



ORIGINAL RESEARCH ARTICLE

Soft tissue uptake due to myoma on [<sup>99m</sup>Tc]Tc-MDP bone scintigraphy: Report of a case

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ABSTRACT

A 43-year-old female known case of Systemic Lupus Erythematosus was presented with chief complaints of pain and morning stiffness in her joints since 3 months ago. Her pain was intensified after Covid-19 pneumonia. She was referred to our nuclear medicine center to rule out active arthritis with three-phase bone scan. An interesting finding was abnormal large tracer accumulation in the pelvis, which was proved to be due to myoma.

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## CASE PRESENTATION

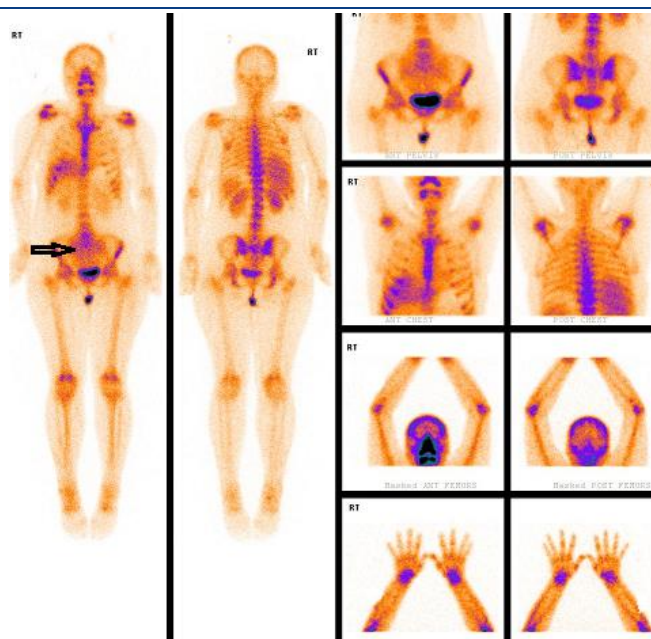
A 43-year-old female known case of Systemic Lupus Erythematosus was presented with chief complaints of pain and morning stiffness about 30 minutes duration in her joint more severe in small joints of both hands since 3 months ago. She expressed that her pain was intensified after Covid-19 pneumonia. In physical exam mild tenderness in her joints was detected. Laboratory assay were normal. The patient was referred to our nuclear medicine center to rule out active arthritis by 3-phase bone scintigraphy. Bone scintigraphy was performed by IV injection of 740 MBq (20 mCi) Tc-99m methylene diphosphonate ( $^{99m}\text{Tc}$ ]Tc-MDP) in 3 phases. As her utmost pain was in both hands, Angiographic phase was obtained from this region immediately after injection and followed by whole-body blood pool phase static images due to her polyarthralgia, 10 minutes later. Subsequently static delayed images were done after 3 hours and patient voiding. While reviewing the study images, the scan revealed mild increased radiotracer uptake in both hands, elbows and shoulders, which were suggestive of joints arthritis. In whole-body blood pool and delayed planar images, a significant large round-shaped soft tissue activity with pressure effect on bladder in pelvic region was observed incidentally (Figures 1, 2 and 3).



**Fig 1.** The 10-min delayed blood pool phase showed activity in a large round-shaped soft tissue mass with a pressure effect on the bladder in the pelvic region

After seeing this coincidence finding, we became curious and questioned the patient again. Except for recent abdominal enlargement, she did not mention any problems in the abdomen and pelvis.

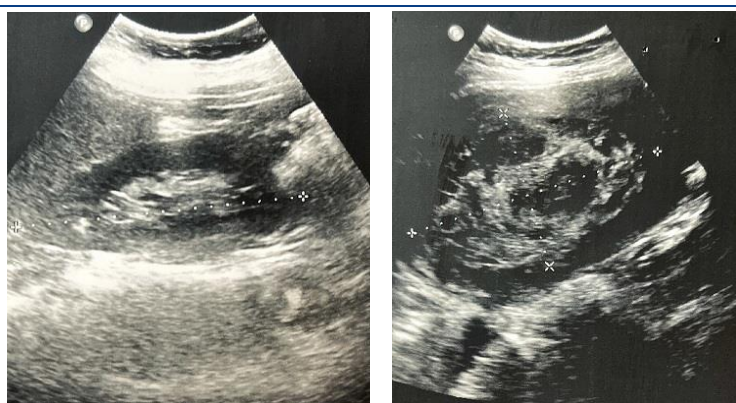
For further evaluation, the patient underwent abdominopelvic sonography. The sonography showed that uterus was enlarged (about 13×9cm) associated with an ill defined heterogeneous slight hyperechoic solid mass measuring 11×7cm in the posterior aspect, causing pressure effect on the endometrium, in favor of myoma (Figure 4).



**Fig 2.** The 3h delayed images revealed mildly increased radiotracer uptake in both wrists, small joints of both hands, elbows, and shoulders, which was suggestive of mild inflammation. Mild haziness due to myoma was also noted in the pelvic cavity in anterior projection (arrow) which is easily distinguishable of bladder activity



**Fig 3.** High-intensity anterior spot views of the pelvis show, huge round shape uptake above the bladder compatible with blood pool images and sonography findings. It is easily distinguishable from bladder uptake



**Fig 4.** The sonography showed that Uterus was enlarged (about 13x9cm) associated with an ill defined heterogeneous slight hyperechoic solid mass measuring 11x7cm in the posterior aspect, causing pressure effect on the endometrium, in favor of myoma

## DISCUSSION

A crucial imaging technique for the evaluation of metabolic problems in the skeletal system is bone scintigraphy [1-3]. The time interval between the administration of radiotracer and imaging is of great importance in the normal biodistribution of [<sup>99m</sup>Tc]Tc-MDP. Several hours after the radiotracer has been administered, MDP is taken up by the genitourinary and skeletal systems. Immediately after IV injection, the flow or angiographic phase starts, during which the radiopharmaceutical's dispersion indicates the relative regional blood flow. After a short period, the radiopharmaceutical promptly enters the extracellular space. Thus, it is better to describe the blood pool phase as the soft tissue phase [4]. As [<sup>99m</sup>Tc]Tc-MDP is distributed into the extracellular space, the binding of the radiotracer to hydroxyapatite crystals and calcium salts leads to the characteristic skeletal accumulation and uptake in other sites of calcium deposition throughout

the body. The radiotracer unbound to the skeleton will be excreted by the kidneys. To minimize the background uptake, imaging should be delayed until 2–3 h post-injection. As a result, in order to decline radiation exposure and enhance image quality, patients undergoing [<sup>99m</sup>Tc]Tc-MDP bone scintigraphy are recommended to stay well hydrated.

After the detection of soft tissue uptake, the initial step is to rule out quality control-related technical causes including artifacts and pitfalls since they frequently result in undesirable distributions of radiotracer activity on bone scintigraphy. Due to the aluminum breakthrough of the molybdenum-technetium generator, colloidal contaminants during radiotracer production could have an impact on a variety of radionuclide studies. If there are no evident technical factors or artifacts, then extrasosseous radioactivity might be due to an altered biodistribution. Underlying disorders are generally categorized into several origins according to their mechanisms, including

extraosseous calcifications (dystrophic or tissue injury), vascular problems, metabolic aspect (metabolic bone disease or malignant calcification), and malignancies. It should be considered that these mechanisms are often multifactorial [4]. The lack of additional lateral views, SPECT, or SPECT-CT is the limitation of this case report. This case report has been approved by the Ethics Committee (IR.SUMS.MED.REC.1401.471) and the Institutional Review Board of Shiraz University of Medical Sciences (No.27443) and informed consent forms were signed by the patient included in the study.

### **CONCLUSION**

Paying attention to incidental findings in three phase bone scintigraphy and accurate reporting

of them may help better interpretation of the patient's symptoms.

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