

Crossed-fused renal ectopia: a case report

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SUMMARY

Crossed renal ectopia is one of the rarest urinary system anomalies. It is more often seen at autopsy than in clinical practice. Most cases of renal ectopia remain asymptomatic during a person's lifetime and are diagnosed incidentally. The identification of crossed fused renal ectopia is important for radiologists and surgeons, since it is a predisposing factor for obstruction, infection, and neoplasia of the urinary system. In this report, we discussed the crossed-fused renal ectopia found in cadaver of a woman aged approximately 60 years. The clinical significance and embryological background of the variation is described in detail.

Key words: Crossed fused renal ectopia – Neoplasia – Urinary system

INTRODUCTION

Anomalies of the kidneys are common. The anomalies described include non-rotation of the kidney, pelvic kidney, and horseshoe kidney. An uncommon anomaly is crossed-fused ectopia of the kidneys (Jones, 1997; Bradshaw et al., 2000). Crossed-fused renal ectopia is a

very rare anomaly in which both kidneys are located on the same side and are fused. Crossed renal ectopia (CRE), which was first described by Pannorlus in 1964, is a rare congenital anomaly consisting of the transposition of a kidney to the opposite side. The associated ureter crosses the midline to insert in its normal position to the bladder (Birmole et al., 1993; Felzenberg and Nasrallah, 1991).

Crossed-fused renal ectopia is a rare renal anomaly with incidence of 1:1300-1:7500 (Campbell and Harrison, 1970). In recent years, the overall incidence at autopsy of crossed renal ectopia has been reported to be between 1:2000 and 1:7000 (Hwang et al., 2002). The incidence of unfused crossed renal ectopia, however, has been reported to be 1 in 75,000 autopsies, an incidence ten times lower than that of crossed-fused renal ectopia (Felzenberg and Nasrallah, 1991). Anatomically, crossed renal ectopia can be classified into four groups: 1) CRE with fusion (the majority of cases: 90%), 2) CRE without fusion (uncommon), 3) solitary CRE (very rare) and 4) unfused bilaterally CRE (also very rare) (Koff and Wise, 1996).

Here we report a case of a crossed-fused ectopic kidney found in the right pelvis of a female cadaver during anatomical dissection.

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CASE REPORT

During routine dissection class for undergraduate medical students, we noted a variation in the location of the kidneys and its vessels in the cadaver of a woman of approximately 60 years old. The right kidney was fused with the left kidney and rested on the right psoas major muscle (Fig. 1a). The left kidney crossed the midline and reached the right pelvis. The right kidney mass received its blood supply from two renal arteries (Fig. 1b). The two renal arteries, which are vessels of large caliber, were seen arising from the bifurcation of the aorta. The caudal-most branch supplying the left renal mass arose from the left common iliac artery. The corresponding veins were found and seen to be draining into the inferior vena cava (Fig. 1b). Two ureters were found in the fused kidneys: the right ureter descended on same side and inserted into the bladder, whereas, the left ureter was seen crossing over the normal side before inserting into the bladder.

DISCUSSION

Renal fusion anomalies are of two types: (1) horseshoe kidney and its variants and (2) crossed renal ectopia. The horseshoe kidney is probably the most common fusion anomaly (Bradshaw et al., 2000). The horseshoe kidney can be differentiated from crossed-fused ectopia, in which both fused kidneys lie on one side of the spine and the ureter of the crossed kidney crosses the midline to enter the bladder.

The kidney and urinary tract are formed by the union of the lower part of Wolffian duct and metanephric blastema. Over-bending and rotation of the caudal end of the embryo may prevent the ureteric bud from uniting with the ipsilateral metanephric blastema and is thus attracted more towards the opposite side, resulting in this abnormal fusion (Cook and Stephens, 1977; Parrots et al., 1994). Ectopic kidneys are more commonly found in the pelvis or the lower abdomen due to failure in their ascent. In most cases the fusion is between the lower pole of the orthotropic kidney and the upper pole of the ectopic kidney. It is usually the left kidney which crosses to the right (Cook and Stephens, 1977; Parrots et al., 1994). Most renal anomalies are incidental findings and ectopic kidneys have a high incidence of stone formation.

Although most of patients with crossed-fused renal ectopia are usually asymptomatic, they do present with increased susceptibility to develop complications such as urinary infections, urolithiasis, and abdominal masses. There are reported cases of renal cell carcinoma and Wilm's tumor associated with crossed-fused renal ectopia (Redman and Beryl, 1997; Aquilera et al., 2005). A case of TAR syndrome (Thrombocytopenia and Absent Radius syndrome) has been reported with a renal anomaly in a patient who developed Wilm's tumor (Greenhalgh et al., 2002). Other congenital anomalies may accompany CRE such as unilateral agenesis of the fallopian tubes and ovaries, skeletal abnormalities (radial clubhand, hemivertebrae, spina bifida, scoliosis, and congenital hip dislocation), gas-

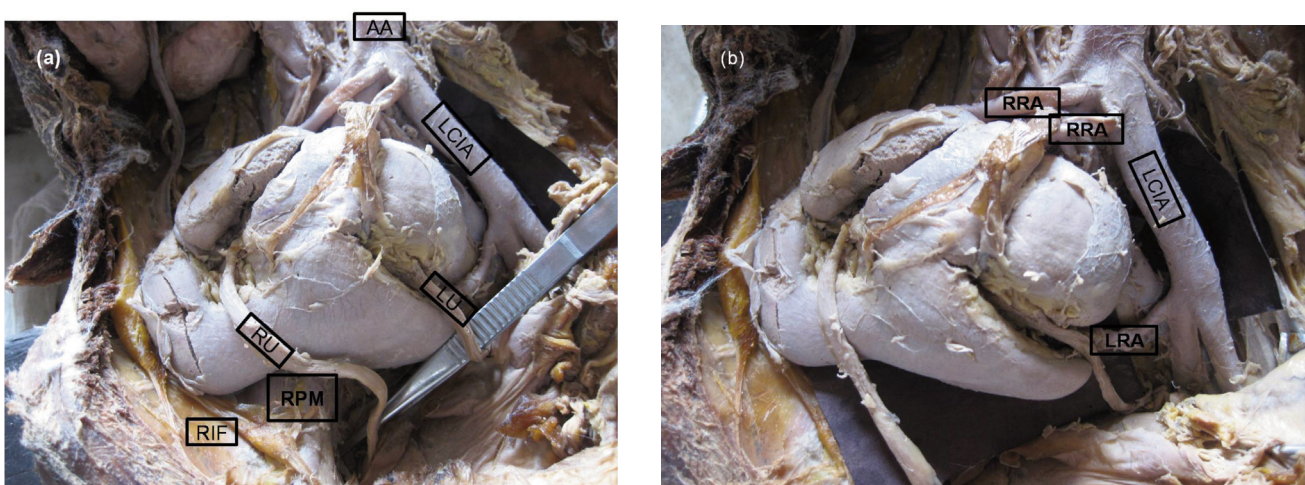


Fig. 1. (a): Crossed-fused ectopic kidney in the right iliac fossa, AA- abdominal aorta, LCIA- left common iliac artery, RU- right ureter, LR- left ureter, RIF- right iliac fossa, RPM- right psoas major. (b): arteries supplying the crossed-fused kidney, RRA- right renal artery, LCIA- left common iliac artery, LRA- lower renal artery.

trointestinal abnormalities (imperforate anus and esophageal atresia with tracheoesophageal fistula), and cardiopulmonary anomalies (Mansberg et al., 1999).

The finding of crossed-fused renal ectopia warrants a complete urologic investigation to rule out surgically correctable pathologies in the urinary tract (Ahmad, 2007; Patel and Singh, 2008). Treatment is only indicated for the complications of the anomaly instead of for the anomaly itself (Felzenberg and Nasrallah, 1991).

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