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Case report

Abnormal focal 99mTc-DMSA uptake in the lung — report of two cases

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Abstract

Extrarenal uptake of 99mTc-DMSA is a rare finding, which has been described in some unusual conditions as bone metastasis, aortic aneurysm and hemangioma. The purpose of this report is to present two cases of abnormal 99mTc-DMSA uptake in the lungs, which remained unexplained even after radiologic assessment.

KEY words: 99mTc-DMSA scintigraphy, extrarenal uptake, urinary infection

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Introduction

Renal scintigraphy with technetium-99m dimercaptosuccinic acid (99mTc-DMSA) is one modality used to distinguish pyelonephritis (APN) and renal parenchymal scars [1]. Extrarenal uptake of 99mTc-DMSA is a rare finding, which has been described in some unusual conditions as bone metastasis, aortic aneurysm and hemangioma [2–6]. The purpose of this report is to present two cases of an abnormal 99mTc-DMSA uptake in the lung, which remained unexplained even after radiologic assessment.

Case report

Case 1

A 5-year-old girl suspicious for pyelonephritis was referred to our department for evaluation of renal parenchymal function by 99m-technetium-Dimercaptosuccinic acid (99mTc-DMSA). She had history of fever, abdominal pain and dysuria. She had no cough, upper respiratory infection (URI) symptoms, or rash. Past history was unremarkable and she was on no medications. A urine specimen was rather cloudy and positive for white blood cell (WBC) and leukocyte esterase. Laboratory data revealed an elevated erythrocyte sedimentation rate (ESR) and leukocytosis. Scan was obtained three hours after IV injection of 74 MBq (2 mCi) 99mTc-DMSA in anterior, posterior and oblique view. Right kidney revealed globally decreased radiotracer uptake, with prominent defects in both poles; suggestive of pyelonephritis. Surprisingly, there was also a focal zone of abnormal radiotracer uptake in right lung (adjacent to the hilum), which was confirmed in right lateral image (Figure 1). Following this unusual finding, chest X ray in anterior posterior (AP) and lateral views was done, which was unremarkable. So, chest CT scan was undertaken to exclude any space-occupying lesion. But no abnormality was found in the right lung, too (Figure 2). Radionuclide cysternography confirmed moderate urinary reflux on the right side. The patient received treatment course of proper antibiotics and then commenced on antibiotic prophylaxis. During more than 6 months follow up, the patient did not have any pulmonary problem or discomfort.

Case 2

Tc-99m DMSA renal scintigraphy was performed in a 35-year-old man, referred for the evaluation of recently detected renal failure. He had history of newly detected high serum creatinine level (2.5 mg/dL), found during evaluation for hypertension. He was a healthy man and his past medical history and routine physical examination was unremarkable. Three hours after IV injection of 185 MBq (5 mCi) of freshly prepared 99mTc-DMSA, images were obtained in anterior, posterior and oblique views. Scintigram demonstrated relatively small-sized kidneys with decreased radiotracer uptake and high background activity (Figure 3). Some abnormal foci of activities were noted in both lung fields, confirmed on the SPECT study. The patient underwent chest CT, which showed no abnormality in the lungs.

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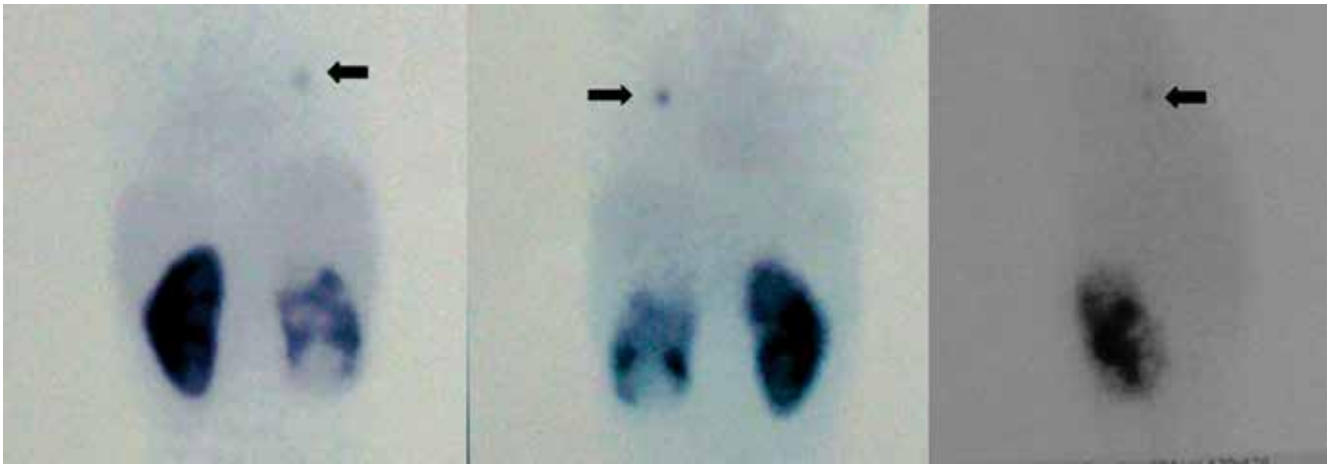

Figure 1. 99mTc-DMSA in posterior, anterior and right lateral views. Right kidney revealed globally decreased radiotracer uptake, with prominent defects in both poles; suggestive of pyelonephritis. In addition, there was a focal zone of abnormal radiotracer uptake in right lung (adjacent to the hilum)

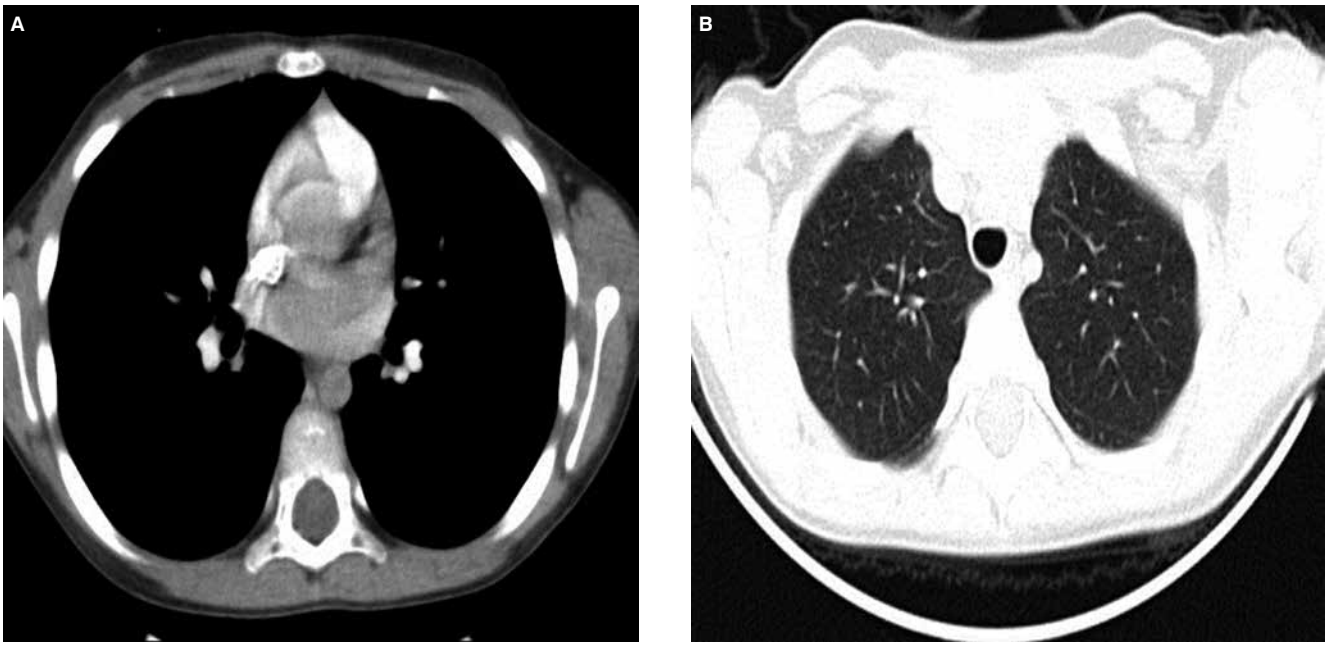

Figure 2. Normal chest CT scan (**A**, **B**)

Discussion

99mTc-DMSA renal scintigraphy is a well-accepted method for the evaluation of renal parenchymal function. Two hours after intravenous injection, more than 50% of the injected 99mTc-DMSA is found mainly in the renal cortex, whereas there is only minimal background activity [7]. Extrarenal localization of 99mTc-DMSA is a rare finding and there are just some limited reports about abnormal uptake in splenic amyloidosis, bone metastases, renal pelvic diverticulum, infantile hemangioma and abdominal aortic aneurysm [2, 3, 5, 6, 8, 9]. This finding has been attributed to the presence of free 99mTc, high percentage of pentavalent DMSA (V-DMSA), hypervascularity of the lesions and high blood pool activity. Some molecular mechanisms, like active transport through the tumor cells or chelating of the tracer with a molecule within the abnormal cell membrane or cellular compartment, has also been proposed [3, 9]. We found just one case, reporting unexplained bilateral basal lung uptake of 99mTc-DMSA in a patient with pulmonary edema without pleural effusion [10].

To the best of our knowledge, this is the first report describing focal uptake of 99mTc-DMSA in the lungs. In these two patients, chest CT was normal and we could not find any anatomic explanation for the abnormal uptakes. However, in both patients some degrees of renal insufficiencies and high background activity were noted. There was also no evidence of the presence of free 99mTc, too. So, it seems that the only cause that may play a role in the uptake of 99mTc-DMSA in the lungs is renal failure, resulted in high blood pool activity. Retention of tracer in some vessels (possibly ecstatic vessels) may lead to abnormal focal uptakes in the lungs.

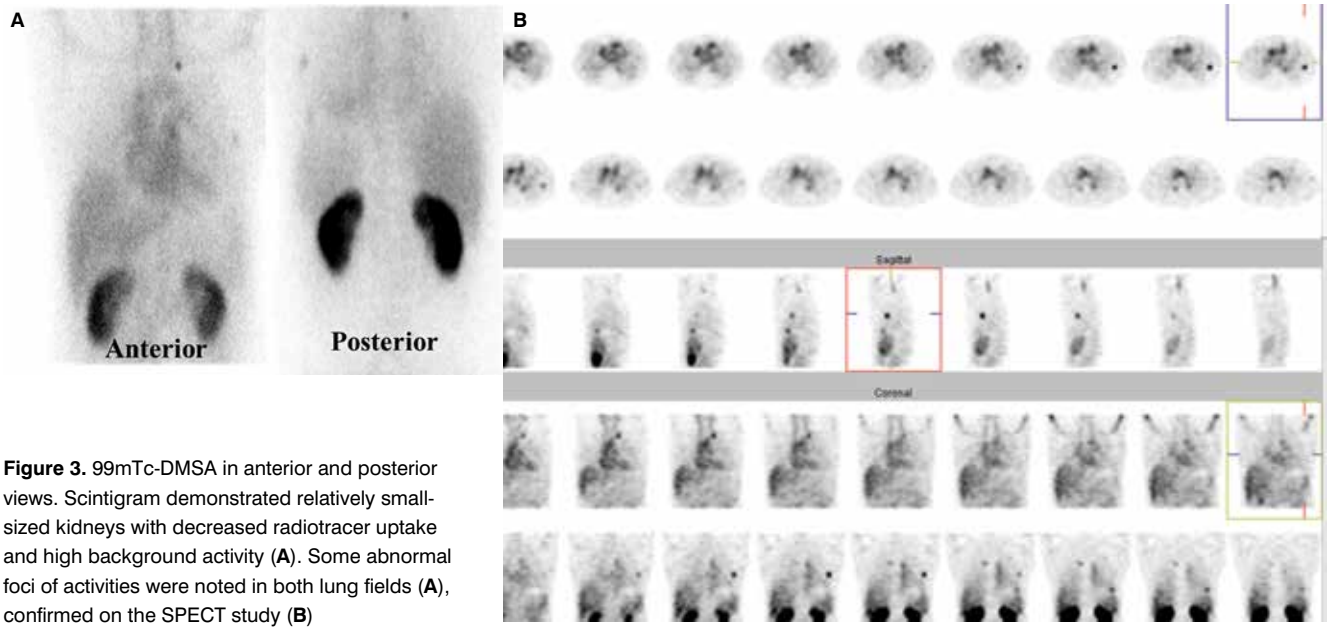

Figure 3. 99mTc-DMSA in anterior and posterior views. Scintigram demonstrated relatively small-sized kidneys with decreased radiotracer uptake and high background activity (**A**). Some abnormal foci of activities were noted in both lung fields (**A**), confirmed on the SPECT study (**B**)

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