

Trauma and reconstruction

Management of blunt renal trauma in a crossed fused ectopic kidney

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Introduction

Crossed renal ectopia is a rare congenital anomaly with an estimated incidence of 1 in 7000.¹ It encompasses a spectrum of anomalies when the ureter crosses the midline and inserts into a kidney located on the opposite side of the body.¹ Crossed renal ectopia with fusion of the kidneys is the most common form and is usually asymptomatic. We present a case of crossed fused renal ectopia that was diagnosed after blunt renal trauma and was managed conservatively.

Case presentation

A 35-year-old previously healthy male presented to the Emergency Department with right sided abdominal and flank pain after being punched in the abdomen. He reported gross hematuria and progressively worsening pain. Laboratory results showed an elevated white blood cell count (11.6×10^6), high blood urea

nitrogen (37 mg/dL), and high creatinine (1.85 mg/dL). Urinalysis was positive for blood and trace white blood cells. Subsequent computerized tomography (CT) imaging of the abdomen and pelvis with IV contrast showed an ectopic left kidney located on the right side of the body with connection to the inferior pole of the right kidney. Severe hydronephrosis was also noted in the ectopic left kidney with extravasation of fluid in the peri-renal area (Fig. 1).

The patient continued to have worsening abdominal pain, so cystoscopy and retrograde ureteropyelogram were done to assess for urinary extravasation. Retrograde ureteropyelogram showed a normal-appearing right ureter that was located slightly more lateral than usual; left ureteral orifice was also orthotopic. The left ureter traversed the midline to the right side, confirming crossed renal ectopia. Left ureteropelvic junction (UPJ) was narrow, causing severe hydronephrosis in the crossed renal unit. The affected collecting system was only partially filled with contrast material without clear evidence of urinary extravasation; however complete assessment of contrast extravasation was not possible because of severe hydronephrosis. Considering high clinical suspicion for urinary leak and severity of hydronephrosis decision was made to place a left ureteral stent bypassing the narrowed UPJ (Fig. 2).

The patient was discharged on day 7 post-trauma with a stable hematocrit and a creatinine down to 1.6 mg/dL. In follow-up period, he had two episodes of urinary tract infections that were managed with oral antibiotics. Follow-up CT scan two months after the trauma showed complete resolution of the perinephric fluid collection but persistent severe hydronephrosis in the ectopic kidney. Left ureteral stent was removed without complications. Follow-up ultrasounds including the 6-month follow-up showed continued severe right-sided hydronephrosis without other complications related to the initial trauma. The recommendation was made for pyeloplasty, however the patient opted for continued monitoring.

Discussion

Crossed renal ectopia is a rare condition with no clear embryological mechanism. Abnormal development and migration of the ureteric bud and metanephric blastema between the fourth and eighth weeks of gestation is one potential explanation. Teratogenic factors and genetic influences have also been implicated as

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¹ <http://www.turnsresearch.org/page/aast-gu-trauma-study-group-author-list-renal-trauma>.

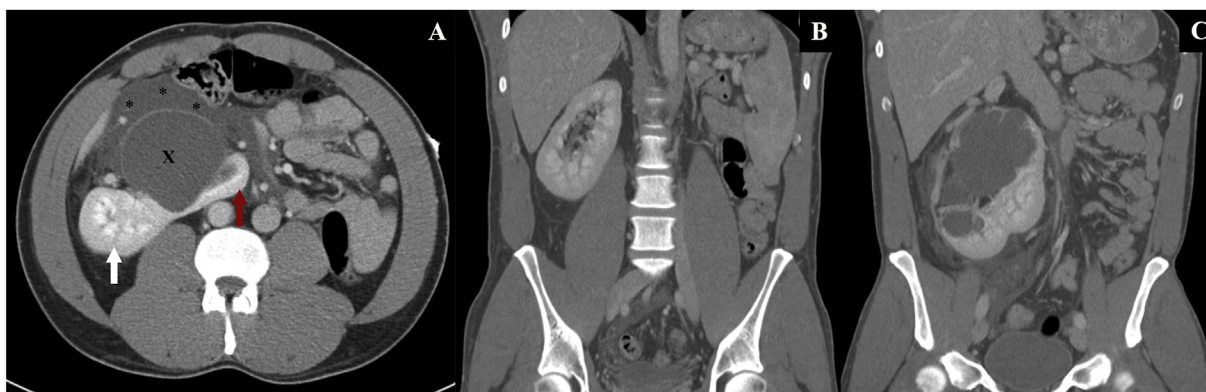


Fig. 1. Computed tomography (CT) of abdomen/pelvis; A) axial plane showing fused right (white arrow) and left (red arrow) kidneys with severe hydronephrosis in the ectopic kidney (cross mark) and peri-renal fluid collection (asterisks); B) coronal view of the right kidney with malrotation; C) coronal view of the ectopic left kidney with hydronephrosis. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

potential causes of crossed renal ectopia.^{2,3}

Crossed fused renal ectopia can be subclassified into six categories in decreasing order of incidence: unilateral fusion with inferior ectopia, sigmoid, lump, L-shaped, disc, and unilateral fusion with superior ectopia. Most patients with crossed renal ectopia are asymptomatic and discovered incidentally on imaging. However, one third of patients experience asymptomatic abdominal mass as the presenting finding. Other presenting symptoms include urinary tract infections, nonspecific abdominal pain, hydronephrosis, and hematuria.⁴ Our reported patient had a unilateral fused kidney with inferior ectopia, which remained asymptomatic before the trauma despite the severe UPJ narrowing and hydronephrosis.

Congenitally abnormal kidneys and those with pre-existing conditions may be more susceptible to injuries, even with low velocity trauma.⁵ This could be explained by a loss of the kidney's usual structural safeguarding due to changes in positioning, size, or

abnormal rotation. In combination with hydronephrosis, even minor insults can potentially cause injury to the collecting system and cause urinary extravasation. In addition, diagnosis of urinary extravasation can be more challenging in hydronephrotic kidneys since the dilated units require more time to fill with contrast to show urinary extravasation in the excretory phase CT scan.

Renal trauma is now often managed non-operatively in hemodynamically stable patients. Most cases of urinary extravasation heal spontaneously. Ureteral stenting is usually used in cases of complications or persistent leak; however, the indications for intervention are not well established. Presence of severe UPJ narrowing and hydronephrosis in combination with abnormal anatomy of the crossed fused kidney led to our decision to use ureteral stenting in hopes of controlling urinary extravasation and aiding the healing process.

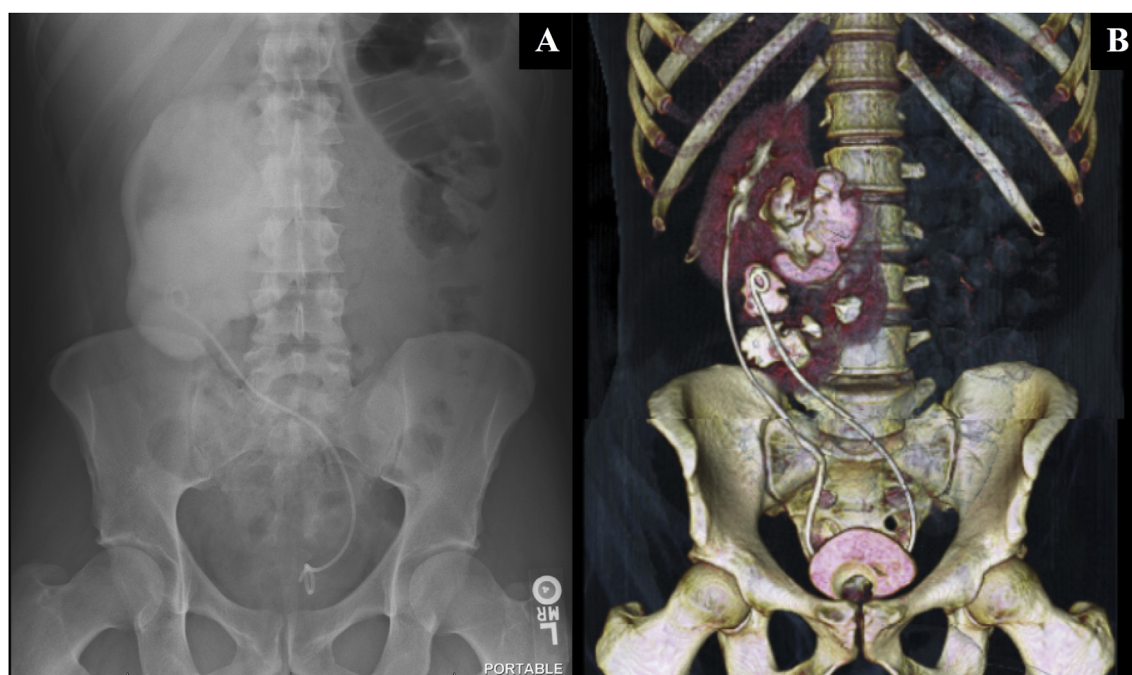


Fig. 2. A) Plain abdominal X-ray showing ureteral stent in the left ureter crossing the midline and inserting into the ectopic left kidney on the right side; B) 3-D reconstruction of the computed tomography scan showing crossed fused renal ectopia with inferior fusion.

Conclusion

Abnormal kidneys may be more prone to injuries after minor renal trauma. Conservative management with close monitoring can be successfully used in the management of kidneys with congenital anomalies if the rent in the collecting system appears to be mild.

Conflicts of interest

None.

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