Thyroidectomy for substernal goiter via a mediastinoscopic approach

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Abstract
We report an unusual case in which a patient presented with a large posterior mediastinal goiter that extended to the level of the aorta. The goiter was resected through a standard Kocher neck incision with mediastinoscopic assistance. The large goiter was completely excised without the need for a sternotomy.

Introduction
Mediastinal goiters either originate in ectopic thyroid tissue in the mediastinal compartment or they descend from thyroid tissue located in the neck. Regardless of origin, the excision of a mediastinal goiter may require a sternotomy for surgical access. In other cases, mediastinal goiters can be resected via a mediastinoscopic approach without the need for a sternotomy. We report the unusual case of a patient who presented with a large posterior mediastinal goiter that extended to the level of the aorta. The goiter was resected with mediastinoscopic assistance and without the need for a sternotomy.

Case report
A retrosternal mass was discovered incidentally on the chest x-ray of a 56-year-old man at another institution. At that time, the patient had denied any dysphagia, breathing problems, or symptoms of hyper- or hypothyroidism. He was treated with a right thyroid lobectomy and sternotomy at a community hospital. Frozen-section analysis revealed that the resected mass was consistent with a multinodular goiter. During this initial resection, the goiter was located in the right paratracheal area with extension into the right atrial area. The right thyroid lobe and the retrosternal mass extended down to the level of the innominate artery. A thyroid nodule had been noted in the left lobe, and it was biopsied. Pathologic review of the left thyroid lobe nodule identified it as a papillary thyroid carcinoma.

Postoperative computed tomography (CT) of the chest revealed a large residual goiter in the right posterior mediastinum, as well as a residual left thyroid lobe (figure 1). The posterior mediastinal goiter was adjacent to the trachea, and it extended into the thoracic spine and inferiorly to the level of the aorta.

The patient was referred to our institution for further treatment. He underwent resection of the left thyroid lobe and the mediastinal mass. A low collar incision was made along the previous thyroidectomy scar. Routine dissection and resection were carried out on the left thyroid lobe. After the left thyroid lobe was removed completely, dissection on the previously operated right side showed extension of the right thyroid into the posterior mediastinum. The large goiter was palpable in the superior and posterior mediastinum. Further dissection was carried out in the posterior mediastinum with the aid of a Storz mediastinoscope, and a large mass was appreciated on the right side of the esophagus and trachea. The mass was dissected freely down to the innominate artery and into the posterior mediastinum where the medial attachments were divided. Blunt dissection was carried out with the mediastinoscope and a Yankauer suction. Bleeding was minimal, as hemostasis was achieved with bipolar cautery; care was taken to avoid cautery in the region of the recurrent laryngeal nerve. One large mass was mobilized and then the other, and they were brought out attached in a dumbbell fashion. The masses were then removed along with the remaining portion of the right thyroid lobe as one complete specimen (figure 2).

The patient tolerated the procedure well. He expressed no complaints, and he experienced no postoperative respiratory distress, vocal fold dysfunction, or hypocalcemia. He was discharged home on postoperative day 3. The final pathologic diagnosis was a multinodular goiter without evidence of papillary carcinoma.

Discussion
Goiters represent an abnormal enlargement of the thyroid gland. They manifest as ectopic thyroid tissue that can
be found in various locations in the body. For a goiter to be considered mediastinal, at least half of it must be substernally located.\footnote{Katlic MR, Wang CA, Grillo HC. Substernal goiter. Ann Thorac Surg 1985;39:391-9.}


Secondary mediastinal goiters stem from the downward extension of cervical thyroid tissue that migrates along the fascial planes in the neck. These goiters receive their blood supply from the normal thyroid vasculature. The impetus for the migration along the fascial planes is the negative mediastinal pressure generated by breathing and swallowing.\footnote{Katlic MR, Wang CA, Grillo HC. Substernal goiter. Ann Thorac Surg 1985;39:391-9.}

Although mediastinal goiters can be excised through a Kocher transverse collar incision, a median sternotomy incision is recommended for recurrent goiters because of the development of collateral mediastinal vessels.\footnote{Mansberger AR Jr., Wei JP. Surgical embryology and anatomy of the thyroid and parathyroid glands. Surg Clin North Am 1993;73:727-46.} However, a collar incision was adequate for our patient because of the superior visualization for dissection provided by the mediastinoscope. A collaboration of the otolaryngology and thoracic teams enabled a thorough dissection of the thyroid in the neck and allowed for tracking of the goiter into the superior and posterior mediastinum. Owing to our use of the mediastinoscopic approach, the patient was able to avoid the morbidity and prolonged hospitalization associated with a sternotomy.

In conclusion, resection of mediastinal goiters often requires a sternotomy for surgical access. However, each patient should be evaluated prior to surgery to determine if mediastinoscopic assistance can obviate the need for a sternotomy. This case demonstrates that a thyroid goiter in the chest cavity may be successfully removed via a neck incision and mediastinoscopic assistance. A median sternotomy is not always necessary, particularly for a goiter in the posterior mediastinum.

References