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Case Report

Incidentally detected retrosternal goitre with posterior mediastinal extension causing compression of airway: a case report

Praveen K. Paramasivam[1]*, Raj Mohan[2], P. K. Sahu[1], Chuimei Keishing[3], Mukesh K. Yadav[1], Jeenu Varghese[4]

[1]Department of Ear, Nose, and Throat, [2]Department of Oncosurgery, [3]Department of Cardiothoracic Surgery, [4]Department of Pathology, Command Hospital Airforce, Bangalore, Karnataka, India

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***Correspondence:**
Dr. Praveen K. Paramasivam,
E-mail: praveen19061996@gmail.com

ABSTRACT

Retrosternal goitre (RG) is an enlarged thyroid gland which extends below the clavicle and sternum. Most patients have slow-growing enlargement without any symptoms but may develop symptoms related to compression of aerodigestive tract like dyspnoea, choking, sleep disturbance, dysphagia and hoarseness. Surgical removal is the treatment of choice either through a cervical approach or combination with sternotomy or thoracotomy. Here we present a case of a 51 years female without any symptoms, detected incidentally to have mediastinal mass on imaging during routine health checkup. On evaluation, she was found to have no significant neck swelling or any evidence of vascular obstruction or neurological compression. Contrast enhanced computed tomography showed large heterogeneous mass lesion extending from posteroinferior aspect of (right) thyroid lobe extending into mediastinum till tracheal bifurcation. Due to the mediastinal extension, multispecialty team approach involving oncosurgeon, ear nose and throat (ENT) surgeon and cardiothoracic surgeon was done. The patient underwent (R) hemithyroidectomy with excision of posterior mediastinal component through combined cervical and mediastinal approach under general anaesthesia. Histopathological examination revealed adenomatous goitre. Post operatively patient was symptom free and is on regular follow-up.

Keywords: Retrosternal goitre, Posterior mediastinal extension, Thyroidectomy

INTRODUCTION

Retrosternal goitre (RG) is an enlarged thyroid gland which extends below the clavicle and sternum. There is no single consensus on any one definition but one of the commonly accepted definition is when more than 50% volume of a goitre extends below thoracic inlet.[1] The incidence of retrosternal goitre in patients with thyroid goitre ranges from 5 to 20%.[2] Most of the cases show slow-growing enlargement without any symptoms but may cause symptoms related to compression of the airways and oesophagus like dyspnoea, choking, sleep disturbance, dysphagia and hoarseness. Surgical removal is the treatment of choice with the removal being through a cervical approach or combination with sternotomy or thoracotomy. Here, we report a case where retrosternal goitre with posterior mediastinal extension was safely resected using combined cervical and median sternotomy approach.

CASE REPORT

A 51 years female without any comorbidity was incidentally detected to have mediastinal mass during regular check-up. There was no history of cough, voice change, respiratory distress, difficulty in swallowing or neck swelling.

There were no features of hypo/hyperthyroidism on clinical examination. No significant neck swelling/cervical

lymphadenopathy was detected. There was no obvious scar in neck and no eye signs. Pemberton sign was negative. Vitals were within normal limits.

Thyroid profile was normal (TSH 2.77 uIU/ml, free T4 0.89 ng/dl and total T4 11.7 uIU/ml). Chest X-ray revealed well defined homogeneous density mass lesion on (right) side of trachea extending from CV6 to DV5 vertebral body indenting and displacing trachea to (left) side, widening of (right) paratracheal stripe and superior mediastinal mass which was suggestive of thyroid mass lesion (Figure 1). There was 1.6×2.4 cm thyroid imaging reporting and data system (TI-RADS) III lesion in inferior aspect of (right) lobe of thyroid detected on ultrasonography (USG) neck. USG guided fine needle aspiration cytology (FNAC) from neck revealed colloid goitre. Contrast enhanced computed tomography (CECT) neck and chest showed 57.5×60.7×85.2 mm (AP×TR×CC) well defined smoothly marginated large heterogeneously mass lesion extending from posteroinferior aspect of (right) lobe of thyroid extending caudally into posterior mediastinum till bifurcation of trachea from CV7 to DV4 level (Figure 2a and b). There was compression of trachea leading to luminal narrowing and deviation to (left) at the level of DV1 to DV4.

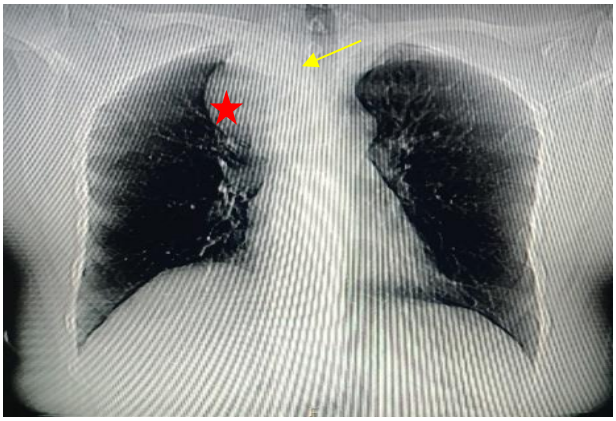

Figure 1: Age group distribution.

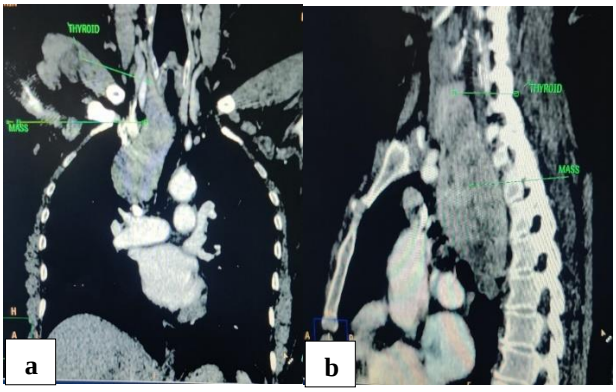

Figure 2: (a) and (b) CECT neck and chest reveals large heterogeneously enhancing mass lesion from posterior inferior aspect of right lobe of thyroid and extending into the mediastinum (marked arrows).

Fibreoptic bronchoscopy revealed indentation of trachea due to the mass indicating compression. Endoscopic ultrasonographic biopsy of the mass revealed thyroid follicles with colloid suggestive of colloid goitre. Pulmonary function tests were normal. Echocardiogram study was normal.

Patient was taken up for excision of retrosternal mass under general anaesthesia. Conventionally through cervical approach, horizontal skin crease incision was given. Thyroid gland was identified after dissection and retraction of strap muscles. Retrosternal mass was seen to be arising from separately from (R) lower pole of thyroid intraoperatively (Figure 3a and b).

There was a globular shaped 8×8 cm large posterior mediastinal component extending into the chest with multiple feeder vessels. (R) upper pole and (L) lobe of thyroid was normal. (R) thyroid lobe was identified and completely mobilized off internal jugular vein, common carotid artery and recurrent laryngeal nerve. Decision then taken for median sternotomy due to large size and posterior mediastinal location. With careful exploration and meticulous dissection, entire thoracic component was delineated and mobilized from surrounding neurovascular bundle of thoracic inlet (vagus nerve, recurrent laryngeal nerve, sympathetic chain, phrenic nerve, brachial plexus, subclavian and brachiocephalic vessels, common carotid arteries, internal jugular veins, thoracic and right lymphatic ducts, trachea and esophagus) and superior vena cava and the whole specimen was delivered through thoracic approach (Figure 4).

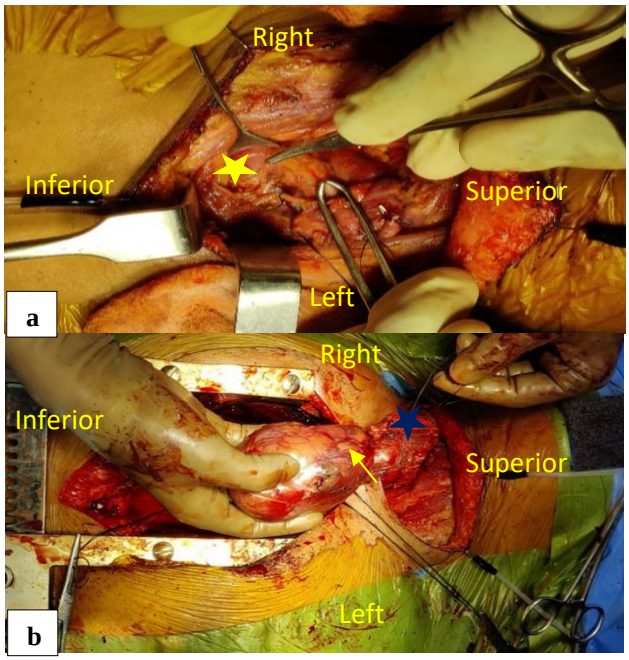

Figure 3: (a) Cervical component of retrosternal goitre (star marked); and (b) cervical (star) and mediastinal (arrow) components of retrosternal goitre.

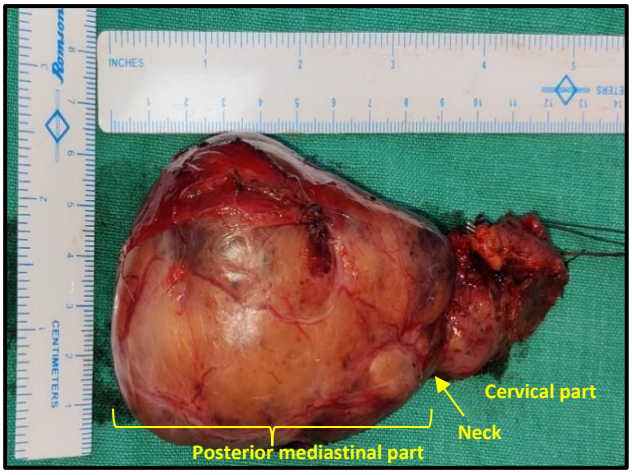

Figure 4: (R) hemithyroidectomy specimen with mediastinal component.

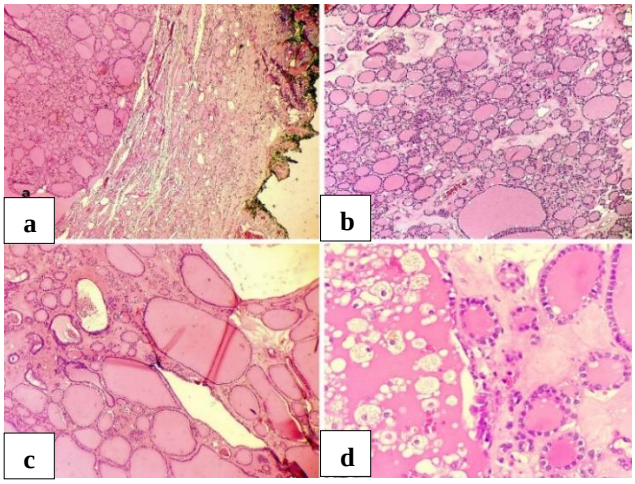

Figure 5: (a) (H&E, 40x) nodule surrounded by fibrous capsule within the thyroid, (b) (H&E, 100x) variably sided colloid filled follicles, (c) (H&E, 200x) thyroid follicles lined by benign cuboidal epithelium, focus shows Sanderson Polster and (d) (H&E, 400x) foamy macrophages within the follicles.

Post operatively patient's vitals were stable. He was managed in intensive care unit (ICU) postoperatively, extubated after 24 hours with uneventful postoperative recovery, normal respiratory function and well preserved (R) recurrent laryngeal nerve. Histopathology examination revealed colloid filled thyroid follicles suggestive of adenomatous goitre.

DISCUSSION

A goitre that extends beyond the thoracic inlet is termed as retrosternal, substernal, intrathoracic, or mediastinal. Exact definition of a retrosternal goitre is lacking leading to variation in incidence. The term RG is commonly denoted when any part of thyroid gland extends below the thoracic inlet with the patient in the surgical position, thyroid gland reaches level of aortic arch, T4 level on chest X-ray or if greater than 50% (or majority) of the gland is residing below the thoracic inlet.[1]

The incidence of retrosternal goitre in patients with thyroid goitre ranges from 5 to 20%.[2] Posterior mediastinal goitres are even rare, comprising of 10% of all retrosternal goitres.[3] RGs have a 1.6 times higher frequency in females than in males with mean age at diagnosis in 6th decade of life.[4]

RGs can be grouped into primary or secondary. Primary intra-thoracic goitres are those arising from ectopic aberrant thyroid tissue in the mediastinum. They depend on mediastinal vessels for blood supply and are not connected to cervical thyroid. Secondary RGs develop from normally located thyroid gland. There is downward migration into mediastinum due to negative intra-thoracic pressure, gravity, traction forces during swallowing and presence of anatomical barriers preventing enlargement in other directions. They are in continuity with cervical portion of the gland and thus depend on branches of the inferior thyroid artery for blood supply.[5]

In most cases they are slow-growing enlargement without any symptoms but may cause symptoms related to compression of the airways and oesophagus like dyspnoea, choking, sleep disturbance, dysphagia and hoarseness. Spontaneous or exertion induced suffocation spells at night are not uncommon. Head and neck movements such as turning head to one side can increase breathing difficulty.[3] A smaller group of patients (2 to 3%) experience acute onset stridor due to incarceration of the mass in thoracic inlet or due to haemorrhage.[6] Acute stridor may be life-threatening in such situation where neither endotracheal intubation nor tracheostomy will have much help.[7]

Approximately 20–40% of RGs are discovered as an incidental finding on imaging modalities like chest X-ray.[4] In our case, patient did not report any symptoms in spite of airway compression being incidentally detected on CT. Therefore, airway occlusion has to be ruled out even in absence of any respiratory difficulty.[8] The lower part of the goitre has to be defined by viewing coronal CT images in correlation with transverse or sagittal CT images in order to look into the mediastinal compartment involvement whether anterior or posterior. This also adds as a measure for comparison with the resected tissue to decrease the risk of leaving any residual goitre in the mediastinum.[9]

The presence of an RG in all but a debilitated patients is an indication for resection. Patients will have benefit from removal of risk of acute stridor, occult malignancies, and from dyspnea and dysphagia if symptomatic.[2] Resection with thyroidectomy through cervical approach is adequate in most of the cases but few cases require mediastinal approach as adjunct. The probability of sternotomy ranges from 0.6 to 9.5% as per literature. Predictive factors include extension to posterior mediastinum, aortic arch, recurrent goitres, an ectopic thyroid, neurovascular

compression, malignancy, and impending airway obstruction.[4,10] In our case, the goitre had extended to posterior mediastinum, was abutting the aortic arch and superior vena cava and had a larger diameter than the thoracic inlet, compressing the airway, so a median sternotomy approach was undertaken which provided adequate exposure with minimal complications. A posterolateral thoracotomy approach can also be used for similar resection. In this type of RG, greater difficulty is faced due to its posterior location, so one has to negotiate through the middle mediastinal structures for access to the goitre. A multispecialty team approach was resorted to, which resulted in meticulous dissection and minimal complications.

Before surgery, terming an RG as malignant or benign is very difficult. Without final histopathological examination it is quite difficult to rule out malignancy. The probability of malignancy in a RG is around 10%, which is similar to that of cervical goitres.[10] In the current case, the histopathological examination revealed adenomatous goitre. Some authors have recommended surgery in asymptomatic patients as these lesions have an increased risk of malignancy.[11]

Although most of the RGs that extend to the mediastinum can be removed via a transcervical approach, it is difficult to do so when diameter of the goiter is more than 10 cm or significantly greater than the thoracic inlet.[12] In the present case, the RG extended to posterior mediastinum abutting the superior vena cava and in close proximity with structures of thoracic inlet with a larger diameter than the thoracic inlet. So, excision of such a large goitre was challenging and various approaches had to be considered and planned preoperatively.

Common post-operative complications of surgery for RGs include pneumonia, atelectasis, pneumothorax, pleural effusion, innominate vein injuries, recurrent laryngeal nerve palsy (RLN) and hypocalcemia. Transient hypocalcemia is one of the common complications ranging from 2 to 28.9% of the surgeries whereas permanent hypocalcemia accounts for 0 to 8.1% of the cases.[4,8,10] The frequency of transient RLN palsy and permanent RLN palsy range from 4.7 to 13.8% and from 0 to 4.7%, respectively.[4,10,13] Permanent RLN palsy is more common on the right side than on the left side due to anatomical location and blind manipulation without visual nerve identification.[10] In our case the patient had uneventful postoperative period.

CONCLUSION

Most of the patients of RG are asymptomatic even in presence of airway compression. Imaging modalities like X ray and CT scan are both useful in incidental diagnosis as well as proper planning for surgical removal of the RG. The main modality of treatment in retrosternal goitre is surgical with multispeciality team approach for meticulous dissection and minimal complications.

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