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PARATHYROID ADENOMA WITH HYPOCALCEMIA AND HYPOVITAMINOSIS D: A CASE REPORT

Pathology

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ABSTRACT

The cases of normocalcemic parathyroid adenoma are recently been recognized with increasing frequency. Present case report discusses parathyroid adenoma presenting with hypocalcemia and severe hypovitaminosis D in a 30 year old female with markedly raised parathormone. The case presented with pathological fracture of upper end of humerus and generalized osteoporosis. A well defined hypoechoic mass lesion was noted on inferior aspect of the right thyroid gland on ultrasonography of neck. The mass enucleated at bilateral neck exploration revealed well capsulated chief cell parathyroid adenoma.

KEYWORDS

parathyroid adenoma, hypocalcemia, hypovitaminosis D

INTRODUCTION

Parathyroid adenoma accounts for 80-85% cases of primary hyperparathyroidism. Most of these cases (95%) occur sporadically without any hereditary syndrome.[1] Primary hyperparathyroidism is defined as elevated or inappropriately normal parathormone with presence of hypercalcemia, hypophosphatemia and normal to high serum alkaline phosphatase levels.[2] In last few decades many western authors have noticed normocalcemic primary hyperparathyroidism. Two population based western studies have shown the prevalence of such entity to be 0.4%.[2,3]

Recently we have come across one such case of sporadic normocalcemic parathyroid adenoma which primarily presented with pathological fracture. We thought this rare interesting occurrence worthy of mention.

CASE HISTORY

Thirty year female presented with pathological fracture of right supracondyle of humerus after a trivial fall. The x- ray examination revealed fracture with generalized osteoporosis which the clinicians initially thought to be drug induced. Open reduction of the fracture was carried out and patient was investigated further. The patient did not reveal anxiety disorder or any other psychiatric illness and was not on any medication. There were no neuropsychiatric manifestations. The urinary output was within normal limits. There was no evidence of edema.

On pertinent work up of the case, the serum alkaline phosphatase was 584 IU/ ml, Total Serum calcium was 8.2 mg/ dl. The vitamin D levels were markedly reduced with values of 25-OH Vitamin D (Total) being 8.17 ng/ml by C.I.A.L. method. The intact parathyroid hormone was raised with its values being 199.2pg/ml. by C.I.A.L. method. The complete blood count and renal parameters were within normal limits (Blood urea - 18mgm/dl; Serum creatinine - 0.8mgm/dl, Creatinine clearance by Crockcroft –Gault formula:81.16 ml/minute). USG abdomen and pelvis were within normal limits.The ultra sonographic examination of the neck showed well defined hypoechoic mass lesion measuring about 3.2x2.7x1 cm, seen at the inferior aspect of the right thyroid gland extending inferiorly and medially over the trachea. The lesion showed extensive vascularity. The thyroid gland appeared normal. The diagnosis of parathyroid adenoma was offered.

The mass in right parathyroid region was surgically removed with conventional surgery of bilateral parathyroid exploration. There were no adhesions. The mass could be enucleated completely. The post operative parathormone levels were within normal limits with values of 23.36 pg/ml. Serum calcium was 7.6 mg/dl. The patient complained of post operative tingling, numbness and tinnitus.

The mass weighed 15 grams, was tan grey in color and little nodular in appearance. It measured 2 cm in diameter. It was well capsulated and had intact smooth capsule (Figure 1). On histopathological examination there was no extra capsular parathyroid tissue. The lesion was mildly vascular and exhibited thin fibrous bands amidst which were seen monotonous chief cells with moderate hypercellularity (Figure 2). There was no evidence of stromal adipocytes, bizarre cells, mitosis, nuclear atypia, cystic change, necrosis, capsular or vascular invasion or entrapped cells in capsule. No extracapsular rim of normal parathyroid tissue or tumor extention was noted.

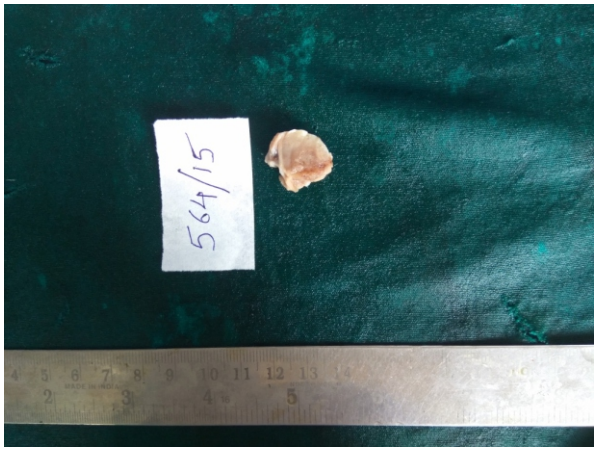

FIGURE 1 - Gross appearance of parathyroid adenoma, capsulated, 2 cm in diameter

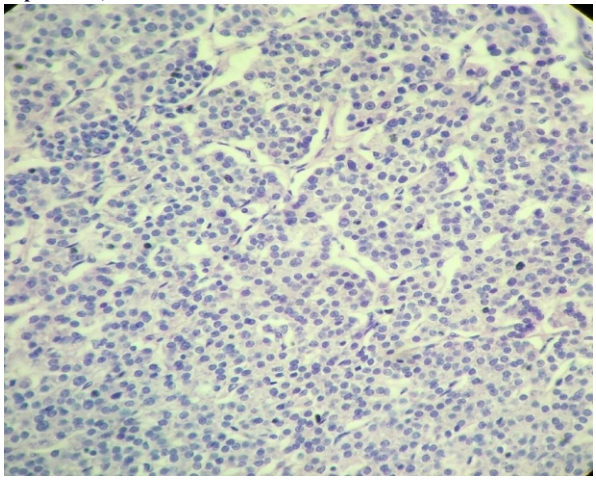

FIGURE 2 - HE, 40X, Fairly monotonous chief cells of parathyroid adenoma.

DISCUSSION:

It is not very often that a surgical pathologist encounters a parathyroid tissue in general purpose tertiary health care centre. It may be to opine on inadvertently removed parathyroid tissue at total thyroidectomy. But most importantly it is to assess abnormal proliferation or neoplastic lesion involving the parathyroid gland. Careful morphological examination, its appropriate interpretation and thorough clinico-pathological correlation are the important steps in managing these lesions. The closest differential diagnosis of parathyroid adenoma in present case was parathyroid hyperplasia but the solitary lesion and presence of thin well defined capsule ruled out this possibility. The status of capsule plays important role in ruling out diagnosis of carcinoma; which shows capsular and vascular invasion, extra capsular spread and broad trabeculae separating the tumor cells along with nuclear atypia, abnormal mitosis and necrosis.[4]

The clinical setting of parathyroid adenoma is very peculiar. The skeletal complications are most common and the imaging techniques clinch the diagnosis as was seen in present case.[4,5,6]

In our teaching institute attached to 650 bedded hospitals, we have encountered 2 cases of parathyroid adenoma including present case in last 15 years period. Both of these cases were not hypercalcemic.[7] In fact the present case showed hypocalcemia not only in postoperative period but even in preoperative period. The frequency of parathyroid adenoma in developing countries is to the tune of 90 to 93% amongst the patients with primary hyperthyroidism.[5,6] In a medical college attached to municipal corporation hospital in Mumbai 43 out of 48 cases of the parathyroid tissues examined in surgical pathology department, over a period of 10 years turned out to be parathyroid adenoma. One of these cases was normocalcemic.[4]

By strict definition, normocalcemic primary hyperparathyroidism is a phenotype with raised parathyroid hormone with consistently normal serum calcium, in the absence of secondary causes of hyperparathyroidism like hypovitaminosis D or renal disease. It has been suggested that this may be due to target organ resistance to action of parathormone. The normal values of consistently normal albumin adjusted total serum calcium and normal ionized calcium is a prerequisite for diagnosis of normocalcemic primary hyperparathyroidism.[8] In our case there was marked reduction in 25-OH Vitamin D. Our case may thus belong to a variety of conditions in primary hyperparathyroidism in which classical hallmark of hypercalcemia is not consistently present or classical hypercalcemic primary hyperparathyroidism is masked by vitamin D deficiency.[9]

The relationship between primary hyperparathyroidism and hypovitaminosis D is poorly understood. Such a combination is known for its association with more severe bone disease. It is not clear if vitamin D deficiency is a cause or effect of primary hyperparathyroidism. It has been suggested that nutritional deficiency of vitamin D is linked to growth of parathyroid adenoma and improved dietary support may partially decrease activity of primary hyperparathyroidism.[9]

Our case showed remarkably raised pre-operative serum alkaline phosphatase. It has been shown that there is a remarkable co-variance between alkaline phosphatase and parathyroid hormone. Alkaline phosphatase has a long biological half life of 8 hours. It is more stable and hence better predictor of post operative risk of hypocalcemia as against parathormone (with half life of 4 minutes). Incidentally alkaline phosphatase is a bone formation marker and there is high bone turnover in hyperparathyroidism. After parathyroidectomy, there is immediate fall in parathyroid hormone which leads to dissociation between osteoclastic and osteoblastic activity. This results in severe hypocalcemia.[10] Our patient complained of hypocalcemic symptoms with post operative serum calcium levels of 7.6 mg/dl. But in view of surgical resection of only one parathyroid with adenoma, one might not worry about the postoperative hypocalcemia. The patient was discharged from hospital and so far has not returned with any complaints.

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