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A Case of Parathyroid Adenoma Presenting as Pathological Fracture Neck of Femur

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Parathyroid adenoma is the common etiology for primary hyperparathyroidism which results in hypercalcaemia. Fractures of bone are generally rare and tend to involve the vertebra commonly. Women are affected more than men. We present a 41-year-old female who suffered a pathological fracture of Left Femur and diagnosed with a left solitary parathyroid adenoma. The patient underwent removal of parathyroid adenoma followed by internal fixation of the fractured femur.
A high index of suspicion is required to diagnose parathyroid adenoma in such cases of pathological fractures. An intraoperative assay of PTH and meticulous dissection is required for adequate management of the parathyroid adenoma. Postoperative hypocalcaemia is expected and requires calcium supplements to prevent complications.

Keywords: Hyperparathyroidism; hypercalcaemia; parathormone; pathological fracture; parathyroid adenoma.

1. INTRODUCTION

Hyperparathyroidism is the third most common endocrinology disorder which can occur either sporadic or familial. Single parathyroid adenoma is the commonest cause of sporadic hyperparathyroidism. It is more common in the female population with a peak incidence among

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30-50 years' age group [1]. Parathyroid adenoma is also a component of familial MEN1 and 2A syndromes [2].

We present a case of Parathyroid adenoma presenting as a pathological fracture neck of Left Femur with nephrocalcinosis and chronic calcific pancreatitis. The patient underwent excision of the adenoma and subsequently treated for fracture femur at Mahatma Gandhi Medical College and Research Institute, Pondicherry.

2. CASE PRESENTATION

A 41-years-old-female presented with complaints of inability to stand or walk following a trivial fall at home with her hip hitting the floor straight down. The patient gave a history of pain in her left hip with limp for 1 year, recurrent episodes of abdominal pain for 1 year. Examination of neck revealed a single firm swelling in the left side of the neck moving with deglutition. Breast and other system examinations were normal. On physical examination, the left lower limb externally rotated with the inability to perform straight leg raising.

2.1 Investigation

Serum calcium (12.5 mg/dl) and parathormone (2146.9 pg/ml) was elevated (Table 1). Laboratory and instrumental findings were negative for MEN syndrome. Renal and Thyroid profile was within the normal range. Ultrasound neck showed a hypoechoic mass lesion measuring 12x19x37 mm posterior and lateral to the left lobe of thyroid with increased vascularity (Fig. 1). X-Ray Pelvis reveals a fracture neck of Left Femur (Fig. 2). Ultrasound abdomen revealed medullary nephrocalcinosis, features of chronic calcific pancreatitis (Fig. 3). X-Ray Skull shows typical "salt and pepper" appearance of hyperparathyroidism (Fig. 4) Contrast CT of the neck showed a parathyroid adenoma in the left superior pole of thyroid with multiple nodules in the thyroid (Fig. 5).

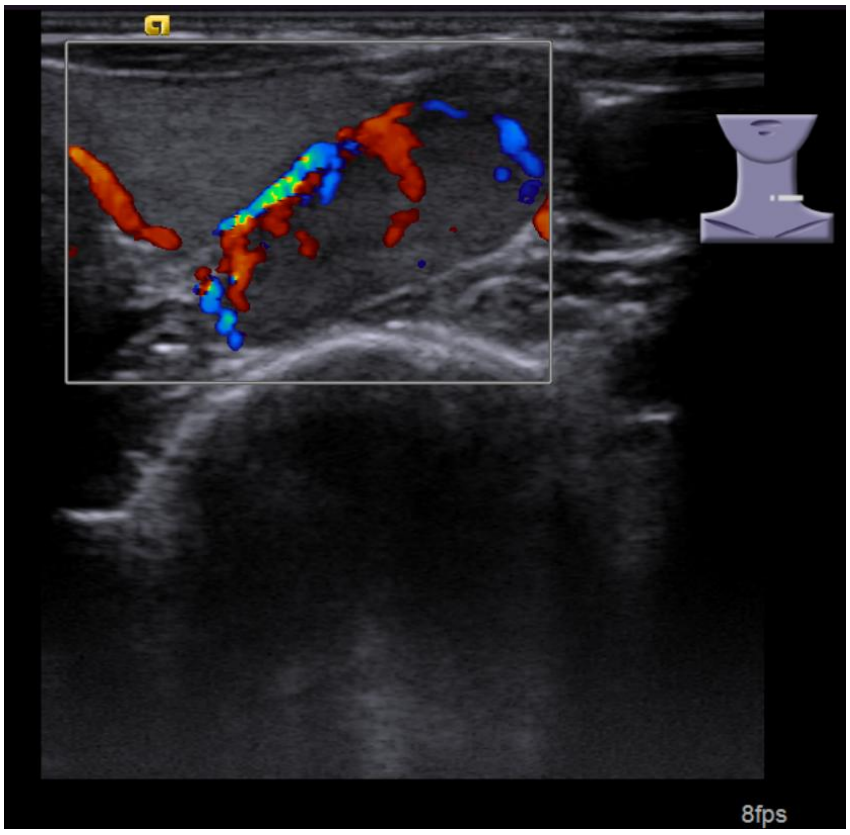

Fig. 1. Ultrasound neck showing hypoechoic lesion measuring 12X19x37 mm in left lobe of thyroid with increased vascularity

Table 1. Investigations

Parameter	Value	Normal range
Serum Parathyroid Hormone (PTH)	2146.9	7-53 (CMIA Method)
Calcitonin	7.74	ND to 11.5 pg/ml
Serum calcium	12.5	8.5 to 10.3 mg/dl
Serum phosphorous	2.4	2.4 to 4.1 mg/dl
Serum M||AGNESIUM	1.4	1.8 to 2.2 mg/dl
ALP	1448	20 to 140 IU/L

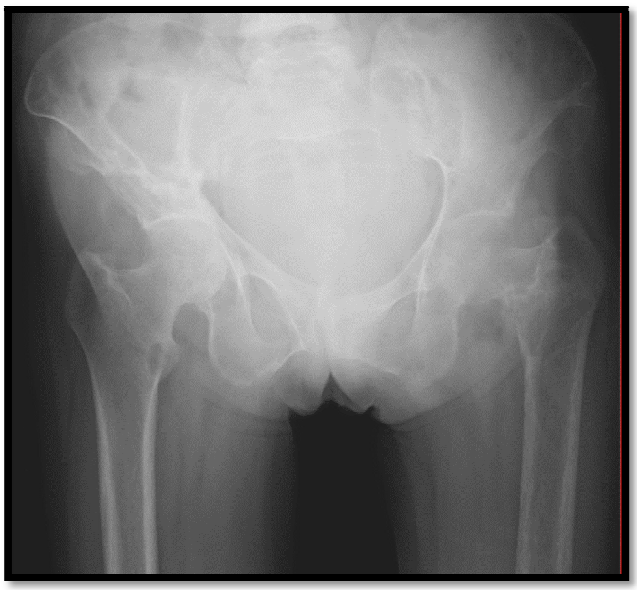

Fig. 2. X-Ray Pelvis showing fracture necl of left femur

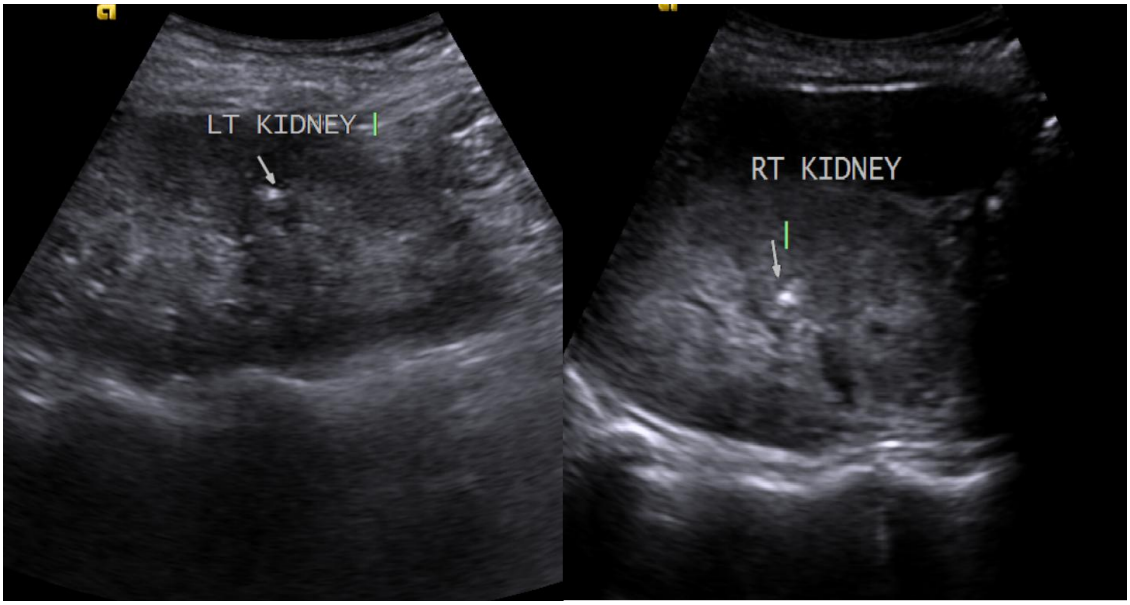

Fig. 3. Ultrasound abdomen showing medullary nephrocalcinosis in B/L Kidney

Fig. 4. Salt and pepper appearance in X-Ray skull

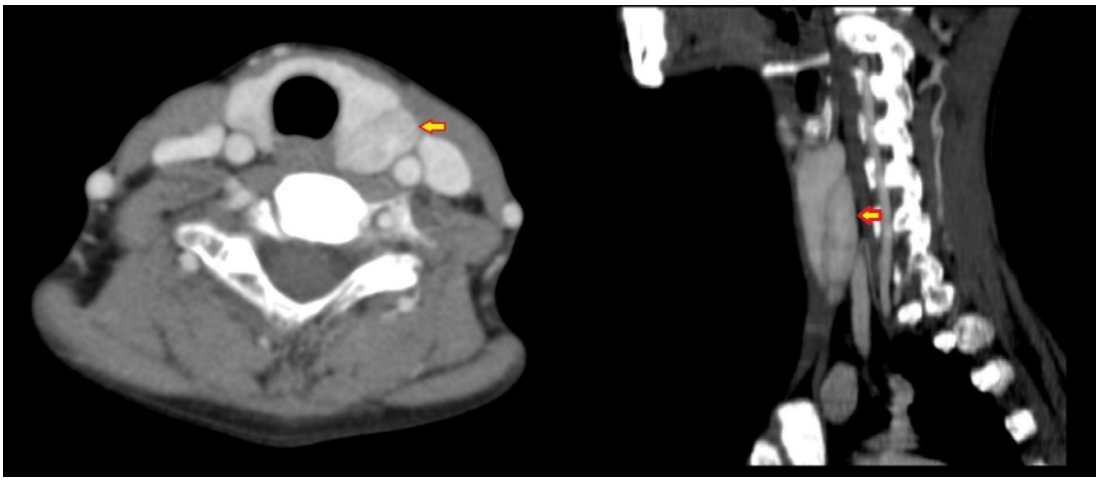

Fig. 5. CT Neck localising the adenoma posterior and lateral to left lobe of thyroid (marked with yellow arrow)

2.2 Operative Procedure

Through a standard thyroidectomy approach, the left lobe of thyroid was explored. A large pinkish-white, vascular tumor of size (2x1.5 cm) was identified posterior and lateral to the left lobe of the thyroid gland (Fig. 6A). Branches from the left superior thyroid artery was ligated and minor branches from the inferior thyroid artery were cauterised. Recurrent laryngeal nerve was identified and protected (Fig. 6B). The tumour along with an adherent portion of thyroid gland was removed after preserving the Inferior parathyroid gland on left side. Tumour was sent for histopathological analysis (Fig. 7) and an intraoperative PTH analysis revealed more than 50% reduction than base value. Transient postoperative hypocalcaemia was observed in the patient which was corrected with IV Calcium Gluconate. On day 2 the Serum calcium and parathormone levels were normal. Supplemental Oral Calcium with Vit D3 was started and patient referred to orthopaedic department for further management of Fracture Femur. Patient was followed up at 4 weeks' intervals for first 6 months and then once in 3 months for next 6

months. During follow up serum Calcium, Parathormone, and Serum Alkaline Phosphatase was monitored. X-Ray of Hip was done at 3 months' interval. A complete reunion of the fracture left femur was observed only at 9 months' post parathyroidectomy. USG abdomen revealed that the chronic changes in kidney and parenchyma remained unchanged. There were no further complaints of abdominal pain during follow up.

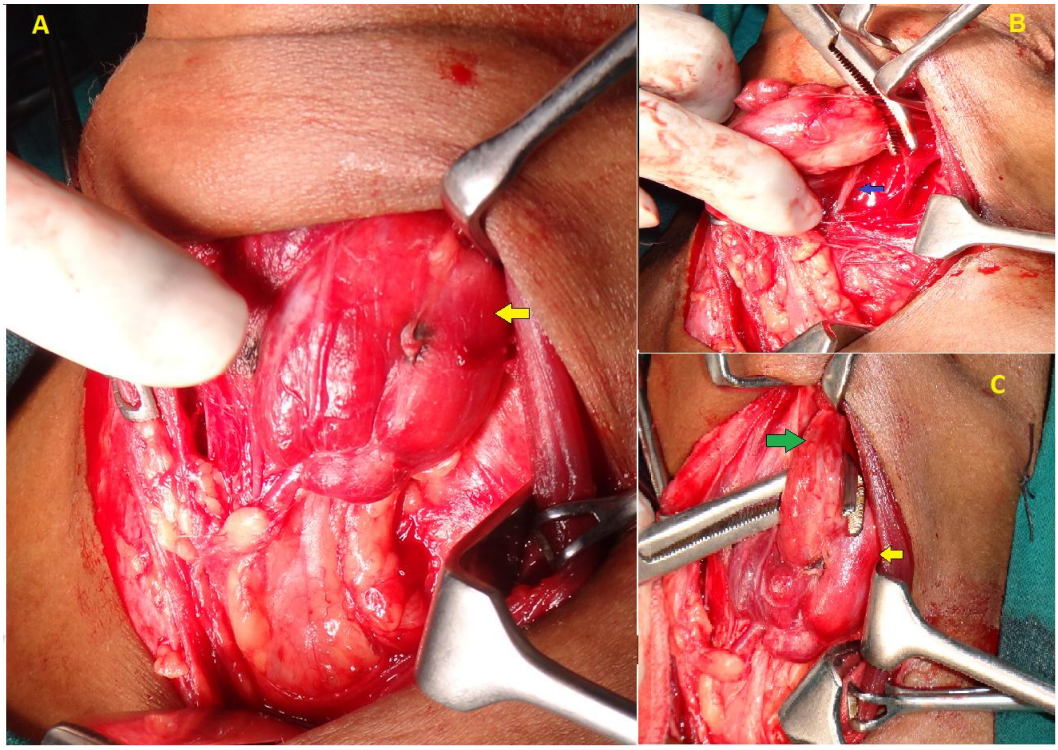

Fig. 6. Intra-operative images. Green arrow: Thyroid gland; (yellow arrow): Parathyroid adenoma; (blue arrow): Recurrent laryngeal nerve

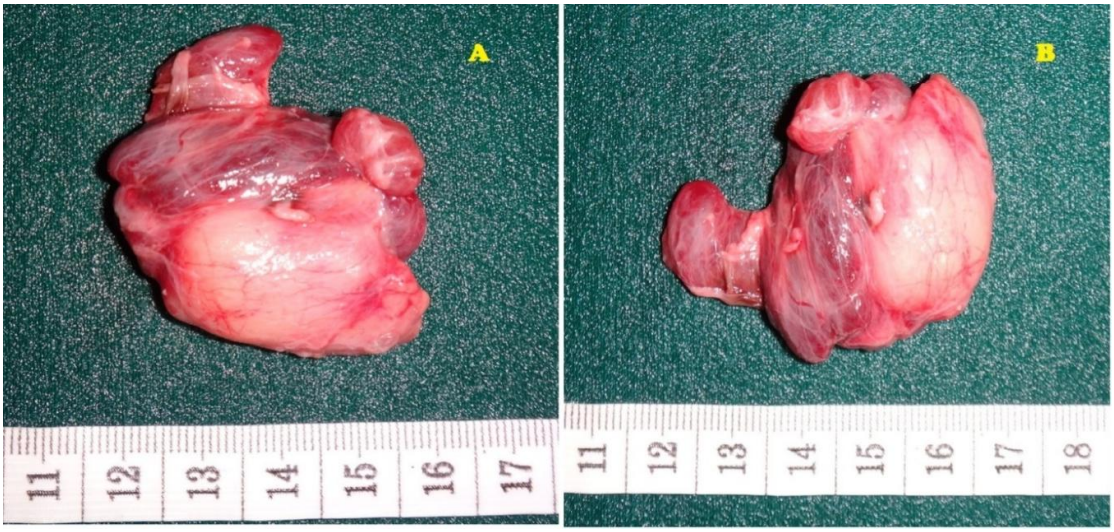

Fig. 7. Specimen showing a vascular tumour adherent to thyroid (2x1.5 cm)

3. RESULTS AND DISCUSSION

Primary hyperparathyroidism is characterized by an elevated PTH, serum calcium level with hypercalciuria, and hypophosphatemia [3]. Primary hyperparathyroidism can be either:

1) Primary
2) Secondary
3) Tertiary

The prevalence of Primary hyperparathyroidism has been reported to be 1 in 500 to 1000 cases.Primary hyperparathyroidism is due to parathyroid adenomas in 80-85% cases, gland hyperplasia in 10-15%, and rarely carcinoma in <1% cases [4]. Single parathyroid adenomas account for 76-85% of sporadic primary hyperparathyroidism. Though life-threatening hypercalcaemic crisis is rare, other complications like renal (5-10%), GIT and skeletal system (5-15%) involvement warrant surgical management of parathyroid adenomas with success rates >95%.

The pathological manifestation of hyperpara-thyroidism in the bone can be either a rapidly progressive type or the classical Osteitis fibrosa cystica. It is characterized by an increase in the giant multinucleated osteoclast and a replacement of the marrow elements by fibrous tissue [5]. There is cortical thinning and osteoporosis leading to pathological fractures in weakened long bones. The incidence of pathological fracture is low and common in the vertebra. The prevalence of bony pathology is common in parathyroid carcinoma than adenomas [6].

High-frequency ultrasound combined with CT Neck is efficient, non-invasive, and cost-effective in pre-operative localization of the adenoma. Though the sestamibi scan combined with SPECT is highly recommended, cost and limited availability, constraints its use [7].

Full neck exploration with the identification of parathyroids is ideal if patients are not eligible for minimally invasive parathyroidectomy. Meticulous dissection by an experienced surgeon with the identification of other parathyroids is the key to cure. Intra-operative PTH assay can be used to determine the adequacy of surgical ablation. Acceptable criterion being a 50% reduction from the base value at 10mins following excision [8].

4. CONCLUSION

A high index of suspicion is required to diagnose Parathyroid adenoma in pathologic fracture of the long bone. Surgical management with parathyroidectomy will resolve the metabolic imbalance resulting in the improvement of bone density and subsequent healing of fractures. Post-operative observation for hypocalcaemia and adequate replacement can prevent serious complications.

CONSENT

As per international standard or university standard, patient's consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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