Resection of an Ectopic Parathyroid Adenoma via Video-Assisted Mediastinoscopy

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INTRODUCTION

In this report, we describe a patient with a parathyroid adenoma situated deep in the mediastinum between the left mainstem bronchus and arch of the aorta. We created a 3-dimensional (3D) rendering of computed tomography (CT) data to guide our surgical approach to parathyroidectomy using video-assisted mediastinoscopy (VAM).

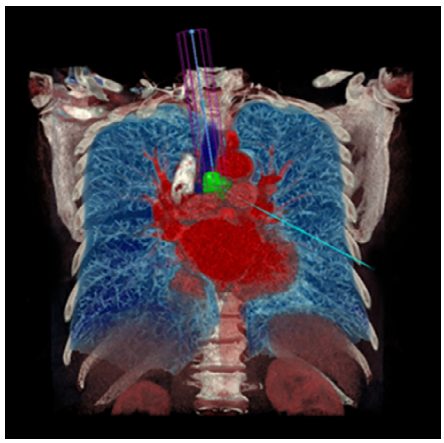
CASE PRESENTATION

A 54-year-old female with no previous medical or surgical history presented with subjective complaints of chest pressure, muscle and joint aches, and fatigue. She was found to have hypercalcemia (11.8 mg/dL) and elevated parathyroid hormone (202 pg/dL) consistent with primary hyperparathyroidism. The patient had normal renal function, normal thyroid function, no evidence of osteoporosis by bone densitometry, and no history or symptoms suggestive of multiple endocrine neoplasia syndrome.

Cervical ultrasonography revealed a normal thyroid gland without nodules or enlarged parathyroid glands. A technetium-99m pertechnetate methoxy-isobutyl-isonitrile (sestamibi) scan was performed revealing a mediastinal soft tissue density with intense uptake suspicious for an ectopic parathyroid adenoma. A 4D chest CT confirmed a 3-cm lesion deep within the mediastinum just superior to the left mainstem bronchus, below the arch of the aorta (Fig. 1). A PET/CT revealed that the mass was FDG-avid. A 3D rendering of the mass was created by Surgical Theater, suggesting the anatomy of the mass and its relationship to surrounding structures was safely accessible via mediastinoscopy (Fig. 2).

With the patient supine, with slight hyperextension of the neck, a transverse cervical incision was made 1 fingerbreadth above the sternal notch. Dissection was carried down through the pretracheal tissue with insertion of a mediastinoscope. Under video-assisted guidance, blunt dissection to the level of the carina was performed using an aspiration cannula with bipolar energy applied at its tip. A circumscribed mass was identified in the left tracheobronchial angle. The mass was mobilized from the surrounding tissue with circumferential dissection and extracted in its entirety using mediastinoscopy grasping forceps. Station 4L lymph nodes were resected to the level of the aorta. Intraoperative intact parathyroid hormone levels were drawn before and after resection of the mass, demonstrating a drop from 227 pg/dL to 30 pg/dL, indicating successful resection of the ectopic parathyroid adenoma. There were no intraoperative complications.

The patient was discharged uneventfully the same day of the procedure and provided with empiric calcium supplementation. Histopathologic examination confirmed a 2.5-cm parathyroid adenoma. Three reactive paratracheal level 4 lymph nodes were also reported. On follow-up 1 week after surgery, the patient's symptoms had abated and biochemical analysis demonstrated normocalcemia (9.3 mg/dL).



Surgical Theater rendering of the chest (ectopic parathyroid adenoma in green).

Central Message

Ectopic parathyroid adenomas can be resected via cervical mediastinoscopy, even when deep in the mediastinum. Preoperative imaging provides a valuable guide for focused surgical resection.

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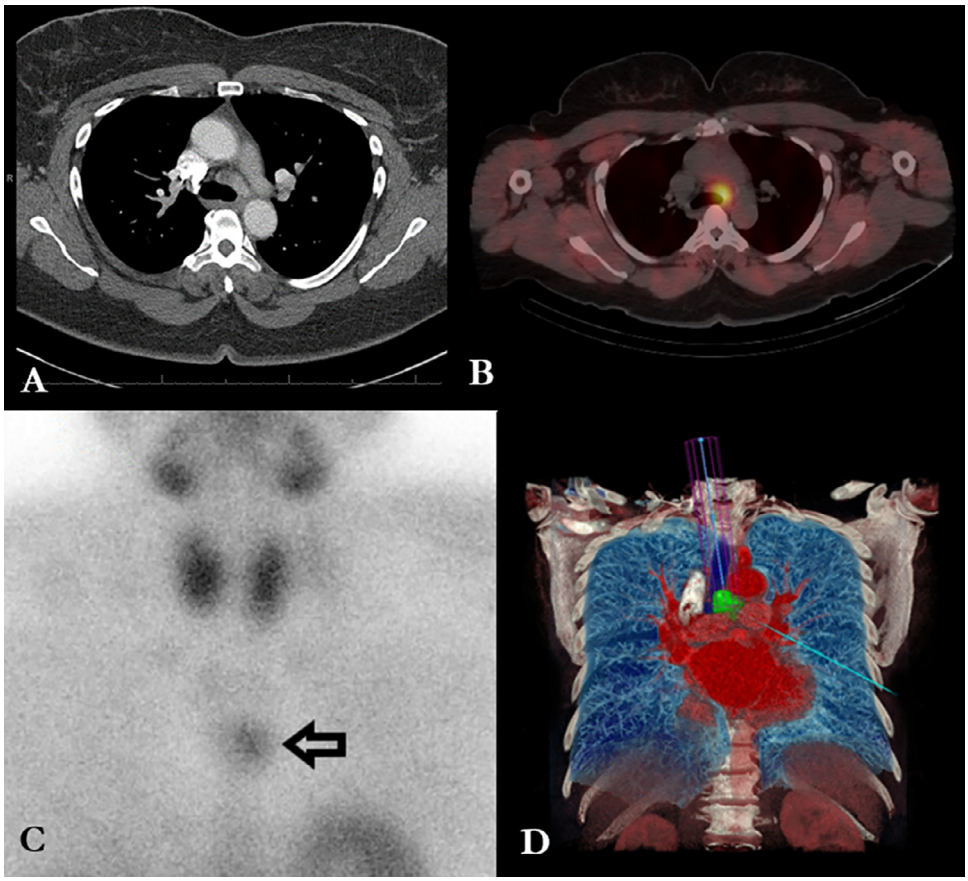


Figure 1. (A) Axial CT of the chest, heterogeneously enhancing left paratracheal mass, superior to the left main stem bronchus; (B) axial PET/CT, FDG-avid paratracheal mass; (C) parathyroid scan, intense uptake in the mediastinum (arrow); (D) Surgical Theater, coronal rendering of the chest (lesion is green lesion, between the arch of the aorta and left main pulmonary artery). (Color version of figure is available online at http://www.semthorcardiovascsurg.com.)

Figure 2. Mediastinoscopy specimen, left paratracheal mass with adjacent paratracheal fat (right aspect).

DISCUSSION

Primary hyperparathyroidism is an endocrine disorder characterized by over secretion of parathyroid hormone, resulting in hypercalcemia and hypophosphatemia. The pathoetiology is most commonly due to a parathyroid adenoma (80–85%). A minority of parathyroid adenomas are ectopic (6–16%), located in the thymus (38%), the retro/paraesophageal space (31%), thyroid (18%), mediastinum (6%), or the carotid sheath (3%). Their abnormal anatomic location is attributed to colocalization with tissues that share a similar embryologic development.

Parathyroidectomy offers a high cure rate for primary hyperparathyroidism, provided all hyperfunctioning tissue is removed. Ectopic lesions located in the superior mediastinum are commonly accessed via a low cervical incision, whereas resection of deep mediastinal lesions may require manubriotomy, sternotomy, or transthoracic exposure via robotic- or video-assisted thoracic surgery. Avoiding the morbidity of open techniques, minimally invasive approaches are becoming

more commonly utilized for resection of ectopic adenomas deep in the mediastinum or with complex associated anatomy. The use of VAM has been described in select cases where ectopic adenomas reside in the cervical region and upper mediastinum.[1–5]

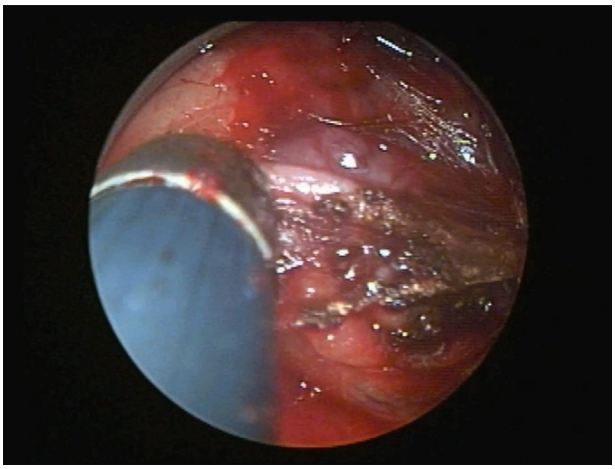
In this case, we utilized VAM to resect an ectopic parathyroid adenoma situated at the left tracheobronchial angle, adjacent the aorta, in the lower mediastinum. Preoperative imaging, including 3D rendering of the lesion and regional anatomy, was imperative to conceptualize the path of dissection and to avoid potential injury to surrounding structures. If the lesion were not successfully resected via VAM, our plan was to approach the lesion from the right chest with robotic assistance.

CONCLUSION

There are a limited number of cases described in the literature where VAM has been performed for the resection of ectopic parathyroid adenomas in the anterior mediastinum. Our experience confirms that this method is safe, effective, and efficient and should be considered as a viable option for the excision of substernal lesions, even for those deep in the mediastinum.

SUPPLEMENTARY MATERIAL

The following is the supplementary data to this article:



Video 1. Resection of an ectopic parathyroid adenoma via video-assisted mediastinoscopy.

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