

Splenic Uptake in 99 mTc-Methylene Di-Phosphonate Scan in a Pediatric Patient with Acute Lymphocytic Leukemia

Abstract

An 12-year-old boy with relapse of acute lymphocytic leukemia and suspected skeletal involvement underwent mTc-Methylene Di-Phosphonate skeletal scintigraphy, which revealed a lytic “cold” lesion in the pelvis and diffuse splenic uptake. There was no active splenic infiltration in cross-sectional imaging. However, the patient had a history of multiple blood transfusions, which is a rare cause for diffuse splenic uptake.

Keywords: 99mTc-MDP, leukemia, multiple transfusions, splenic uptake

A 12-year-old boy with the diagnosis of acute lymphocytic leukemia (ALL) for 2 years was referred for 99 mTc-Methylene Di-Phosphonate Skeletal Scintigraphy (99 mTc-MDP) to evaluate possible skeletal involvement. At the time of first diagnosis, the patient had presented with vertebral marrow involvement and was responding to chemotherapy. He had needed multiple blood transfusions on account of bone marrow infiltration. He had also lost the ability to walk ~ 4 months back. Relapse of the disease was suspected and confirmed in bone marrow aspiration from the pelvis. 99 mTc-MDP scan had been requested to check for any additional skeletal involvement and secondary features such as osteonecrosis. In the planar 99 mTc-MDP bone scan images, no focal increased radiotracer uptake was noted to suggest active osteoblastic involvement [Figure 1a and b]. Furthermore, no prominent cold areas were noted. However, additional findings of reduced vertebral height and diffuse splenic uptake were noted [Black arrows, Figure 1a and b]. Since skeletal involvement in ALL has been documented to manifest as “cold” lesions,^[1,2] single photon-emission computed tomography/computed tomography (SPECT/CT) was acquired to check for any missed lesions. SPECT/CT revealed “cold” lytic lesions in the inner cortex of the ilium [white arrows, Figure 1e and f],

along with osteopenic changes (likely due to bone marrow infiltration). The vertebrae showed osteopenia, reduced height, and sclerosis [vertebra plana; Figure 1c], which was consistent with past spinal involvement.^[3] Finally, diffuse uptake in the spleen was confirmed in SPECT/CT [Figure 1d].

Musculoskeletal involvement in ALL is quite common.^[4] Skeletal involvement in ALL can show as increased or reduced uptake in skeletal scintigraphy.^[1,2] In this case, active disease (as confirmed with bone marrow biopsy) manifested as a cold lesion in the pelvis. Due to the small size of the lesion, biopsy could not be performed to confirm cortical involvement, but clinically, (panel discussion) the finding was presumed to be active skeletal involvement.

However, the interesting aspect of this particular case was diffuse splenic uptake. Splenic uptake in the absence of hepatic uptake is rare and can be associated with hematological malignancies and severe anemia.^[5] Since this patient did not show signs of “smoldering leukemia,” nor did he show any splenic infiltration in cross-sectional imaging (magnetic resonance imaging); splenic uptake was most likely attributable to multiple transfusions and red blood cell sequestration, which can result in local high concentration of extracellular iron, which in turn has been documented to cause intense 99Tc-MDP uptake in the spleen.^[6]

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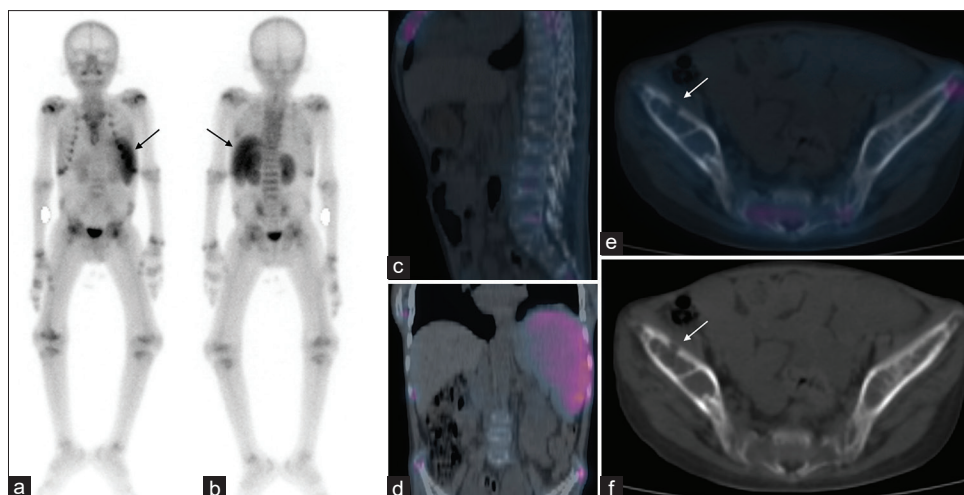


Figure 1: Planar (a anterior and b posterior) and single photon emission computed tomography/computed tomography (c-f) ^{99m}Tc-Methylene Di-Phosphonate images in a 12-year-old boy with relapsed acute lymphocytic leukemia. Planar images revealed reduced vertebral height and diffuse uptake in the spleen (black arrows). Single photon emission computed tomography/computed tomography showed osteopenia and reduced vertebral height (c), which was consistent with past bone marrow infiltration. Furthermore, diffuse uptake in the spleen was confirmed (d). Finally, a “cold” lytic lesion was seen in the right ilium (white arrows, e and f), which was clinically deemed to be active involvement in view of active disease in the bone marrow

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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