

## Case Report

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# Left parathyroid adenoma with features of brown tumor, incidental finding - a case report

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## ABSTRACT

Primary hyperparathyroidism (PHPT) occurs in a setting of excessive parathyroid hormone (PTH) secretion with an autonomous parathyroid gland which resulting in hypercalcemia. Cases of parathyroid adenoma are rare, PTH is a chief regulator of calcium homeostasis in the human body. PHPT could be caused by solitary adenomas, hyperplasia, multiple adenomas and carcinomas. A 35-year-old female who came in with complaints of left hip pain past 1 month which aggravated since 1 week, with previous medical history of hyperthyroidism. Laboratory and biochemical findings suggested features of PHPT. She underwent left parathyroid excision with subtotal thyroidectomy. Histopathology analysis revealed features of parathyroid adenoma with eosinophilic to clear cytoplasm, few foci with oxyphilic nodules. Patient showed significant fall in PTH levels after tumor excision and is being discharged 5<sup>th</sup> day after surgery. PHPT occurs at any age, but it is most commonly seen in people over the age of 50 years and postmenopausal women. The current presentation of PHPT shifts from the classical symptomatic form to the asymptomatic form. parathyroidectomy is still the treatment of choice for both symptomatic and asymptomatic forms. Parathyroid adenoma has an excellent prognosis with surgical treatment.

**Keywords:** Parathyroid adenoma, Hyperthyroidism, Serum calcium, Hyperparathyroidism

## INTRODUCTION

Parathyroid adenoma is a component of a spectrum of parathyroid proliferative disorders that has parathyroid hyperplasia, parathyroid adenoma and parathyroid carcinoma.<sup>1</sup> 80-85% of cases accounts for parathyroid adenoma, 15% with hyperplasia and 0.5-1% carcinoma respectively. Parathyroid adenoma may be a benign neoplasm, commonly sporadic, and most frequently seen in women than men (3:1).<sup>4</sup> It can occur at any age, although most occur between 50-60 years of aged. Patients typically present with evidence of primary hyperparathyroidism with elevated serum calcium levels and elevated serum parathormone levels.<sup>3</sup> Differentiation of benign and malignant parathyroid tumors is usually

difficult. In fact, because parathyroid carcinomas have a really low incidence rate, no staging system has been established by the American joint committee on cancer (AJCC). Generally, diagnosis of parathyroid adenoma and parathyroid carcinoma are made on the idea of both the clinical findings and also the histological criteria as proposed by Schantz and Castleman.

Herein, we report our experience with a case of left parathyroid adenoma with features of hyperparathyroidism (brown tumor) which was diagnosed as a parathyroid adenoma based on the pathological findings, despite parathyroid carcinoma being initially suspected in preoperative clinical findings.

## CASE REPORT

A 35-year-old female who came in with complaints of left hip pain in the past 1 month which aggravated in the past 1 week, with previous medical history of hyperthyroidism.

Patient was referred to general surgery from orthopedics department, after high levels of parathyroid hormone (PTH) and ultrasonography (USG) guided fine needle aspiration cytology (FNAC) showed cytological features in correlation with critical levels of serum calcium and low levels of sodium and chloride levels, suggestive of parathyroid adenoma.



**Figure 1: Demineralization with predominance of the distal radius and ulna.**

On general physical examination, patient moderately built and nourished, on systemic examination cardiovascular system (CVS), respiratory system (RS), central nervous system (CNS), P/A showed no abnormalities.

Local examination of the neck on palpation revealed solitary firm, smooth swelling in right of front neck, separate from thyroid gland, moves with deglutition, non-tender, no local rise of temperature and well-defined margins.



**Figure 2: Subchondral resorption with widening and also subligamentous resorption of the ischial tuberosities.**

Laboratory investigation showed increased levels serum calcium 13.9 mg/dl, elevated serum levels of intact PTH of 900 pg/ml, creatinine of 1.6 mg/dl, total cholesterol (TC) of 15.70 and decreased levels of serum sodium of 123 mmol/l, and chloride of 123 mmol/l.

Histopathology of cell block showed cytological features of parathyroid neoplasm.

Radiological examination with computed tomography (CT) scan of neck revealed heterogeneously enhancing lesion in the visceral space of neck on left side postero-superior to thyroid gland-suspicious for parathyroid adenoma.

Magnetic resonance imaging (MRI) of left hip showed multiple altered signal intensity areas in bilateral iliac wing and ala of sacrum on right side with pathological fracture of left iliac wing and surrounding soft tissue edema-features consistent with hyperparathyroidism (brown tumor).



**Figure 3: Multiple diffusely scattered lytic lesions of varying size and shape in pelvis.**

With preoperative diagnosis of parathyroid adenoma with features of hyperparathyroidism.

After optimizing the patient preoperatively, patient was taken for left parathyroid excision with subtotal thyroidectomy.

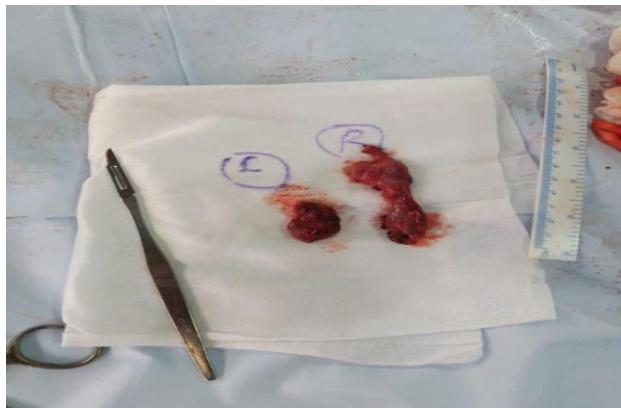


**Figure 4: Intraoperative surgical incision marking.**

A 2 cm horizontal incision was made in the left lower neck. The left lobe of thyroid was identified and identification of the enlarged left lower parathyroid was done which was posteroinferior to the left thyroid lobe.

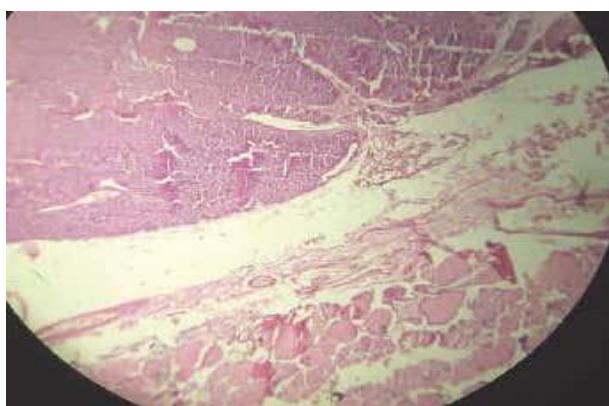


**Figure 5: Intraoperative view of parathyroid gland.**



**Figure 6: Surgical excision specimen of left parathyroid and subtotal thyroidectomy.**

The preoperative PTH level was 900 pg/ml and 20 minutes post tumor excision the PTH levels were checked to be 187 pg/ml, an 80% fall in PTH levels suggestive of successful tumor excision.

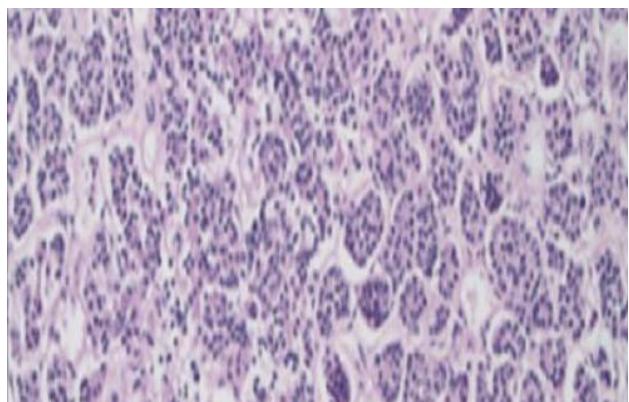


**Figure 7: Histopathological microscopic view characteristic parathyroid adenoma features.**

The left inferior parathyroid gland was anterior to the plane of the recurrent laryngeal nerve and was found medial and anterior to the intersection of the recurrent laryngeal nerve and the inferior thyroid artery. With gentle retraction, the enlarged inferior parathyroid gland was pulled up into the neck and removed. The specimen was sent for histopathology examination.

Final histopathology report was consistent with parathyroid adenoma and thyroid showed normal histology.

The post-operative period was uneventful and patient recovered symptomatically over the period in hospital and was discharged on 5<sup>th</sup> postoperative day.



**Figure 8: Histopathology showing features of cells arranged in solid diffuse sheets, nests, few areas with follicles. Nucleoli showing indistinct cytoplasm with few foci and oxyphilic nodules. Impression: parathyroid adenoma.**

## DISCUSSION

Parathyroid tumours are generally not visible or palpable clinically. The clinical symptoms of most patients are more often related to the manifestation of hypercalcemia. In this case, the patient didn't complain about the pain or enlargement of glands within the neck. Palpable neck masses are often found in cases of parathyroid cancer.<sup>2</sup> Calcium affects the majority functions of the organ systems. Manifestations of hypercalcemia are very diverse. The classic pentad of hypercalcemia symptoms is kidney stones, painful bones, abdominal groans, psychic moans, and fatigue.<sup>5</sup> Symptoms of early hypercalcemia are often undiagnosed. Reduced bone mineral density causing osteopenia, osteoporosis, and fractures may be a frequent complication in late-diagnosed hypercalcemia.<sup>14,15</sup>

Neurological disorders and multiple fractures are manifestations of primary hyperparathyroidism. In such cases, the patient may frequently consult with neurologists complaining of fatigue, bone and joint pain, osteopenia, and osteoporosis. Numerous fractures within the patient are often diagnosed as a neurological disease.<sup>6</sup> Other symptoms can include muscle weakness. In some studies,

muscle biopsies showed that the explanation for muscle weakness was neuropathy, not myopathy.<sup>8</sup>

The diagnosis of parathyroid adenoma is predicated on clinical symptoms confirmed by laboratory findings. Significant laboratory findings are increased calcium and parathormone levels.<sup>7</sup> There are often an inconsistency within the laboratory results, during which there's a rise within the PTH level, a rise within the calcium level with hypophosphatemia, and an increase in urinary calcium excretion, indicating impaired calcium homeostasis within the body.<sup>11</sup> Patients with primary hyperparathyroidism show decreased serum phosphate and increased calcium concentrations in urine over 24 hours.

Approximately 80% of cases end in mild hyperchloremic acidosis. Elevated levels of alkaline phosphatase are often found in 10% of cases, alongside complications associated with bone disease. A serum and urine protein electrophoresis examination are often conducted to eliminate the likelihood of myeloma.

In some cases, primary hyperparathyroidism (PHPT) could also manifest normocalcemic conditions due to a vitamin D deficiency, low albumin levels, excessive hydration, a high-phosphate diet, and low calcium levels within the normal range.<sup>10</sup> In such cases, the laboratory results show concurrent levels of calcium and parathormone, with normal levels of free thyroxine (FT4) and thyroid stimulating hormone (TSH), normal kidney function, and no signs of infection.<sup>9</sup> Extreme increases in the parathyroid hormone level compared with the level of in some cases, the parathyroid adenoma is diagnosed together with bone diseases, such as osteoporosis, and fractures, as reported by Mabulac and Twigt. Braverman stated that there are correlations among the PTH level, bone disease, and neuropsychiatric symptoms, during which the PTH level attended increase the occurrence of bone disease and neuropsychiatric disorders.

The treatment of parathyroid tumours is that the surgical exploration of the neck and removal of pathological parathyroid followed by another parathyroid gland biopsy to see the likelihood of adenoma or multiple gland hyperplasia.<sup>13</sup>

The laboratory examination results for the patient in this case before surgery were as follows: calcium, 13.9 mg/dl; parathyroid hormone, 900 pg/ml; serum sodium, 123 mmol/l, serum creatinine 1.6 mg/dl. After surgery, the calcium level was 10 mg/dl, and the PTH level was 187 pg/ml. According to these results, the amount of calcium and parathormone decreased significantly after surgery. Calo and Zawawi reported that during a case of primary hyperthyroidism, after removal of the parathyroid tumour, the parathormone and calcium levels would immediately decrease. In this case, during surgery, the left parathyroid was first removed; then, the PTH level was measured, and so the value was significantly decreased. This result

indicates that parathyroid surgery decreases excessive PTH levels.

Along with the postoperative decrease within the parathormone and calcium levels, the condition of the patient gradually improved with decrease in patient's perceived pain. The patient also consulted the physiotherapy unit for guidance regarding walking exercises. After surgery and physiotherapy, the patient's condition tended to improve, and being discharged with follow up.

## CONCLUSION

The parathyroid endocrine glands play a significant role in calcium homeostasis. Cases of parathyroid adenoma are rare.

Parathyroid adenoma causes excessive autonomic formation and release of parathyroid hormone, called PHPT.

PHPT could be caused by solitary adenomas (80-85%), hyperplasia (10%), multiple adenomas (2%), and carcinomas (2-5%). Parathyroid adenoma occurs in women and men at a ratio of approximately 2:1, and Parathyroid adenoma has an excellent prognosis with surgical treatment. Parathyroidectomy stands as the main stay in management of PHPT due to parathyroid adenoma.

Once the biochemical and radiological investigation confirms the presence of parathyroid adenoma, surgical excision is the primary and only modality of treatment.

Post parathyroidectomy, PTH levels returning to normal within 10 min of surgery is a conclusive evidence of successful excision of the parathyroid adenoma.

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