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## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

## An unusual recurrent bilateral posterior mediastinal goiter after subtotal thyroidectomy: Case report



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### ARTICLE INFO

#### Article history:

Received 23 January 2014

Received in revised form 21 May 2014

Accepted 25 May 2014

Available online 6 June 2014

#### Keywords:

Intrathoracic goiter

Mediastinum

Median sternotomy

### ABSTRACT

**INTRODUCTION:** Surgical treatment of benign thyroid diseases need to be followed up closely, since recurrent thyroid nodules can be seen after subtotal thyroidectomy. Intrathoracic goiter (ITG) occurs in 10–30% of patients following subtotal thyroidectomy. In general these goiters are benign, having a malignant rate of only 2–22%. ITG grows slowly but steadily and in its process of development, it narrows the thoracic inlet by compressing the surrounding structures. Most of these can not located in the anterior mediastinum, others located in posterior retrovascular area. Bilateral posterior retrovascular goiters are very rare.

**PRESENTATION OF CASE:** We report a case involving a 61-year-old woman with history of gradual-onset dyspnea who was referred to us for evaluation of a large mediastinal mass. She had undergone bilateral thyroid lobectomy for a cervical goiter 10 years ago. The mass was removed successfully via median sternotomy without complication. The patient recovered well and was discharged in 1 week.

**DISCUSSION:** Most anterior mediastinal goiters can be resected through a transcervical approach, but if those extending beyond the aortic arch into the posterior mediastinum are better dealt with by sternotomy or lateral thoracotomy.

**CONCLUSION:** Bilateral recurrent posterior mediastinal and retrovascular large goiters are better resected via sternotomy rather than lateral thoracotomy. The reason for that are the possibility of injury to large vascular structures and the difficulty of their management through lateral thoracotomy when cardiopulmonary bypass needed.

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## 1. Introduction

Retrosternal, substernal, intrathoracic or mediastinal are terms that have been used to describe a goiter that extends beyond the thoracic inlet which can cause respiratory distress, dysphagia, vascular compression, and even sudden death. Recurrent nodules after subtotal thyroidectomy may develop in time in patients who had inadequate follow-up. A lot of them are situated in the anterior mediastinal compartment, but according to the literature, 10–15% are located in the posterior mediastinum.<sup>1,2</sup>

The gold standard imaging method in the posterior mediastinal goiter was suggested to be computerized tomography.<sup>3</sup> Although the majority of these goiters are amenable to transcervical thyroidectomy, a minority of patients may require sternotomy or thoracotomy extending into the posterior mediastinum and retrovascular space. However, overall number of complications

associated with this approach is higher than that seen with the transcervical approach.<sup>4</sup> Lateral thoracotomy cannot achieve good exposure for bilateral posterior retrovascular, recurrent goiter and especially their malignant forms. Another advantage of sternotomy is that during any vascular injury surgeon can easily control this problem and if necessary can start cardiopulmonary bypass. In the literature, there are few reports of true bilateral retrovascular recurrent goiter.<sup>5–7</sup> This report describes the use of median sternotomy with a good postoperative result for recurrent bilateral posterior retrovascular mediastinal goiter.

## 2. Case report

A 61-year old postmenopausal woman was referred to our department for mediastinoscopy due to mediastinal mass. Her medical history included a subtotal cervical thyroidectomy 10 years ago. She presented with progressively increasing shortness of breath on exertion and recent fatigue. The patient was euthyroid and a cervical mass was barely palpable above the sternum. Her neck was soft and the trachea was slightly deviated to the

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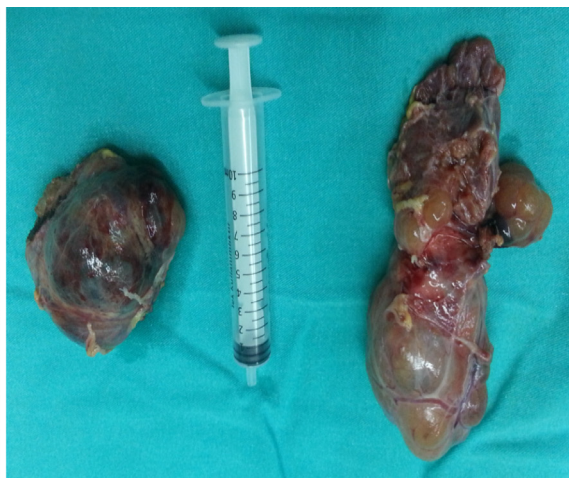
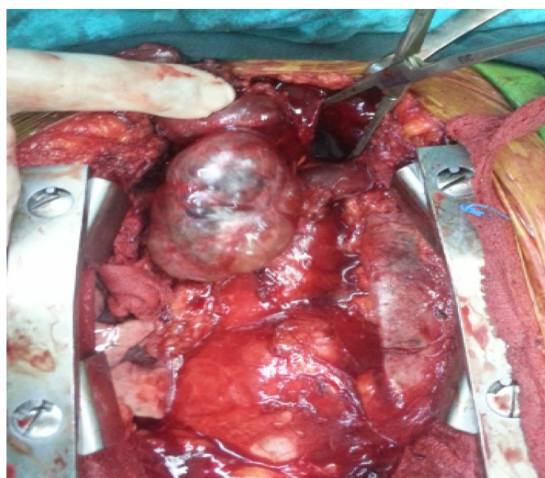
Fig. 1. Enlargement upper and middle mediastinum.

left. A 1 cm × 2 cm enlarged thyroid gland was palpable in the neck, the inferior pole of which was extending into the thorax through the thoracic inlet. Her physical examination and thyroid function tests were normal. A chest X-ray showed enlargement of the upper

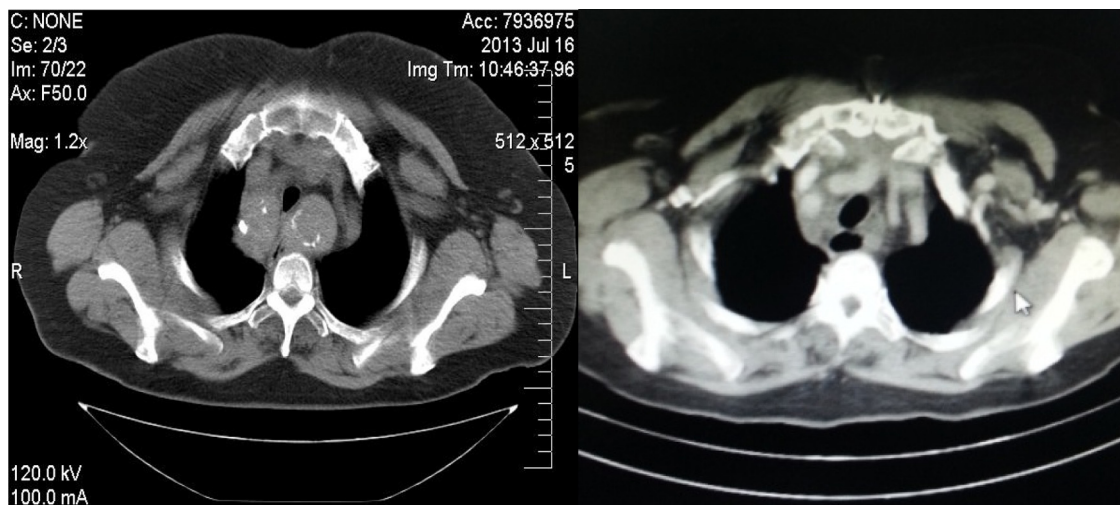
and middle mediastinum, mild tracheal deviation to the right, and possible tracheal stenosis, at the level of the aortic arch (Fig. 1).

Thoracic computed tomography showed a huge mass in the posterior mediastinum which was extending from the neck retrotracheally. Left lobe of the mass was measured 15 mm × 8 mm × 3 mm and right lobe 8 mm × 5 mm × 3 mm. The mass considerably compressed the trachea in the mediastinum and displaced it to the right side. The diagnosis of recurrent intrathoracic goiter was made and operation was scheduled (Figs. 4 and 5).

Incision of chest was made by anteromedian sternotomy. Bilateral brachiocephalic veins and branches of the arch of the aorta were compressed and deviated anteriorly, residual goiter extended to the posterior mediastinum through the thoracic entrance, back of which passed the brachiocephalic artery and the left brachiocephalic vein transversely. On examination, the left side was palpated as a hard capsulated nodule extending into the posterior mediastinum and thoracic vertebra, over the innominate vein, starting from the level right of the left common carotid artery and from the left of trachea. In the right side, an encapsulated right lobe was seen that was starting at the junction of the jugular vein and the innominate vein at the right side of the anterior tracheal wall, extending toward the right of the right carotid communis, and down to the posterior mediastinum and the spine. The lower parathyroid glands and the recurrent laryngeal nerves were



Figs. 2 and 3. Intraoperative view. Dissection of the left lobe and vascular structures and after thyroidectomy (2), bilateral thyroid nodules are seen (3).



Figs. 4 and 5. Comparison of preoperative and postoperative thoracic computed tomographies. Notice the degree of tracheal compression preoperatively (4). Anatomy restored postoperatively (5).

visually identified and protected. Intraoperative monitoring of the laryngeal nerves was not used. The 2 lobes were resected with their capsules, by extracapsular dissection, gentle traction and digital mobilization. The right lobe was enucleated first, followed by enucleation of the second lobe (Figs. 2 and 3).

Bilateral mediastinal pleura were slightly injured during the operation. After the removal of the mass, the trachea and vessels regained their normal positions without tracheomalacia (Fig. 5).

The postoperative course was uneventful, without bleeding, infection, recurrent laryngeal nerve palsy, cardiorespiratory, or wound complications. We did not see any respiratory problems. Pathology report was nodular thyroid goiter. The patient was discharged from the hospital after 11 days with levothyroxin (100 µg daily orally). She resumed normal activity in the follow-up visit 1 month after the surgery

### 3. Discussion

Retrosternal or intrathoracic goiter was first defined by Haller in 1749. The incidence rate of substernal goiter or mediastinum goiter is 1/5000.<sup>1</sup> Depending on the weight, negative intrathoracic pressure and respiration movement, the thyroid gland forms by migrating into the thorax progressively. It is classified as primary and secondary goiter according to the intrathoracic goiter formations. Primer ITG is congenital and characterized by the presence of aberrant thyroid tissue in the mediastinum. ITG forms in 1% of the cases. Anatomically, the thyroid gland and its vascular structures are not located in the cervical region. A majority of the ITG cases develop from secondary goiters and occur when the thyroid tissue extends into to the cervical and mediastinum.<sup>2,3</sup>

While it is known that intrathoracic goiters are mostly localized at the anterior of the innominate artery and vein at the anterior mediastinum, it was reported that they can also be located in the posterior mediastinum retroracheally in 10–15% of cases.<sup>1,3</sup> A few bilateral posterior recurrent goiters were also reported in the English literature.<sup>5–7</sup>

Huge posterior mediastinal intrathoracic goiters usually compress important intrathoracic organs, which may impose high surgical risk with a technically demanding difficult surgery and thus greater associated chances of injury to native structures.<sup>8</sup> Thoracic imaging should be performed to exclude or confirm the presence of a thoracic goiter and evaluate the degree of compression.<sup>8,9</sup>

Currently there is no consensus about the extent of thyroidectomy in the treatment of thyroid disease and controversies continue to exist for both benign nodular disease and thyroid cancer.<sup>10</sup> The adequacy of surgical treatment is based on the risk of recurrence, postoperative morbidity, necessity and use of hormone replacement and/or survival factors in cancer. In recent studies<sup>10,11</sup> keeping in mind the recurrence risk, 'near-total thyroidectomy' is recommended as the least satisfactory approach for the treatment of both toxic and euthyroid multinodular goiter.

Most retrosternal goiters can be resected through transcervical approach, but those extending beyond the aortic arch into the posterior mediastinum are better dealt with by sternotomy or lateral thoracotomy.<sup>9</sup> Extraction of a posterior mediastinal goiter or a retrovascular goiter may prove difficult, requiring a combined cervical–thoracic or cervical–sternotomy approach.<sup>12</sup> Apart from primary intrathoracic and posterior mediastinal goiters, malignant goiters, recurrent goiters and the presence of an aberrant adenoma situated in the mediastinum often require median sternotomy for safe removal.<sup>13</sup>

De Perrot et al.<sup>14</sup> reported sternotomy in 13 out of 185 patients (7%) mainly due to recurrent goiter, ectopic goiter, or invasive carcinoma (incidences 0.1%, 0.001%, <0.001%, respectively), concluding that sternotomy should be reserved for patients having these risk factors (in our case, we preferred sternotomy because it is recurrent and bilateral). Thus, sternotomy was performed to obtain full exposure and the tumor was dissected under direct vision.<sup>14</sup>

Our case was euthyroid and she did not have a palpable thyroid nodule. However, her positive history for thyroidectomy and the well-limited smooth mass that was found in the imaging it was considered recurrent intrathoracic goiter. Early surgery should be done to avoid complications such as compression and tracheomalacia.<sup>15</sup>

### 4. Conclusion

We suggest that sternotomy is a better approach than lateral thoracotomy especially in bilateral posterior recurrent goiter, because of better control of vascular system and in case that a cardiopulmonary bypass needed, which is can be life saving. We think that one should avoid performing subtotal thyroidectomy instead of doing more radical intervention just because of the risk of recurrence and/or hypocalcaemia. There are few difficulties in sternotomy approach though, such as, in case that the patient had prior coronary artery bypass, aorto–carotid bypass, and other cardiac operations. Sternotomy is the best approach if those conditions are not present.

### Conflict of interest

None.

### Funding

None.

### Ethical approval

Consent was obtained from the patient for publication.

### Author contributions

All authors contributed equally to this manuscript.

### Key learning points

1. Inadequate reporting can lead to biased results.
2. Reports of health research need to be clear, complete, and transparent.
3. Good reporting is an essential component of doing good research.
4. Clear, complete, and transparent reports of health research empower readers.
5. The quality of reporting of health research reports is not optimal.
6. Poor reporting means that key information is missing, incomplete or ambiguous.

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