Case Report

Rare case of thoracic kidney detected by renal scintigraphy

Aravintho Natarajan, Archi Agrawal, Nilendu Purandare, Sneha Shah, Venkatesh Rangarajan

Department of Nuclear Medicine and Molecular Imaging, Tata Memorial Hospital, Mumbai, Maharashtra, India

ABSTRACT

Intrathoracic kidney is a rare congenital abnormality with lowest frequency among all renal ectopias. Patients with thoracic kidneys are usually asymptomatic, and the condition is usually discovered incidentally during radiological evaluation for other conditions or during thoracic surgery. We report a case of a 62-year-old male who was referred to our department for renal scintigraphy for a nonvisualized left kidney on ultrasonography report. Both Tc-99m dimercaptosuccinic acid and diethylenetriaminepentaacetic acid scans revealed a left thoracic kidney which was confirmed by CT scan of the thorax and abdomen.

Keywords: Diethylenetriaminepentaacetic acid, dimercaptosuccinic acid, ectopic kidney, scan, scintigraphy, thoracic kidney

INTRODUCTION

Renal ectopia refers to a kidney situated in any location other than the renal fossa. Estimated incidence of ectopic kidneys is thought to be approximately 1 in 1000 births, out of which only small fraction of cases is diagnosed. Intrathoracic kidney has the lowest frequency rate among all renal ectopias with prevalence rate of about <0.01%, accounting for <5% of all renal ectopias.[1-3] The condition is usually identified incidentally as posterior mediastinal mass in chest radiograph, requiring further investigation. Here, we present a case of the left thoracic kidney that was initially reported as nonvisualized left kidney on ultrasonography, stressing the importance of nuclear medicine imaging in diagnosis and evaluating the function of ectopic kidney.

CASE REPORT

A 62-year-old male, recently diagnosed case of diabetes mellitus and hypertension, presented to our hospital with ulceroproliferative growth over right upper alveolus. On routine investigation, his serum creatinine was 1.6 mg/dl. Ultrasonography of pelvis and abdomen reported normal right kidney and nonvisualized left kidney. He was then referred to our department for Tc-99m dimercaptosuccinic acid (DMSA) scan for suspected ectopic kidney. High count anterior and posterior static images revealed left ectopic thoracic kidney with normal cortical function [Figure 1]. Subsequently, Tc-99m diethylenetriaminepentaacetic acid (DTPA) renogram was performed to study the drainage pattern of thoracic kidney. Dynamic images were acquired with the camera placed anteriorly and posteriorly after intravenous (IV) injection of 5 mCi of Tc-99m DTPA with F-0 protocol of lasix and sequential cortical and excretion images were studied. Tc-99m DTPA renogram demonstrated left ectopic thoracic kidney with normal parenchymal function and normal drainage [Figure 2], and right kidney in a normal position with normal parenchymal function and normal drainage.

Computed tomography (CT) thorax was done to get further information on anatomy. It revealed left ectopic thoracic kidney completely herniated above the diaphragm into left hemithorax through the foramen of Bochdalek [Figure 3].

Address for correspondence:
Dr. Venkatesh Rangarajan, Department of Nuclear Medicine and Molecular Imaging, Tata Memorial Hospital, E. Borges Road, Parel, Mumbai - 400 012, Maharashtra, India.
E-mail: drvrangarajan@gmail.com

Access this article online

Quick Response Code:

Website: www.ijnm.in

DOI: 10.4103/0972-3919.181863

How to cite this article: Natarajan A, Agrawal A, Purandare N, Shah S, Rangarajan V. Rare case of thoracic kidney detected by renal scintigraphy. Indian J Nucl Med 2016;31:219-21.

DISCUSSION

Intrathoracic kidney is a partial or complete protrusion of the kidney above the hemidiaphragm into the posterior mediastinal compartment of the thorax.

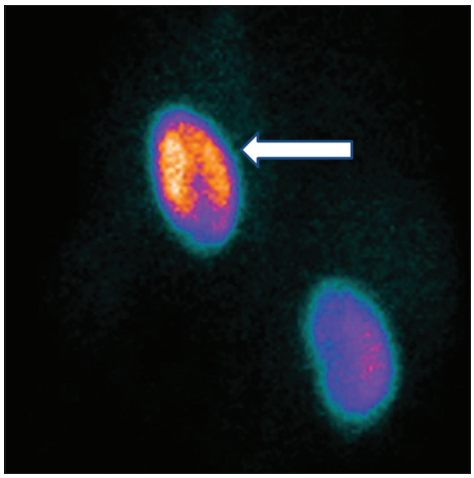

Figure 1: Tc-99m dimercaptosuccinic acid scintigraphy (posterior view) shows left kidney (arrow) situated ectopically in the thorax, with normal and uniform cortical tracer uptake. The right kidney is normal

Wolfromm in 1940 reported the first case of intrathoracic kidney using retrograde pyelography. Around 100 cases have been reported since then.[4] This condition shows male predominance and occurs more commonly on the left than on the right side. Two percent of cases are bilateral.[1]

Exact mechanisms for intrathoracic kidney are not clear; however, possible etiologies for excessive renal ascent may be delayed closure or maldevelopment of the pleuroperitoneal membrane and delayed ingrowths of the ureter bud into the metanephrons.[1,5] In almost all cases, the kidney is located in the thoracic cavity and not in the pleural space, with renal vessels and ureter passing through the foramen of Bochdalek.[6]

The features of thoracic kidney include rotational anomaly, a long ureter, and anomalous high derivation of the renal vessel, and medial deviation of the lower pole of the kidney. In most cases, the adrenal gland occupies its normal position within the abdomen. Thoracic kidneys are usually asymptomatic and functionally normal.[7] The stretched ureter provides good drainage, and infection and other complication to which low lying kidney are prone do not occur.[8,9]

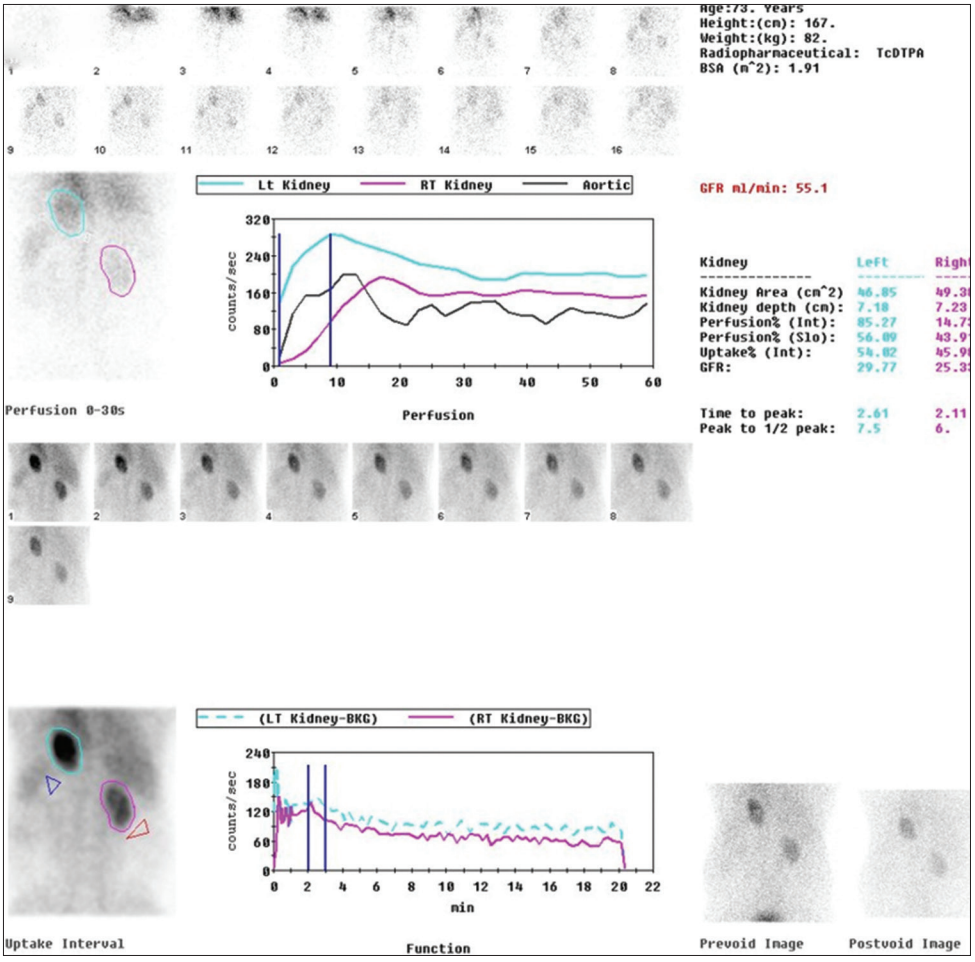

Figure 2: Tc-99m diethylenetriaminepentaacetic acid dynamic images show normal perfusion, cortical tracer uptake, and subsequent nonobstructed drainage of ectopic (thoracic) left kidney. The right kidney is normal

Figure 3: Computed tomography scan with axial, sagittal, and coronal reconstruction shows left ectopic kidney in thoracic cavity and renal vessels passing through defect in posterior diaphragm

Although the condition is often detected in plain radiograph as posterior mediastinal mass, findings are often indeterminate to make a final diagnosis. CT and ultrasonography have surpassed IV urography as the modality of choice. Functional imaging using Tc-99m DMSA and Tc-99m DTPA scintigraphy plays an important role in differentiating an ectopic thoracic kidney from other tissues. Renal scintigraphy must be performed even if CT and IV pyelogram results are normal because it depicts the kidney function more accurately.

CONCLUSION

Thoracic kidney is one of the important differential diagnoses for posterior mediastinal mass and in the evaluation of nonvisualized kidney in the renal fossa. DMSA renal scintigraphy is usually the first line of investigation in a case of nonvisualized kidney on ultrasonography. If the ectopic kidney has functioning cortical mass, DMSA scintigraphy accurately localizes it. Adequate cortical function and nonobstructed drainage of thoracic kidney demonstrated by Tc-99m DMSA and DTPA scan, respectively, obviated the need for unnecessary investigations and operative procedures.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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