

A 44-Year-Old Male with Repeat Cervical Neck Exploration for 1° Hyperparathyroidism and Imaging Suspicious for Intrathyroidal Parathyroid

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ABSTRACT

A 44-year-old male with primary hyperparathyroidism underwent a negative cervical neck exploration. The subsequent workup including imaging and management suggested an intrathyroid mass suspicious for a parathyroid adenoma. A thyroid lobectomy was performed with the pathologic evaluation demonstrating an intrathyroidal parathyroid adenoma. The patient had resolution of his persistent primary hyperparathyroidism.

Keywords: Thyroidectomy, Thyroid surgery, Parathyroidectomy, Parathyroid, Parathyroids.

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INTRODUCTION

A 44-year-old male with hypercalcemia and elevated parathyroid hormone (PTH) levels underwent an unsuccessful neck exploration for primary hyperparathyroidism (1° HPT). Ultrasonography had visualized a suspicious 6 mm nodule in the left thyroid lobe; the sestamibi scan showed no evidence of a parathyroid adenoma. The surgeon removed a normal-sized left superior parathyroid gland and several left-sided lymph nodes. The left inferior parathyroid gland was not visualized. The left recurrent laryngeal nerve was identified and protected.

The patient was referred to our institution with persistent fatigue, mild irritability, polydipsia, polyuria, nephrolithiasis, and a serum calcium level consistently over 11.5 mg/dl (reference range, 8.9-10.1 mg/dl). His PTH level was elevated at 97 pg/ml (reference range, 15-65 pg/ml). A 24 hours urine analysis for calcium was elevated at 435 mg/24 hours. His serum 25-hydroxyvitamin D was 42 ng/ml (reference range, 30-80 ng/ml). Bone mineral density testing of the spine and hip showed diffuse osteopenia with T-scores below -2.5. Our sestamibi scan (Fig. 1) was suspicious for a left intrathyroidal parathyroid adenoma. A repeat ultrasound exam, showed a 6 × 7 × 9 mm

hypoechoic nodule inferiorly placed within the left thyroid lobe (Fig. 2). Given the suspicious imaging findings, his symptomatic hypercalcemia and abnormal laboratory findings, an ultrasound guided FNA was not utilized (for PTH estimation) for the intra-thyroidal lesion.

The patient met the criteria for parathyroidectomy according to National Institutes of Health (NIH) criteria (Table 1)¹ and desired a repeat exploration and excision of his parathyroid abnormality. He consented to cervical re-exploration and was informed that a left thyroid lobectomy might be required.

MANAGEMENT

Intraoperatively, dense scar tissue was encountered after the platysma was divided. The left lobe of the thyroid was mobilized anteriorly and medially and a search for the left inferior parathyroid was undertaken. The left inferior parathyroid gland was not visualized, and the left thyroid lobe was resected being careful to protect the recurrent laryngeal nerve. The right side of the neck was not explored.

Intraoperative serum PTH monitoring showed a baseline of 81.7 pg/ml. Following resection of the left thyroid lobe the value was 12.3 pg/ml at 10 minutes and 12.3 pg/ml at 15 minutes.

Immediate frozen section histology analysis of the left-sided thyroid lobe and isthmus (Fig. 3) showed an intrathyroidal hypercellular parathyroid gland. It measured 1.2 × 1.0 × 0.5 cm consistent with a parathyroid adenoma. The adjacent thyroid parenchyma was unremarkable (Fig. 3). At 1 month follow-up the serum calcium was normal (9.3 mg/dl).

DISCUSSION

The incidence of true intrathyroidal parathyroid adenoma (ITPTA) is only 0.7% of 10,000 cases of primary hyperparathyroidism.² The exact mechanism for the development of this entity remains to be completely understood, but it has been postulated that the primordium of the parathyroid gland may become trapped within the thyroid tissue, as the lateral and medial lobes fuse during embryological development.³ When intrathyroidal,

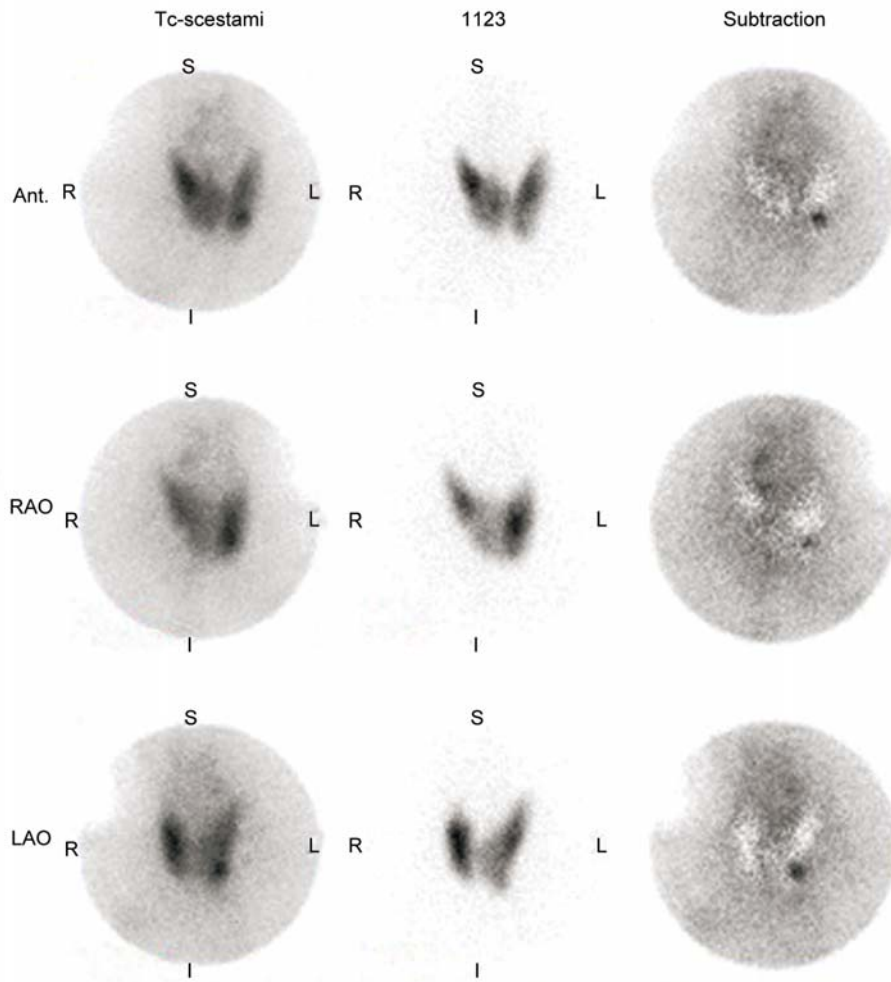


Fig. 1: The pinhole subtraction images show a focus of mismatch sestamibi at or within the lower pole of the left lobe of the thyroid. Ant. indicates anterior; LAO, left anterior oblique; RAO, right anterior oblique

adenomas typically lie in the lower lateral quadrant of the thyroid.² While the intrathyroid position of ectopic parathyroid glands makes surgical intervention extremely challenging for this location, fortuitously the most common locations of ectopic parathyroid adenomas are easier to find: superior glands lie within the tracheoesophageal groove and less commonly the retroesophageal space; ectopic inferior parathyroid glands usually reside within the thymic remnant or may descend into the mediastinum (Fig. 4).⁴ If skilled parathyroid surgeons have exhausted all locations for a missing parathyroid gland in the setting of primary hyperparathyroidism, performing a unilateral thyroid lobectomy on the side of the missing parathyroid gland is appropriate.

Our case demonstrates that after a thorough preoperative evaluation, which suggested the presence of intrathyroidal parathyroid adenoma in the setting of 1° HPT, a thyroid lobectomy has a good chance of offering cure. The use of intraoperative PTH measurement does aid in confirming operative success or ruling out the presence of a missed adenoma or four gland hyperplasia. In the setting of

reoperative surgery, surgeons must remain especially vigilant to careful preservation of the recurrent laryngeal nerve and recognition of the more common locations of ectopic parathyroid adenomas (Fig. 4).⁴

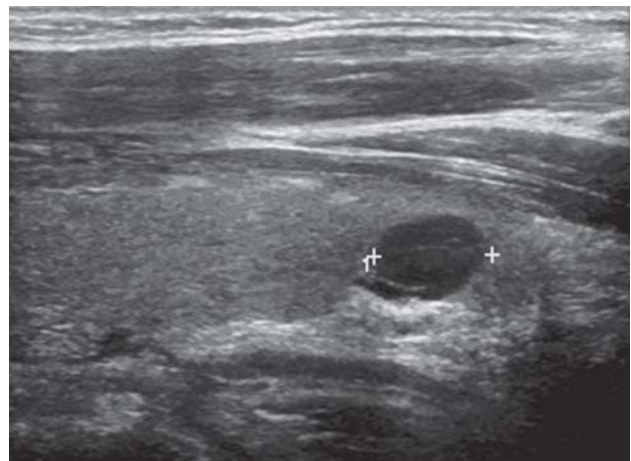
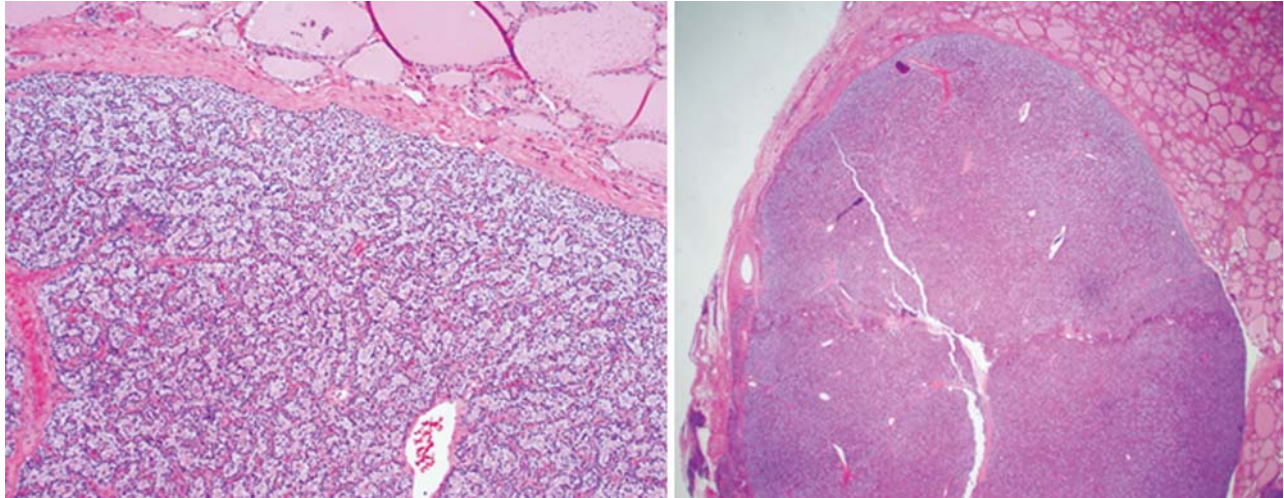
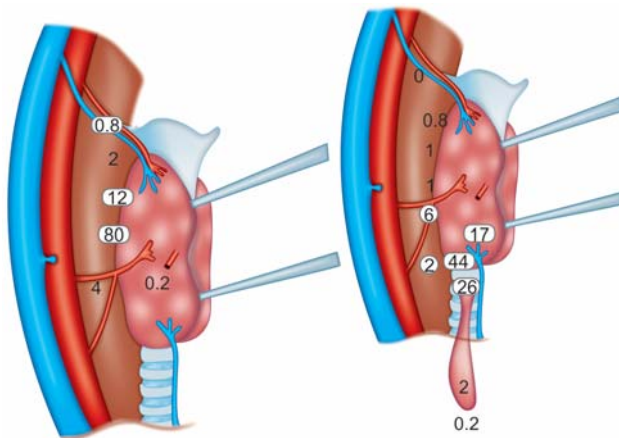


Fig. 2: Ultrasound shows 6 × 7 × 9 mm hypoechoic nodule in the left lobe of the thyroid

Table 1: The NIH criteria for parathyroidectomy¹

Measurements	Guidelines for surgery
Serum calcium level	1.0 mg/dl above normal
24 hours urinary calcium	Currently not indicated (however, some experts use a calcium excretion >400 mg/24 hours)
Kidney function	Less than 60 ml/min
Bone mineral density	Osteoporosis (T-score less than -2.5 at any site) or previous fracture
Age	Age <50

**Fig. 3:** Histology demonstrating an intrathyroidal hypercellular parathyroid gland under high 60× (left) and low power 20× (right)**Fig. 4:** Location of ectopic upper and lower parathyroid glands in percent. Reused with permission⁴

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