

## Case Report

## An unusual case of hyperparathyroidism, presenting as multiple skeletal lesions

## ABSTRACT

We report the case of a 43-year-old male patient, who presented with severe osteoporosis and pain at multiple sites and a chest X-ray suggestive of few cystic lesions in bilateral ribs. Subsequently, the patient was referred for bone scan, in view of the suspicion of polyostotic fibrous dysplasia or neoplastic lesions. Bone scan showed homogenously increased tracer uptake in the axial and appendicular skeletal system, suggestive of metabolic superscan. Computed tomography neck localized right inferior parathyroid adenoma and expansile lytic skeletal lesions suggestive of brown tumors were also seen. This case highlights the importance of bone scan, helping in the differential diagnosis of multiple skeletal lesions.

**Keywords:** Brown tumors, hyperparathyroidism, Methylene diphosphonate (MDP) bone scan, skeletal lesions

## INTRODUCTION

Majority of the hyperparathyroidism cases are diagnosed when a routine assay shows hypercalcemia. Symptoms include recurrent renal stones, asthenia, neuromuscular or psychiatric disorders, gastrointestinal manifestations, or osteoporosis. Brown tumors are rare nonneoplastic lesions that arise in the setting of hyperparathyroidism. They can arise as solitary or multiple lesions of any bone, more common in the extremities, clavicle, ribs, and pelvis. We report an unusual case in which a patient presented with multiple skeletal lesions and bone scan and further investigations helped in the diagnosis.

## CASE REPORT

A 43-year-old male patient who presented with pain at multiple sites was referred for whole-body bone scan with suspicion of polyostotic fibrous dysplasia, other differentials being multiple myeloma or metastatic lesions. Whole-body bone scan, anterior and posterior views [Figure 1a and b], was suggestive of homogenously increased tracer uptake in the axial and appendicular skeleton system with faint visualization of the kidneys, likely suggestive of metabolic

superscan. Since chest X-ray revealed cystic lesions, and relevant biochemical parameters were raised serum calcium (12.8 mg/dl, range: 8.6–10.2 mg/dl), raised alkaline phosphatase (592 IU/L, range: 20–140 IU/L), and low inorganic phosphorus (1.8 mg/dl, range: 2.5–4.5 mg/dl), suspicion of parathyroid adenoma was raised. Noncontrast computed tomography neck, transaxial and coronal sections [Figure 1c and e] localized large hypodense nodular lesion in relation to the inferior pole of the right lobe of the thyroid gland, and bone window transaxial and coronal sections [Figure 1d and f] revealed expansile lytic lesions involving the ribs and scapula. On further

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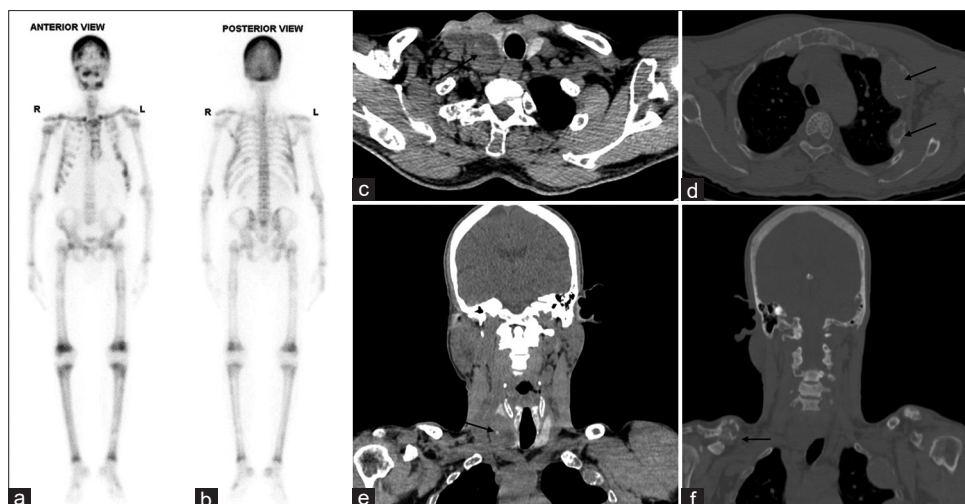
**Submission:** 26-Aug-19, **Accepted:** 15-Oct-19, **Published:** 17-Jan-20

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**How to cite this article:** Gupta N, Pruthi A, Verma R, Manocha A. An unusual case of hyperparathyroidism, presenting as multiple skeletal lesions. World J Nucl Med 2020;19:149-51.

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<b>DOI:</b> 10.4103/wjnm.WJNM_69_19	

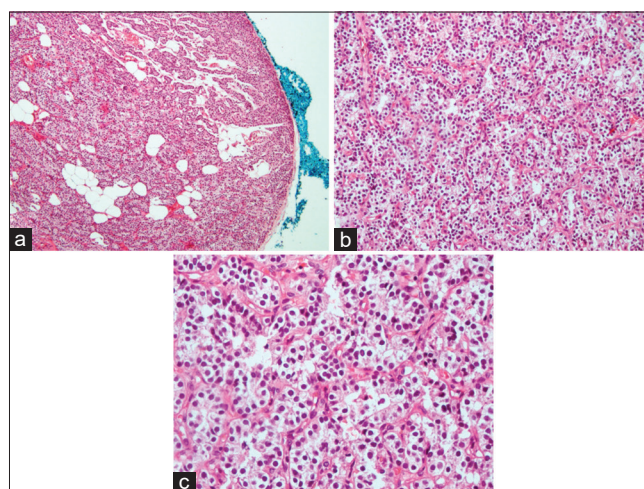


**Figure 1:** Whole-body bone scan, anterior and posterior views (a and b), suggestive of homogeneously increased tracer uptake in the axial and appendicular skeleton system with faint visualization of the kidneys. Noncontrast computed tomography neck, transaxial and coronal sections (c and e), localized large hypodense nodular lesion in relation to the inferior pole of the right lobe of the thyroid gland, and bone window transaxial and coronal sections (d and f) revealed expansile lytic lesions involving the ribs and scapula

blood test, serum parathyroid hormone was  $\sim 1700$  pg/ml (range: 10–65 pg/ml), correlating with other findings and confirming diagnosis of primary hyperparathyroidism with multiple skeletal lesions. Subsequently, the lesion was excised, and histopathology report [Figure 2] confirmed parathyroid adenoma.

## DISCUSSION

Primary hyperparathyroidism is a disease characterized by excessive secretion of parathormone. Multiple skeletal lesions (brown tumors) represent a rare clinical manifestation of prolonged hyperparathyroidism and reported in approximately 3% of patients with primary hyperparathyroidism.<sup>[1]</sup> Differential diagnosis of multiple bony lesions include metastatic lesions, bone cysts, osteosarcoma, and giant-cell tumor. There are various reports of brown tumors imitating skeletal metastases.<sup>[2]</sup> Although homogeneously increased tracer uptake in bone scan, with greater uptake in the appendicular skeleton compared to axial skeleton and faint visualization of kidneys, raises suspicion of metabolic superscan and in presence of raised calcium, primary hyperparathyroidism appears more likely with less chances of malignancy, but few cases of secondary hyperparathyroidism have been reported in prostate cancer patients with bone metastases.<sup>[3]</sup> However, there was no known history of carcinoma prostate in our patient, and serum prostate-specific antigen levels were also normal (0.5 ng/ml, range: 0.2–4.0 ng/ml); later, histopathology report of parathyroid lesion confirmed parathyroid adenoma in the patient. Few cases have been reported in literature, where multiple skeletal lesions were later diagnosed due to hyperparathyroidism.<sup>[2,4-7]</sup> The classical radiographic features



**Figure 2:** Histopathology images of the specimen. Section (a) shows an encapsulated tumor composed of cells arranged in nests separated by thin-walled vasculature (H and E,  $\times 4$ ). Section (b) shows an encapsulated tumor composed of cells arranged in nests separated by thin-walled vasculature (H and E,  $\times 10$ ). The adenoma cells show (c) monomorphic nuclei with stippled chromatin, inconspicuous nucleoli, and moderate amount of clear-to-pale eosinophilic cytoplasm (H and E,  $\times 20$ )

of skeletal lesions (brown tumors) in hyperparathyroidism are osteopenia and diffuse subperiosteal bone resorption.<sup>[8]</sup> Thus, in case of hypercalcemia and multiple lytic lesions, primary hyperparathyroidism should always be kept in differential diagnosis, and further biochemical evaluation and bone scan can help in management.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

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