CASE REPORT

Anaesthetic Management for Massive Neck Mass with Retrosternal Extension with Severe Tracheal Narrowing posted for Thyroidectomy: A Case Report

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Abstract

Anesthetic management in patients with large mediastinal mass is challenging owing to the cardiorespiratory compromise that can happen following induction of anaesthesia.1 . We describe a 52 years old lady with a large anterior neck mass (thyroid malignancy?) for thyroidectomy with severe tracheal narrowing with risk of cardiorespiratory compromise owing to the mediastinal mass syndrome.2 Awake fibreoptic intubation was planned.3 After meticulous dissection and surgery the mass was removed without any cardiorespiratory compromise intraoperatively. A tracheostomy was done owing to the soft trachea. Close communication between the surgeons and the anesthesiologist helped in the successful outcome of the patient.

Keywords: Awake fibreoptic intubation, Mediastinal mass, Superior venacaval syndrome.

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Introduction

Huge retrosternal goitres have dramatic presentations and hence anaesthetic management remains challenging. Retrosternal goitre can be classified as grade 1, above the aortic arch, grade 2 between the aortic arch and pericardium, grade 3 below the pericardium.[4] Incidence of retrosternal goitre were 0.02 to 15%. In the mediastinum as a confined space, the enlarged substernal goiters compressed onto the tracheal, esophagus, and even vital large vessels and appeared high incidence of malignancy.[3] The surgical approach is by cervical incision but rarely a sternotomy or thoracotomy can be required. Anesthesia for retrosternal goitre requires a skilled anaesthesiologist who is efficient in detecting difficult airway and managing it with all other major systemic hemodynamic changes that arise. We describe a case of huge retrosternal goitre with compression on major blood vessels and trachea and the anesthetic challenges.

Case Report

A 52-year-old female presented to the hospital surgical opd with swelling in the neck increasing in size gradually over 4 to 5 years, and increasing in size suddenly for 40 days. She was sent to the pre-anesthesia clinic for a checkup. She has a history of swelling in the neck (12x8x10cm) with increasing size. She has a history of difficulty in deglutition, difficulty in breathing in a supine position more than in a sitting position, weight loss, heat intolerance, and high temperature. She had hoarseness of voice.

Examination revealed– T -102, HR-160 per min, BP-130/74 mm Hg, SpO2 on room air 91%, wheeze on both sides. A firm neck swelling measuring 12 × 8 cm with dilated superficial veins was found to extend below the chin retrosternally, moving with deglutition. Neck flexion and extension were restricted but mallampatti score was 1. Pemberton's test was positive.

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Investigations revealed– high T4, T3, and low TSH <0.01, CRP- 4.58, rest of the blood lab (Complete blood count, renal function, liver function, electrolytes) were within normal range. Electrocardiography revealed sinus tachycardia. Echocardiography was within normal limits.

After endocrinology consultation, antithyroid treatment {t. neomarcazol 10 mg BD, T. ciplar LA (40) mg OD, vitamin D3 60K once a week} was started. CT scan revealed the retrosternal extension of the mass and narrowing of trachea. The tracheal diameter was only 6 mm. CT scan also revealed skeletal metastasis, mass extending between both the carotid vessels, and atheromatous plaque in both the common carotid and subclavian arteries. Dilated and tortuous superficial veins on the anterior surface of the mass. Fibro-bronchiectatic changes with the surrounding area of consolidation in the medial segment of the right middle lobe. Pulmonary function tests revealed severe restriction.

Plan was to optimise the case for 2 to 3 weeks in view of thyrotoxicosis and correction of the cardiac and respiratory status after consultation of a cardiologist and respiratory physician. She was also started with chest physiotherapy, deep breathing exercises, and nebulization with bronchodilator preoperatively.

After 3 weeks when the symptoms subsided, TSH decreased (0.01), HR decreased 110/ min, dyspnea improved (RR 18/min), The patient was planned for surgery.

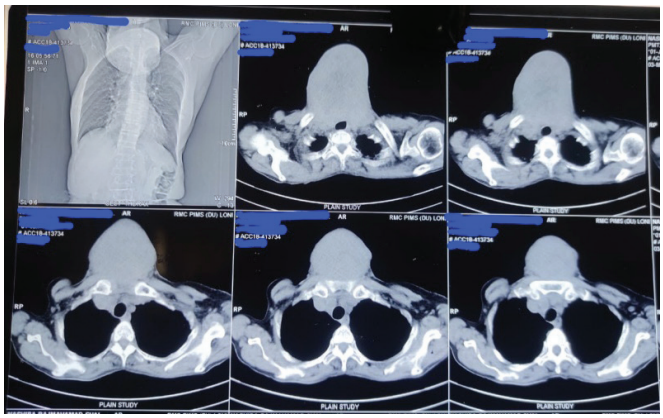

Figure 2: CT scan – mediastinal extension of the mass.

Anesthesia plan

A comprehensive discussion and plan for the surgery was done in collaboration with the general surgeon, cardiovascular surgeon, ENT surgeon. A bronchoscopic physician was in the OR. Ent surgeon was on standby for rigid bronchoscopy and jet ventilation if intubation failed. Patients and relatives were explained about the need for postoperative ventilation, ICU stay, tracheostomy, blood loss, need for cardiopulmonary bypass, and mediastinal syndrome after induction of anesthesia, and detailed informed consent was taken. Nil by mouth status was confirmed. She was taken up for surgery under ASA III status. The mouth opening was adequate with a mallampatti score of 1.

Awake fibreoptic guided intubation was planned under local anesthesia. The patient was shifted to the preoperative room, monitors were attached, and injection of glycopyrrolate 0.2 mg gradually over 5 mins. The patient was nebulized with lignocaine 4%, 5 mL. After shifting the patient inside the operating room ASA standard monitors were attached. Left radial artery cannulation was done with a 3 Fr catheter using Seldinger's technique before induction

Figure 1: Preoperative examination.

Figure 3: Intraoperative mass extension (Plz cite all images in article text).

owing to the hemodynamic instability. After fibrescopy, once the glottic structures were visible, 4% lignocaine was sprayed directly on the glottic inlet. After visualization of vocal cords 4% lignocaine was sprayed on it, then the fiberscope was negotiated inside the trachea, and intubation was achieved with 6.0 mm ID cuffed endotracheal tube. After confirmation of the endotracheal tube in the trachea by ETCO2, auscultation, and chest rise, anesthesia was induced with fentanyl 1.5 mcg/kg, midazolam 1-mg/kg, propofol 1-mg per kg and atracurium 0.5 mg/kg.

Right femoral central venous cannulation was done under all aseptic precautions using seldinger's technique with triple lumen catheter and fixed after checking forward and backward flow in all the 3 ports. A wide-bore peripheral intravenous cannula was taken in the right hand. Anaesthesia was maintained with O_2: air and sevoflurane. The patient was catheterized to monitor the hourly urine output. After meticulous dissection and surgery, no tracheal compromise was seen during the intraoperative period. The mass was removed successfully without any major bleeding. At the end of surgery laryngoscopy was done to see the movements of the vocal cords and found intact.

As the patient's trachea was soft decision to do on table tracheostomy was made and 7.0 mm ID cuffed tracheostomy

tube was inserted under all aseptic precautions. The patient was then shifted to the intensive care unit with spontaneous respiration on Bain's circuit.

The postoperative recovery was smooth and uneventful with minor electrolyte disturbances. After a week she was decannulated and later on discharged.

Discussion

Mediastinal syndromes include a group of syndromes characterized by the compression of mediastinal structures. Causes of mediastinal syndromes are classified according to the anatomic division of the mediastinum, including the anterior, medium, and posterior regions.[5] Typically, 3–6% of mediastinal anterior masses are represented by intrathoracic goiter, and 5–17% are carcinomas.

The patients may have cardiorespiratory compromise and collapse following induction of anesthesia. Direct mechanical compression of the trachea or main bronchi or both may lead to complete occlusion of the airway.[1] Compression on the major neck vessels can cause cerebral hypoperfusion or even major cardiovascular catastrophe.[6]

The problems associated with large retrosternal goitre are difficult airway, massive blood loss, prolonged operative time, sternotomy complications, and postoperative tracheomalacia.[7] Our case in addition had thyrotoxicosis (raised BP, raised heart rate, raised TSH) which imposed a risk of intraoperative thyroid storm.[8] Hence it was imperative to control the thyroid function with antithyroid drugs before surgery and decrease the intraoperative risks.[9] The antithyroid drugs helped to decrease the symptoms and optimize the patient. Hence the decision to postpone the surgery for 3 weeks was made. CT scan helps to see the retrosternal extension and hence it is important to get it done. Our patient also had signs of mediastinal compression; hence it is important to do a thorough preoperative evaluation. The CT scan helps to see the retrosternal extension and the compression of the vital structures.

The incidence of difficult intubation in patients with retrosternal giotre is 2 to 12.7% and failed intubation is 0.3 to 0.5%.[1] Awake intubation can be done by fibreoptic guided, awake tracheostomy, awake laryngoscopy, and awake rigid bronchoscopy.[10] So awake fibreoptic intubation was planned with the backup of a bronchoscopy physician and ENT surgeon was on standby in case rigid bronchoscopy was required.

Owing to the vascularity and blood loss invasive monitoring was decided, arterial line was inserted in the left radial artery.[11] Femoral central venous cannulation was done with triple lumen,15 cm, 7 French catheter using seldingers technique under all aseptic precautions. Patients with mediastinal mass can collapse at any stage, so vigilant monitoring is mandatory. Blood and blood products should be reserved before taking these patients for surgery. We had adequate blood and blood products reserved for the case.

Owing to the meticulous dissection there was not much intraoperative trouble in terms of hemodynamics and airway pressures. There was minimal blood loss during the procedure. Throughout the procedure, urine output was adequately maintained. During tracheal handling, it was found that the trachea is very soft, so the decision to do a tracheostomy was made and done with 7.0 mmID tracheostomy tube.

Figure 4: Postoperative recovery.

Such patients need very stringent postoperative monitoring, hence decision to shift the patient to the intensive care unit (ICU) was made.[12] Owing to the smooth intraoperative course patient was reversed and shifted with the tracheostomy tube on spontaneous respiration to ICU.

There are chances of electrolyte disturbances in the postoperative period. Our patient had a smooth postoperative course except for some hypocalcemia which was corrected by *i.v.* calcium supplementation. The patient was decannulated 7 days later.

Conclusion

Patients with large neck masses pose challenges to the anaesthesiologist. A detailed preoperative examination (history and clinical examination and relevant investigation) is essential. A comprehensive multidisciplinary approach with the involvement of multiple surgeons is important for successful perioperative management and uneventful recovery of the patient.

References

1. Tan PC, Esa N. Anesthesia for massive retrosternal goiter with severe intrathoracic tracheal narrowing: the

challenges imposed -A case report-. Korean J Anesthesiol. 2012 May;62(5):474-8. doi: 10.4097/kjae.2012.62.5.474.
2. Zardi EM, Pipita ME, Afeltra A. Mediastinal syndrome: A report of three cases. Exp Ther Med. 2016 Oct;12(4):2237-2240. doi: 10.3892/etm.2016.3596. Epub 2016 Aug 12.
3. 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 Dec 22;16:1267-1273. doi: 10.2147/TCRM.S281709.
4. Choudhary N, Kumar A, Wadhawan S, Bhadoria P, Panwar V. Retrosternal goitre: Anaesthetic implications and management. Indian J Clin Anaesthe, 2018; 5(3):453-456.
5. Yoneda KY, Louie S, Shelton DK. Mediastinal tumors. Curr Opin Pulm Med. 2001 Jul;7(4):226-33.
6. Asai T. Emergency cardiopulmonary bypass in a patient with a mediastinal mass. Anaesthesia. 2007 Aug;62(8):859-60. doi: 10.1111/j.1365-2044.2007.05210.x. PMID: 17635456.
7. Kurdi MS, Shaikh SI, Trekking through a huge goitre with retrosternal extension. MED Inn 2013;2:105-07
8. Reber A, Valenti L, Müller S. A Patient with Graves' Disease Scheduled for Thyroidectomy with High Risk for Thyroid Storm Caused by Severe Medication Nonadherence: Anaesthetic and Surgical Considerations. Case Rep Anesthesiol. 2019 Jul 22;2019:4781902. doi: 10.1155/2019/4781902.
9. Buget MI, Sencan B, Varansu G, Kucukay S. Anaesthetic Management of a Patient with Thyrotoxicosis for Nonthyroid Surgery with Peripheral Nerve Blockade. Case Rep Anesthesiol. 2016;2016:9824762. doi: 10.1155/2016/9824762. Epub 2016 Jan 17. PMID: 26885409; PMCID: PMC4738992.
10. Chao YK, Liu YH, Hsieh MJ, Wu YC, Liu HP, Wang CJ, Ko PJ. Controlling difficult airway by rigid bronchoscope--an old but effective method. Interact Cardiovasc Thorac Surg. 2005 Jun;4(3):175-9. doi: 10.1510/icvts.2004.098038. Epub 2005 Mar 23. PMID: 17670386.
11. Wismans NM, Bouman EAC (2019) Anaesthesia for obstructive symptomatic retrosternal goiter requiring hemithyroidectomy – A case report. Med Case Rep Rev 2. DOI: 10.15761/MCRR.1000133
12. G. A. Dempsey, J. A. Snell, R. Coathup, T. M. Jones, Anaesthesia for massive retrosternal thyroidectomy in a tertiary referral centre, *BJA: British Journal of Anaesthesia,* Volume 111, Issue 4, October 2013, Pages 594–599, https://doi.org/10.1093/bja/aet151