Extra osseous uptake of ^{99m}Tc-MDP in psoas muscle on bone scintigraphy: Importance of SPECT/CT imaging

Case Report

Yasaman Fakhar, Vahid Roshanravan, Mohammad Esmatinia, Somaye Barashki, Ramin Sadeghi

Nuclear Medicine Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

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ABSTRACT

Incidental extra-osseous uptake of ^{99m}Tc-MDP on bone scintigraphy has been frequently reported in the literature; however, calcification of the psoas muscle is a rare condition, which has been reported on magnetic resonance (MR) and computed tomography (CT) imagings. Here we report a 67-year-old woman with acute paraplegia and low back pain who was referred for a ^{99m}Tc-MDP bone scintigraphy. A destructive lesion in lumbar vertebrae was identified; which was compatible with the findings on CT scan. The planar images also showed focally increased activity in the right pelvis, which was confirmed as extra osseous MDP uptake in psoas muscle on the SPECT/CT images.

Key words: Bone scintigraphy; Psoas muscle; Extra osseous uptake; Tuberculosis

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Corresponding author: Dr. Ramin Sadeghi, Nuclear Medicine Research Center, Mashhad University of Medical Science, Mashhad, Iran. E-mail: sadeghir@mums.ac.ir

INTRODUCTION

Incidental extra-osseous uptake of ^{99m}Tc-MDP on bone scan has been frequently reported in the literature [1, 2]. The most common etiologies are related to genitourinary system, or to soft tissue abnormalities, such as heterotopic ossification or myositis. Other etiologies which can concentrate Tc-99m methylene diphosphonate (^{99m}Tc-MDP) are infections including cellulitis, abscess, synovitis, vascular conditions, artifacts related to improper preparation of radiopharmaceutical and urine contamination [1, 3]. SPECT/CT is a modality with high sensitivity for localization of extraosseous uptake of ^{99m}Tc-MDP [4]. Calcification of the psoas muscle is a rare condition which has been reported on magnetic resonance (MR) and computed tomography (CT) imagings [5, 6].

CASE PRESENTATION

We report a 67-year-old-woman presented with acute paraplegia, low back pain and urinary incontinency since 1 week prior to admission. She had no history of recent trauma, fever or weight loss. The lab data revealed normal level of calcium and phosphorous. The patient had been suffering from low back pain and severe lumbar kyphosis for 20 years. She was also a known case of cured pulmonary tuberculosis treated 20 years ago. Compression fracture of fourth lumbar vertebra diagnosed on computed tomography (CT) imaging and the patient was referred to our center for a ^{99m}Tc-MDP bone scintigraphy with presumed diagnoses of either spondylo-discitis, pathologic fracture or metastasis. Three hours after intravenous injection of 740 MBq of ^{99m}Tc-MDP, whole body bone scan was performed using a dual-head gamma camera (GE) equipped with low-energy and high-resolution parallel-hole collimator (13cm/min table speed, matrix size of 256×1024 and 140 keV energy window with 10% width). On whole body images focal zones of increased activity were noted in L4 and L5 (Figure 1); which were compatible with the compression fracture of L4 and severe degenerative changes of L4 and L5 on SPECT/CT images (Figure 2). The planar images also showed a linear extra-osseous activity on the right side of the pelvis (Figure 1, arrow).

In order to further characterize the linear activity on the right side of the pelvis, SPECT/CT images of the abdomen and pelvis were reviewed confirming the extra-osseous nature of the ^{99m}Tc-MDP uptake corresponding to a calcified area in the right psoas muscle (Figure 3, arrows).

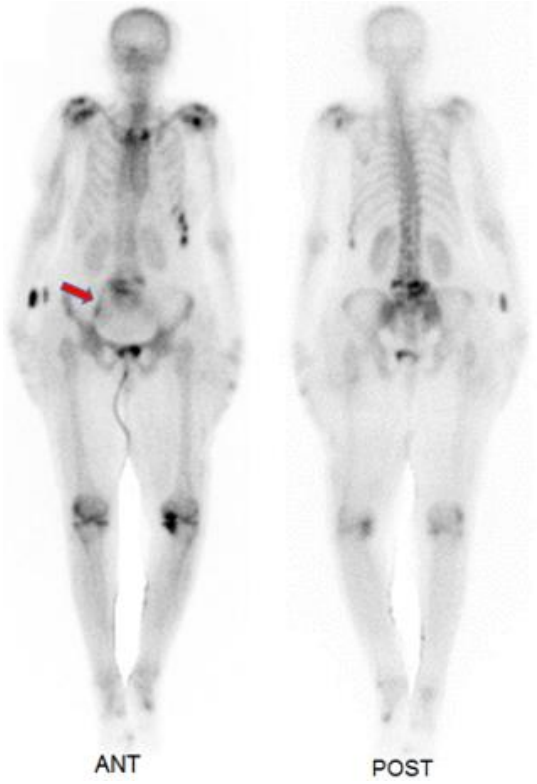

Fig 1. On whole body images, focal zones of increased activity were noted in L4 and L5. The linear activity was also noted on the right side of the pelvis, which appeared to be outside the axial skeleton (arrow).

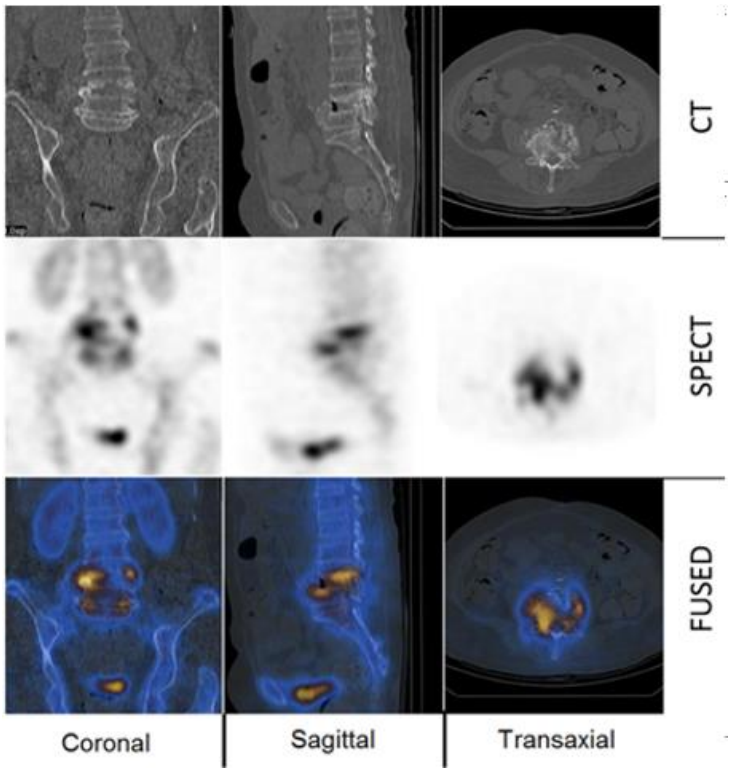

Fig 2. SPECT/CT images revealed the compression fracture of L4 and severe degenerative changes of L4 and L5; which showed tracer activity.

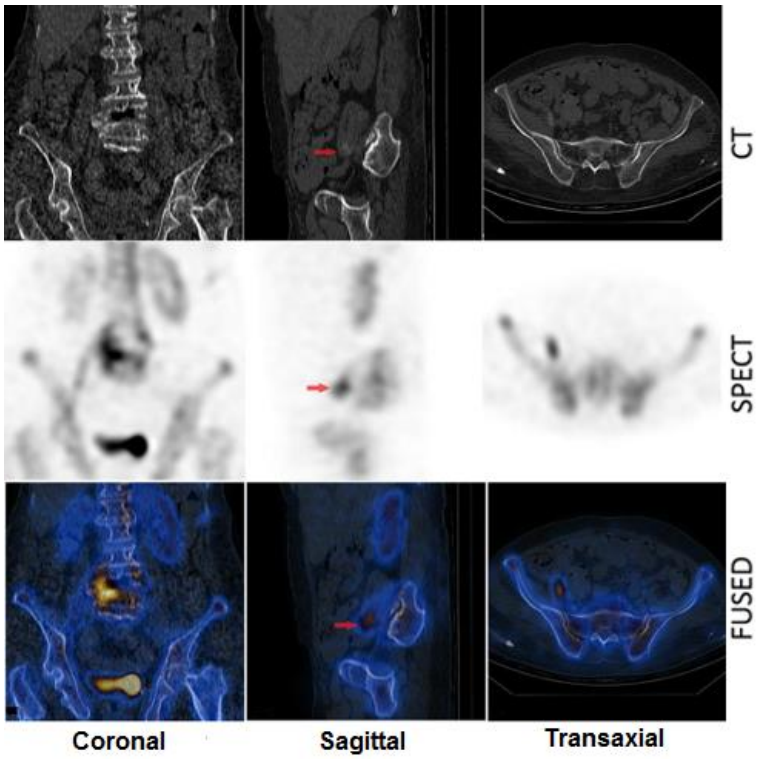

Fig 3. SPECT/CT images of the abdomen and pelvis showed that the linear activity is an extra-osseous uptake of ^{99m}Tc-MDP and corresponded to a calcified area in the right psoas muscle (arrows).

The physical examination no corresponding mass lesion or abdominal distention was identified. The prior lumbar X-ray and CT scan did not reveal any calcification including in the region of psoas muscle. Considering the severe neurological deficit, surgical fixation of the lumbar spine was performed. The intra-operative histologic examination confirmed severe degenerative changes.

DISCUSSION

The uptake of ^{99m}Tc-MDP in extra-osseous soft tissue is could be as a result of artifacts, the physiological uptake in normal organs, neoplastic uptake, trauma or infection [7]. It is usually difficult to correctly localize the sites of extraosseous uptake of ^{99m}Tc-MDP on planar bone scintigraphy alone [1]. Calcification of the psoas muscle is not common and recent traumatic insult, muscle overuse or psoas abscess being suggested as the predisposing etiology [5, 6, 8, 9]. In developing countries, the most common cause of psoas abscess and subsequent psoas calcification is Mycobacterium tuberculosis infection [5]. Calcification of the psoas muscle has been reported after trauma such as vertebral compression fractures even in patients with no systemic disease such as hematologic abnormalities [6]. Considering the patient's history of lung tuberculosis, long time lumbar kyphosis and compression fracture of the lumbar vertebrae, ^{99m}Tc-MDP uptake was most likely due to a healed psoas muscle abscess or because of repeated micro-trauma. The present case underscores the importance of thorough clinical examination and detailed review of patient's medical history when interpreting the bone scans. Review of SPECT/CT images are of utmost importance to clarify any unexpected extra-osseous uptake on bone scintigraphy.

REFERENCES

1. Soundararajan R, Naswa N, Sharma P, Karunanithi S, Nazar AH, Das KJ, Bal C, Malhotra A, Kumar R. SPECT-CT for characterization of extraosseous uptake of 99mTc-methylene diphosphonate on bone scintigraphy. Diagn Interv Radiol. 2013 Sep-Oct;19(5):405-10.
2. Kaye J, Hayward M. Soft tissue uptake on 99mTc methylene diphosphonate bone scan imaging: pictorial review. Australas Radiol. 2002 Mar;46(1):13-21.
3. Bertagna F, Bosio G, Giubbini R. Incidental thyroid Tc-99m methylene diphosphonate (MDP) uptake in a patient affected by polynodular goiter at bone scintigraphy. Nucl Med Rev Cent East Eur. 2009;12(2):81-2.
4. Yoshida S, Fukumoto M, Yoshimura N, Oobayashi K, Takada Y. Ectopic accumulation of 99mTc-HMDP in primary lung cancer in comparison with CT findings. Ann Nucl Med. 1996 Aug;10(3):329-33.
5. Pannu CD, D K, Goswami A, Vijayaragharan G. Complete bilateral calcified psoas abscess- Rare sequelae of untreated pott's spine. JNMA J Nepal Med Assoc. 2015 Apr-Jun;53(198):126-9.
6. Kim SW, Choi JH. Myositis ossificans in psoas muscle after lumbar spine fracture. Spine (Phila Pa 1976). 2009 May 1;34(10):E367-70.
7. Loutfi I, Collier BD, Mohammed AM. Nonosseous abnormalities on bone scans. J Nucl Med Technol. 2003 Sep;31(3):149-53; quiz 154-6.
8. Masquijo JJ, Sartori F. Myositis ossificans circumscripta of the psoas muscle due to overuse in an adolescent gymnast. J Pediatr Orthop B. 2014 Nov;23(6):529-32.
9. Watanabe R, Fujii H, Ishii T, Harigae H. Calcified iliopsoas abscess caused by Enterococcus faecalis. Intern Med. 2014;53(4):345.