

Laparoscopic treatment of ureteral stone in retrocaval ureter

Tratamento laparoscópico de cálculo ureteral em ureter retrocava

Robson Cristian Virgilio¹, Fernanda Monteiro Orellana², Luiz Felipe de Melo Pereira Leitão²,
Tiago Granucci Guirro², Rafael Freitas de Andrade Neri², Pablo Leonardo Traete²,
Pedro Ivo Ravizzini², Luis Gustavo Morato de Toledo³

Abstract

Introduction: The retrocaval ureter is a rare congenital malformation which may cause obstructive uropathy with nonspecific symptoms such as low back pain and complications as ureterolithiasis and pyelonephritis, which usually appear between the third and fourth decades of life, and requires surgical treatment in most cases. **Objective:** To present a case of ureterolithiasis and retrocaval ureter and a review of literature, regarding the different types of access for his surgery. **Case Report:** The authors present a case of ureterolithiasis and retrocaval ureter diagnosed by computed tomography in a 43-year-old male patient with right lower back pain, corrected using a transperitoneal laparoscopic technique. **Conclusion:** Laparoscopic surgical correction of the retrocaval ureter has shown to be beneficial in several aspects when compared to open access, and one that has not been previously reported is the one-step resolution of the association with ureterolithiasis.

Keywords: Retrocaval ureter, Hydronephrosis, Ureterolithiasis, Urogenital abnormalities, Laparoscopy

Resumo

Introdução: O ureter retrocava é uma malformação congênita rara que pode ser causa de uropatia obstrutiva com sintomas inespecíficos como dor lombar e complicações como ureterolitíase e pielonefrite, que normalmente aparecem en-

tre a terceira e a quarta décadas de vida, e exige tratamento cirúrgico na maior parte dos casos. **Objetivo:** Apresentar um caso de ureter retrocava associado a ureterolitíase e uma revisão da literatura a respeito das técnicas cirúrgicas para sua correção. **Relato de caso:** Os autores apresentam um caso de ureterolitíase e ureter retrocava, diagnosticado por tomografia computadorizada, em um paciente masculino de 43 anos com dor lombar direita, corrigido através de técnica laparoscópica transperitoneal. **Conclusão:** A correção cirúrgica laparoscópica do ureter retrocava tem se mostrado benéfica em diversos aspectos quando comparada ao acesso aberto e uma abordagem que ainda não havia sido publicada é a correção do ureter retrocava associado a ureterolitíase num mesmo tempo cirúrgico.

Palavras chave: Ureter retrocava, Hidronefrose, Ureterolitíase, Anomalia urogenital, Laparoscopia

Introduction

Retrocaval ureter is a rare congenital malformation, first described in 1893 by Hotchstetter⁽¹⁾ and characterized by the passage of the ureter posteriorly and medially to the inferior vena cava. It occurs more commonly in men than in women, at a ratio of about 3-4:1, with an incidence of 1 in 1500 in autopsies⁽²⁾.

It is often more found on the right (although it can occur on the left) and is associated with other malformations - situs inversus, inferior vena cava duplication⁽³⁾ - or even may manifest bilaterally.

Although it is a congenital defect, when present, symptoms usually appear between the third and fourth decades of life, especially with low back pain and recurrent urinary tract infections⁽⁴⁾.

The retrocaval ureter is classified radiologically into two types, with a greater or lesser degree of obstruction and hydronephrosis⁽⁴⁾.

The treatment choice must be individualized with clinical follow-up being possible in cases with minor degrees of ureteral obstruction and hydronephrosis - and oligosymptomatic or asymptomatic patients - while surgical treatment with sectioning and anteriorization of the ureter and uretero-

1. Santa Casa de Sao Paulo. Department of Surgery. São Paulo – SP - Brazil

2. Santa Casa de Sao Paulo. Department of Surgery. Service of Urology. São Paulo – SP – Brazil

3. Santa Casa de Sao Paulo School of Medical Sciences. Department of Surgery. São Paulo – SP – Brazil

Institution: Santa Casa de Sao Paulo. Department of Surgery. Service of Urology. São Paulo – SP – Brazil / Santa Casa de Sao Paulo School of Medical Sciences. Department of Surgery. São Paulo – SP – Brazil

Correspondence address: Robson Cristian Virgilio. Rua Frei Caneca, 750 - 307-000 - São Paulo - Brasil. E-mail: robson_virgilio@terra.com.br

ureteral reanastomosis is the choice for cases with severe hydronephrosis and recurrent urinary tract infections⁽⁵⁾.

Despite of the open approach has remained the gold standard for a long time, minimally invasive laparoscopic techniques - transperitoneal, retroperitoneal and, more recently, robotic - have shown advantages, being associated with lower intraoperative morbidity and bleeding, less postoperative pain, shorter recovery and hospital stay and more aesthetically acceptable scars⁽⁵⁻⁶⁾.

Case Report

This study was sent to the Ethics Committee - Santa Casa de Misericórdia de São Paulo, CAAE: 33143020.6.0000.5479 and approved under the number 4.130.409.

A 43-year-old male patient with a history of systemic arterial hypertension was admitted to the Central Emergency Room of Santa Casa de Misericórdia de São Paulo in October 2018, referring to a history of weekly right flank pain for five years, occasionally accompanied by episodes of hematuria. Physical examination and laboratory tests without significant changes, except for a serum creatinine of 1.4 mg/dl, with urea of 36 mg/dl.

He presented an abdominal ultrasound brought from another service in August 2017, showing moderate to severe hydronephrosis on the right, with right ureter dilatation in the proximal and middle thirds, with a caliber of up to 25 mm (reference value <10 mm), which progressively reduces until the topography of the crossing of the great vessels and echogenic calculus of 32x12x15 mm partially occupying the lumen of the right ureter, distant 53 mm from the pyeloureteral junction. There was also the presence of bilateral non-obstructive nephrolithiasis with small stones (<0.5 mm).

He had excretory urography that showed delay in the elimination of contrast on the right, with significant pyelocalyceal dilatation that extended to the proximal and middle thirds of the right ureter, but without being able to identify its distal portion or obstructive factor.

A non-contrast computed tomography was then performed, which showed significant right ureteral dilatation in the proximal and middle thirds, with an anomalous pathway of the right ureter behind the vena cava and right ureterolithiasis. [Figure 1]

Due to the patient's persistent and progressive symptoms, a surgical approach for ureteral repair was decided upon.

Elective laparoscopic surgical repair performed December 2018, via transperitoneal access and isolation of the right ureter [Figure 2] after Cattell's maneuver and dissection of the retroperitoneum, with section of the retrocaval portion, removal of the ureteral calculus [Figure 3] and end-to-side uretero-ureteral anastomosis with 4-0 Vicryl absorbable thread in continuous suture. Ureteral catheterization was performed with a Double-J (6 x 26 Fr), located through the methylene blue test, refluxed through the ureter after occlusion and bladder filling with 0.9% saline solution through the Foley 22Fr 3-way catheter.

The surgical time was 180 minutes, with an estimated blood loss of 80 ml, without anesthetic complications.

The patient was reintubated and had the indwelling urinary catheter removed on the first postoperative day. He was discharged on the third postoperative day, after removal of the drain (<10cc).

The double-J was removed six weeks after the surgical procedure, radiological control was performed, with improvement of the right pyelocalyceal dilatation. An excretory urography 6 months after the procedure showed improved radiopharmaceutical clearance compared to the preoperative exam - T1/2 evolved from not evaluable to 28 minutes



Figure 1 - Abdominal tomography A) coronal section showing right ureter anomalous pathway. Arrows: proximal (dilated) and distal (normal) portions of the retrocaval stenosis. B) sagittal section of the previous image. C) dilated proximal portion of the right ureter with calculus inside.

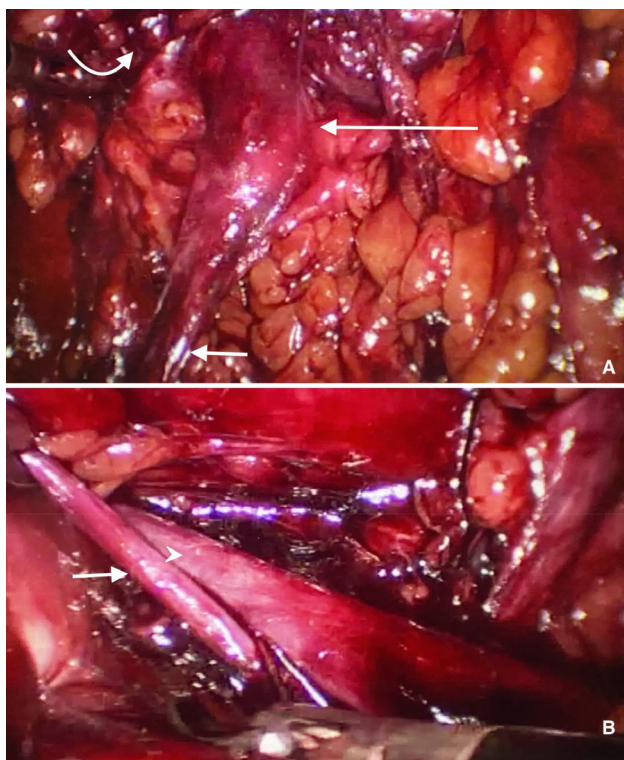


Figure 2 - Laparoscopic view A) Right proximal ureter isolation, showing the kidney (curved arrow), renal pelvis (long arrow) and the proximal ureter (short arrow). B) Right distal ureter isolation, showing the vena cava (arrowhead) and the distal ureter (short arrow).

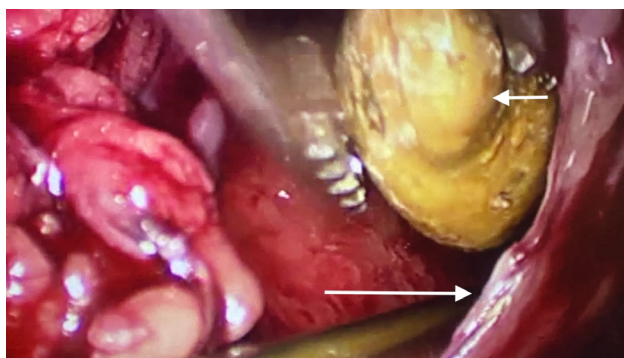


Figure 3 - Laparoscopic view of ureteral stone removal (short arrow) from the renal pelvis (long arrow).

in the right kidney. [Figure 4]. The patient remains asymptomatic.

Discussion

Retrocaval ureter surgical treatment consists of sectioning the ureter, anteriorization in relation to the inferior vena cava - with or without resection of the obliterated portion - and uretero-ureteral or ureteropelvic reanastomosis⁽⁵⁾.

The open approach, although the gold standard for a long time, has been successively replaced by

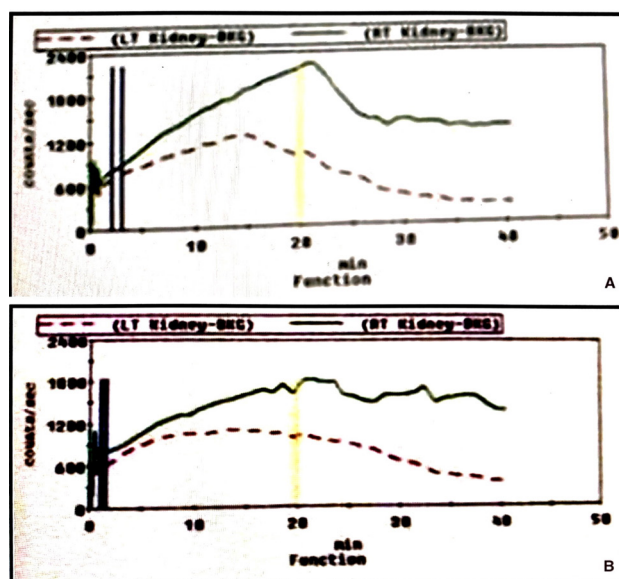


Figure 4 - Preoperative (A) and postoperative (B) excretory urograms showing improved radiopharmaceutical clearance - T1/2 evolved from non-evaluable to 28 minutes, respectively.

minimally invasive laparoscopic techniques, considering that, although both guarantee satisfactory results, the laparoscopic technique is associated with lower morbidity and intraoperative bleeding, less postoperative pain, shorter recovery time and hospital stay, besides more aesthetically acceptable scars⁽⁵⁻⁶⁾.

The first laparoscopic retrocaval ureter repair was described in 1996 by Matsuda et al⁽⁷⁾ and the first robotic approach was published by Gundeti et al in 2006⁽⁸⁾.

Since then, few studies have set out to compare the results between the techniques described, most with a very limited number of patients.

In 2014, a study published by Ji et al⁽⁹⁾ showed no significant differences in surgical outcomes - with respect to surgical time, blood loss, and postoperative complications - of 18 patients undergoing laparoscopic retroperitoneal and transperitoneal retrocaval ureter repairs.

A second study, published in 2017 by Mao et al⁽¹⁰⁾, compared the clinical efficacy and safety of retroperitoneal X open repair of the retrocaval ureter, analyzing data from surgeries of 14 patients and showed the advantages of the laparoscopic technique: decreased blood loss and urinary fistulas and shorter hospital stay and postoperative recovery time, although with longer surgery time.

Finally, a third study, published in 2019 by Temiz et al⁽¹¹⁾, showed similar results between transperitoneal laparoscopic and robotic repairs (n=10), but with a shorter surgical time in the robotic technique, because

it allows easier dissection and greater comfort for the surgeon during sutures.

No study published so far has shown a significant difference in the occurrence of postoperative ureteral stenosis and recurrence of obstructive symptoms between the surgical techniques described.

Similarly, there are no studies in the literature comparing surgical correction with conservative follow-up - mainly because of the differences in clinical presentation that suggest the decision for each type of treatment. However, a paper published by Yen et al⁽¹²⁾, in 2015, describes favorable short-term outcomes of two patients diagnosed with type I retrocaval ureter and moderate hydronephrosis, treated conservatively with no evidence of altered renal function or significant obstruction by baseline renograms within eight months.

Sequential control with imaging exams, both in conservative and postoperative follow-up, should take into consideration the potential risk of radiation - especially considering that most patients are young - thus favoring the choice of ultrasound, even if examiner dependent.¹²

Conclusion

Retrocaval ureter laparoscopic surgical repair has been shown to be beneficial in several respects when compared to open access, and one approach that has not yet been published is the repair of retrocaval ureter associated with ureterolithiasis in the same surgical procedure.

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