

Case Report

Challenges for a perioperative physician – A choking thyroid planned for total thyroidectomy

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ABSTRACT

A large retrosternal goiter is a nightmare for an anesthesiology and a surgeon. A comprehensive history, a thorough clinical examination, pre-operative planning and a close working relationship among multidisciplinary medical teams are prerequisites to prevent adverse events intra-operatively and postoperatively. This case report is about a geriatric patient who presented with progressively enlarged anterior neck swelling for past 30 years associated with orthopnea and dysphagia. Patient underwent awake fiberoptic intubation under topical anesthesia. Thyroidectomy combined with sternotomy was done. Intra-operative and postoperative was uneventful. This case report suggests the use of AFOI in anticipated difficult airway and its success.

Keywords: Retrosternal goiter, Thyroidectomy, Sternotomy, Awake fiberoptic intubation

INTRODUCTION

The term “Retrosternal Goiter (RSG)” describes a thyroid mass that extends from the neck to the substernal region of the sternum, descending beyond the thoracic inlet. In 1749, Haller first described retrosternal, substernal, or intrathoracic goiter.^[1] Even though RSG is clearly stated, there is still a lot of ambiguity over its precise description. Huins *et al.* examined 34 articles that included 2426 patients and discovered four definitions of RSG.

These definitions included the presence of a gland which:

- (i) Any part extends below the thoracic inlet with the patient in the surgical position,
- (ii) More than 50% lies within the thoracic cavity,
- (iii) Extends to the level of the fourth thoracic vertebra on chest X-ray and
- (iv) Extends to the level of the aortic arch, the currently accepted definition of a retrosternal goiter is a thyroid gland with more than 50% of its mass located below the thoracic inlet.^[2]

RSG can also be classified depending on the location:

- Grade 1 – Above the aortic arch;
- Grade 2 – Between the aortic arch and pericardium; and
- Grade 3 – Below the right atrium.^[2]

In addition to compressing mediastinal tissues, RSGs can result in serious side effects such as cerebral hypoperfusion and axillosubclavian vein thrombosis.^[3]

Surgery is often performed through a cervical incision, but depending on the extent of the intra-thoracic extension, it may be necessary to do a manubriotomy, sternotomy, or thoracotomy (3.1%,

6.6%, and 4%, respectively), which leaves the patient at risk for a pneumothorax and hemorrhage.^[2] The anesthesiologist and surgeon face a hurdle while treating large RSGs. We are reporting the successful anesthetic management of a 65-year-old female patient who was scheduled for a complete thyroidectomy and had a massive RSG with severe intrathoracic tracheal narrowing.

CASE REPORT

A 65-year-old female, weighing 52 kg, height of 156 cm, and body mass index of 21.4, presented with a history of swelling in the anterior aspect of her neck for 30 years, associated with dyspnea on lying down and dysphagia. There was no history of stridor or change in voice. She was clinically and biochemically euthyroid and had no other comorbidities.

On clinical examination, the patient was found to have a right-side tracheal deviation, which was confirmed on the chest radiograph film. The swelling was on the anterior aspect of the neck, extending beyond the anterior border of the left and right sternocleidomastoid muscle, superiorly, up to the hyoid [Figure 1]. The lower border of the swelling was not palpable. The swelling was firm in consistency and moved with deglutition. A dull note was felt on percussion over the manubrium sternum, and there were no palpable neck lymph nodes. Pemberton's sign was negative. No visible/engorged veins were seen on the face, neck, and chest. On airway examination, she was partially edentulous with adequate mouth opening, modified Mallampati class 2. Neck movements were adequate both in flexion and extension with normal side-to-side movements. Indirect laryngoscopy revealed mobile bilateral vocal cords during phonation and respiration.

On examination, vitals were stable with pulse rate - 92/min, blood pressure - 120/70 mm Hg, and oxygen saturation of 100%. Baseline investigations were within normal limits with hemoglobin-10.8 mg/dL and platelet 233. An electrocardiogram (ECG) showed normal sinus rhythm with minimal pericardial effusion in the echocardiography study. Pulmonary function test and thyroid profile were normal.

Ultrasound examination of the neck showed the left lobe with multiple large cystic nodules and the right lobe with large colloid goiter 4 mm * 22 mm with a comet tail artifact. Fine-needle aspiration cytology showed nodular colloid goiter with cystic degeneration [Figure 2]. Contrast-enhanced computed tomography (CECT) neck showed retrosternal extension of the left lobe up to the manubriosternal joint. The mediastinal component measured 6.7 cm * 4.4 cm with tracheal and esophagus displaced to the right [Figure 3].

Whole body positron emission tomography scan was done and showed enlargement of both lobes of the thyroid gland. Fluorodeoxyglucose (FDG) avid small heterogeneously

enhancing nodules and non-FDG avid large solid, cystic nodules with calcifications are seen in both lobes.

The patient was reviewed by a cardiothoracic surgeon. Written informed consent was obtained for awake intubation, flexible fiberopticscopy, post-operative mechanical ventilation and other complications; pre-operative fasting of 6 h for solid food and 2 h of clear fluid was followed.

She was taken up for surgery under the American Society of Anesthesiologists (ASA) II. The patient was premedicated with proton-pump inhibitors and benzodiazepines the day before surgery. On the day of surgery, the operating room was equipped with a difficult intubation cart. The patient was premedicated with an intramuscular injection of glycopyrrolate 0.4 mg as an anti-sialagogue. The patient was nebulized with 6 mL of 4% lignocaine, and oral cavity sprayed with 10% lignocaine. Superior laryngeal nerve was blocked with 3 ml of 2% lignocaine on each side under ultrasound guidance. After checking nasal patency, the right nostril was prepared using 2% xylometazoline nasal drops and prepared for awake flexible fiberoptic intubation. No sedative medication was given.

The patient shifted inside the operation theater, and standard ASA monitors (non-invasive blood pressure, ECG, and pulse oximeter) were attached. The left radial artery was cannulated under local anesthesia, and the patient was put on the American Society of Anesthesiologist standard monitoring. AFOI was performed, and once glottic structure was identified, 2% lignocaine was sprayed directly onto the glottis inlet. Tracheal intubation was done with a 6.5 cuffed flexometallic tube. Tube placement was confirmed by equal air entry on auscultation and end-tidal carbon dioxide. Subsequently, the patient was induced with an injection of propofol 100 mg IV. Injection fentanyl 2 µg/kg IV was given. The patient was maintained on oxygen (O₂) + nitrous oxide + sevoflurane [minimum alveolar concentration (MAC) ≤1]. Adequate muscle relaxation was achieved with the injection vecuronium. The patient was positioned for surgery with neck extension for adequate surgical exposure. The patient was catheterized for perioperative fluid management. The cardiac thoracic surgeon did the sternotomy, and necessary precautions were taken to avoid lung or pleural injury. Subsequently, normal ventilation was resumed; initially, the mediastinal part of the left thyroid lobule was mobilized by the surgeon, followed by Kocher's incision, and the entire thyroid gland was excised, and care was taken to preserve recurrent laryngeal nerve and parathyroid gland [Figure 4]. After resection of the thyroid gland, tracheomalacia was ruled out by the surgeon by palpation. The patient was hemodynamically stable intraoperatively.

The patient was shifted to the intensive care unit for overnight elective mechanical ventilation. Following completion of the surgery, when the patient was conscious and breathing, it spontaneously reversed using an injection of neostigmine 3.0 mg IV and an injection of glycopyrrolate 0.6 mg IV.



Figure 1: Gross enlargement of bilateral thyroid lobes with indistinct inferior borders.

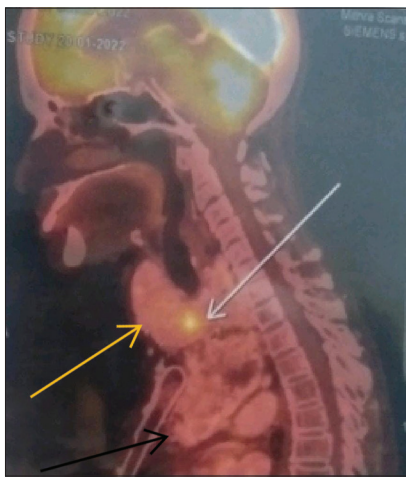


Figure 2: Bilateral enlarged thyroid lobes with fluorodeoxyglucose avid large solid, cystic nodules with calcifications. The white arrow shows the large colloid goitre inside the thyroid gland. The yellow arrow shows enlargement of the thyroid gland. The black arrow shows retrosternal extension of the thyroid gland.

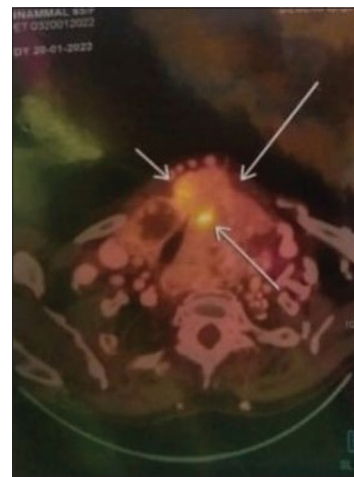


Figure 3: Retrosternal extension of left lobe of thyroid seen, causing right lateral displacement of trachea – appears to partially compress the trachea. The white arrows shows transverse section of the thyroid gland with partial compression of the trachea.

On 1st post-operative day, the patient was weaned off the ventilator. A leak test was done the next morning. The patient was extubated over a tube exchanger and kept on a Hudson mask at 4 L O₂/min. Post-operative recovery was impeccable without respiratory compromise.

Post-operative pain was managed with non-steroidal anti-inflammatory drugs and morphine based on a verbal rating scale ≥ 3 . Incentive spirometry and chest physiotherapy were started. The patient was mobilized on 2nd post-operative day and was shifted to the ward. The patient was discharged after a week of uneventful stay.

DISCUSSION

Large RSGs raise concerns such as mediastinal mass syndrome (MMS), difficult intubation, massive blood loss, extensive surgery, sternotomy challenges, and post-thyroidectomy complications.^[4]

Although our patient did not exhibit any signs of mediastinal compression, the presence of a huge RSG should concern doctors about the possibilities of MMS under anesthesia. Successful management of such patients depends on a thorough preoperative evaluation to rule out MMS symptoms and signs. In these situations, CECT is particularly beneficial for evaluating and effectively managing the airway. Patients

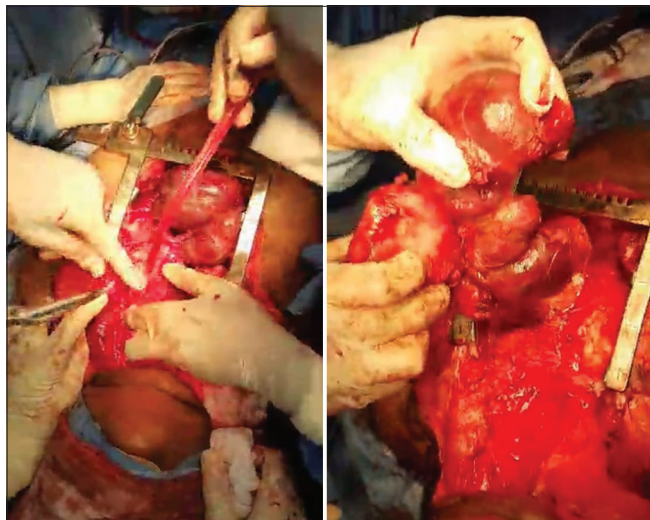


Figure 4: Retrosternal extension of the goiter visible.

with goiters are more likely to experience difficult intubation by 2–12%.^[5,6] To reduce mortality and morbidity, it is crucial to maintain an uninterrupted patent airway and adequate gas exchange.^[7] Our patient falls into grade 1 with a goiter above the aortic arch as per Huins *et al.* classification of RSG.^[2] Our patient is classified as having a grade 2 “uncertain” form of MMS by Erdos and Tzanova, with a history of dyspnea and computed tomography signs of tracheal compression.^[8] Intubations with thyroid swellings are difficult 2–12.7% of the time, and they fail 0.3–5.0% of the time.^[5,6,9]

The cornerstones of anesthetic management include a thorough pre-anesthetic assessment of symptoms, airway examination, blood profile, and imaging studies.^[8] The success of awake intubation is increased by gaining the patients’ trust and cooperation.^[5] The cornerstones of anesthetic management include a thorough pre-anesthetic assessment of symptoms, airway examination, blood profile, and imaging studies.^[8] The success of awake intubation is increased by gaining the patients’ trust and cooperation.^[5] Although technically challenging to do out in the context of an enlarged and vascular thyroid gland, awake tracheostomy can be life-saving. AFOI was the most secure method of securing the airway in our patient while taking potential difficulties into consideration before administering general anesthesia for surgery. A “cork in the bottle” condition may occur when AFOI is used in a patient with an already narrowed trachea and obstructive symptoms.^[10-12] After assessing the benefits and hazards, a customized “plan ABC” must be created for each scenario.

Availability of adequate blood and blood products should always be ensured before undertaking a patient for surgery. Thorough analgesia, deeper planes of anesthesia, and appropriate muscle relaxation are all necessary for an extremely painful procedure such as a sternotomy to spread the sternum. The risk of lung and vascular damage is high during sternotomy.

Invasive hemodynamic monitoring was carried out by inserting an arterial catheter due to the anticipated blood loss and the potential for cardiovascular decompensation.

In our patient, there was a long-standing history of goiter and gross intraoperative handling of the trachea. The patient was more prone to tracheomalacia and post-operative respiratory complications, which might have been catastrophic. In addition, significant blood loss and the potential for hypocalcemia were present (following parathyroid gland excision). For the aforementioned reasons, we intended to choose to ventilate the patient for 24 hours in order to allow the airway edema to subside and facilitate painless extubation. After being extubated, the patient resumed deep breathing exercises and incentive spirometry, which reduced the risk of post-operative pulmonary problems. The thoracic epidural provided adequate pain management during the pre-operative period.

CONCLUSION

A comprehensive history, a thorough clinical examination, preoperative planning, and a close working relationship among multidisciplinary medical teams were prerequisite for the successful delivery of anesthesia and the uneventful recovery of this patient.

Ethical approval

The research/study complied with the Helsinki Declaration of 1964.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Gonçalves Filho J, Kowlski LP. Surgical complications after thyroid surgery performed in a cancer hospital. *Otolaryngol*

- Head Neck Surg 2005;132:490-4.
- Huins CT, Georgalas C, Mehrzad H, Tolley NS. A new classification system for retrosternal goitre based on a systematic review of its complications and management. *Int J Surg* 2008;6:71-6.
 - Santos GH, Ghalili K. Axillosubclavian vein thrombosis produced by retrosternal thyroid. *Chest* 1990;98:1281-3.
 - Choudhary N, Kumar A, Wadhawan S, Bhadoria P, Panwar V. Retrosternal goitre: Anaesthetic implications and management. *Indian J Clin Anaesth* 2018;5:453-6.
 - Randolph GW, Shin JJ, Grillo HC, Mathisen D, Katlic MR, Kamani D, *et al.* The surgical management of goiter: Part II. Surgical treatment and results. *Laryngoscope* 2011;121:68-76.
 - Chaves A, Carvalho S, Botelho M. Difficult endotracheal intubation in thyroid surgery: A retrospective study. *Internet J Anesthesiol* 2009;22.
 - Tan PC, Esa N. Anesthesia for massive retrosternal goiter with severe intrathoracic tracheal narrowing: The challenges imposed -a case report. *Korean J Anesthesiol* 2012;62:474-8.
 - Tripathy DK, Ravishankar M. Airway management in a case of severe tracheal narrowing by retrosternal goiter - A case report. *Internet J Anaesthesiol* 2019;13:UD01-3.
 - Rodrigues J, Furtado R, Ramani A, Mitta N, Kudchadkar S, Falari S. A rare instance of retrosternal goitre presenting with obstructive sleep apnoea in a middle-aged person. *Int J Surg Case Rep* 2013;4:1064-6.
 - Findlay JM, Sadler GP, Bridge H, Mihai R. Post-thyroidectomy tracheomalacia: Minimal risk despite significant tracheal compression. *Br J Anaesth* 2011;106:903-6.
 - Dempsey GA, Snell JA, Coathup R, Jones TM. Anaesthesia for massive retrosternal thyroidectomy in a tertiary referral centre. *Br J Anaesth* 2013;111:594-9.
 - Wong P, Chieh Liew GH, Kothandan H. Anaesthesia for goitre surgery: A review. *Proc Singap Health Care* 2015;24:165-70.

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