

# Crossed Fused Ectopic Kidney with Stone Disease and Bifid Renal Pelvis: A Case Report

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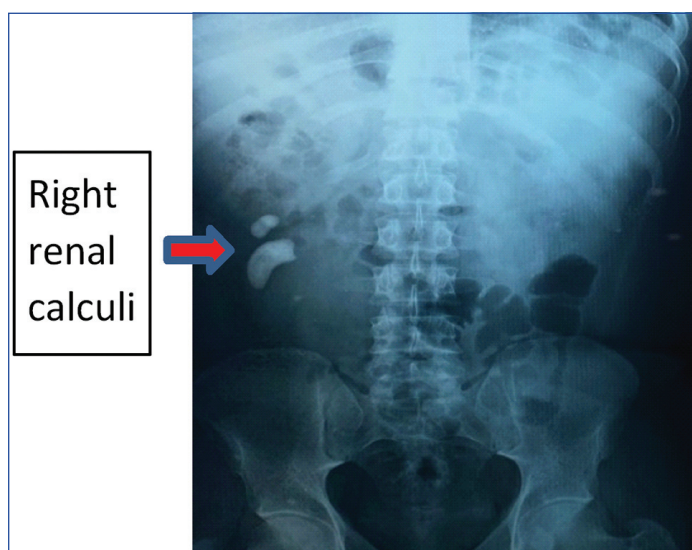
## ABSTRACT

Crossed fused ectopic kidney is a rare congenital anomaly wherein the kidneys are present on the same side due to fusion. It is a rare disease that may remain undiagnosed throughout life. Its rarity and anatomical abnormality make any intervention challenging. A 32-year-old male patient presented with symptoms of pain in the abdomen and burning micturition for a year. Serum creatinine, along with other blood tests, was normal. X-ray KUB showed renal calculi in the region of the right kidney. However, a Computed Tomography (CT) scan showed that the left kidney was malrotated and fused with the lower pole of the right kidney, suggestive of crossed fused renal ectopia. A cystoscopy and retrograde pyelography were performed, followed by open pyelolithotomy, wherein calculi were removed, and a stent was placed. Through this case report, it is suggested that adequate presurgery evaluation is necessary for patients with such malformations.

**Keywords:** Congenital kidney disease, Fusion anomaly, Multiple calculi, Retrograde pyelography

## CASE REPORT

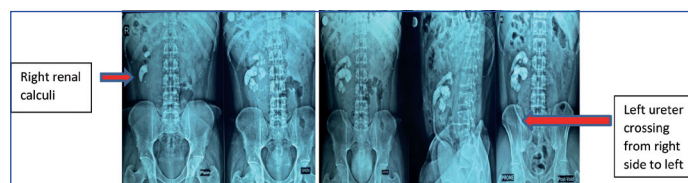
A 32-year-old male presented with pain in the right-side of the abdomen and burning micturition for a year. The pain was intermittent and was relieved after taking medications. There was no history of dysuria, lithuria, haematuria, Lower Urinary Tract Symptoms (LUTS), or fever. There was no history of similar complaints in the past. The patient hadn't undergone any surgeries in the past nor has any history of co-morbidity. There was no significant family history. On medical examination, the patient was moderately built. The vitals were stable, including pulse: 80/minute; blood pressure: 112/86 mmHg; temperature: 98.40 Fahrenheit; and 96% SpO<sub>2</sub> room air. There was no icterus, clubbing, cyanosis, pallor, or lymphadenopathy. No abnormality was detected on systemic and local examination. The Serum creatinine was 1.16 mg/dL, and other laboratory tests including Complete Blood Counts (CBC), Liver Function Tests (LFT), and blood glucose were within normal limits. X-ray KUB showed renal calculi in the region of the right kidney [Table/Fig-1].



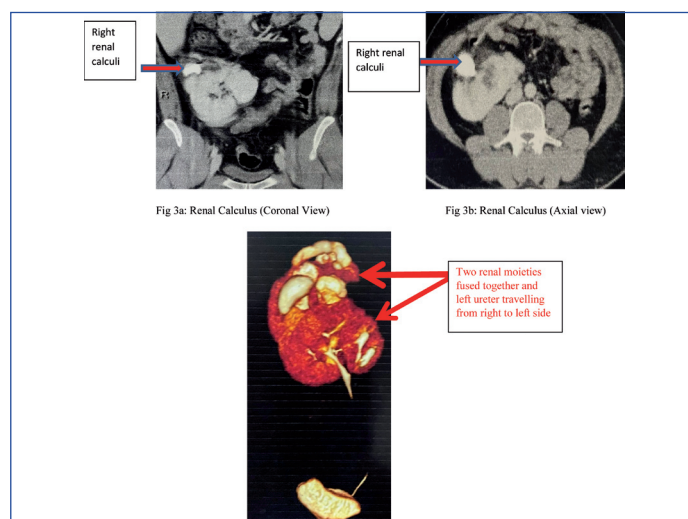
[Table/Fig-1]: X-ray KUB suggestive of right-sided renal calculi.

Intravenous Pyelogram (IVP) showed right-sided renal calculus with the right ureter draining to the right-side [Table/Fig-2a] and one more ureter originating on the same side tracing towards the

left-side [Table/Fig-2b]. The CT scan showed right bifid renal pelvis with a 17\*11 mm calculus in the upper moiety and a 32\*17 mm calculus in the lower moiety with moderate hydronephrosis. The left kidney was malrotated and fused with the lower pole of the right kidney, suggestive of crossed fused renal ectopia [Table/Fig-3a,b]. Two renal moieties were seen fused, and the left ureter traveling to the opposite side [Table/Fig-3c]. The diagnosis of the right renal calculi in a case of left crossed fused ectopic kidney was made. The decision was made to perform cystoscopy and retrograde pyelography and do open pyelolithotomy. Cystoscopy showed bilateral ureteric orifices at the normal position. Left cystoscopy and retrograde pyelography showed the ureter crossing over the right-side, whereas right cystoscopy and retrograde pyelography showed



[Table/Fig-2]: a) Showing right-side calculi; b) Showing ureter crossing to left-side.



[Table/Fig-3]: a) Renal calculus (coronal view); b) Renal calculus (Axial view); c) Two renal moieties fused together.

a bifid pelvis. Open pyelolithotomy was performed wherein a single pelvic incision was made through which calculi were removed, and the stent was placed. Postoperative X-ray KUB showed complete stone clearance [Table/Fig-4]. After surgery, the patient was followed-up for suture removal after 12 days. Stent removal was done after 21 days, and the patient improved symptomatically.



[Table/Fig-4]: Postoperative X-ray Kidney, Ureter, and Bladder (KUB) with DJ stent in situ.

DISCUSSION

Crossed fused ectopic kidney is a rare congenital anomaly characterised by fusion and migration of the kidneys to the opposite side, resulting in both kidneys being located on the same side of the body [1]. The prevalence of crossed fused ectopic kidney is estimated to be 1 in 1,000 live births [1], with an occurrence rate

of 1 in 7,500 autopsies [2]. Cross-Fused Renal Ectopia (CFRE) is usually asymptomatic, but symptoms like abdominal pain, dysuria, and haematuria can also be observed [3]. This condition can lead to various complications, including Urinary Tract Infections (UTIs), kidney stone formation, infections, obstructions, and neoplasia [4]. Calculus disease in crossed fused ectopic kidneys with a bifid renal pelvis is an even rarer finding. It can present significant challenges in terms of clinical management and treatment. Bilateral crossed ectopia is the rarest form to find. The ectopic solitary kidney is one of the most uncommon forms of ectopia, and the ectopic kidney may not fuse, even though fusion is eight times more common than non fusion [5]. With a male-to-female frequency ratio of 3:1, crossed renal ectopia affects men more frequently than women. Right-to-left renal fusion is less common than left to right. It is a rare disease that may remain undiagnosed throughout life and is usually associated with vesicoureteral reflux, ureteropelvic junction obstruction, UTIs, renovascular hypertension, renal calculi, and malignancy [6]. Renal fusion anomalies may involve abnormal rotation or vascular supply, creating challenges in open, minimally invasive surgeries, and endourological surgeries. CFRE patients typically present with UTI, stone formation, and generalised abdominal pain [7]. Definitive diagnosis of CFRE is difficult. Congenital anomalies are identified through radiological investigations. Various radiological investigations like Ultrasonography (USG), IVP, and CT can be used. USG is the primary investigation of choice as it is relatively less costly and does not involve radiation. However, it has limitations, being observer-dependent and may not provide an accurate diagnosis. CT scan is a better investigation to examine renal anomalies as it can provide details about the number, position, vessels, ureteral dilatation, and malrotation [7,8]. Renal calculi in such cases can be managed by various methods such as open surgery, laparoscopic surgery, or lap-guided puncture for Percutaneous Nephrolithotomy (PCNL) and USG-guided PCNL. Asymptomatic renal anomalies without calculi or obstructions can be managed conservatively [8]. These anomalies may present with various conditions such as pyelonephritis and calculi, which can be managed in various ways [9]. [Table/Fig-5] discusses similar cases published in the literature [1,2,10-17].

Author name	Age (years)/sex	Chief complaints and its duration	Radiological findings	Treatment
Cao Y et al., [2]	59/F and 24/F	Two cases presented with abdominal pain	First case was diagnosed as right-to-left crossed-fused ectopic kidney. Many calculi were found in the left kidney. The second case had a lump kidney with right kidney crossed to left with two 3-mm calculi in both kidneys	First case was managed with Percutaneous Nephrolithotomy (PCNL) and second case was managed conservatively.
Aminsharifi A et al., [10]	32/M	Right flank pain	Left-sided kidney crossed and fused with right kidney. Calculus in left kidney seen	Managed by laparoscopic nephrolithotomy.
Resorlu M et al., [11]	28/M	Left flank pain	Right kidney crossed to left	Retrograde Intra Renal Surgery (RIRS).
Agrawal S et al., [12]	8/M	Left flank pain	Right to left ectopia	Laparoscopic pyelolithotomy.
Benabdallah W et al., [1]	40/M	Abdominal pain and diabetic ketoacidosis	Left to right ectopia	Crossed kidney had ureteric calculus which was managed by Ureteroscopic Lithotripsy (URSL) and right renal calculus managed by open pyelolithotomy followed-up by Extracorporeal Shock Wave Lithotripsy (ESWL).
Amin QK et al., [13]	31/M	Right flank pain associated with burning micturition and haematuria	Left to right ectopia	PCNL.
Kumawat G et al., [14]	19/M	Right flank pain for three months	Left to right ectopia	Managed conservatively.
Huang L et al., [15]	51/F and 62/F	Two cases presented with right flank pain and repeated urinary infections	First patient-left to right ectopia-B/L ureteric calculi with right renal calculi. Second patient-Left to right-ureteral stone	First ureteric calculus managed with URSL and renal calculus with PCNL. Second case was managed flexible ureteroscope.
Akdogan L et al., [16]	25/M	No complaints	Right to left ectopia	-
Kaur N et al., [17]	22/F	Intermittent episodes of colicky pain in the right flank for eight months	Left to right ectopia	Open pyelolithotomy.
Present case	32/M	Right side abdominal pain and burning micturition for one year	The left kidney was malrotated and fused with the lower pole of the right kidney	Open pyelolithotomy.

[Table/Fig-5]: Summarises similar cases in the literature [1,2,10-17].

## CONCLUSION(S)

Crossed fused ectopic kidney is a rare congenital anomaly. Unless linked to other anomalies, they are typically detected inadvertently during the assessment of another ailment. Crossed fused renal ectopia is a rare anomaly with abnormal blood supply, making stone treatment challenging. With proper imaging and operative techniques, one could manage patients, making them stone-free and asymptomatic.

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