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Pancake Kidney in 99mTc-DMSA Study (Case Report)

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Abstract Pancake kidney, also known as discoid kidney, lump kidney, or fused pelvic kidney, is a rare renal fusion anomaly of the kidneys of the crossed fused variety. The majority of patients with this anomaly are asymptomatic. We present a case of pancake kidney which was incidentally found in a child with abdominal pain with no other associated anomalies and was managed conservatively.

Keywords: *pancake kidney, renal 99mTc-DMSA*

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1. Introduction

Pancake kidney characterized by the presence of a displaced, lobulated pelvic renal mass of dual parenchymatous system without intervening septum [1].

The upper and lower poles of the kidneys are fused; hence, giving it the appearance of pancake and usually give rise to two separate ureters which enter the bladder in a normal relationship. An even more rare variant is when the pancake kidney is drained by a single ureter.

Pancake kidneys are usually situated anterior to the bifurcation of the abdominal aorta.

We present the clinical presentation, the embryological development of crossed ectopia and its management.

2. Case Report

A two years old child presented to the emergency department with history of colicky abdominal pain and passing blood with stool, had abdominal ultrasound after clinical impression of intussusception which was confirmed by the ultrasound. Incidental finding of an ectopic pelvic kidney was noted on ultrasound. Patient was treated for the intussusception and few days later Renal 99mTc-DMSA study was done to evaluate his kidneys. Patient was injected with the radiotracer and two hours delayed static images of the abdomen and lower pelvis were obtained in the anterior, posterior, LPO and RPO projections which demonstrated ectopic kidneys in the lower abdomen both appeared fused together in the pelvis giving the appearance of a pancake or discoid kidney (Figure 1). Patient was asymptomatic when he came for the renal DMSA study and was discharged with an appointment for a routine follow-up at the paediatric surgery clinic.

3. Discussion

Congenital anomalies in kidney position and renal fusion anomalies are the results of impaired cephalic migration from the pelvis to the flank of the ureteric bud and metanephric blastema. This process of ascent begins in 5^{th} week and ends at 9^{th} week of gestation. It includes both ectopic location of the kidneys and abnormal fusion of part or whole of the kidneys [2].

Although children with these anomalies are generally asymptomatic, some children develop symptoms due to complications, such as infection, renal calculi, and urinary obstruction.

Commonest fusion pattern is fusion of lower pole of orthotopic kidney to the upper pole of crossed ectopic kidney. Other described patterns include sigmoid, L shaped, discoid and cake kidneys [2].

Crossed renal ectopia is the 2nd most common fusion renal anomaly. This occurs in 1:7000 with a M:F ratio of 2:1. In such anomaly, both kidneys are located on the same side and may occur with fusion (85%), without fusion (<10%), or extremely rarely be solitary or bilateral. The left kidney is 3 times more likely to migrate to the right than vice versa [3]. Other fusion anomalies are extremely rare, like our case and include lump kidney, sigmoid kidney and L-shaped kidney. There are rare cases of familial crossed ectopia.

Mc Donald and Mc Clellan classified CFRE into six types. In decreasing order of frequency, they are [4]:

(A) Unilateral fused kidney inferior ectopia with the upper pole of the crossed ectopic kidney fusing with the lower pole of the orthotopic ipsilateral mate. Both renal pelvises may be anterior.

(B) Sigmoid or S-shaped kidney in which the crossed kidney lies inferiorly with the renal pelvis directed laterally and the normally positioned kidney lies

superiorly with the pelvis directed medially. Each renal pelvis is oriented correctly in this type because the fusion of the two kidneys occurs after the complete rotation on the vertical axis has taken place.

(C) Unilateral Lump kidney with fusion occurring over a wide margin and both renal pelvis directed anteriorly; located more inferiorly.

(D) L-Shaped or Tandem kidney in which the crossed kidney lies inferiorly and transversely fusing with the lower pole of the normal kidney.

(E) Unilateral disc kidney in which the fusion occurs along the medial borders.

(F) Unilateral fused kidney superior ectopia type is the least common type; the ectopic kidney is placed superiorly with its lower pole fusing with the upper pole of the normal kidney. Both renal pelvis are anterior.

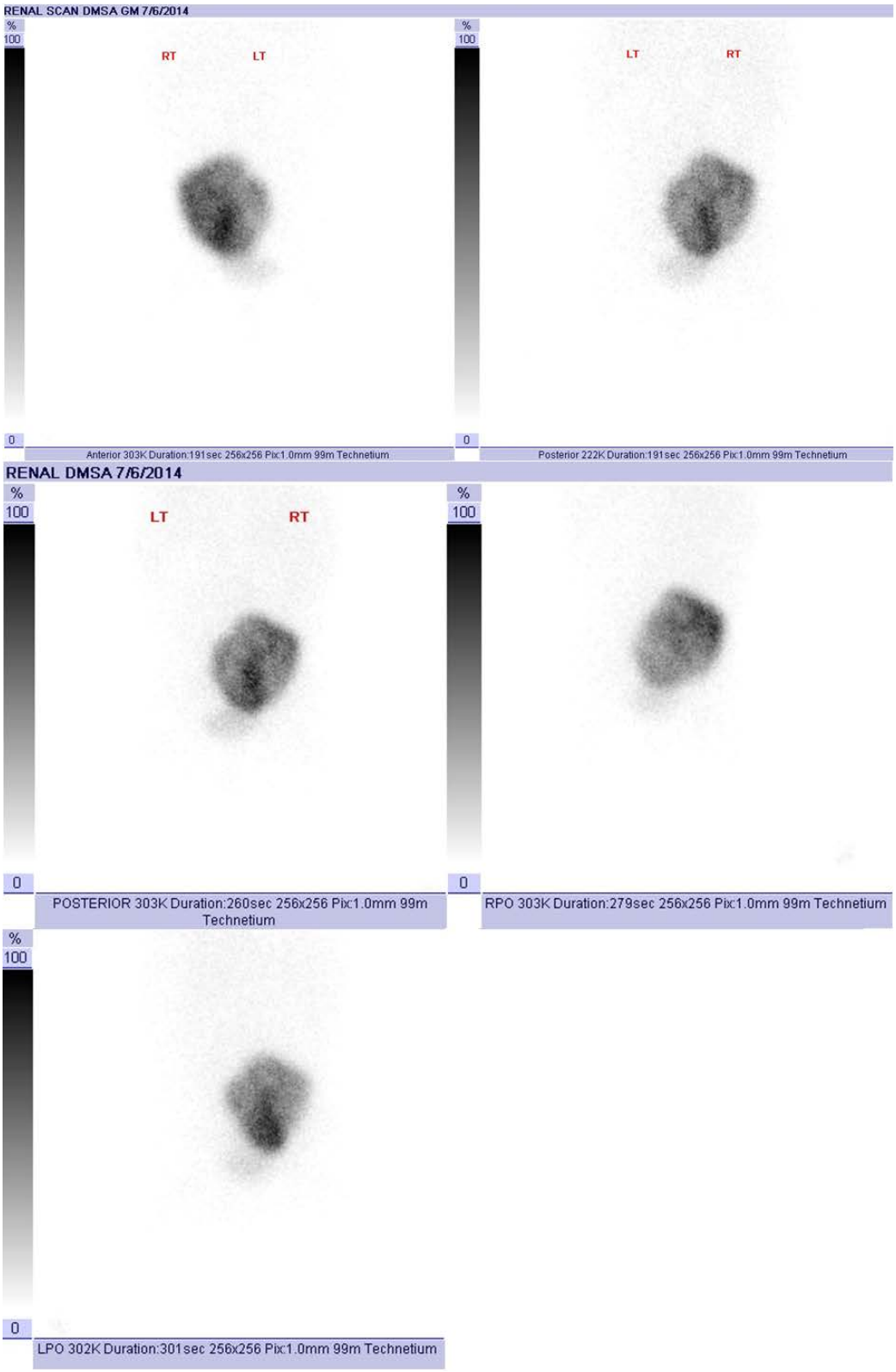

Figure 1. TC99m- DMSA :Posterior, anterior, right posterior oblique (RPO), and left posterior oblique views demonstrating fused ectopic kidneys in the lower abdomen

Pancake kidneys are usually situated anterior to thebifurcation of the abdominal aorta and can be demonstrated on ultrasound, CT, IVU, MRI and scintigraphy.

Pancake kidney malformation is not necessarily associated with renal dysfunction but does require exclusion of concomitant anomalies, long-term follow-up for early detection of possible future complications such as: ureteropelvic junction obstruction, recurrent infection, recurrent calculus, increased incidence of malignancies, more prone to trauma.

There are no specific guidelines for the management of crossed fused renal ectopia [5]. The fused renal units do not need to be separated. The treatment is guided toward the associated problems that lead to either symptoms or the deterioration of the upper tracts e.g., a pelviureteric junction obstruction would require a pyeloplasty or vesicoureteral reflux would require either injection of a bulking agent or reimplantation of ureters.

4. Conclusion

Pancake kidney or crossed fused ectopia is a rare congenital anomaly of the renal system, found more commonly in boys and are usually incidentally detected during investigations for other problems (as in our case). It can be managed either conservatively or surgically depending on the patient situation and associated symptoms.

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