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Giant Parathyroid Adenoma Causing Severe Primary Hyperparathyroidism: A Case Report

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1. Abstract

1.1. Background

Primary hyperparathyroidism (PHPT) is the most common cause of hypercalcemia in the outpatient setting, predominantly due to parathyroid adenomas. While typical adenomas are small, giant parathyroid adenomas are exceedingly rare and can mimic malignancy due to their size and biochemical profile.

1.2. Case Presentation

We report a case of a 52-year-old woman presenting with chronic body aches, dizziness, and leg cramps. Laboratory investigations revealed severe hypercalcemia (14.1 mg/dL) and elevated parathyroid hormone (PTH) levels (3,654 pg/mL). Imaging via neck ultrasound and MIBI scan localized a large left inferior parathyroid adenoma. Fine needle aspiration cytology (FNAC) ruled out malignancy despite suspicious cervical lymph nodes. The patient underwent a successful left inferior parathyroidectomy, removing a 6 x 3.5 x 1.7 cm, 19.6 g adenoma. Postoperatively, PTH levels dropped significantly, and calcium levels normalized.

1.3. Conclusion

Giant parathyroid adenomas are rare and can present diagnostic challenges due to their resemblance to malignancy. Comprehensive imaging, cytology, and intraoperative PTH monitoring are essential for accurate diagnosis and successful surgical outcomes.

2. Introduction

Primary hyperparathyroidism (PHPT) is characterized by excessive secretion of parathyroid hormone (PTH), leading to hypercalcemia. Parathyroid adenomas are responsible for approximately 80% of PHPT cases. These typically measure 0.5–1.0 cm and weigh around 70 mg. However, giant parathyroid adenomas, defined as those exceeding 3 cm or 1 g, are rare and can lead to severe biochemical abnormalities, complicating the clinical picture. This report discusses a rare case of a giant parathyroid adenoma in a 52-year-old woman with severe PHPT [1-3].

3. Case Report

3.1. Initial Presentation

A 52-year-old woman presented to the clinic with chronic body aches, particularly in the knees and neck, dizziness, and recent onset of left leg cramps. Initial evaluation by an orthopedic specialist was inconclusive, and supportive treatment failed to alleviate symptoms. Subsequent endocrinological assessment revealed hypercalcemia (14.1 mg/dL) and elevated PTH levels (544 pg/mL), confirming PHPT. Financial constraints delayed further investigations.

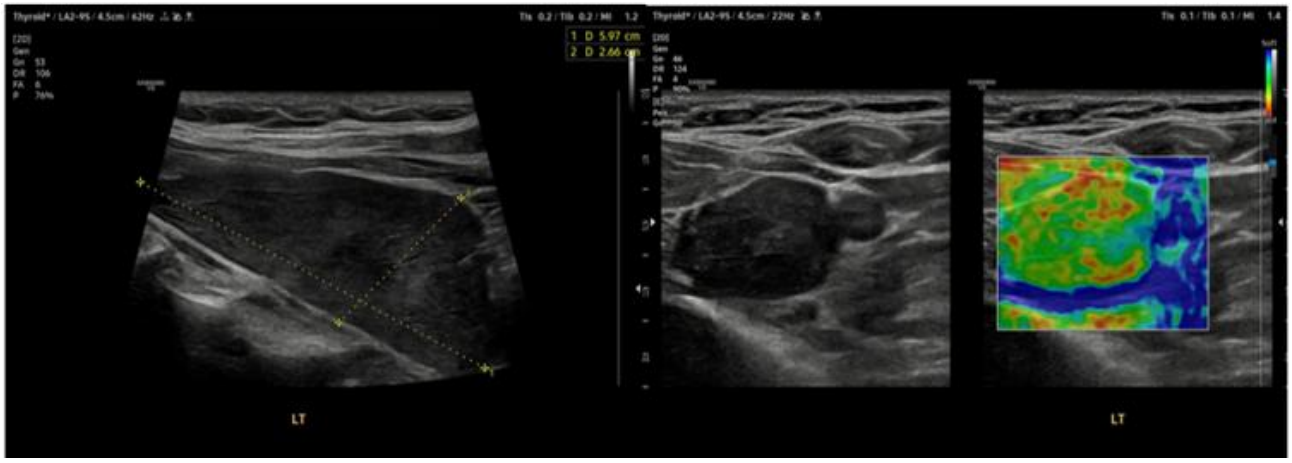

Image 1: Preoperative neck ultrasound images showing the hypoechoic mass at the inferior aspect of the left thyroid lobe.

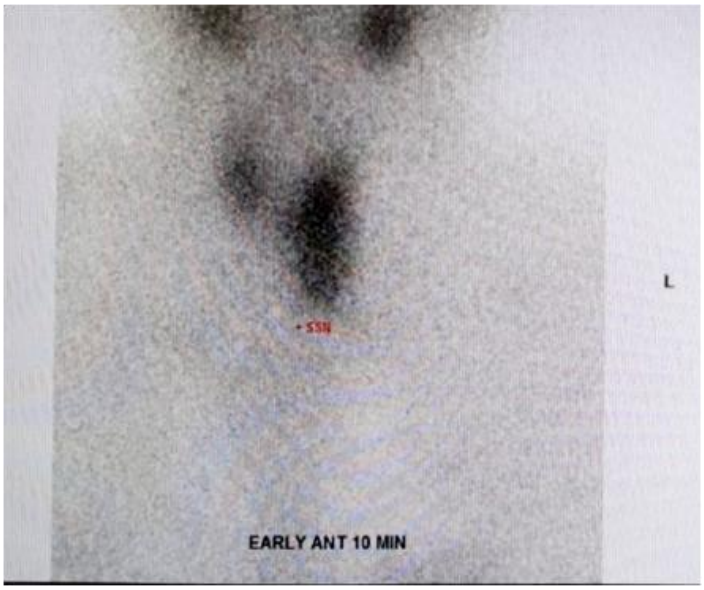

Image 2: MIBI scan indicating metabolically active left inferior parathyroid adenoma.

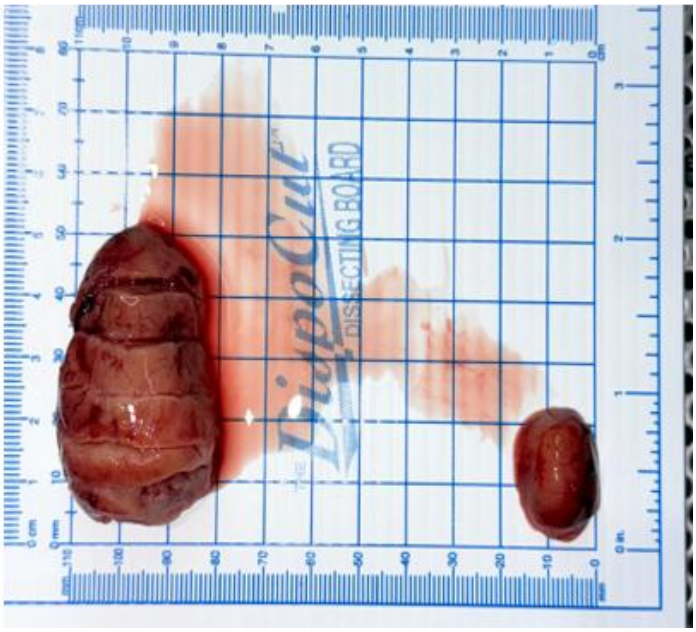

Image 3: Intraoperative image of the excised giant parathyroid adenoma.

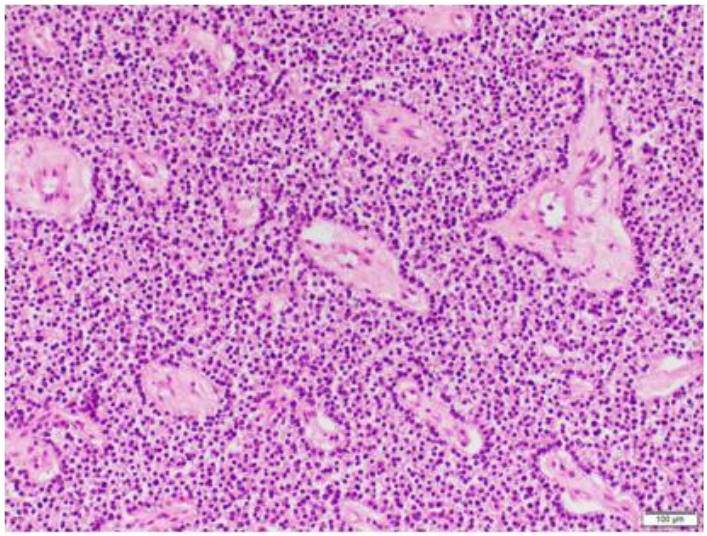

Image 4: Postoperative histopathological slide confirming benign adenoma.

3.2. Investigations

Parathyroid scintigraphy performed and identified a metabolically active left inferior parathyroid adenoma. Neck ultrasound revealed a well-defined hypoechoic mass at the inferior aspect of the left thyroid lobe measuring 1 x 1.5 cm corresponding to left inferior parathyroid adenoma. Patient was booked for elective left inferior parathyroid adenoma excision.However, the patient presented to the emergency with signs and symptoms of severe hypercalcemia three weeks before surgery. She was found to have very high calcium and parathyroid hormone levels. She was then admitted for medical management of hypercalcemia.

3.3. Surgical Findings

Repeat imaging showed a significant increase in the size of the adenoma from 1 x 1.5 cm to 4 x 4 cm at the same location with suspicious cervical lymph nodes, raising suspicion of parathyroid carcinoma with severe elevation of calcium (15.9 mg/dL) and parathyroid hormone levels (14,000 pg/mL). FNAC of suspicious lymph nodes was done and showed benign reactive lymph nodes. After optimization of serum calcium levels, the patient was taken for left inferior parathyroid adenoma excision.During surgery, a large, encapsulated parathyroid adenoma measuring 6 x 3.5 x 1.7 cm and weighing 19.6 g was excised. Intraoperative PTH levels dropped from 3,654 to 140 pg/mL, confirming complete resection.

3.4. Postoperative Course

The patient's postoperative course was uneventful, with serum calcium levels normalizing to 8.8 mg/dL by the second postoperative day.

4. Discussion

Primary hyperparathyroidism (PHPT) is a medical condition where the parathyroid glands produce and secrete excessive amounts of parathyroid hormone (PTH), causing the patient to have elevated calcium levels in the blood. Hyperparathyroidism causes high calcium levels by increasing bone resorption, enhancing calcium absorption in the intestines through vitamin D activation, and reducing calcium excretion by the kidneys. Additionally, it lowers phosphate levels, preventing calcium from binding and further contributing to hypercalcemia. The most common cause of this overactivity is a benign tumor called a parathyroid adenoma. Patients may have a range of symptoms, such as depression, fatigue, kidney stones, and bone pain. Blood tests that demonstrate hypercalcemia and increased PTH levels are commonly used to diagnose the condition. Imaging techniques such as ultrasonography or sestamibi scans are utilized to identify the overactive gland. The definitive treatment for PHPT is surgical excision of the afflicted gland(s), which often leads to calcium level stabilization and resolution of the symptoms [4].When individuals exhibit significant hypercalcemia, there is a higher suspicion of malignancy, especially parathyroid cancer. Parathyroid carcinoma is a relatively rare endocrine malignancy that accounts for only a small proportion of primary hyperparathyroidism patients. Clinically, it often presents markedly elevated serum calcium and PTH levels, a palpable neck mass, and symptoms related to hypercalcemia. The tumors are typically firm, adherent to surrounding tissues, and average around 3 cm in size at diagnosis. However, larger sizes have been reported. The combination of significantly elevated serum calcium, high PTH levels, and a substantial adenoma size raises the suspicion for parathyroid carcinoma, as was observed in our case [5].Differentiating between benign giant parathyroid adenomas and parathyroid carcinomas can be challenging due to overlapping clinical and biochemical features. Although rare, giant parathyroid adenomas (those weighing more than 3.5 grams) can exhibit severe hypercalcemia and increased PTH levels, just like carcinomas. It is crucial to perform a thorough preoperative evaluation that includes comprehensive imaging and fine-needle aspiration when necessary. For a conclusive diagnosis, intraoperative observations and histological analysis are still essential. Since it has a substantial impact on surgical therapy and prognosis, early and precise identification between these entities is essential[6].In summary, while giant parathyroid adenomas are uncommon, their presentation can closely mimic that of parathyroid carcinoma. A thorough diagnostic approach is imperative to ensure appropriate treatment and optimal patient outcomes.

6. Conclusion

This report highlights an interesting and rare case of a giant parathyroid adenoma presenting with severe hypercalcemia and markedly elevated PTH levels, a clinical picture that initially raised concerns about possible malignancy. The significant size of the adenoma, combined with the biochemical abnormalities, emphasized the importance of a thorough diagnostic workup. Accurate preoperative imaging, including neck ultrasound and sestamibi scintigraphy, played a pivotal role in localizing the lesion, while fine-needle aspiration cytology (FNAC) provided additional reassurance regarding its benign nature. Intraoperative PTH monitoring proved very useful, allowing for real-time confirmation of successful gland removal and a rapid decline in PTH levels. Postoperatively, the patient experienced a smooth recovery with normalization of serum calcium and resolution of symptoms. This case emphasizes the need to recognize that giant parathyroid adenomas can closely mimic malignancy, making a comprehensive and multidisciplinary approach essential for accurate diagnosis, effective surgical management, and optimal patient outcomes.

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