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LAPAROSCOPIC MANAGEMENT OF RETROCAVAL URETER: A CASE REPORT FROM MALI

PRISE EN CHARGE LAPAROSCOPIQUE DE L'URETÈRE RÉTROCAVE : À PROPOS D'UN CAS AU MALI

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Abstract

Introduction and importance: Retrocaval ureter is a rare congenital anomaly of the inferior vena cava (IVC), found in about one in 1,000 births. Laparoscopic and robotic reconstruction are established minimally invasive options, but published African experience remains limited.

Case presentation: A 30-year-old woman with no medical history presented with right renal colic of one year's duration. Serum creatinine was 79 µmol/L and urine culture was sterile. CT urography showed right hydronephrosis (renal pelvis 24 mm) and a ureter passing behind the IVC in an S-shaped course (Bateson–Atkinson type I). Through three transperitoneal ports, we excised the 2.2 cm retrocaval segment, which appeared aperistaltic, transposed the ureter anterior to the IVC and performed a ureteropelvic anastomosis over a double-J stent. Operative time was 240 minutes and estimated blood loss 50 mL, without conversion. Histology showed ureteritis. The patient was discharged on day 2 and the stent was removed at six weeks. At two months she was pain-free and the renal pelvis measured 11 mm on ultrasound.

Clinical discussion: Blood loss and hospital stay were comparable to small published series. Operative time exceeded most reported values (80–225 minutes), mainly because of intracorporeal suturing early in our learning curve.

Conclusion: Tracing the ureter beyond the pelviureteric junction on CT allowed a preoperative diagnosis. Conventional laparoscopic repair was feasible in our setting, with a favourable early outcome; longer follow-up with functional imaging is needed. To our knowledge, this is the first laparoscopic repair of a retrocaval ureter identified in the Malian literature.

Keywords

Retrocaval Ureter,

Vena Cava, Inferior/abnormalities,

Laparoscopy,

Ureteral Obstruction,

Mali,

Case report.

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Résumé

Introduction et importance : l'uretère rétrocave est une malformation congénitale rare de la veine cave inférieure (VCI), estimée à une naissance sur 1 000. La reconstruction laparoscopique ou robotique est une option mini-invasive établie, mais l'expérience africaine publiée reste limitée.

Observation : une femme de 30 ans, sans antécédent, consultait pour des coliques néphrétiques droites évoluant depuis un an. La créatininémie était de 79 µmol/L et l'ECBU stérile. L'uroscanner montrait une dilatation pyélocalicielle droite (pyélon de 24 mm) et un uretère passant derrière la VCI avec un trajet en S (type I de Bateson et Atkinson). Par voie transpéritonéale à trois trocarts, nous avons réséqué le segment rétrocave de 2,2 cm, qui paraissait apéristaltique, transposé l'uretère en avant de la VCI et réalisé une anastomose urétéro-pyélique sur sonde double J. L'intervention a duré 240 minutes, avec des pertes sanguines estimées à 50 mL, sans conversion. L'histologie a montré une urétérite. La patiente est sortie au deuxième jour et la sonde a été retirée à six semaines. À deux mois, elle ne souffrait plus et le pyélon mesurait 11 mm à l'échographie.

Discussion clinique : les pertes sanguines et la durée d'hospitalisation sont comparables à celles de petites séries publiées. La durée opératoire dépasse la plupart des valeurs rapportées (80 à 225 minutes), surtout en raison de la suture intracorporelle en début de notre courbe d'apprentissage.

Conclusion : suivre l'uretère au-delà de la jonction pyélo-urétérale sur le scanner a permis un diagnostic préopératoire. La correction laparoscopique conventionnelle a été faisable dans notre établissement, avec une évolution précoce favorable ; un suivi prolongé avec une imagerie fonctionnelle est nécessaire. À notre connaissance, il s'agit de la première correction laparoscopique d'un uretère rétrocave identifiée dans la littérature malienne.

Mots clés

Uretère rétrocave,

Veine cave inférieure, anomalies,

Laparoscopie,

Obstruction urétérale,

Mali,

Cas clinique.

INTRODUCTION :

Right-sided hydronephrosis in a young adult usually suggests pelviureteric junction obstruction, but an abnormal ureteric course is worth keeping in mind. If the ureter is not followed past the junction on imaging, the diagnosis is easily missed [1,2]. Retrocaval ureter affects about one birth in 1,000, men more often than women, and it usually becomes symptomatic in the third or fourth decade [3]. Hochstetter first described it in 1893 [4].

The name is misleading. The ureter itself develops normally; the problem is venous. The infrarenal IVC normally arises from the right supracardinal vein, which lies dorsal to the ureter. When the right posterior cardinal vein, which lies ventral to it, persists instead, the IVC ends up in front of the ureter. "Preureteral vena cava" therefore describes the anatomy more accurately [3].

Bateson and Atkinson described two radiological types in 1969 [5]. Type I, the low loop, accounts for about nine cases in ten: the ureter crosses behind the IVC at around the third lumbar vertebra, takes an S-shaped or fish-hook course and is often obstructed. In type II, the high loop, the crossing lies closer to the renal pelvis and obstruction is mild or absent [3,5].

Anderson and Hynes performed the first open repair in 1949 [6]. Baba et al. reported the first laparoscopic repair in 1994 [7], and Salomon et al. the first retroperitoneal one in 1999 [8]. Laparoscopic and robotic reconstruction are now established options for symptomatic patients when the expertise is available, although the evidence still comes from small retrospective series and case reports [3,9].

In Africa, most published cases were treated by open surgery or did not state the approach [1,2,10,11]; laparoscopic repair had so far been reported from Morocco [12,13]. We report a right type I retrocaval ureter that we repaired laparoscopically at Professor Bocar Sidy Sall University Hospital in Kati, a public teaching hospital in Mali, and we compare our experience with the literature. This case report has been prepared in accordance with the SCARE 2023 guideline [14].

CASE PRESENTATION :

Patient information. A 30-year-old woman (59 kg, 168 cm; body mass index 20.9 kg/m²) came to our department with intermittent right flank pain resembling renal colic. The pain had been recurring for about a year, with no other urinary or digestive symptom. She had no relevant medical or surgical history and no known allergies.

Clinical findings. She was in good general condition, with a soft abdomen, no palpable mass and right flank tenderness. Haemoglobin was 11 g/dL and serum creatinine 79 µmol/L, giving an estimated glomerular filtration rate of

89 mL/min/1.73 m² with the 2021 CKD-EPI equation. Urine culture was sterile.

Diagnostic assessment. Contrast-enhanced CT urography in August 2026 showed a dilated right collecting system, with a 24-mm renal pelvis, and a normal left kidney (Figure 1a,b). The right kidney still excreted contrast and its parenchyma was preserved. At the level of the renal hila, the dilated pelvis and proximal ureter headed medially towards the IVC (Figure 1c). Further down, the ureter passed behind the IVC in an S-shaped course, crossing at about the level of L3. Volume rendering confirmed the right-sided dilatation and the normal course of the left ureter (Figure 2). Our working diagnosis was a right Bateson–Atkinson type I retrocaval ureter. Imaging did not show an associated pelviureteric junction obstruction, although the two lesions have been reported together [15]. Diuretic renography was not performed.

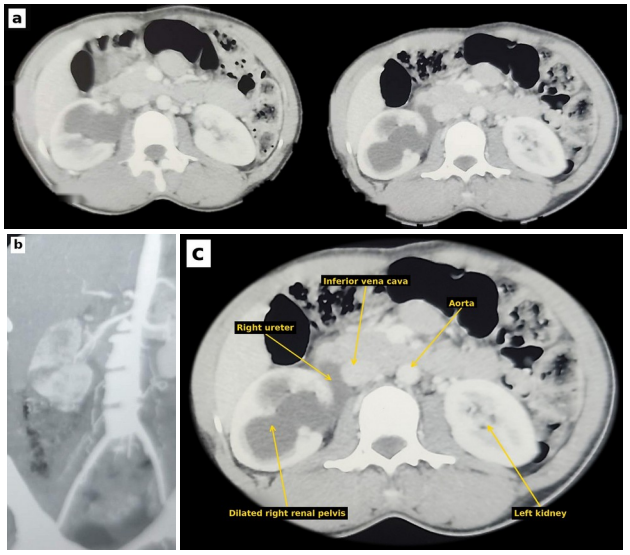


Figure 1. *CT urography. (a) Axial slices and (b) coronal reconstruction: dilated right collecting system (24 mm renal pelvis) and normal left kidney. (c) Annotated axial slice at the level of the renal hila: dilated right renal pelvis, with the proximal ureter running medially towards the inferior vena cava; aorta and normal left kidney.*

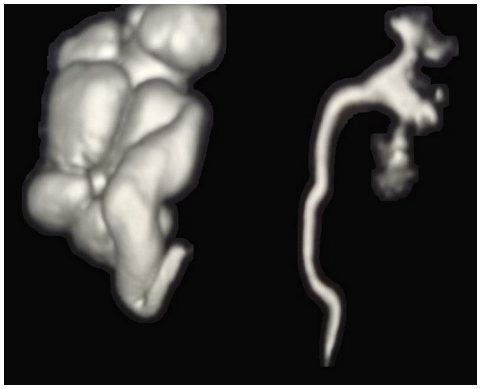


Figure 2. *3D volume rendering: dilated right collecting system and normal course of the left ureter.*

Therapeutic intervention. After written informed consent, we operated in August 2026 under general anaesthesia, with ceftriaxone 2 g for antibiotic prophylaxis and enoxaparin 4,000 IU for thromboprophylaxis. We began with cystoscopy, placed a 6-Fr, 26-cm double-J stent retrogradely and inserted a 16-Fr urethral catheter. The patient was then turned to the left lateral decubitus position. We introduced an 11-mm umbilical camera port by open access and kept the pneumoperitoneum at 12 mmHg. Two 5-mm working ports followed, one midway between the umbilicus and the right anterior superior iliac spine, the other near the costal margin at the tip of the twelfth rib (Figures 4a and 5). We used a Karl Storz laparoscopic column with 0° and 30° optics, and monopolar and bipolar energy for dissection.

We mobilised the right colon medially and exposed the IVC. The dilated pelvis came into view, with the ureter disappearing behind the vein (Figure 3a). We partially divided the ureter at the pelviureteric junction, taking care to spare the stent, pulled the upper coil out through the opening, then completed the division and freed the ureter. The 2.2-cm retrocaval segment looked poorly contractile, so we excised it and sent it for histology. We brought the ureter in front of the IVC, spatulated it and put the upper coil of the stent back into the renal pelvis with a grasper (Figure 3b). We then performed a tension-free ureteropelvic anastomosis over the stent with two running hemi-sutures of 4/0 polyglactin (Vicryl) (Figure 3c). No leak was visible on laparoscopic inspection, and we left a non-suction Redon drain in the renal bed, brought out through the iliac port.

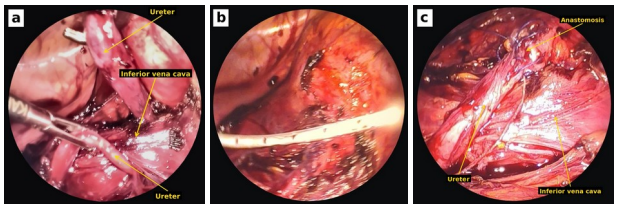


Figure 3. *Laparoscopic views. (a) The two portions of the right ureter lifted by two graspers, with the inferior vena cava between them; (b) the double-J stent in place before the anastomosis; (c) completed ureteropelvic anastomosis, with the ureter lying in front of the inferior vena cava.*

The whole procedure, including cystoscopy and stent placement, took 240 minutes. We did not time each step, but by our estimate most of this time went into the intracorporeal anastomosis. Estimated blood loss was 50 mL. There was no intraoperative complication and no conversion. We had performed four laparoscopic reconstructive procedures before this one and were still early in our learning curve.

Follow-up and outcomes. The patient was eating again at 12 hours, and paracetamol with nefopam was enough for pain relief. The urinary catheter came out on day 1. The drain stayed dry, and on day 2 we removed it and sent her home. Haemoglobin remained at 11 g/dL, and creatinine and electrolytes were normal. A plain abdominal film confirmed the position of the double-J stent (Figure 4b). Histology of the excised segment showed ureteritis.

She tolerated the stent well, and it was removed at 6 weeks without incident. At the 2-month visit she was free of pain,

and ultrasound measured the right renal pelvis at 11 mm. The 24-mm value before surgery came from CT, so the two figures are not directly comparable. The three port scars had healed well (Figure 5). No postoperative complication was recorded up to the 2-month visit, so no Clavien–Dindo grade applies. CT urography is planned at 3, 6 and 12 months to check that the anastomosis stays patent.

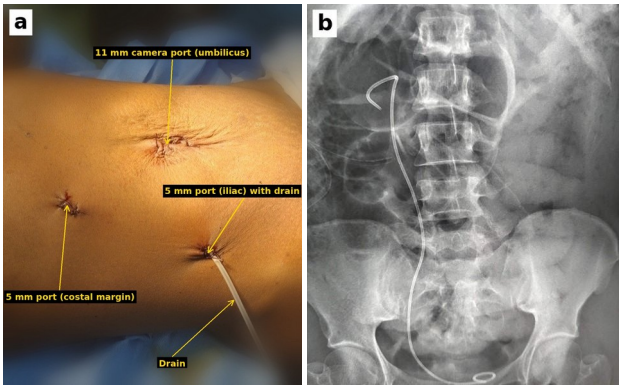


Figure 4. *(a) Port sites at the end of surgery: 11 mm umbilical camera port, 5 mm working port near the costal margin and 5 mm working port towards the right anterior superior iliac spine, through which the drain is brought out; (b) postoperative plain abdominal film showing the right double-J stent in place.*



Figure 5. *Port sites at the two-month visit: an 11 mm umbilical camera port and two 5 mm working ports placed to respect triangulation. The three scars have healed well, with no wound complication.*

Timeline. The sequence of events is summarised in Table 2.

Table 2. Timeline of the case

Date	Event
≈ 06/2025	Onset of intermittent right renal colic (about one year before diagnosis)
10/08/2026	CT urography: right Bateson–Atkinson type I retrocaval ureter
26/08/2026	Transperitoneal laparoscopic repair (day 0)
Day 1	Urinary catheter removed
Day 2	Drain removed; discharge
Week 6	Double-J stent removed
Month 2	Clinical and ultrasound review: pain-free, renal pelvis 11 mm
10/08/2026	CT urography at 3, 6 and 12 months

Patient perspective. The patient was satisfied with the result.

DISCUSSION :

A diagnosis often made late. Retrocaval ureter is often recognised late, because its symptoms are non-specific and mimic junction obstruction; some cases are found only at surgery. In Bamako, Diarra et al. discovered the anomaly during an operation planned for pelviureteric junction obstruction [1]. In Cameroon, a delayed diagnosis ended in nephrectomy of a destroyed kidney [11]. CT urography with multiplanar and three-dimensional reconstructions remains the key examination [3], provided the ureter is traced beyond the junction and its relation to the IVC is checked, as we did here. No associated junction obstruction was seen in our patient, but the two lesions can rarely coexist [15].

When to operate. Surgery is usually reserved for symptomatic patients and for those with progressive hydronephrosis, recurrent infection, stones or proven obstruction [3]. Asymptomatic patients without obstruction can be followed clinically and radiologically. Our patient had a year of colic and a dilated upper tract, which justified repair. Her right kidney still excreted contrast and its parenchyma looked preserved, but without diuretic renography we could not quantify split function or drainage.

Excision or preservation of the retrocaval segment. There is no consensus on this point. Simforoosh et al. left the segment in place in six patients treated by laparoscopic pyelopyelostomy, with good radiological results at 3 months [16]. Preserving it spares a dissection behind the IVC, where the lumbar veins can bleed [3]. Excision may be considered when the segment looks stenotic, dysplastic or poorly contractile, and preservation may be reasonable when it looks normal [3]; the published series reflect this case-by-case approach rather than a fixed rule [12,16,17]. We excised the 2.2-cm segment because it looked poorly contractile, and histology showed ureteritis. This points to a local abnormality, but it does not prove that excision is better than preservation.

Surgical approach and published results. No randomised study has shown one approach to be superior. In a retrospective comparison of 14 patients, retroperitoneal laparoscopy gave a shorter mean hospital stay than open repair (7.3 versus 14.8 days) and less blood loss (45.3 versus 108.6 mL), at the cost of a slightly longer operation (112.0 versus 95.6 minutes) [18]. A second small series comparing transperitoneal laparoscopy with open surgery found similar trends [19]. Other retrospective comparisons suggest that the robot may make intracorporeal suturing easier and shorten the operation in some settings [9,20], but these studies are small, their populations heterogeneous and their surgeons differently experienced. In the retroperitoneal series of Li et al., blood loss was under 10 mL [17]. We chose the transperitoneal route because it leaves more room for intracorporeal suturing.

Our results. Blood loss and hospital stay in our patient fell within the ranges of small published series [9,17,21], although differences in patient selection, approach and outcome reporting limit any direct comparison. Our

procedure time, 240 minutes, was longer than most published values, which range from about 80 to 225 minutes [9,17–19,21]; Simforoosh et al. reported a mean of 180 minutes through the transperitoneal route [16]. By our estimate, most of this time went into the intracorporeal anastomosis, a demanding step with a well-known learning curve. Robotic assistance may make this step easier, as robotic case reports and small series suggest [9,21,22], but the evidence does not show a general advantage over conventional laparoscopy.

The African context. In October 2026, we searched PubMed, African Journals Online and Google Scholar, in English and French, for "retrocaval ureter", "circumcaval ureter" and "preureteral vena cava", alone and combined with "Africa" or the name of each African country. Any published case or series treated in an African country was eligible. This was a targeted, non-systematic search, not designed to capture unpublished or unindexed reports. Table 1 lists what we found. Most African cases were treated by open surgery or did not state the approach [1,2,10,11,23–28]. Laparoscopic repair had been reported from Morocco, in three patients by El Harrech et al. and in one by Daghdagh et al. [12,13]. The two earlier Malian reports came from Point G and Gabriel Touré university hospitals [1,23]. Within the limits of our search, this appears to be the first laparoscopic repair of a retrocaval ureter in the Malian literature. It shows that this reconstruction is feasible with conventional laparoscopy in our hospital.

Table 1. Published African reports of retrocaval ureter identified by the authors' literature search, with surgical approach (not intended to be exhaustive)

Country (centre)	Publication	Cases	Approach
Mali (Point G University Hospital)	Tembely et al., 2014 [23]	2	Not specified
Mali (Gabriel Touré University Hospital)	Diarra et al., 2022 [1]	1	Open (flank incision)
Togo	Tengue et al., 2016 [10]	3	Open
Cameroon	Fola et al., 2022 [11]	1	Open, nephrectomy
Nigeria	Ahmed et al., 2017 [2]	4	Not specified
Morocco	Ouali et al., 2005 [24]; Fadil et al., 2021 [25]	3	Open (flank incision)
Morocco (Avicenne Military Hospital, Marrakech)	El Harrech et al., 2016 [12]	3	Transperitoneal laparoscopy (pyelopyelostomy)
Morocco (Ibn Rochd University Hospital, Casablanca)	Daghdagh et al., 2024 [13]	1	Transperitoneal laparoscopy
Ethiopia (Saint Paul's Hospital, Addis Ababa)	Mideksa et al., 2023 [28]	2	Open (flank incision)
Egypt	Elrashidy et al., 2023 [26]	3	Open (flank incision)
Tunisia	Hidouri et al., 2025 [27]	1	Open
Mali (Professor Bocar Sidy Sall University Hospital, Kati)	**This report**	**1**	**Transperitoneal laparoscopy**

Strengths and limitations. The diagnosis was made before surgery, the technique is described step by step, the key stages are documented with intraoperative photographs, and there was no conversion. The report also has clear limits. A single case allows no statistical comparison. Our search did not cover unindexed literature such as theses and national meeting abstracts. We did not time the operative steps. Follow-up is short, 2 months and only about two weeks after stent removal, and relies on ultrasound. Without diuretic renography, drainage and split renal function cannot be assessed objectively, and the pelvic measurements before and after surgery come from different modalities. Longer follow-up is needed to confirm that the anastomosis stays patent and that the kidney keeps its function.

CONCLUSION :

In our hospital, transperitoneal laparoscopic repair of a symptomatic retrocaval ureter was feasible, and the clinical and ultrasound result at 2 months was good. Longer follow-up, with functional imaging, is needed to confirm that the anastomosis remains patent. When right hydronephrosis has no obvious cause, following the ureter on CT down to the IVC is a simple step that avoids missing this diagnosis.

DECLARATIONS :

Consent: Written informed consent was obtained from the patient for publication of this case report and the accompanying images, which have been anonymised. Consent to the procedure is documented in the patient's file.

Ethics approval: According to institutional policy, formal ethics committee approval was not required for this single anonymised case report. No identifying information is published.

Conflicts of interest: The authors declare no conflicts of interest.

Funding: None.

Author contributions: I. Sissoko performed the operation, collected the data and wrote the manuscript. M. Diakité and M. Togola were in charge of the anaesthetic and perioperative management. D. Sangaré, M.S. Diallo and A. Kassogué participated in the management of the patient. All co-authors critically revised the manuscript, and all authors read and approved the final version.

Guarantor: Idrissa Sissoko.

Previous submission: The manuscript is not under consideration by any other journal.

Data availability: Not applicable; all relevant data are included in the article.

Use of AI tools: The authors used an AI assistant (Claude, Anthropic) to help draft and translate the manuscript. They reviewed and revised all content and take full responsibility for it. The AI tool was not involved in patient management, data analysis or clinical decision-making.

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