

Brown Tumors Due to Parathyroid Carcinoma; ^{99m}Tc-MIBI Scan Findings (Case Report)

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= 국문 초록 =

부갑상선 암증에 의해 발생한 갈색 종양: ^{99m}Tc-MIBI 스캔 소견 (증례 보고)

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갈색 종양 (brown tumor or osteitis cystica fibrosa)은 일차성 또는 이차성 부갑상선 기능항진증의 골소견 중 하나이다. 부갑상선 질환이 의심될 때에 과거에는 ²⁰¹Tl/^{99m}Tc 감영 스캔이 가장 많이 이용되는 비침습적 방법 중 하나였으나, 근래에는 ^{99m}Tc-MIBI를 이용한 핵의학 영상이 더 널리 사용되고 있다. ^{99m}Tc-MIBI의 종양 섭취에는 혈류의 증가, 세포 대사 및 미토콘드리아의 활동성이 관계된다고 보고되었지만, 갈색 종양에의 ^{99m}Tc-MIBI의 섭취 기전에 대해서는 거의 알려져 있지 않다. 저자들은 이전에 증족골의 거대 세포종 (Giant cell tumor)으로 오진 하였던 환자에서, ^{99m}Tc-MIBI스캔상 갈색 종양이 의심되었고, 후에 수술을 통해 부갑상선 암증 (Parathyroid carcinoma)이 확인 되었던 1예를 보고하고자 한다.

noma evaluated by ^{99m}Tc-MIBI which was previously misdiagnosed as "Giant cell tumor".

INTRODUCTION

Brown tumor is one of the skeletal manifestations of hyperparathyroidism. The most common cause of primary hyperparathyroidism is solitary adenoma followed by hyperplasia. Parathyroid carcinoma is rare in frequency^{1,2)}. Although ²⁰¹Tl/^{99m}Tc subtraction scanning was one of the most popular noninvasive techniques for detecting parathyroid disease in the past³⁾, scintigraphy using ^{99m}Tc-hexakis 2-methoxy isobutyl isonitril (MIBI) or sestamibi is more commonly used recently⁴⁾. We report a case of multiple brown tumors due to parathyroid carci-

CASE REPORT

A 62-year-old female patient presented with painful limitation of motion of the right hip for 5 months. She had a history of removal of "Giant cell tumor" of the right 5th metatarsal bone at another institution 5 months prior to visiting our hospital. CT of the pelvis demonstrated osteolytic lesions in right acetabulum, the superior ramus and body of right pubic bone suggesting osteolytic metastases(Fig. 1). The patient underwent open biopsy of the osteolytic lesion in right pubic bone but, specimen was too small to diagnose histologically. Then whole body scintigraphy using ^{99m}Tc-MIBI was performed to

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rule out multiple metastases and the scan revealed abnormal uptakes in right pelvis, both shoulders and left knee (Fig. 2). Also noted was an incidental finding of focal increased uptake in lower aspect of the right thyroid gland on early and delayed images with slow wash out indicating a parathyroid lesion (Fig. 3). Ultrasonography depicted a lobulated 3.0×1.8×1.4cm sized inhomogenous hypochoic lesion in the right lower pole of thyroid gland. The pertinent laboratory data revealed serum Ca of 16.6mg/dl (N:8.4-10.2), Inorganic phosphorus of 2.1mg/dl (N:2.4-4.5), Alkaline phosphatase of 320IU/L (N:42-98) and serum PTH (parathormone) level of

1207pg/ml (N:10-65). She then underwent right thyroid and parathyroidectomy. Histologic exami-



Fig. 1. CT of the Pelvis depicts an osteolytic lesion in the right ilium (arrow). Multiple other lesions are not shown in this figure.

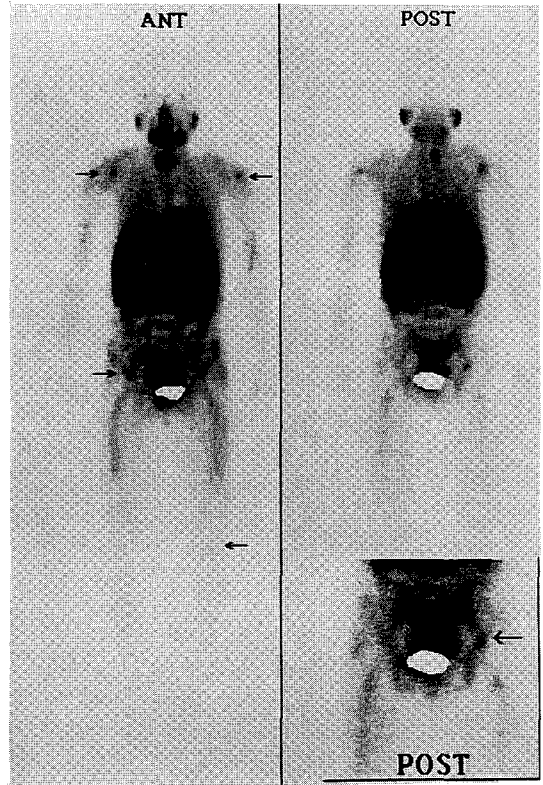


Fig. 2. Whole body scintigraphy using ^{99m}Tc-MIBI reveals mild increased uptake in left knee, both shoulders and right acetabulum (arrows). Iliac lesion on the right is shown in insert (right lower corner).

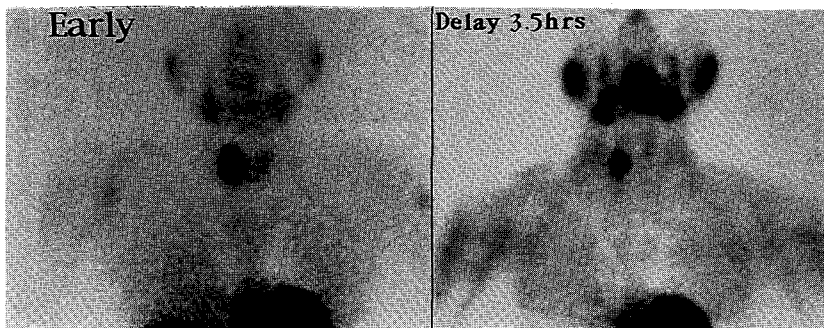


Fig. 3. Magnified neck view from the whole body MIBI scan demonstrates increased uptake in the right thyroid lobe which persists upto 3 & 1/2 hours indicating a parathyroid lesion with slow washout.

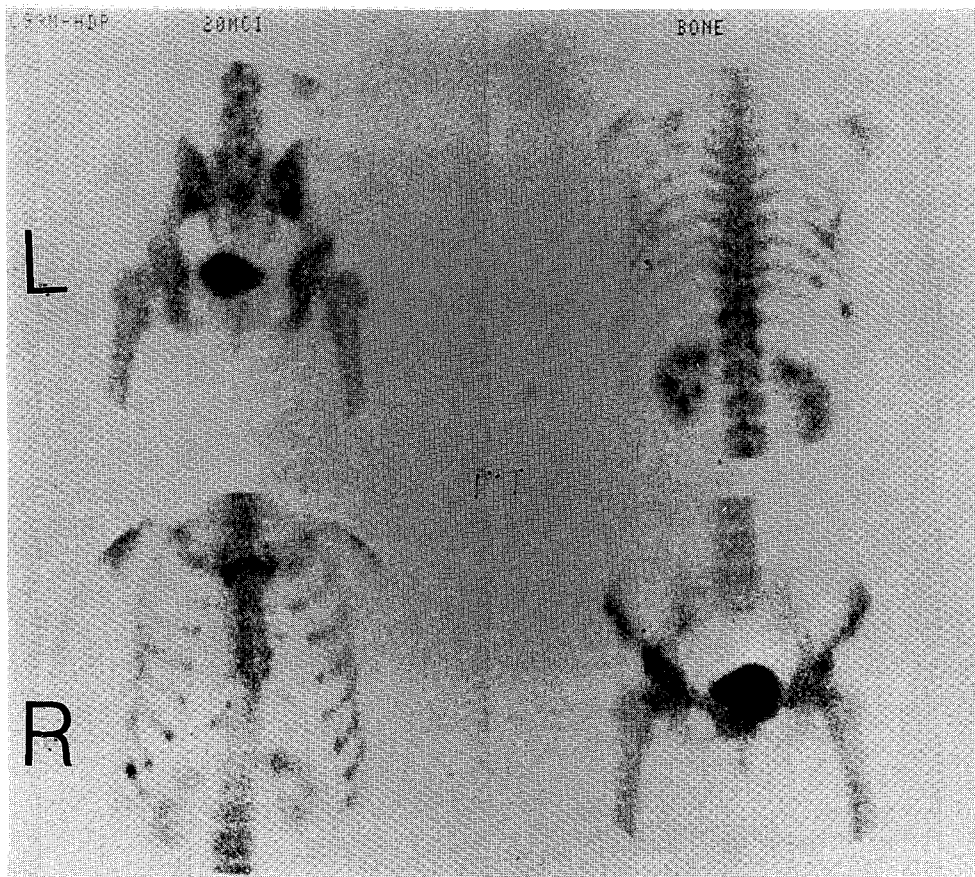


Fig. 4. Multiple spot views of bone scan using ^{99m}Tc -MDP show multiple increased uptakes in the ribs, right sacroiliac joint and right acetabulum.

nation of the parathyroid lesion confirms carcinoma without local spread. But, we could not follow up the patient because she went to the another hospital.

DISCUSSION

Brown tumors or osteitis cystica fibrosa are highly vascular and well defined lesions of purely lytic to sclerotic⁵⁾. Common sites of involvement are the facial bones, pelvic bones, ribs and femurs. On reviewing the ^{99m}Tc -MDP (methylene diphosphonate) bone scan which was performed 5 months prior to visiting our hospital, there were multiple increased uptakes

in pelvis and ribs (Fig. 4). Although the uptakes in ^{99m}Tc -MDP bone scan was not detected at first diagnosis, the distribution was similar to that of ^{99m}Tc -MIBI scan which was the same result as previously reported cases. Histologic features of brown tumor are easily misinterpreted as giant cell tumor because the findings are very similar. Review of the histology of our patient was intramedullary giant cells with background stromal cells consistent with a brown tumor. Although tumor uptake of ^{99m}Tc -MIBI is related to increased blood flow, cellular metabolism and mitochondrial activity, the mechanism of ^{99m}Tc -MIBI uptake of brown tumor is poorly understood. But, giant cells,

macrophages and increased vascularity of the brown tumor may be responsible for ^{99m}Tc -MIBI uptake. Giant cell tumor is histologically similar to brown tumor and also giant cell tumor avidly takes up ^{99m}Tc -MIBI (unpublished data—personal experience). Therefore, we believe ^{99m}Tc -MIBI uptake in giant cell tumors and brown tumors is probably similar in uptake mechanism.

SUMMARY

Whole body ^{99m}Tc -MIBI scan in conjunction with parathyroid scan is an effective method in detecting parathyroid lesions in patients with bone pain and possible bone lesions such as brown tumors.

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