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Brown Tumor of Shaft of Humerus As First Presentation of Primary Hyperparathyroidism Caused By Parathyroid Hyperplasia

Authors
Dr Aniruddha Kulkarni[1], Dr Md Ashfaque Tinmaswala[2], Dr Shubhangi Shetkar[3], Dr Prathamesh Joshi[4], Dr Mubashshera Afreen[5], Dr Amruta Mulavekar[6] Dr Niraj Yadav[7]
[1]Professor, [3]Consultant radiologist, [4]Nuclear medicine consultant, [2,5,6,7]Resident
Department of Radiology and Nuclear Medicine, Tapadia Diagnostic centre Bansilal Nagar Aurangabad.
Corresponding Author
Dr Md Ashfaque Tinmaswala
Resident in Radiology, Tapadia Diagnostic centres Bansilal Nagar Aurangabad.

Abstract
Excessive parathyroid hormone secretion is one of the important causes of bone resorption. Under the influence of excessive parathyroid hormone bones undergo cystic and fibrotic changes. These characterstic changes are called brown tumor. Brown tumors are rare manifestation of hyperparathyroidism and usually occurs in less than 2% patients of hyperparathyroidism.
The skeletal manifestations of hyperparathyroidism are usually found in phalanges, metacarpals, facial bones, pelvic bones, ribs and sometimes femur and tibia. The incidence of these changes in humerus is uncommon. We report here a case of brown tumor involving shaft of humerus. Patient presented to us after a trivial trauma. On X-ray she had lytic lesion involving shaft of humerus. She was further investigated and was found to be having hyperparathyroidism secondary to diffuse parathyroid hyperplasia.
Keywords: *Hyperparathyroidism, parathyroid hyperplasia, Brown tumor, humerus, parathyroid scintigraphy.*

Introduction

Excessive parathyroid hormone secretion may be responsible for varied signs and symptoms including abdominal pain, vomitings, polyuria, urolithiasis, nephrocalsinosis, gastric ulcers and pathological fractures [1]. One of the classic features of bony lesions caused by hyperparathyroidism is brown tumor. Brown tumor actually is a misnomer because it is not a true tumor. It is called so because of its characteristic brown color. These tumors are usually found in femur, clavicle and jaw. But they may sometimes be present in humerus. Brown tumor may have varied appearance including lytic lesion, bony expansion and endosteal resorption [2]. Other skeletal manifestation of hyperparathyroidism may include subperiosteal

resorption of phalanges, osteopenia and pathological fractures.

Case Report

A 23 year old female was referred to us with a history of pain in left shoulder since 3-4 months. There was also a history of recurrent abdominal pain, vomitings and constipation. Patient had a trivial trauma 1 week back after which she developed severe pain in right arm and shoulder. An X-Ray was done which showed lucency of the proximal humerus (Fig 1).

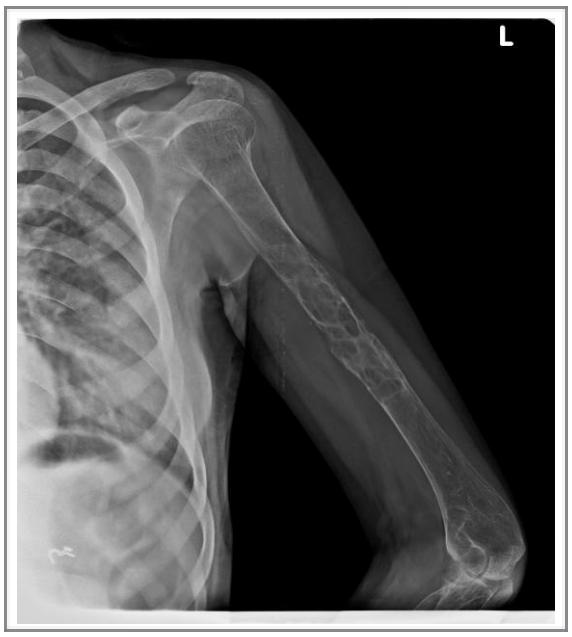

Fig 1: Radiograph showing lytic lesion in shaft of humerus suggestive of brown tumor.

Anteroposterior radiograph of the both hands which showed mild osteopenia but there was no characteristic subperiosteal resorption of distal phalanges [Fig: 2]

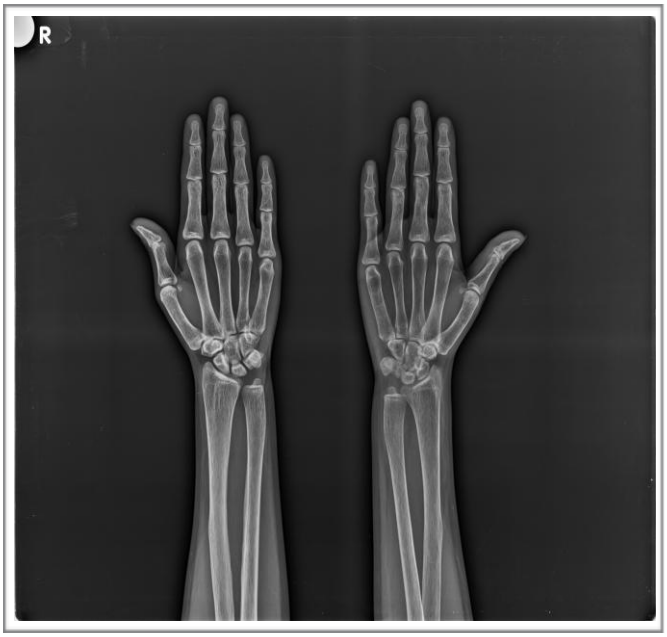

Fig 2 : X-ray both hands revealed osteopenia.

Given the typical features of brown tumor parathyroid hormone levels were sent. The serum parathyroid hormone (PTH) estimation confirmed the diagnosis of hyperparathyroidism. Serum PTH levels were found to be 220 pg/ml (Reference range - 15-65 pg/ml). Since parathyroid adenoma is the most common cause of hyperparathyroidism, 99mTc MIBI scanning was done which showed normaltracer uptake the tracer wash out was adequate with no residual focal retention anywhere in neck. Screening of mediastinum (for ectopic parathyroid) revealed no focal lesion.

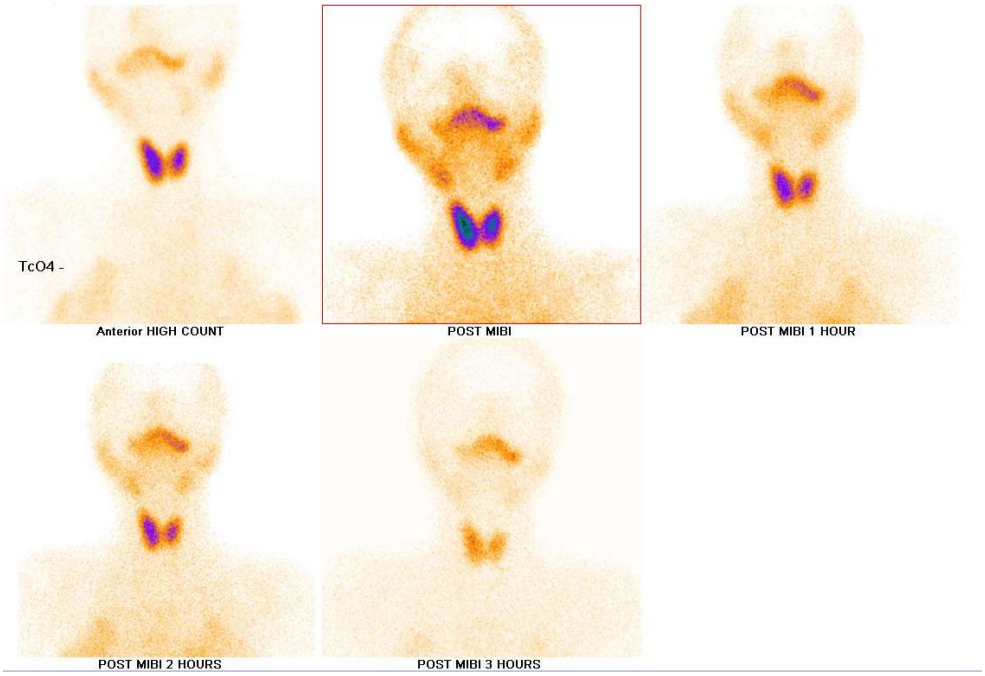

Fig 3 : 99mTc MIBI scan showed normal tracer uptake and no residual retention ruling out parathyroid adenoma.

Since there was no focal residual retention of tracer a parathyroid adenoma was ruled out. Since there was no evidence of any ectopic site tracer retention even a parathyroid adenoma in ectopic location was not a possibility. A provisional diagnosis of primary hyperparathyroidism secondary to parathyroid hyperplasia was made and calcium and vitamin D supplementation were started with an advice of regular follow up.

Discussion

The most common cause of hypercalcemia is excessive production and secretion of parathyroid hormone either by an autonomously functioning parathyroid adenoma or parathyroid gland hyperplasia. Sometimes other rare causes like carcinoma, ectopic parathyroid adenoma or familial syndromes like MEN 1 and MEN 2a may be responsible for hyperparathyroidism [3]. Irrespective of the etiology the hypersecretion of parathyroid hormone causes excessive resorption of calcium from bone which consequently results in osteopenia. These changes may result in subperiosteal resorption of distal phalanges, tapering of clavicles, brown tumors of femur tibia and rarely humerus [4]. Brown tumor is a misnomer because it is not a true neoplasm rather it's a lytic lesion secondary to hyperparathyroidism [5]. The diagnosis of brown tumor depends upon demonstration of increased level of parathyroid hormone in presence of characteristic bony lesions. On plain X-ray brown tumor may present as lytic bone lesion with endosteal scalloping [6]. Ultrasonography can be very sensitive and specific for localizing a parathyroid adenoma but unfortunately ultrasound

as a technique is highly operator dependent [7]. Moreover in many cases ectopic adenomas are responsible for hyperparathyroidism which can't be picked up by ultrasound of usual parathyroid gland location. Other techniques which can be used to localize parathyroid adenomas are Computed tomography, MRI and 99mTc MIBI scan [8]. Management depends upon the cause of hyperparathyroidism and may include surgical resection in cases of parathyroid adenoma, Calcium and vitamin D supplementation in cases where there is no adenoma. Pharmacological agents like biphosphonates can be given in some cases [9]. In resistant cases calcimimetic drugs can be used [10].

Conclusion

Diagnosis of hyperparathyroidism should always be considered in patients presenting with lytic lesions in bones especially after malignancy has been excluded. These lytic lesion are more common in femur and tibia. But may also be present in humerus like we have demonstrated in this case.

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