



Airway Management Of Retrosternal Goitre With Tracheal Compression- A Case Report

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Abstract

Huge thyroid swelling with retrosternal extension pose significant challenges for anaesthesiologists worldwide. Anaesthetic implications in such cases include difficult airway management, uncontrolled hyperthyroidism or hypothyroidism, and post-thyroidectomy complications. Airway securing is a big challenge due to tracheal compression and/or deviation by the huge thyroid swelling, and this requires meticulous preoperative preparation, good communication among the multidisciplinary team, and appropriate psychological and pharmacological preparation of the patient. In this case report, we describe the effective management of a patient with a retrosternal goiter causing tracheal compression using awake fiberoptic intubation under topical anesthesia and conscious sedation, which scheduled for total thyroidectomy under general anaesthesia via cervical route. Successful management of such patient requires a comprehensive multidisciplinary team approach in conjunction with the surgical team.

Keywords: Retrosternal goitre, Thyroidectomy, Tracheal compression, Awake fibreoptic intubation

Introduction

In retrosternal goitre, the thyroid gland extends abnormally below the thoracic inlet. Depending on where it is location, it can be categorized as grade 1, which is above the aortic arch; grade 2, which is between the aortic arch and the pericardium; or grade 3, which is below the right atrium[1]. Patients with retrosternal extension present differently depending on the location, types, and size of the mass as well as the structures that are compromised. The patient may experience dyspnea and stridor as a consequence of slowly progressing growth or sudden nodular haemorrhage resulting in tracheobronchial compression[2,10]. A cervical incision is generally utilized for surgical procedures; however, depending on the degree of involvement in the thoracic area, a sternotomy, manubriotomy, or thoracotomy may be required (3.1%, 6.6%, and 4%, respectively)[1]. This increases the patient's risk for complications such as hemorrhage and pneumothorax. Anaesthesia for a

retrosternal goiter presents significant challenges due to potential respiratory complications and haemodynamic decompensation that may arise from obstruction of the trachea or vascular structures. Here, we present the intraoperative considerations and airway management strategies implemented for a thyroid patient with retrosternal extension and tracheal compression, who is scheduled for total thyroidectomy with sternotomy, with or without tracheostomy.

Case Presentation:

A 71 year old female (54kg, 154 cm, BMI 22.8) having diffuse multinodular goiter was posted for total thyroidectomy with sternotomy with or without tracheostomy. She came with gradually increasing neck swelling over the past 5 years, associated with cough and difficulty in breathing. On examination, patient was conscious and oriented. Her pulse rate was 94 beats per min, and her blood pressure was 150 over

90 mmHg. The swelling was firm in consistency, measuring about 15x 10 cm, the inferior margin of the swelling was neither visible nor palpable, and it moved with deglutition. The airway examination showed that the patient had good mouth opening and a Mallampati score of II. The vocal cords moved normally on indirect laryngoscope. Her systemic examination was normal with no other abnormalities. All the routine investigations, including thyroid function tests, were normal. The ECG, chest X-Ray, and 2DEchocardiography were all within normal limits.

The CT scan of the neck and chest showed two lobulated hyperenhancing solid lesions measuring approximately 7.8x4.3x9.1 cm and 7x6x10.6 cm(APxTR) in the right and left lobes of the thyroid gland, respectively. Medially, the lesions were sandwiching and compressing the trachea, reducing its transverse diameter to 7 mm. Laterally, the lesions displaced the common carotid artery, right brachiocephalic artery, and the left subclavian artery. Inferiorly, the lesions extended into the superior and posterior mediastinum up to the level of aortic arch.

Figure 1: Axial and Coronal contrast-enhanced computed tomography of the neck and thorax demonstrated bilateral lobulated thyroid masses measuring $7.8 \times 4.3 \times 9.1$ cm on the right side and $7 \times 6 \times 10.6$ cm on the left side. The masses compressed and displaced the trachea, reducing its transverse diameter to approximately 7 mm. Inferior extension into the superior and posterior mediastinum reached the level of the aortic arch.



After multidisciplinary discussion among specialized team consisting of Anaesthesiologist, ENT Surgeon and Cardiothoracic Surgeon, a comprehensive management plan was developed pre-operatively before the surgery focusing on the management of challenging airways and acute cardiorespiratory decompensation which could follow after induction of anaesthesia. A written high risk informed consent was taken after explaining the complications related to difficult airway and hypoxia. Patient was kept nil per orally according to ASA fasting guidelines. Patient was shifted to the operating theater with fully

equipped difficult airway trolley including video laryngoscope, surgical airway set, and fiberoptic bronchoscope. Standard monitoring was applied: 5 lead electrocardiogram (ECG), peripheral oxygen saturation (SpO₂) by pulse oximetry, noninvasive blood pressure (NIBP), and end tidal carbondioxide (EtCO₂) capnography via nasal sampling cannula throughout the awake phase. Glycopyrrolate 0.2 mg was given intramuscularly to reduce airway secretions, and 0.2% oxy-xylometazoline nasal drops were applied in both nostrils to induce vasoconstriction. This was done to allow the fiberoptic bronchoscope to

pass through without causing mucosa injury. Airway topicalisation was achieved with nebulised 4% lignocaine (2ml=80mg). Under strict aseptic precaution, SLN block was given with 2ml of 2% lignocaine bilaterally along with transtracheal nerve block with 2 ml of 2% lignocaine. Then, 10% lignocaine sprayed over both nostrils and pharynx. Nasopharyngeal airway size 6.5 mm was put to dilate the nasal passage for easy insertion of flexometallic tube. Supplemented oxygen was delivered at 2L/min via nasal prong during the entire awake intubation. The patient received 1 mg of midazolam and 50 mcg of fentanyl i.v. for anxiolysis. A 6.5 mm cuffed flexometallic endotracheal tube was inserted into the fiberoptic bronchoscope. The bronchoscope was advanced through the right nostril, towards larynx and finally crossed the vocal cord. Once the carina was visualized, the endotracheal tube was inserted into the trachea by railroading over the FOB and it was placed above the carina. The tube position was confirmed by visualization of tracheal rings and carina through the bronchoscope, followed by capnographic waveform. General anaesthesia was then induced. Under strict aseptic and aseptic precautions, a 3 Fr leader catheter was inserted into the left radial artery to monitor invasive arterial blood pressure, and a 7 Fr triple-lumen central venous catheter was inserted in the left femoral vein and secured. The neck of the patient was extended by putting wedge under the shoulder by the surgeon. In our case. The thyroid mass was successfully removed by cervical approach without the need for sternotomy as whole thyroid mass was totally pull up over the neck after proper extension of the neck. Throughout the surgery, the patient remained stable and extubated after negative leak test. Post operative period of the patient was uneventful and discharged after 1 week of hospital stay.

Discussion:

Anaesthetic management in patient with retrosternal goiter remains challenging during the entire intra-operative period[4]. Cardiovascular as well as respiratory complications can occur during any stage of anaesthesia. There is a potential risk of airway obstruction due to direct mechanical compression of the trachea or main bronchi or both. Along with this, there is chance of cardiovascular compromise due to compression of major vessels or heart which can be fatal to the patient.[5] Meticulous pre-operative evaluation is mandatory to rule out any mediastinal

mass syndrome which is also one of the important aspects for a successful management in such situation. Contrast enhanced CT scans are very useful for assessment and effective airway management. The incidence of difficult intubation in patients with goiter ranges from 2% to 12%[6,7]. Cook et al suggested that patient factors, physician skills and accessibility of resources may alter airway management techniques in such patient[8]. Malhotra et al also highlighted various strategies for managing airway of thyroid patients such as inhalational tracheostomy, rigid bronchoscope ventilation, awake FOI, and inhalational induction with sevoflurane. In our case, considering the difficult airway due to compression of the trachea by a huge retrosternal goiter, our plan was to perform awake fiberoptic intubation using topical anesthesia and sedation. Airway blocks was possible in our case. ENT surgeon was asked to prepare for emergency tracheostomy in case if we were unable to secure the airway. With great effort and difficulties, the patient was intubated nasally with fiberoptic bronchoscope after proper topicalization of nasopharynx. Considering the anticipated blood loss and the risk of hemodynamic collapse, an arterial catheter was placed for invasive hemodynamic monitoring, and the left femoral vein was cannulated and secured. In addition to this, with proper extension of the neck, huge thyroid mass was able to excise by cervical approach only without the need for sternotomy.

Conclusion:

Patient with huge thyroid goiter may poses challenges to the anaesthetist. Airway management in such case should be discussed among the experienced multidisciplinary team. Among the various alternatives, awake fiberoptic intubation combined with airway blocks and sedation is one of the most effective options for selected group of patients at risk of airway obstruction due to tracheal compression by retrosternal goiter.

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