Case Report

A Brown Tumor Simulating Bone Metastases

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ABSTRACT

Primary hyperparathyroidism usually presents with renal, gastrointestinal, mental and skeletal signs and symptoms. Brown tumor is a benign lesion that arises as a direct result of parathyroid hormone on bone tissue in some patients with hyperparathyroidism. Multiple brown tumors may simulate a malignant neoplasm and it is a real challenge for the clinicians in the differential diagnoses. Here, we present a 68-year-old man with multiple lytic lesions in pelvis bones, highly suspicious for metastatic malignancy that finally we found that the patient had primary hyperparathyroidism.

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Introduction

Primary hyperparathyroidism is a disorder of calcium, phosphate, and bone metabolism caused by increased level of parathyroid hormone. The elevation of parathyroid hormone usually leads to hypercalcemia and hypophosphatemia. Patients may have multiple signs and symptoms, including recurrent nephrolithiasis, peptic ulcers, mental changes and less frequently, extensive bone resorptions. The frequency of bone disease in hyperparathyroidism is about 10-20% (1).

Brown tumors are well-defined lesions that may be purely lytic to sclerotic. Histologically, brown tumor is a benign lesion, which may cause swelling, pathological fracture and bone pain in the skeletal system. There may be multiple brown tumors, although they are rare in the setting of primary hyperparathyroidism and they commonly arise in the pelvis, ribs, clavicles and extremities, though atypical locations have been frequently defined (1-2).

Case Report

A 68-year-old man was referred to general ward of Imam Khomeini hospital, Tehran, Iran, complaining of persistent low back and pelvic pain for over 6 months. The pain had been persistent and progressing with variable severity, exacerbated by walking and also any physical activity. The patient also reported anorexia, constipation, urinary frequency and nocturia. His past medical history was positive for nephrolithiasis and hypertension.

There was no family history of malignancy or other diseases. Drug history was positive for intermittent use of nonsteroidal anti-inflammatory drugs (NSAIDs) and nosartan.

On physical examination, the patient appeared ill. Head and neck examinations were normal except a bony protrusion at the frontal bone. No cervical masses or lymphadenopathy were palpated. Lungs, heart and abdominal exam were normal. There was no point tenderness on vertebrae or pelvis. No neurovascular deficit was identified.

Laboratory findings at the time of admission are presented in table 1.

A plain digital radiography of pelvis and lumbar vertebrae revealed decrease of bone density in pelvis and vertebrae and marked lytic lesions on right iliac bones. A lumbar spine magnetic resonance imaging (MRI) showed scattered expansile destructive lesions in body and left ala of sacrum and right iliac bones (Figure 1).

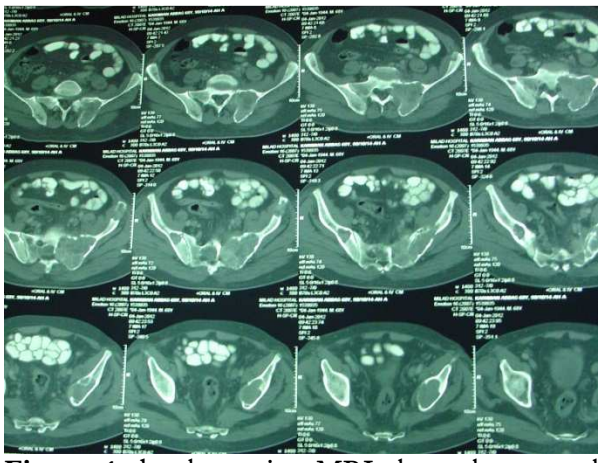

Figure 1. lumbar spine MRI showed scattered expansile destructive lesions in body and left ala of sacrum and right iliac bone

A whole body bone scintigraphy showed increased activity in thoracolumbar spine, left side of the sacrum and right superior ramus (Figure 2). Considering the patient's age and the clinical manifestations, multiple bony metastatic lesions and multiple myeloma were the most likely diagnoses. All of the findings indicated metastatic bone disease, but computed tomography (CT) scan of the chest, abdomen and pelvis were normal. Tumor markers (α-fetoprotein, prostate-specific antigen, and carcinoembrionic antigen) were all within normal limits. Serum and urine protein electrophoresis were done. Lack of gamma peak in electrophoresis and no proteinuria in 24-hour urine collection in association with increased uptake in bone scan made multiple myeloma a less-likely diagnosis.

Because of high calcium and low phosphorus levels, serum intact parathyroid hormone (iPTH) and 25-OH vitamin D levels were measured. Serum iPTH level was 681 pg/ml (normal 15-65) and serum 25-OH vitamin D level was 38 ng/ml (sufficient 30-100). Urine calcium in a 24-hour colection was 240 mg/day (normal 25-300). A parathyroid scan (^{99m}Tc sestamibi) was done which showed parathyroid adenoma in the right thyroid lobe (Figure 3). Postoperative exploration confirmed existence of a parathyroid adenoma in the same location. This suggested the diagnosis of primary hyperparathyroidism.

Two weeks postoperatively, the serum levels of calcium and iPTH became normal. At a follow-up visit 9 months later, marked improvement in the patient's clinical condition and radiological findings were noted.

Table 1. Laboratory findings of the patient on admission

Laboratory test		Patient's value	Reference value
Serum calcium		12.7 mg/dl	8.4-10.7 mg/dl
Serum phosphorus		2.3 mg/dl	2.5-4.5 mg/dl
Serum albumin		4 g/dl	3.5-5.2 g/dl
Serum alkaline phosphatase		1194 IU/l	64-306 IU/l
Erythrocyte sedimentation rate (ESR)		34 mm/hour	< 30 mm/hour
Serum creatinine		1.6 mg/dl	0.6-1.1 mg/dl
Serum urea		28 mg/dl	13-43 mg/dl
Complete blood count (CBC)	White blood cell (WBC)	5600/mm^3	4000-10000/mm^3
	Hemoglobin (Hb)	14 g/dl	12-16 g/dl
	Mean corpuscular volume (MCV)	87 fl	80-99 fl
	Platelet (Plt)	245000/mm^3	150000-400000/mm^3

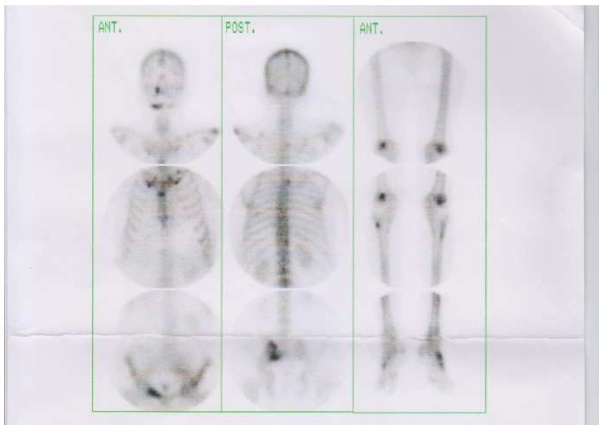

Figure 2. Whole body bone scintigraphy showed increased activity in thoracolumbar spine, left side of the sacrum and right superior ramus

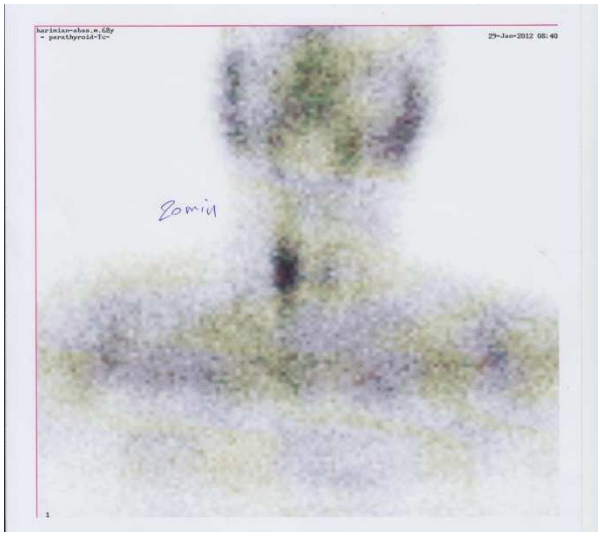

Figure 3. Parathyroid scan showed parathyroid adenoma in the right thyroid lobe

Discussion

Primary hyperparathyroidism is frequently caused by development of parathyroid adenoma and less often by hyperplasia or carcinoma (3). Manifestations of hyperparathyroidism primarily involve the kidneys and the skeletal system. Clinical manifestations of kidney involvement are nephrolithiasis, which is common, and nephrocalcinosis, which is uncommon (4). Skeletal changes in hyperparathyroidism include bone resorption, bone cyst, osteoporosis, osteosclerosis, and brown tumors (5).

Brown tumor is a benign reactive destructive process of bone that occurs in patients with either primary or secondary hyperparathyroidism. Histologically, brown tumors represent localized accumulation of fibrous tissue and giant cells, which can replace bone and may even produce osseous expansion and subsequently undergo necrosis and liquefaction, producing cysts as a result of intraosseous bleeding and tissue degeneration (6). Common sites of involvement are pelvis, ribs, clavicles and femur.

Today, brown tumors are relatively rare, due to earlier diagnosis and prompt treatment of hyperparathyroidism. The reported prevalence of brown tumor is 0.1% and is seen more often as a result of secondary hyperparathyroidism because of an increasing number of dialysis patients and their increased longevity (5, 6). Multiple bone involvements are exceedingly rare in primary hyperparathyroidism and may be mistaken for the clinical diagnosis of metastatic lesions (6-9).

Metastatic bone disease is the first rational diagnosis in a patient with multiple osteolytic lesions. It would be rational to complete a tumor survey including bone scan, chest and abdominal imagings and relevant laboratory studies including cell counts, biochemical analyses and tumor markers. However, since other etiologies such as multiple myeloma or brown tumor should also be considered, serum phosphate, calcium and iPTH levels and serum protein electrophoresis should be measured before initiating a whole set of tumor survey. High serum calcium and iPTH levels with imaging evidence of parathyroid adenoma in our patient, all pointed the diagnosis of primary hyperparathyroidism and brown tumors.

With the correct diagnosis of brown tumor caused by parathyroid adenoma, the key treatment is excision of the adenoma and except for impending pathologic fracture; the multiple osteolytic lesions require no further orthopedic surgery, since they would resolve following normalization of serum iPTH level (6-10). In our case, the osteolytic lesion did not produce any symptom and we did not use any intervention; a follow-up visit showed marked improvement in patient's clinical condition and radiological findings.

In summarize, about 90% of the patients

with skeletal metastases present with multiple lesions. In the presence of hypercalcemia and radiographic evidence of multiple lytic lesion, primary hyperparathyroidism should always be considered in differential diagnosis and should be looked into once more common causes such as malignancy have been excluded. A high suspicion will lead to an early diagnosis.

Conflict of Interests

Authors have no conflict of interests.

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