

^{99m}Tc-MDP Whole body Bone Scintigraphy in Multicentric Giant cell tumor : A Rare Case Report

¹Ratan Kumar Chakraborty, ²Rawshan Ara, ³Shakila Zaman Rima, ²Nazmun Nahar, ³Fahima Akther Dowel, ⁴M Nasim Khan, ⁵Mohammad Saiful Islam, ⁶Muhammad Azizur Rahman Bhuiyan

¹Director & CMO, ²Principal Medical Officer ³Senior Medical Officer ⁴Ex Director & CMO
Institute of Nuclear Medicine & Allied sciences (INMAS), Mymensingh
⁵Professor of Orthopedics, Mymensingh Medical College Hospital, Mymensingh.
⁶Medical officer, Upazila Health Complex, Sorail, Brahmanbaria.

Correspondence Address : Dr Ratan Kumar Chakraborty, Professor & CMO, INMAS, Mymensingh. Mymensingh-2200.
E-mail: drratanchakraborty@gmail.com.

ABSTRACT

Background: Giant cell tumor (GCT) or osteoclastoma are rare benign bone tumor and best known for their local aggressiveness and high recurrence. GCT frequently involves tubular long bones (75-90%). Multicentric giant cell tumor is rarer type of GCT. We report a case of a young girl with multicentric GCT.

Case History: A 18 years old girl was presented with swelling of right middle finger. X-ray of right hand showed an oval shaped lytic lesion in middle phalanx of right middle finger. Then she underwent open biopsy and histopathologic diagnosis was GCT. Three months later she again developed swelling in left side of mandible. Excision biopsy from left side of mandible confirmed the diagnosis of GCT. Seven months later she again developed swelling in upper part of left humerus. She was then sent to our department for ^{99m}Tc-MDP Whole body Bone Scintigraphy. ^{99m}Tc-MDP Whole body Bone Scintigraphy with regional SPECT/CT identifies additional three lesions in right 12th rib, left iliac bone and distal left tibia which then confirmed by histopathology.

Conclusion: ^{99m}Tc-MDP Whole body Bone Scintigraphy with regional SPECT/CT is very much useful in detection of occult lesions in multicentric GCT.

Keywords: Giant cell tumor, bone, multicentric, ^{99m}Tc-MDP Whole body Bone Scintigraphy.

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INTRODUCTION

Giant cell tumor (GCT) of bone was first described in 1818 by Cooper and Travers (1). Giant cell tumor (GCT) comprises of about 4-5% of all primary bone tumors (2). Multicentric GCT is further more rare accounts for only >1% of all GCTs (3). They are locally aggressive tumor usually found in 20-45 years age (4). Multicentric GCT (MGCT: two or more centers) is a rare variety of GCT

(5). These lesions occur in slightly younger age group and are often found in distal extremities, particularly the hands and feet (3). MGCT may be synchronous (present as multiple lesions at once or within 6 months of initial tumor) or metachronous (diagnosis of second tumor occurs after 6 months of initial tumor) (6). Around 100 cases of MGCT have been reported worldwide (2). Multiple imaging modalities can identify solitary GCT very well eg. conventional radiography, Computed tomography, Magnetic resonance Imaging (7). But it is difficult to identify multicentric GCT with these imaging modalities. Fluorodeoxyglucose (FDG)- positron emission tomography (PET) can help in detection of multifocal lesions (8). But FDG-PET is only available in few institutes and it is beyond the reach of poor people of our country. Here we present a case of multicentric GCT; in which ^{99m}Tc-MDP Whole body Bone Scintigraphy with regional SPECT/CT identifies additional lesions that helped in further management of the patient.

CASE REPORT

A woman of 18 years of age was presented to Mymensingh Medical College Hospital with a swelling in right middle finger for 2 months. The swelling was hard; not aggressive nor associated with pain or tenderness. There is no history of trauma. X-ray of right hand showed an oval shaped lytic lesion in middle phalanx of right middle finger. Then she underwent open biopsy and histopathologic diagnosis was GCT. Surgical curettage was done with placement of bone cement.

Again, she developed swelling in left side of mandible after three months of detection of previous lesion and histopathology confirmed the diagnosis of GCT. She was then treated accordingly. Seven months later she again developed swelling in upper part of left humerus. Then she was sent to our institute for ^{99m}Tc -MDP Whole body Bone Scintigraphy. Planar ^{99m}Tc -MDP whole body bone scan showed focal areas of increased uptake of radiotracer in proximal part of left humerus, right 12th rib and distal part of left tibia; faint uptake is also seen in left iliac bone (Figure 1). Regional SPECT/CT from chest to pelvis showed a subarticular expansile lytic lesion involving proximal part of left humerus (Figure 2) without any calcification or pathological fracture or periosteal reaction. CT image showed a lytic lesion in right 12th rib. CT portion also showed a lytic lesion in left iliac bone at left sacroiliac joint (Figure 3). CT guided FNAC from these lesions confirmed the diagnosis of GCT (Figure 4).

Other investigations like complete blood count, serum calcium, and alkaline phosphatase are within normal limit. Serum parathormone was also normal. There was no radiologic manifestation of hyperparathyroidism.



Figure 1: Planar image of ^{99m}Tc -MDP whole body bone scan shows increased uptake of radiotracer in left proximal humerus, right 12th rib and left distal tibia.

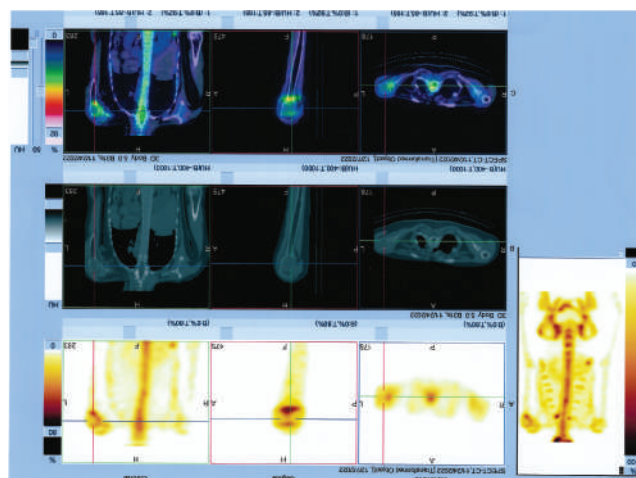


Figure 2: ^{99m}Tc -MDP SPECT/CT image from chest to pelvis showed an expansile subarticular lytic lesion in proximal humerus without any calcification or periosteal reaction.

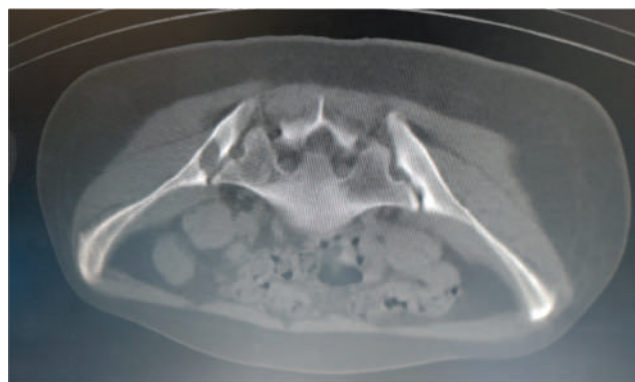


Figure 3: CT portion of SPECT/CT image showed a lytic lesion in left iliac bone at the sacroiliac joint.

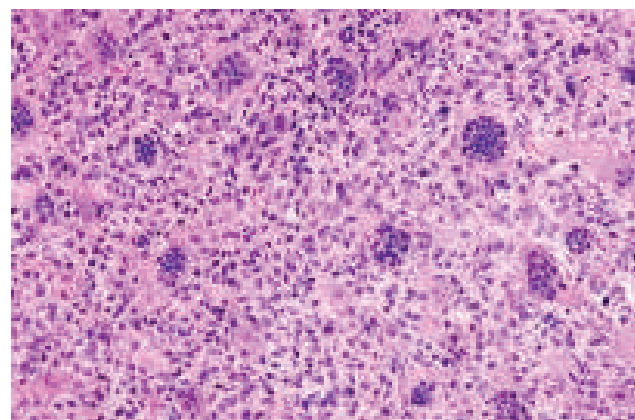


Figure 4: Microscopic image of lesion from proximal left humerus showing round or oval cells having eosinophilic cytoplasm with round or oval nuclei with indistinct nucleoli and multiple multinucleated giant cells suggestive of giant cell tumour.

DISCUSSION

GCT usually present as solitary lytic lesion involving metaphyseal-epiphyseal region of long bones in a skeletally mature person. There are six common sites of GCT in Goldenberg's series namely distal femur, proximal tibia, distal radius, proximal femur, sacrum and proximal fibula (9). Multicentric GCTs are rare and mostly synchronous with slightly female predominance (10).

The cause behind this may be the effect of estrogen over osteoclasts (8). We classified our case as synchronous as well as metachronous because some of the lesions appear within and some after 6 months of detection of initial lesion.

The pathogenesis of MCGT is not clear but probable mechanisms are contiguous spread, iatrogenic seeding of tumor cells, benign metastasis, malignant transformation and de novo formation (3). Involvement of diaphysis is more in MCGT than Solitary GCT (11). Recurrence of rate is lower in MGCT compared to that of solitary GCT (3). Pulmonary metastasis in MGCT is more frequent than solitary GCT (6).

Diagnosis of MCGT is difficult and needs clinical suspicion, serological and radiologic support. Other differential diagnoses like hyperparathyroidism, paget's disease, fibrous dysplasia, metastases and multifocal osteomyelitis should be ruled out (2, 6).

Plain radiograph till now is the primary investigation modality for diagnosis of solitary GCT of bone. Conventional radiograph shows an eccentric subchondral well-defined lytic lesion with non-sclerotic margin in an uncomplicated GCT (12). Magnetic resonance (MR) imaging findings are nonspecific, usually show low signal in T1-weighted images, heterogeneous high signal intensity on T2-weighted images and enhance after intravenous administration of gadolinium contrast material (12). ^{99m}Tc-MDP Whole body Bone Scintigraphy shows increased uptake of tracer in GCT which may be diffuse (40%) or peripheral with little central activity as that of doughnut (60%) (13). PET shows the metabolic activity of the tumor and helps in localization of distant disease (14).

Radiologic and histologic diagnosis of solitary and MGCT are similar (6). In our case planar image of ^{99m}Tc-MDP Whole body Bone Scintigraphy showed lesions in left proximal humerus, right 12th rib and left distal tibia.

Regional SPECT/CT showed a subarticular expansile lytic lesion involving left proximal humerus without any calcification or periosteal reaction, another expansile lytic lesion in right 12th rib and CT portion of SPECT/CT additionally identifies a lesion in left iliac bone.

Some authors also suggested skeletal survey and multiple follow ups to detect MGCT (15).

CONCLUSION

If radiolucent lesions are found at different sites and at different period of time in a young patient the multifocal GCT should be kept on mind. ^{99m}Tc-MDP Whole body bone scintigraphy with regional SPECT/CT helps in identification of multifocal disease.

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