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CASE REPORT

[^{99m}Tc]Tc-DMSA uptake in the thoracic region mimicking ectopic kidney in a case of crossed fused renal ectopia

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ABSTRACT

We present the findings of a [^{99m}Tc]Tc-DMSA scan conducted on a 6-month-old girl who was experiencing fever and recurrent urinary tract infections. The scan revealed crossed fused kidneys on the right side with no radiotracer uptake in the left renal site. Additionally, the scan showed an incidental finding of radiotracer uptake in the left hemithorax, which was initially suspected to be an ectopic thoracic kidney. However, fused SPECT/CT images clarified that this uptake was a lung clot embolus. This case underscores the importance of considering the possibility of radioactive lung clot when encountering incidental intrathoracic uptake especially following traumatic catheterization. Doing so can enhance patient comfort by reducing the need for further diagnostic procedures while minimizing unnecessary radiation exposure.

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INTRODUCTION

Renal ectopia is characterized by the abnormal positioning of a kidney outside its normal anatomical location within the renal fossa. Diagnosis of this condition occurs in only a small percentage of cases. Among the different forms of renal ectopia, intrathoracic kidneys are the least commonly observed. This case revealed an unexpected uptake of [^{99m}Tc]Tc-DMSA in the left hemi-thorax, which was initially suspected of being an ectopic thoracic kidney. However, further fused SPECT/CT imaging clarified that this uptake was due to an iatrogenic lung microembolism, which highlights the critical importance of accurately characterizing extrarenal DMSA uptake.

CASE PRESENTATION

A 6-month-old girl with fever and recurrent urinary tract infection was referred for [^{99m}Tc]Tc-DMSA scan. After administration of 37 MBq (1 mCi) [^{99m}Tc]Tc-DMSA, imaging was performed 4 hours later in multiple views (Figure 1). On the planar images, the right kidney seemed to be large-sized and mal-rotated with a zone of decreased tracer activity in the upper pole and no radiotracer uptake in the left renal lodge with an incidental finding of [^{99m}Tc]Tc-DMSA uptake in the left hemi-thorax (black arrow in Figure 1), which was initially suspected to represent an ectopic thoracic kidney.

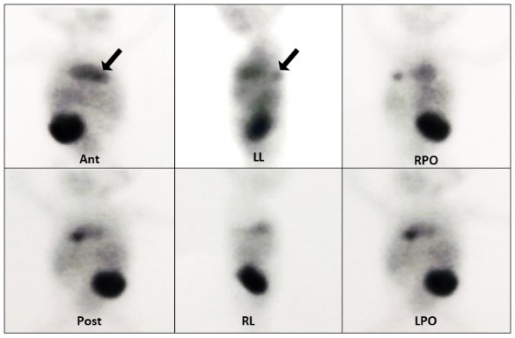

Figure 1. Planar images in multiple views, shows no radiotracer uptake in the left renal lodge with an incidental finding of [^{99m}Tc]Tc-DMSA uptake in the left hemi-thorax (black arrow)

Subsequent fused SPECT/CT images revealed mal-rotated crossed fused kidneys on the right side with a zone of decreased tracer uptake in the upper pole related to pyelocalyceal system (Figure 2). Furthermore, SPECT/CT images localized [^{99m}Tc]Tc-DMSA uptake in the left hemi-thorax to the superior segment of the left lower lobe of the lung (blue arrow in Figure 3) with no abnormal lesion on the co-registered CT images. This finding was determined to be an iatrogenic microembolism most likely resulting from a traumatic intravenous catheterization.

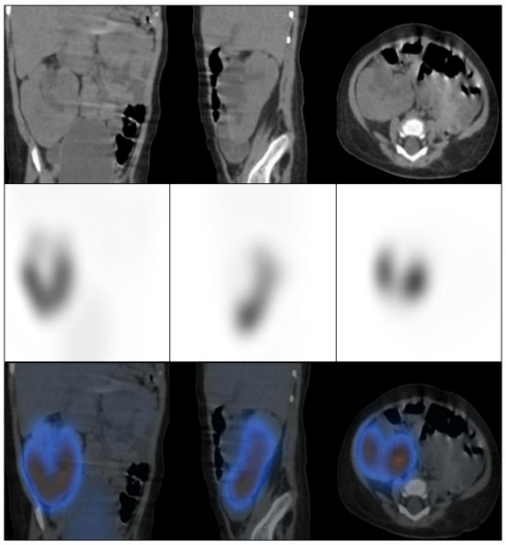

Figure 2. The fused SPECT/CT images revealed mal-rotated crossed fused kidneys on the right side with a zone of decreased tracer uptake in the upper pole related to pyelocalyceal system and no evidence of active renal tissue on the left side

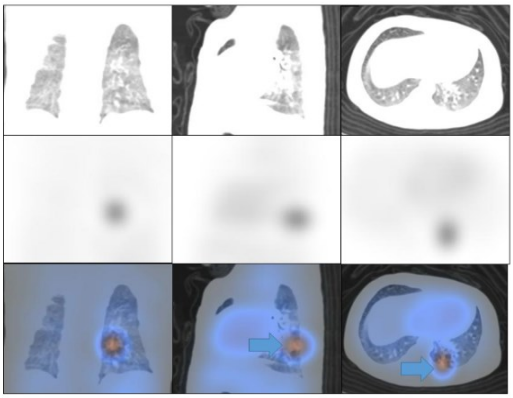

Figure 3. The fused SPECT/CT images localized [^{99m}Tc]Tc-DMSA uptake in the left hemi-thorax to the superior segment of the left lower lobe of the lung (blue arrow) with no abnormal lesion on the co-registered CT images

DISCUSSION

[^{99m}Tc]Tc-DMSA is currently employed for the detection of morphological abnormalities within the renal parenchyma.[1] Crossed fused kidneys represent a rare congenital condition that may cause diagnostic and therapeutic challenges [2], occurring in approximately 1 in 7,500 autopsies.[3] These malformations may be associated with various complications as a result of superimposed infection (pyelonephritis), obstruction (hydronephrosis due to ureteropelvic junction obstruction) and urolithiasis[4,5], which

can lead to significant renal impairment.[6] Fused SPECT/CT images combines functional and anatomical changes of the disease and enables the evaluation of abnormalities with more precision.[7] Detection of this fusion anomaly is of great importance to prevent potential complications. A differential diagnosis for [^{99m}Tc]Tc-DMSA uptake in the thoracic region includes the possibility of an ectopic thoracic kidney, which is the rarest form of renal ectopia, accounting for less than 5% of cases , more commonly observed in males and on the left side.[8] Extrarenal uptake of [^{99m}Tc]Tc-DMSA has been reported in various conditions, including bone metastases associated with colorectal cancer and prostate adenocarcinoma [9,10], renal pelvis diverticulum [11], splenic amyloidosis [12], abdominal aortic aneurysm [13] and primary renal cell carcinoma [14]. Additionally, [^{99m}Tc]Tc-DMSA uptake has been reported in cases of infantile hemangioma [15] and lower GI tract due to an enterovesical fistula [16]. In this case, based on clinical presentation and imaging studies, a final diagnosis of iatrogenic microembolism resulting from faulty injection technique was established. Instances of radiolabeled thrombotic pulmonary emboli dislodged from traumatic intravenous lines have been reported with various radiopharmaceuticals, including [^{99m}Tc]Tc-MAA [17], [^{99m}Tc]Tc-MDP [18], [^{99m}Tc]Tc-HDP [19], [^{99m}Tc]Tc-MIBI [20] and [^{18}F]FDG [21].

CONCLUSION

Accurately determining the nature of extrarenal [^{99m}Tc]Tc-DMSA uptake poses a considerable diagnostic challenge. The potential presence of a radioactive clot resulting from difficult catheterization should be considered when evaluating incidental intrathoracic uptakes. This will enhance patient comfort by reducing the need for further diagnostic procedures while minimizing unnecessary radiation exposure.

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