



ANAESTHETIC MANAGEMENT OF GIANT MULTINODULAR GOITRE WITH SEVERE AIRWAY COMPRESSION IN A MORBIDLY OBESE PATIENT WITH OBSTRUCTIVE SLEEP APNOEA

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ABSTRACT

Background: Giant multinodular goitre with retrosternal extension presents a formidable challenge to the anesthesiologist due to distorted airway anatomy, tracheal compression, and the risk of postoperative airway compromise. Meticulous preoperative assessment, anticipation of difficult airway, and careful postoperative management are crucial to ensure patient safety. **Case Presentation:** We report the successful anaesthetic management of a 58-year-old morbidly obese male with h/o obstructive sleep apnoea (OSA) and massive multinodular goitre causing tracheal deviation and significant airway compromise, posted for total thyroidectomy. The postoperative course was complicated by hypocalcaemia presenting as a seizure-like episode, which was promptly identified and treated. This case highlights the importance of detailed airway evaluation, availability of advanced airway equipment, multidisciplinary planning, and vigilant postoperative monitoring in patients with giant goitres.

KEYWORDS : Giant Multinodular Goitre, Morbid Obesity, OSA, Difficult Airway, Tracheal Compression, Staged Extubation, Hypocalcaemia.

INTRODUCTION

Thyroid enlargement is a common endocrine disorder; however, giant multinodular goitre with retrosternal extension is relatively uncommon in modern clinical practice. Such goitres may cause compression and displacement of adjacent structures, including the trachea, larynx, oesophagus, and major cervical vessels. From an anaesthetic perspective, these anatomical distortions significantly increase the risk of difficult ventilation, difficult intubation and postoperative airway compromise.

Patients with compressive symptoms such as orthopnoea, dysphagia, and hoarseness of voice are particularly high risk. In addition, long-standing goitres may cause tracheomalacia, further increasing the risk of airway collapse following thyroidectomy. Careful airway assessment, imaging, and planning are therefore essential components of perioperative management.

Obesity and OSA significantly increase the risk of perioperative airway obstruction. In obesity, excess adipose tissue around the neck, pharynx, and chest wall reduces airway calibre, decreases functional residual capacity and promotes airway collapse. OSA is characterized by recurrent upper airway obstruction during sleep due to pharyngeal muscle relaxation and anatomical narrowing. These factors contribute to difficult mask ventilation, challenging intubation, rapid desaturation, and increased risk of postoperative airway compromise. Careful airway assessment, positioning, preoxygenation, and vigilant postoperative monitoring are essential to prevent hypoxia and airway-related complications.

We present a case of giant multinodular goitre with retrosternal extension associated with significant tracheal compression and deviation, managed successfully with a structured anaesthetic approach, emphasizing airway preparedness and staged postoperative extubation.

Case Presentation

A 58-year-old morbidly obese male (BMI 38.1 kg/m²) presented with a progressively enlarging anterior neck swelling since 10-12 years. The swelling was associated with compressive symptoms, including dysphagia since 1 yr, hoarseness of voice since 5 months and dyspnea on supine

position since 1-2 months. The patient was scheduled for total thyroidectomy.

The patient had a h/o hypertension and was on oral Tab. Nicardia 10 mg OD. There was no previous history of surgery or addiction. STOP-BANG score was 7/8, indicating a high risk of obstructive sleep apnoea.

Preoperative Evaluation

On general examination, the patient was conscious and cooperative with PR 89bpm, BP 130/78 mmHg and SPO₂ 93% on room air.

Airway assessment revealed several predictors of difficult airway, including a short neck, large tongue, heavy jaw. MPC III, and the thyromental distance < 6 cm.

Neck Swelling

On inspection, a diffuse swelling was noted in the anterior aspect of the neck. The swelling moved with deglutition. No visible scars, dilated veins, or skin changes were noted.

On palpation, the swelling was large, extending across the anterior part of neck but predominantly on the right side, firm in consistency, and had a smooth surface. The lower border of swelling could not be palpated, suggesting retrosternal extension. Tracheal deviation towards left side was present.

On auscultation, no bruit was heard over the thyroid gland.

Pemberton's sign was not performed, as elevation of the arms could precipitate acute airway obstruction.

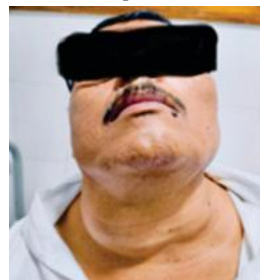


Figure 1: Preoperative Neck Swelling-thyroid

Investigations

Routine laboratory investigations including complete blood count, renal function tests, liver function tests, and coagulation profile were unremarkable. Thyroid function tests revealed a euthyroid state (FT3 3.3 pg/mL, FT4 1.24 ng/dL, TSH 0.403 μ IU/mL). Arterial blood gas analysis showed mild hypoxaemia with a PaO₂ of 63 mmHg.

X-ray neck demonstrated tracheal deviation to the left with evidence of tracheal compression. CT scan of the neck revealed a large multinodular thyroid gland, with the right lobe measuring 8.6 $\times$ 7.4 $\times$ 9.5 cm and the left lobe measuring 4.7 $\times$ 3.4 $\times$ 7.0 cm. There was retrosternal extension of $\sim$ 2.5 cm, craniocaudally extending from C2-T1. The mass caused significant displacement and compression of the larynx and trachea, resulting in approximately 20–30% luminal compromise. Compression and displacement of the right common carotid artery and right internal jugular vein were noted. The inferior portion of the swelling was indenting the brachiocephalic trunk.

IDL could not be performed. Naso-pharyngo-laryngoscopy (NPL) performed preoperatively showed hypertrophy of lingual papillae, a folded epiglottis, bilateral aryepiglottic fold collapse, and partially visualised vocal cords due to external compression.

ECG revealed RBBB. 2D ECHO showed an ejection fraction of 60%, mild left ventricular hypertrophy, and type I diastolic dysfunction. FNAC was suggestive of colloid goitre (Bethesda category II).

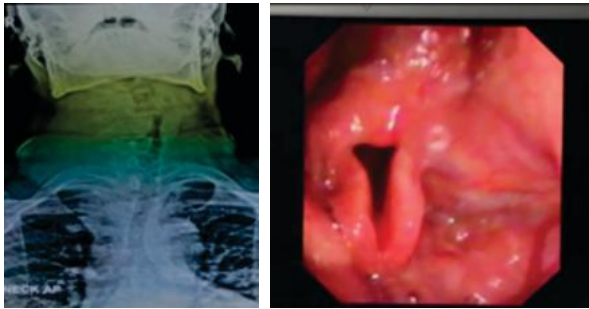


Figure 2: a) X-ray neck showing deviation of trachea b) NPL showing, a folded epiglottis, bilateral aryepiglottic fold collapse

Anesthetic Management

Considering the presence of significant airway compression, multiple predictors of difficult airway and h/o OSA, a comprehensive airway management plan was formulated. A difficult airway cart with fiberoptic bronchoscopy, video laryngoscope, bougie was kept ready. A rigid bronchoscope was kept available with ENT standby.

Adequate NBM status was confirmed, informed consent obtained and patient was shifted to the OT. The plan for intubation was awake fiberoptic intubation (AFOI) for which airway was prepared with 4% lignocaine nebulisation, lignocaine gargles and xylometazoline nasal drops. After adequate preoxygenation, premedication included intravenous glycopyrrolate 0.2 mg and fentanyl 40 μ g. Sedation was achieved with dexmedetomidine (1 μ g/kg over 10 minutes followed by 0.5 μ g/kg infusion), maintaining spontaneous breathing.

AFOI was attempted; however, the procedure was aborted due to equipment malfunction. Hence, check laryngoscopy was done using Macintosh #4 blade which revealed folded epiglottis, bilateral aryepiglottic fold collapse and barely visible vocal cords. Bougie-guided intubation was successfully performed using a 7.0 mm ID flexo-metallic

cuffed endotracheal tube. Correct ET tube placement was confirmed by capnography and auscultation. Subsequently Inj.Propofol 160mg i.v and Inj.Vecuronium 8 mg i.v was administered.

Anaesthesia was maintained with sevoflurane 0.5–2% in air: O₂ mixture with ventilator in VC mode (450/14/3/50). Dexmedetomidine infusion was continued to ensure haemodynamic stability. Intraoperative vital parameters remained stable throughout the procedure. Estimated blood loss was approximately 370 ml. Total intravenous fluid administered was 900 ml, urine output was 430 ml and surgery duration was 2hrs.

At the end of surgery, cuff/leak test was performed to confirm the absence of tracheomalacia. But considering the h/o OSA and long-standing goitre, direct laryngoscopic view showing aryepiglottic fold collapse and anticipated airway oedema, decision was taken not to extubate the patient in the immediate postoperative period. The flexometallic tube was exchanged for a PVC endotracheal tube over a bougie using video laryngoscope. Reversal of neuromuscular blockade was done with Inj.Neostigmine 3.5mg and Inj. Glycopyrrolate 0.5mg. Patient was shifted to the ICU on T-piece with O₂@6L/min for further observation and monitoring. Intravenous dexamethasone was administered intraoperatively and continued postoperatively BD for 1 day.

Postoperative Course

On postoperative day 1, after ensuring adequate respiratory effort, resolution of airway oedema, and confirmation of vocal cord mobility on NPL, staged extubation was performed under controlled conditions in the OT. The patient tolerated extubation well and remained haemodynamically stable. Post extubation, vocal cord mobility was confirmed with help of NPL.

On postoperative day 3, patient developed an episode suggestive of syncope or seizure-like activity. Prompt evaluation was carried out; laboratory evaluation revealed hypocalcaemia, with serum calcium levels 7.9 mg/dL. He was treated with i.v calcium gluconate and magnesium sulphate.

The patient was shifted to the ward on day 4 and was subsequently discharged in stable condition on day 7.

DISCUSSION

Giant multinodular goitres pose significant challenges to airway management due to anatomical distortion and compression. Imaging studies such as CT scan provide invaluable information regarding the extent of airway compromise and aid in planning airway management strategies. Although awake fiberoptic intubation is often recommended in such cases, direct /video laryngoscopy with bougie assistance may be successful in select patients, when performed by experienced anaesthesiologists with adequate preparation and backup. It is important to have multiple backup plans when dealing with such patients.

Postoperative airway management is equally important, as airway collapse, oedema, and hypocalcaemia-related complications may occur. Early recognition and treatment of hypocalcaemia are essential to prevent serious complications. Elective postoperative ventilation and staged extubation may reduce the risk of sudden airway obstruction.

CONCLUSION

This case emphasizes the importance of meticulous preoperative assessment, anticipation of difficult airway, and multidisciplinary planning in patients with giant multinodular goitre. Bougie-assisted intubation and staged extubation can be safe and effective in managing severe airway compression in selected patients when performed with adequate

preparation and backup plans. Vigilant postoperative monitoring allowed early identification and management of hypocalcaemia, resulting in a favourable outcome.

REFERENCES

1. Raval CB, Rahman SA. Difficult airway challenges—intubation and extubation in a case of large goiter with retrosternal extension. *Anesth Essays Res.* 2015;9(2):247–250.
2. Mahajan S, Sekar L, Kumar S. Airway management in a patient with retrosternal goiter: a context-sensitive airway strategy. *Indian J Otolaryngol Head Neck Surg.* 2022;74(Suppl 2):2214–2216.
3. Cook TM, Morgan PJ, Hersch PE. Airway obstruction caused by retrosternal thyroid mass: management strategies. *Anaesthesia.* 2011;66(9):828–836.
4. Sajid B, Rekha K. Airway management in patients with tracheal compression undergoing thyroidectomy: a retrospective analysis. *Anesth Essays Res.* 2017;11(1):110–116.
5. Pan Y, Chen C, Yu L, Zhu S, Zheng Y. Airway management of retrosternal goiters in 22 cases in a tertiary referral center. *Ther Clin Risk Manag.* 2020;16:1267–1273.
6. Osinaike BB, Ogunsiyi AO, Joseph OC. Challenging airway management in a patient with retrosternal goiter presenting in respiratory distress. *Niger J Surg.* 2021;27(1):66–70.