

A giant parathyroid adenoma mimicking a thyroid swelling: A case report

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ABSTRACT

Giant parathyroid adenomas are uncommon. Its clinical management is challenging. Our study's goal is to share our experience with pre-operative localization of parathyroid adenomas while emphasizing the importance of intraoperative parathyroid hormone (IOPTH) assays in such situations. Here, we present the case of a 46-year-old woman who was diagnosed with parathyroid adenoma. The clinical aspects, pre-operative management, and surgical procedure have all been examined. Parathyroid hormone levels were reduced by 90% following surgical removal of the tumor and an IOPTH assay. IOPTH significantly improves surgical success rates in patients with only one positive imaging test result and adds significant value to surgical decision-making.

Key words: Giant parathyroid adenoma, Hypercalcemia, Intraoperative parathyroid hormone assay, Parathyroid adenoma, Thyroid swelling

Primary hyperparathyroidism (PHPT) is a common cause of hypercalcemia with a prevalence of one to seven cases per 1000 persons [1,2]. Women are two to three times as likely to be affected. It is usually caused by a solitary parathyroid adenoma (80–85%) or four-gland hyperplasia (10–15%), double adenomas, or carcinoma (4%) [3]. The weight of a normal parathyroid gland is approximately 50–70 mg [4]. Majority of parathyroid adenomas (PA) are <1 g, with a few measuring more than three grams [5]. PHPT is commonly found in asymptomatic patients after routine calcium tests. Generalized bone disease, kidney stones, and nephrocalcinosis, along with gastrointestinal, cardiovascular, neuromuscular, and neuropsychiatric symptoms, are common PHPT symptoms [4].

Here, we report a case with the aim of outlining the rarity of these giant parathyroid adenomas (GPA) and highlighting the importance of intraoperative parathyroid hormone (IOPTH) assay during surgery.

CASE REPORT

A 46-year-old woman complaints of chronic pain in the abdomen and back for the past 2 years. This was also associated with continuous bone pain and intermittent muscle cramps. There were no aggravating or relieving factors. This was associated with bilateral hip discomfort which worsened when walking. Anorexia, weight loss, generalized weakness, and constipation


were also present. She had no symptoms of thyroid dysfunction. She had undergone ureteroscopy and laser stone fragmentation for renal stones and open cholecystectomy for symptomatic gall stones 10 years ago.

On examination, the patient was thin built with normal vital signs. The neck examination revealed a solitary, firm nodule of 3 × 3 cm², in the thyroid region; 3 cm to the right of the midline. All borders were well-defined and the nodule moved with deglutition. There was no cervical lymphadenopathy. A healed right subcostal scar was noted on abdominal examination. Proximal myopathy and tenderness was present at the anterior joint line of the right hip. Painful and limited right hip range of motion was present. The left hip was normal. Examination of other systems was normal. The patient was admitted with a clinical diagnosis of the right thyroid nodule.

Anemia, thrombocytopenia, hypokalemia, hypercalcemia, and hypophosphatemia were found in her laboratory results, along with hypercalciuria and hyperphosphaturia. Repeat serum calcium showed persistent elevation. Her thyroid and renal function tests came back normal.

A well-defined lesion in the right lobe of the thyroid was seen on neck sonography (measuring 23 × 30 × 16 mm³)-TIRADS IV. Computed tomography neck showed the right inferior parathyroid tumor with normal adjacent thyroid (Fig. 1). Chronic calcific pancreatitis with bilateral nephrocalcinosis, right-sided hydronephrosis, and obstruction of the pelviureteric junction (PUJ) were found on sonography of the abdomen and pelvis.

After admission to the hospital, packed cells transfusion was given to correct anemia. In view of persistently elevated serum

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Figure 1: Computed tomography neck showing the right inferior parathyroid tumor

calcium (14.5 mg/dl) and a history of recurrent renal stones and calcific pancreatitis, a diagnosis of PHPT was considered. Serum parathyroid hormone (PTH) (2,600 pg) and serum alkaline phosphatase (1129U/L) levels were elevated.

Bilateral hip X-rays showed suspicious lytic lesions at both femoral neck. The X-ray of the skull showed a salt and pepper appearance along with subperiosteal resorption. Subperiosteal bone resorption was seen on a hand X-ray. The patient was diagnosed with PHPT due to parathyroid tumour. Sestamibi scan confirmed the presence of a right inferior parathyroid adenoma and surgical treatment was planned (Fig. 2).

During neck exploration, a solid, mobile parathyroid tumor measuring $3 \times 3 \text{ cm}^2$ was discovered adhering to the lower pole of the right thyroid lobe. Right superior, left superior and inferior parathyroid and the left lobe of thyroid were normal. There was no lymphadenopathy. Right hemithyroidectomy with *en bloc* removal of the adherent parathyroid tumor was done. IOPTH level before the incision was 3091.6pg/ml. 10 min after tumor excision, it was 202.8 pg/ml and PTH level on post-operative day 2 was 19.3 pg/ml. Serum calcium levels were monitored regularly and a decreasing trend was noticed. The patient was started on calcium supplements. Hypocalcemia noted on post-operative day 9 was corrected by IV calcium infusion and oral calcium supplements.

Histopathological examination showed a well-encapsulated lesion arising from the right inferior parathyroid gland measuring $3 \times 1.6 \times 0.5 \text{ cm}^3$ weighing more than 3 g. Features were suggestive of parathyroid adenoma (chief cell type) with no capsular and vascular invasion. In view of her PUJ obstruction, a ureteroscopy with DJ stenting was done.

For persistent pain and impending fracture of the right hip, prophylactic right femoral nailing 10 days later. The patient recovered and was able to walk with support. At the time of discharge, the serum calcium levels were normal. During follow-up period of 6 months, the patient has remained symptom-free.

DISCUSSION

Our patient exhibited a solitary enlargement in the right thyroid lobe region with PHPT-like clinical characteristics. Initially in view of the location, a solitary thyroid nodule was considered. As work-up progressed, it became clear that it was a parathyroid adenoma.

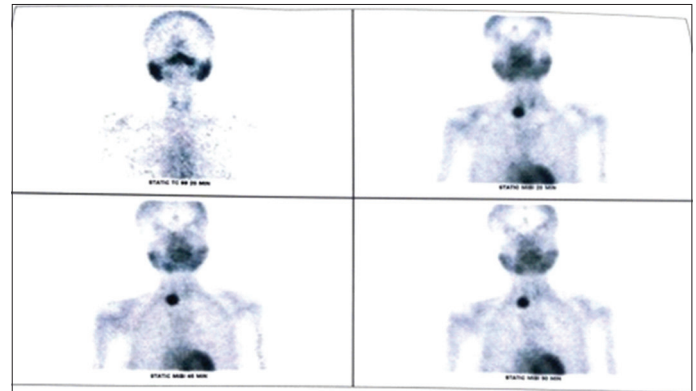


Figure 2: Sestamibi scan showed the presence of a right inferior parathyroid adenoma

PHPT is caused by PA in 85% of cases and parathyroid carcinomas in fewer than 1% of cases [6]. The PA is usually $<2 \text{ cm}$ and weighs $<1 \text{ g}$, and it causes mild PHPT [5]. GPAs $>3 \text{ g}$ are linked to extremely high levels of PTH and calcium [5]. Our patient had severe PHPT associated with a large PA weighing greater than 3 g.

Surgery is the treatment of choice for parathyroid adenoma [1-5]. A 50% decline from the highest IOPTH level at 10 min after gland removal and a final IOPTH level within the reference range had a high operational success rate in a retrospective research comprising 352 consecutive patients [7].

Another retrospective analysis of 1882 individuals undergoing parathyroidectomy for PHPT with IOPTH monitoring revealed that a 50% drop at 10 min was 96% sensitive and 94% accurate [8]. This success has led surgeons to practice parathyroidectomy with IOPTH monitoring [7,8]. Intraoperative PTH assay accurately predicts post-operative success in patients with PHPT [8].

There is ongoing discussion on the ideal surgical technique for parathyroidectomy and the appropriateness of routine IOPTH monitoring. When compared to benign disease, the IOPTH assay for malignant parathyroid disease exhibits a greater baseline value and a sharper decline [9]. IOPTH monitoring can support the need for a minimally invasive approach.

CONCLUSION

Our patient had a giant parathyroid adenoma with classic features of PHPT and high calcium and PTH levels. Surgical removal of the tumor and IOPTH assay showed a 90% drop in PTH levels. This technique helps to find the diseased gland earlier, preventing unnecessary neck exploration and dissection. Further our patient also shows decline in serum calcium levels post-operatively which required correction showing the relationship between PTH and serum calcium.

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