CASE REPORT

MULTIDETECTOR COMPUTED TOMOGRAPHY UROGRAPHY IN PANCAKE KIDNEY: A RARE CASE

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ABSTRACT: Pancake kidney is a rare congenital anomaly of the genitourinary system, with fewer than 30 cases described in the literature. Cake kidney or fused pelvic kidney is an anomaly in which the entire renal substance is fused into one mass, lying in the pelvis, and giving rise to two separate ureters which enter the bladder in normal relationship. We present a case of pancake kidney who was diagnosed incidentally during a routine infertility work up. Our case did not have any associated genital anomalies.

KEYWORDS: Multidetector computed tomography urography, renal fusion anomalies, pancake kidney.

INTRODUCTION: Renal fusion anomalies are rare non-fatal congenital malformations of renal development in which both kidneys are fused together in early embryonic life. Knowledge of the presence of renal fusion anomaly is important because the condition is associated with an increased rate of infection, obstruction, stone formation, other congenital anomalies and renal tumors. Pancake kidney is a rare congenital anomaly of the genitourinary system, with fewer than 30 cases described in the literature.

CASE REPORT: 21 year old married female presented to our department with inability to conceive since 2 years. Physical examination revealed no specific abnormality and gynecological examination was normal. Laboratory investigations including renal function tests were normal. Chest radiograph was normal.

Ultrasound abdomen revealed absence of both kidneys in respective renal fossae. Ultrasound of pelvis (Fig. 1) revealed fused kidneys located slightly to right side of the midline. It measured ~ 9.8 x 11.4 cm and demonstrated peripheral hypoechoic cortex and inner pyramids and hyperechoic medullary sinuses with maintenance of cortico-medullary differentiation. The mass showed normal pattern of vascularity and normal Doppler parameters. No specific abnormality was noted in pelvic scan.

Plain and contrast enhanced CT scan (Fig. 2) showed the pancake kidney as a large lobulated mass in pelvis in the prevertebral region slightly to right side which showed normal opacification on corticomedullary and nephrographic phases. Delayed scan was done after 10 minutes and revealed normal excretion pattern with opacification of two renal pelves and two ureters which were arising separately. The ureters were draining to bladder separately. The fused kidney was supplied by a single artery arising from aorta at its bifurcation into common iliac arteries and drained by a vein which in turn was draining into distal inferior venacava. No abnormality noted in genital organs.

Further multiplanar reformatting (Fig. 3) in coronal and sagittal planes was done and with the use of volume rendering techniques CT angiographic (Fig. 4) and CT urographic (Fig. 5) images were generated.

DISCUSSION: Renal fusion anomalies are rare non-fatal congenital malformations of renal development in which both kidneys are fused together in early embryonic life. Knowledge of the presence of renal fusion anomaly is important because the condition is associated with an increased rate of infection, obstruction, stone formation, other congenital anomalies and renal tumors.[1-3]

Cake kidney is a rare congenital malformation of the urogenital tract, characterized by complete fusion of both kidneys to form one mass, lying in the pelvis, and giving rise to two separate ureters which enter the bladder in normal relationship.[4] It accounts only for 2% of fused kidneys. Fewer than 30 cases have been described in the literature till date. Rarely such kidney may possess a single ureter.[5] It can be diagnosed at any age group.[6] The fused kidney usually occupies prevertebral or presacral space.[7]

It may be asymptomatic and be detected at autopsy or may become infected or may cause local pain from dragging on the renal vessels by the weight of the organ. Majority of these cases are associated with anomalies in other organs such as abnormal testicular descent, tetrology of Fallot, vaginal absence, sacral agenesis, caudal regression syndrome, spina bifida and anal abnormalities.[7]

The diagnosis of cake kidney is not necessarily associated with a poor prognosis. However, complications that can be associated with anatomic malformations such as urinary stasis, infection, formation of stones, and vascular involvement, can cause serious clinical problems.[6] Therefore, cases of cake kidney must be investigated in order to exclude concomitant anomalies and to prevent complications.[6] It may pose problems to surgeons during abdominal surgery. Surgeons should be aware of renal fusion anomalies to minimize perioperative complications because of the uncertain anatomy.

Cake kidney occurs at an early phase in the embryological development.

During the formation of a cake kidney, the nephrogenic blastemas would be compressed between the umbilical arteries at the beginning of the cranial migration of the ureteral buds, and this would lead to their fusion.[6]

The vascular supply of the cake kidney is consistent with its arrested migration. It usually derives its blood supply from the aorta near its bifurcation or from the common iliac vessels. Venous drainage is usually into the distal inferior venacava or the common iliac veins. This anomalous blood supply is at increased risk for vascular compromise due to pelvic trauma, vascular disease, pregnancy or space occupying lesion.[7]

Multidetector computed tomographic (MDCT) urography depicts the normal urinary tract anatomy, including the renal parenchyma, collecting structures and ureters. It is helpful to screen for the presence of stones, hydronephrosis or masses. It also provides information about the vascular supply of the fused kidneys. Three-dimensional reformatted images can provide good delineation of congenital fusion anomalies of the kidney. Therefore, MDCT urography enables a comprehensive evaluation of patients with renal fusion anomalies in a single examination.[3]

CONCLUSION: Cake kidney is a rare renal fusion anomaly which may be associated with other anomalies or complicated by stasis, infection, calculus formation and tumors. MDCT urography forms a one stop shop for complete evaluation of such cases with good depiction of collecting system and vascular anatomy.

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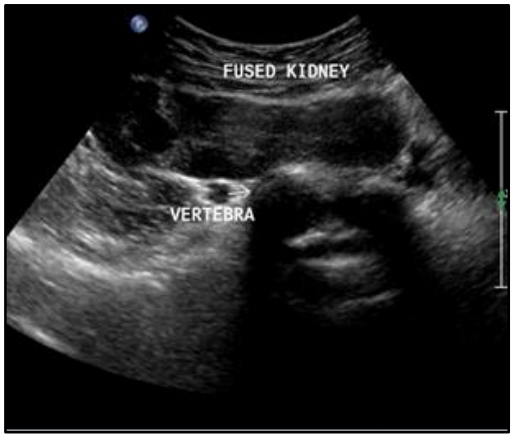

Fig. 1: Transverse ultrasonogram: Fused kidneys lying in prevertebral space slightly to the right side with maintenance of cortico medullary differentiation

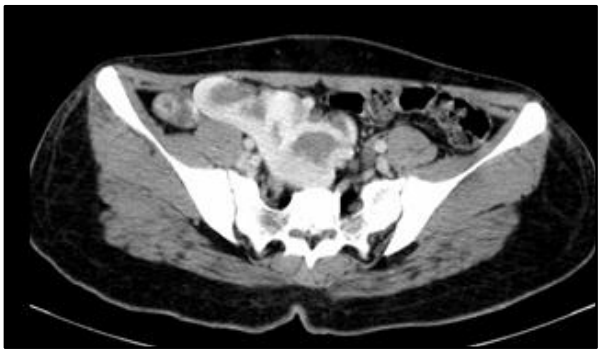

Fig. 2: Axial post contrast CT image in nephrographic phase: Fused kidney located in prevertebral region with normal opacification of fused kidneys

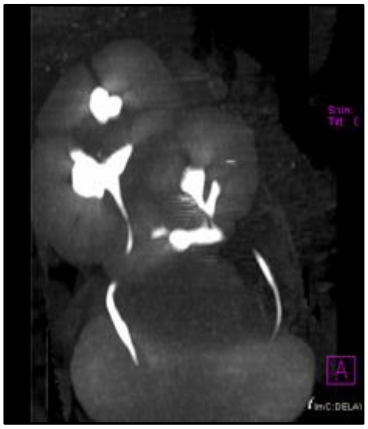

Fig. 3: Coronal MIP image: Fused kidneys with normal excretion pattern with two ureters draining separately into bladder

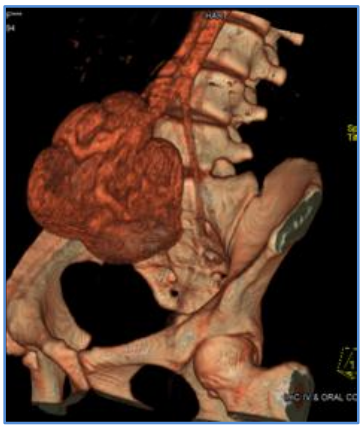

Fig. 4: Curved planar volume rendered image in nephrographic stage: Arterial supply by a branch arising from the aortic bifurcation and venous drainage to distal inferior venacava

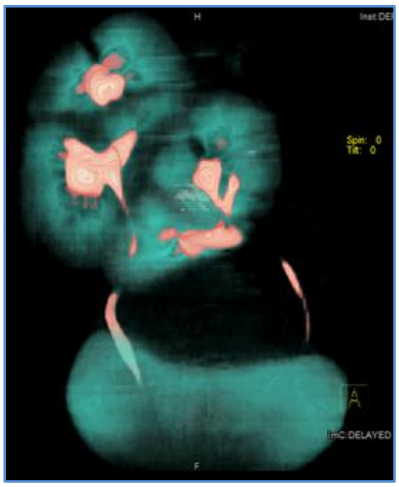

Fig. 5: Coronal volume rendered images in delayed phase: Pancake kidney with two ureters draining separately to the bladder

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