Acta Scientific CANCER BIOLOGY (ISSN: 2582-4473)

Volume 7 Issue 5 July 2023

Case Report

Intense Splenic ^{99m}Tc-MDP Uptake in Patient with Langerhans Cell Histiocytosis

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Received: June 26, 2023

Published: June 29, 2023

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Abstract

Uptake of ^{99m}Tc-MDP (methylene diphosphonate) in spleen is very rare in ^{99m}Tc-MDP bone scintigraphy scan. We encountered a 14-year-old child patient with Langerhans Cell Histiocytosis was examined by ^{99m}Tc-MDP bone scintigraphy. There was intense uptake of tracer in spleen. The patient was treating with chemotherapy and 4 cycles of chemotherapy were completed. Ultrasonography report revealed that there was mild spleenomegaly. Bone scintigraphy showed intense and diffuse MDP accumulation in the enlarged spleen without ultrasonographic or radiologic evidence of calcification. We never seen intense splenic ^{99m}Tc-MDP accumulation in patient with Langerhans Cell Histiocytosis in any case report or any other literatures.

Keywords: ^{99m}Tc-MDP; Splenic Uptake; Langerhans Cell Histiocytosis

Introduction

Normally, uptake of ^{99m}Tc-MDP (methylene diphosphonate) radiopharmaceuticals in skeletal system of our body is normal. Many unusual types of nonosseous tissues may accumulate ^{99m}Tc MDP (methylene diphosphonate) radiopharmaceuticals during bone scintigraphy, but in none of these is the specific mechanism known. The majority of regular causes of accumulation of ^{99m}Tc-MDP in the spleen on the bone scintigraphy are hemochromatosis, hemosiderosis, and sickle cell disease. Some of the unusual causes of splenic accumulation are neoplastic deposits to the spleen for example any carcinoma like breast cancer, Hodgkin lymphoma and splenic hemangioma, splenic artery calcification, frequent platelet or red blood cell transfusions and thalassemia major [1].

Most exceptional causes of splenic accumulation include glucose-6-phosphate dehydrogenase deficiency. Herein we presented a case report of a patient with Langerhans Cell Histiocytosis with diffuse and intense and diffuse ^{99m}Tc-MDP accumulation in a markedly enlarged spleen without any radiological evidence of calcification.

Case Report

A 14 years old girl with past history of Langerhans Cell Histiocytosis was complaining whole skeleton pain like feeling. Patient has had history of 4 cycles of chemotherapy. Patient was referred to the Department of Radiodiagnosis, Imaging and Nuclear medicine in our hospital for Computed Tomography (CT), X-Rays, and Ultrasonography (USG).

X-Rays report was unremarkable. Ultrasonography and Computerized Tomography images showed mild hepatomegaly (Craniocaudal measurement 16.4 cm) and spleenomegaly (10.8 X 4.5 X 14.3 cm^3) with diffusely decreased attenuation of splenic

parenchyma (NCCT HU 55-60). Average Hounsfield Unit (HU) of spleen was 54 which were quit lower than HU of liver 88.2 (Figure 1). Normally, Non-Contrast Computed Tomography (NCCT) HU of spleen should be higher than HU of liver.

Figure 1: Ultrasonography and Computed Tomography images revealed that there is mild hepatomegaly (Craniocaudal measurement 16.4 cm) and spleenomegaly (10.8 X 4.5 X 14.3 cm3) with diffusely decreased attenuation of splenic parenchyma (NCCT HU 55-60).

After then patient was undergone for ^{99m}Tc-MDP bone scintigraphy. She had multiple itching skin lesions all over the body since birth. After the intravenous administration of 12 mCi ^{99m}Tc-MDP, flow and blood-pool images of the pelvis were obtained, followed by delayed whole-body and spot views of the chest and pelvis. Whole-body images concluded intense increased radiotracer accumulation in the left upper quadrant of the abdomen just superolateral to the left kidney, suggesting uptake in the spleen (Figure 2).

Figure 2: Anterior and posterior whole body bone scan and chest spot scan show unexpected accumulation in left upper quadrant characteristic of spleen. There is normal uptake over whole skeleton system except spleen.

There was normal uptake MDP throughout the whole skeleton system. There was no hepatic or any other soft tissue uptake.

Diffuse and intense splenic ^{99m}Tc-MDP radiopharmaceutical accumulation in patient with Langerhans Cell Histiocytosis is rare and never reported in any case report or any other literatures.

Discussion

Many common causes of accumulation of ^{99m}Tc-MDP in the spleen on the bone scintigraphy are hemochromatosis, hemosiderosis, and sickle cell disease. Some of the unusual causes of splenic accumulation are neoplastic deposits to the spleen for example any carcinoma like breast cancer, Hodgkin lymphoma and splenic hemangioma, splenic artery calcification, frequent platelet or red blood cell transfusions and thalassemia major [1].

Most exceptional causes of splenic accumulation include glucose-6-phosphate dehydrogenase deficiency. Herein we presented a case report of a patient with Langerhans Cell Histiocytosis with diffuse and intense and diffuse ^{99m}Tc-MDP accumulation in a markedly enlarged spleen without any radiological evidence of calcification. Extraosseous uptake of bone seeking radiopharmaceuticals like MDP is common.

There were a few case reports concluded that diffuse hepatic and splenic of ^{99m}Tc-MDP radiopharmaceuticals on bone scan due to after intravenous administration of gadolinium-containing Magnetic Resonance Imaging (MRI) contrast and Frequent Platelet and RBC Transfusions [2,3]. Another cause of splenic uptake could be a recent prior radionuclide study, such as with ^{99m}Tc-sulfur colloid (SC) or ^{111}In-labeled white blood cells (WBC). Both will additionally demonstrate radiotracer uptake in the liver. In our case study, there was no evidence of intravenous administration of gadolinium MRI contrast, Frequent Platelet transfusions, RBC Transfusions, ^{99m}Tc-SC or ^{111}In-WBC.

The mechanism of splenic uptake of bone-seeking agents in sickle cell anemia has been presumed to be deposition of calcium. Microscopic deposits of calcium that could not be detected radiographically might also cause uptake of ^{99m}Tc-MDP. Several ultra-structural studies have demonstrated mitochondrial binding of calcium ions in necrotic muscle cells, within a crystalline structure like that of hydroxyapatite [4]. In our case study, above cause is not relevant. Diffuse and intense splenic ^{99m}Tc-MDP accumulation in patient with Langerhans Cell Histiocytosis is never reported in any published literature before.

Conclusion

It is not unusual to see subsidiary accumulation of skeleton seeking radiopharmaceuticals in the extraosseous body tissue, for example spleen, liver, breast, and lungs etc. A review of the patient's history, laboratory findings, and other imaging workup provides useful clues in reaching the diagnosis.

Splenic uptake on a ^{99m}Tc-MDP bone scintigraphy can be rooted by number of diseases. It is supposed to be rooted by macroscopic or microscopic calcification of spleen or previous infarcts. Iron overload in patients receiving blood transfusions can be another cause. Diffuse and intense splenic ^{99m}Tc-MDP accumulation in patient with Langerhans Cell Histiocytosis is never reported in any published literature before.

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