

Incremental diagnostic value of SPET/CT in precise localization of extraskelatal uptake of bone-seeking agents in multiple myeloma

To the Editor: The extra-skeletal uptake of bone-seeking radiopharmaceuticals is often an unexpected finding [1-2]. It has been stated that bone scans show a great sensitivity in detecting soft-tissue calcifications or metastatic calcinosis [1-6]. A 54 years old woman was admitted for surgical fixation of right clavicular fracture with no underlying osteopathology on the plain films. Pre-operative investigations showed an erythrocyte sedimentation rate (ESR) of 59mm, calcium 3.30mmol/L, phosphate 2.7mmol/L, and creatinine 9.15mg/dL with significant renal insufficiency (GFR<20mL /min). Large amounts of kappa-light chains in both serum and urine raised suspicion for multiple myeloma. Bone marrow aspirate indicating 50% plasma-cell infiltration confirmed the diagnosis. As a whole body survey, ^{99m}Tc-methylene-diphosphonate (^{99m}Tc-MDP) scan was performed, which showed increased radiotracer uptake in the medial right clavicle, the left sixth and eight ribs (posteriorly), scoliotic vertebrae and more interestingly, soft tissue radiotracer activity in left upper abdominal quadrant, mimicking the anatomical picture of left kidney or stomach (Fig. 1).

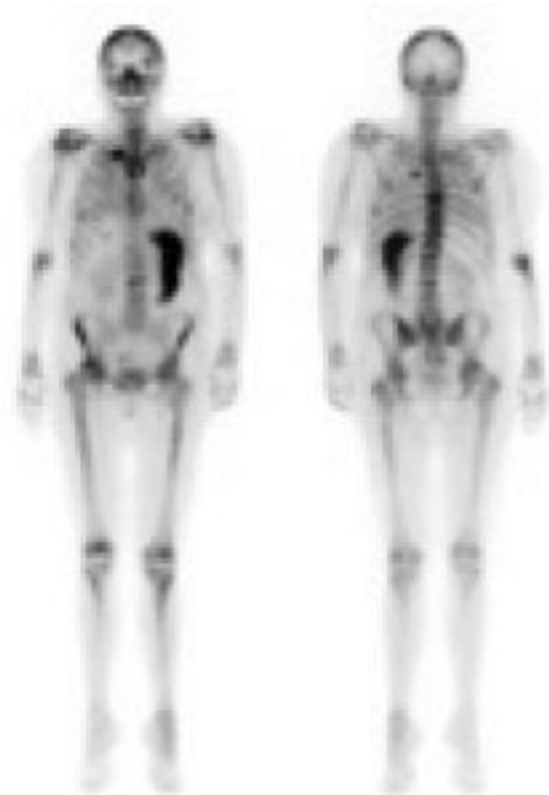


Figure 1. ^{99m}Tc-MDP bone scan showed soft tissue radiotracer activity in left upper abdominal quadrant.

The differentiation was not easily possible, as ultrasonographic findings reported distorted and enlarged configuration of the left renal pelvicalyceal system. In fact, regarding the severe degree of the patient's renal function impairment and the renal ultrasonic appearance of markedly echogenic and thickened cortices, it was not possible to definitely conclude that the radiotracer activity in the left upper abdominal quadrant should be attributed to gastric activity. However, using SPET/CT, diagnosis of metastatic gastric calcification was made (Fig. 2).

As an alternative approach, differentiating renal from gastric morphologies, as presented by the ultrasound and MDP-scan findings, could be achieved based on a simple renal cortical ^{99m}Tc-DMSA scintigraphy, with a lower radiation dose. However, such an approach could not be performed on the same day and two days imaging was its main disadvantage.

Although our case does not add a particularly innovative approach to the already published cases,

emphasizes again on the fact that SPET/CT improves the diagnostic confidence of bone scan and reduces eq-

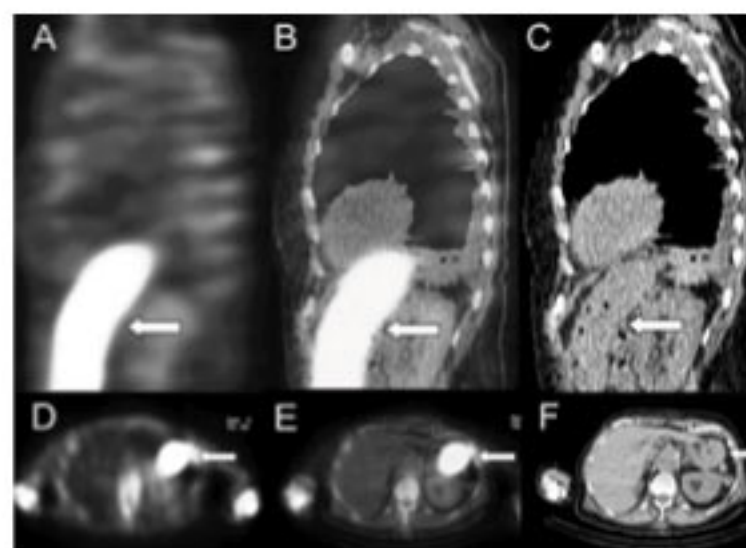


Figure 2. Differentiation between renal or gastric uptake of ^{99m}Tc-MDP and metastatic calcinosis using SPET/CT (A-F). A, Sagittal view of SPET; B, Sagittal view of SPET/CT; C, Sagittal view of CT; D, Transverse section of SPET; E, Transverse section of SPET/CT; F, Transverse section of CT; Arrows show the gastric anatomic location and radiotracer uptake.

uivocal reports. In such cases, definition of anatomical localization of extraskelatal uptakes is much easier by SPET/CT due to better depiction of underlying anatomical details [7].

On the other hand, gastric uptake in bone scintigraphy of multiple myeloma due to metastatic calcification has been infrequently reported [2, 8-10]. Although it has been stated that bone scintigraphy suffers from low sensitivity for the diagnosis of multiple myeloma, due to the minimal osteoblastic activity and hypovascularity of the lesions [11], our case showed multiple foci of increased osteoblastic activity involving the spine and ribs.

Acknowledgement

Research supported by Marie-Curie Training grant from the European Association of Nuclear Medicine (EANM) to the first author.

Bibliography

- Hung GU, Tsai SC, Kao CH et al. Incidental finding of pancreatic calcification on bone scan. *Semin Nucl Med* 2000; 30: 231-3.
- Hirose Y, Tachibana J, Sugai S et al. Metastatic calcification in the stomach demonstrated by a bone scan in Bence Jones lambda myeloma. *Jpn J Med* 1987; 26: 72-5.
- Reitz MD, Vasinrapee P, Mishkin FS. Myocardial, pulmonary, and gastric uptake of technetium-99m MDP in a patient with multiple myeloma and hypercalcemia. *Clin Nucl Med* 1986; 11: 730.
- Low RD, Hicks RJ, Arkles LB et al. Progressive soft tissue uptake of ^{99m}Tc-MDP reflecting metastatic microcalcification. *Clin Nucl Med* 1992;17: 658-62.
- Castaigne C, Martin P, Blocklet D. Lung, gastric, and soft tissue uptake of Tc-99m MDP and Ga-67 citrate associated with hypercalcemia. *Clin Nucl Med* 2003; 28: 467-71.
- Gezici A, van Duijnhoven EM, Bakker SJ et al. Lung and gastric uptake in bone scintigraphy of sarcoidosis. *J Nucl Med* 1996; 37: 1530-2.

7. Horger M, Eschmann SM, Pfannenbergs C et al. Added value of SPECT/CT in patients suspected of having bone infection: preliminary results. *Arch Orthop Trauma Surg* 2007; 127: 211-21.
8. Valdez VA, Jacobstein JG, Perlmutter S, Brusman H. Metastatic calcification in lungs and stomach demonstrated on bone scan in multiple myeloma. *Clin Nucl Med* 1979; 4: 120-1.
9. Kanoh T, Uchino H, Yamamoto I, Torizuka K. Soft-tissue uptake of technetium-99m MDP in multiple myeloma. *Clin Nucl Med* 1986; 11: 878-9.
10. Wynchank S, Brendel AJ, Leccia F et al. Transient intense gastric fixation of ^{99m}Tc-MDP. *Eur J Nucl Med* 1983; 8: 458-60.
11. Ceneli O, Haznedar R. Advanced multiple myeloma with negative bone marrow biopsy and positive soft tissue lesions in the ¹⁸F-FDG PET/CT scan. *Hell J Nucl Med*. 2008; 11: 56-7.

Ali Gholamrezanezhad MD, FEBNM¹, Amir Sabet MD², Samer Ezziddin MD², Hans-Jürgen Biersack MD, PhD², Hojjat Ahmadzadehfar MD²

1. *Research Institute for Nuclear Medicine. Tehran University of Medical Sciences. Tehran, Iran*
2. *Department of Nuclear Medicine. University Hospital Bonn, Germany.*

Ali Gholamrezanezhad, MD, FEBNM

Research Institute for Nuclear Medicine
Tehran University of Medical
Sciences. Tehran. Iran.
E-mail: gholamrezanezhad@razi.tums.ac.ir.
Tel: +98 9122107037.

Hell J Nucl Med 2010; 13(3): 285-286
Published on line:25-11-10