

## Retrocaval Ureter: Diagnostic Dilemma - A Case Report

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### Abstract

**Summary:** Retrocaval ureter is one of the unique and rarest congenital anomalies resulting from abnormal development of the inferior vena cava. The characteristic J-shaped or fishhook appearance is pathognomonic for this on CT urogram.<sup>1</sup>

Case presentation: A middle-aged man with a prolonged history of right lumbar pain spanning over three years presented to us. CT urogram depicted right moderate hydronephrosis with a fish-hook ureter. Subsequently, open surgical repair was performed successfully. At 6 months follow-up, he was pain-free with improvement in RFTs. In patients with progressive hydronephrosis or declining renal function, surgical repositioning of the ureter, either by open or laparoscopic method, is the treatment of choice.

**Keywords:** Retrocaval ureter, congenital anomaly, inferior vena cava, hydronephrosis.

### Introduction

Retrocaval ureter results from the abnormal embryological development of the inferior vena cava. This rare congenital anomaly is signified by the posterior course of the ureter with respect to the IVC, resulting in its compression against the lumbar vertebrae.<sup>3</sup> Pathogenesis is the persistence of the right subcardinal vein, which fails to regress and causes entrapment of the ureter behind the IVC.

The classical presentation is flank pain with a history of recurrent infections or obstructive uropathy, usually in the third or fourth decade of life.<sup>2</sup> The condition is more frequent in males, with a male-to-female ratio of approximately 3:1, and is predominantly right-sided; left-sided cases are extremely rare and usually associated with situs inversus or double IVC.<sup>1</sup>

Diagnosis is challenging due to nonspecific symptoms. CT urography is considered the most reliable modality, demonstrating the pathognomonic “fishhook” deformity of the proximal ureter as it loops behind the IVC.<sup>5</sup>

### Case Presentation

A 46-year-old man presented with dull, intermittent right flank pain persisting for three years, associated with nausea and occasional vomiting. He had a history of multiple hospital admissions in the periphery, where supportive treatment was given, which temporarily relieved his symptoms. He denied fever, hematuria, or lower urinary tract complaints.

On examination, he was stable with mild right flank tenderness.

#### Investigations

Laboratory tests were normal, including urea and creatinine. Ultrasound revealed Moderate Hydronephrosis with no evidence of stone, proximal ureteric dilatation, and distal ureter not visualized. (figure-1).

X-ray KUB was unremarkable. Contrast-enhanced CT urography demonstrated a dilated right renal pelvis and proximal ureter with a fishhook configuration looping behind the IVC at L3, consistent with a type I retrocaval ureter. (Figure-2 and Figure-3)

After obtaining informed consent, the patient underwent ureteroureterostomy through a right flank incision using an extraperitoneal approach.

Intraoperatively, we noted a dilated renal pelvis and a retrocaval ureter looping behind the inferior vena cava at the level of the L3 vertebra, with a narrowed retrocaval segment. (Figure-4)

#### Contributions:

RAM ZQ - Conception, Design  
UJC FBK - Acquisition, Analysis, Interpretation  
RAM FBK - Drafting  
ZQ UJC - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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Figure 1: Ultrasound depicting moderate hydronephrosis



Figure-2: CT urogram showing classic fish-hook appearance of the ureter with hydronephrosis



Figure-3: Coronal section of excretory urogram confirming the findings. No stone was seen anywhere in the urinary tract



Figure 4: dilated renal pelvis and narrowed ureter slung by a loop

The right renal pelvis and ureter were carefully isolated, and the ureter was looped with a vessel marker, then mobilized cranially and caudally around the stenotic segment. Gentle, atraumatic handling was ensured throughout to preserve vascularity and reduce the risk of anastomotic leak or ischemic atrophy.

The adventitia at both ends of the ureter was freed from scar tissue, maintaining adequate blood supply, and the segment was brought together without tension. The stenotic retrocaval portion was excised, and the proximal and distal ends were spatulated about 7–10 mm, positioned 180° apart. (Figure 5)

A ureteric stent was placed, and corner sutures with 5-0 Vicryl were applied. The anastomosis was then completed with interrupted sutures to ensure a watertight seal. (Figure 6)

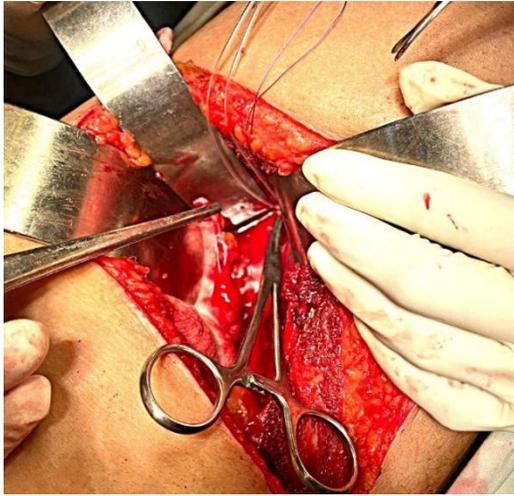


Figure 5: Proximal and distal ureteric ends freed and excised

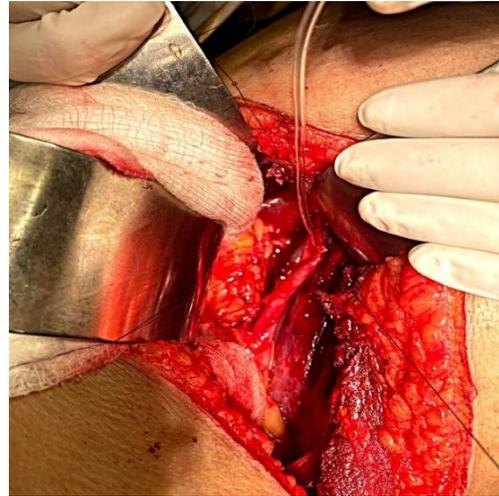


Figure 6: Anastomosis being done of both proximal and distal ends

A surgical drain was inserted and removed on the fourth postoperative day once drainage became minimal. A Foley catheter was kept indwelling for 72 hours.

#### Follow up

Ultrasound at six weeks showed resolving hydronephrosis, and the DJ stent was removed. At six months, he remained asymptomatic with good renal function and no recurrence of obstruction.

## Discussion

Retrocaval ureter is a vascular anomaly rather than a true urinary tract malformation. Bateson and Atkinson originally classified it into two subtypes:

- **Type I (low loop):** Most common, with a sharp medial deviation of the ureter crossing posterior to the IVC at L3, causing marked hydronephrosis.
- **Type II (high loop):** Less common and less obstructive, where the ureter crosses higher near the renal pelvis, usually producing only mild dilatation.<sup>1</sup>

Patients typically present with flank pain, recurrent urinary tract infections, or nephrolithiasis. Rarely, delayed presentations have been reported even in the fifth decade.<sup>7</sup>

Imaging is key to diagnosis. While ultrasound may show hydronephrosis, it cannot delineate the course of the ureter. CT urography provides three-dimensional visualization of the ureter's anomalous course behind the IVC.<sup>4</sup>

Surgery is indicated in symptomatic patients, progressive hydronephrosis, or deteriorating renal function. The principle is repositioning the ureter anterior to the IVC and restoring continuity. Both open and minimally invasive approaches (laparoscopic and robotic) have been described, but the latter approach is superior in terms of patient satisfaction, enhanced recovery, and less morbidity.<sup>6</sup> Unfortunately, due to resource limitations, open surgery was performed in our hospital.

## Conclusion

In young or middle-aged adults with a prolonged history of pain or hydronephrosis, thorough clinical examination and investigations should be performed to rule out rare causes like retrocaval ureter. In this respect, CT urography remains the gold standard. Surgery is the treatment of choice with excellent results and symptom resolution with renal function improvement. Postoperatively, follow-up imaging is required to confirm resolution.

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