dexmedetomidine compared to remifentanil,[5] while Hu et al. showed superior patient tolerance with dexmedetomidine compared to midazolam during awake fibreoptic nasotracheal intubation.[6] These findings suggest that sedative choice should prioritise preservation of spontaneous ventilation and airway reflex control.

Post-thyroidectomy airway complications remain an important consideration. Rosenblatt and Sukhupragarn emphasised that hematoma formation and airway oedema may lead to delayed airway compromise, requiring vigilant postoperative monitoring.[10] Therefore, shifting the patient to a monitored setting such as a High Dependency Unit (HDU) after extubation is consistent with best practice in high-risk thyroid surgery patients.

In the present case, adherence to guideline-based airway planning, meticulous airway topicalisation, and preservation of spontaneous ventilation resulted in successful airway control and an uneventful perioperative course. Compared with reports of emergent airway compromise in similar patients, the proactive awake fibreoptic approach allowed controlled airway management and minimised perioperative risk.

CONCLUSIONS

Awake fibreoptic intubation is a safe and effective technique for airway management in patients with massive thyroid enlargement and an anticipated difficult airway. Thorough airway assessment, adequate topicalisation, preservation of spontaneous ventilation, and adherence to difficult airway guidelines are critical for successful outcomes. Postoperative vigilance is essential to detect and manage potential airway complications.

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

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