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Surgery Illustrated – Focus on Details
Laparoscopic repair of obstructing retrocaval ureter

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ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com

INTRODUCTION

Retrocaval ureter was first reported by Hochstetter in 1893 and is due to an anomalous development of the inferior vena cava (IVC) [1]. This condition occurs when the fetal posterior cardinal veins do not regress, so that the IVC develops anteriorly to the ureter and displaces it medially. Generally, an obstruction may occur below the third lumbar vertebra where the IVC rests on the ureter. Although this condition is rare, the exact prevalence of the retrocaval ureter is unknown. Individuals who become symptomatic typically present in the third or fourth decade of life. When symptoms develop (lumbar pain, UTI, haematuria, urolithiasis) or renal function progressively decreases, surgical correction should be performed [2–4].

The first report of laparoscopic repair of the retrocaval ureter comes from Baba *et al.* [5] in 1994. An increasing number of centres perform the procedure laparoscopically with either a trans- or retroperitoneal approach.

Laparoscopic repair is sometimes challenging as it requires an extensive dissection both laterally and medially to IVC. However, it is feasible and provides the indisputable advantages of minimally invasive approaches (i.e. minor skin incision associated with minor risk of infection, less postoperative pain and better cosmesis, faster return to daily activities/work and shorter hospital stay).

We describe a case of a 44-year-old French man who presented at our department with a history of intermittent right-side flank pain. CT revealed right hydronephrosis in the presence of an obstructing retrocaval ureter. Following informed consent, the patient elected to undergo laparoscopic dismembered pyeloplasty. We present a step-by-step description of our surgical technique.

MATERIALS AND METHODS

A JJ ureteric stent (that facilitates the dissection manoeuvres of the right ureter) was placed.

PATIENT POSITION

The patient is placed in a flank position. The bottom leg is flexed to 90 ° with the top leg straight to maintain stability. A pillow is placed between the knees and a meticulous padding of the soft tissues and bony sites takes place, to avoid neurapraxia phenomena in case of a lengthy procedure. A sponge pad is placed under the axilla to prevent compression of the axillary vessels and nerves. The patient is secured in this position with a wide adhesive tape passed over the greater trochanter and attached to the moveable portion of the table. The extended upper arm can be supported on a padded Mayo stand, which is adjusted to the appropriate height to maintain the arm in a horizontal position with the shoulder rotated slightly forward. Padding is used to support the buttocks and dorsum. A body warmer is placed to minimize patient cooling.

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SURGICAL TECHNIQUE

Figure 1

We use a standard four-port transperitoneal approach. The hepatic flexure and right colon are mobilized medially (through incision of the Toldt's line) to provide exposure to the right retroperitoneal structures. The ureter is identified in its iliac part and it is subsequently dissected cranially until the retrocaval segment. The renal pelvis and PUJ are dissected laterally to the IVC.

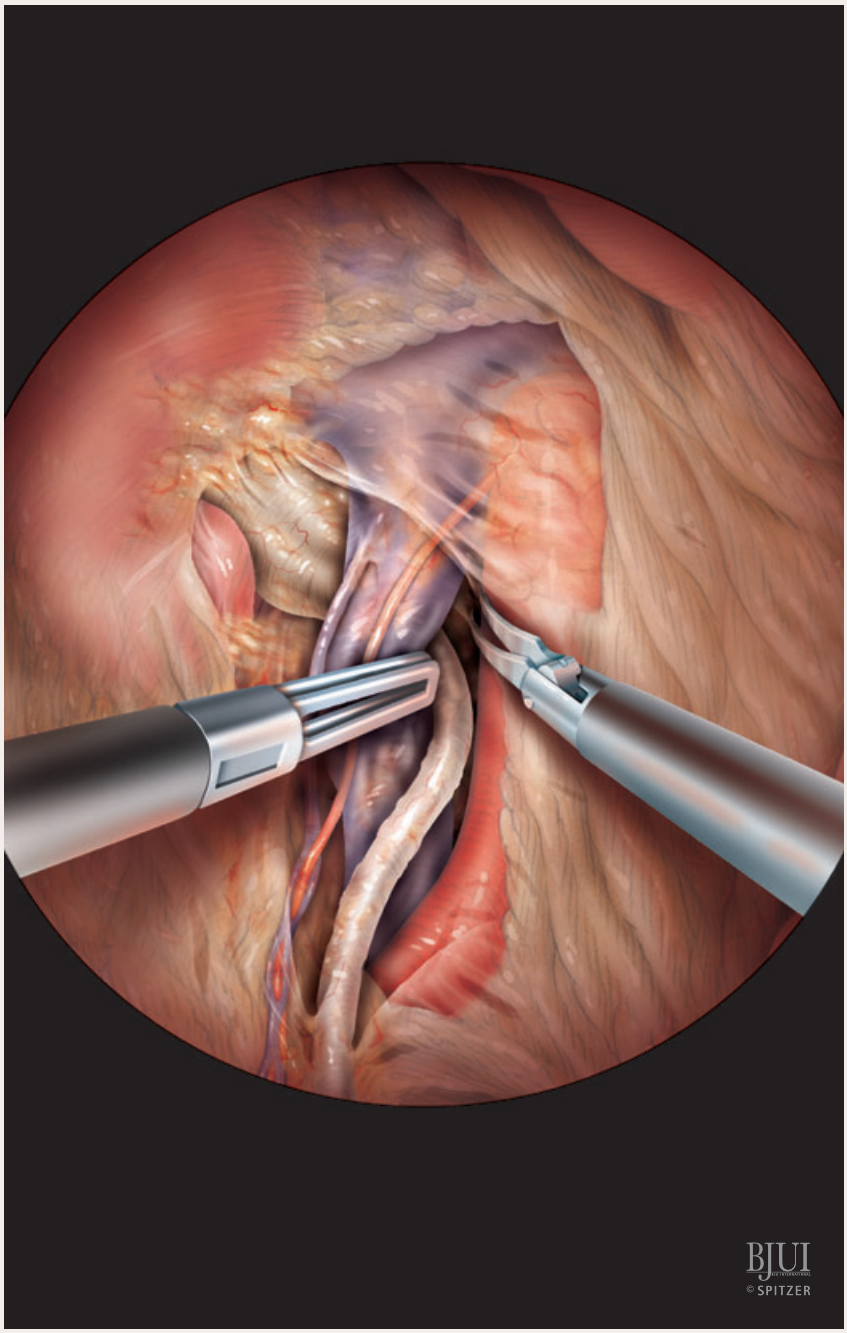


Figure 2

The PUJ is transected obliquely at the lateral border of the vena cava. The retrocaval portion of the ureter is inspected to evaluate if it is scarred or atretic. In case of redundant renal pelvis its volume could be reduced. The retrocaval ureteric segment is transposed anteriorly to the IVC and a neo-ureteropyelostomy is performed with interrupted 4-0 polyglecaprone 25 sutures. The direction of the sutures is 'out–in' in the pelvis and 'in–out' in the ureter. The first suture is placed posteriorly at the 6 o'clock position; one extreme of it is kept longer to facilitate the exposure. After the reconstruction of the posterior half of the neoanastomosis, the proximal curl of the stent is placed again in the pelvis and the anterior half is completed.

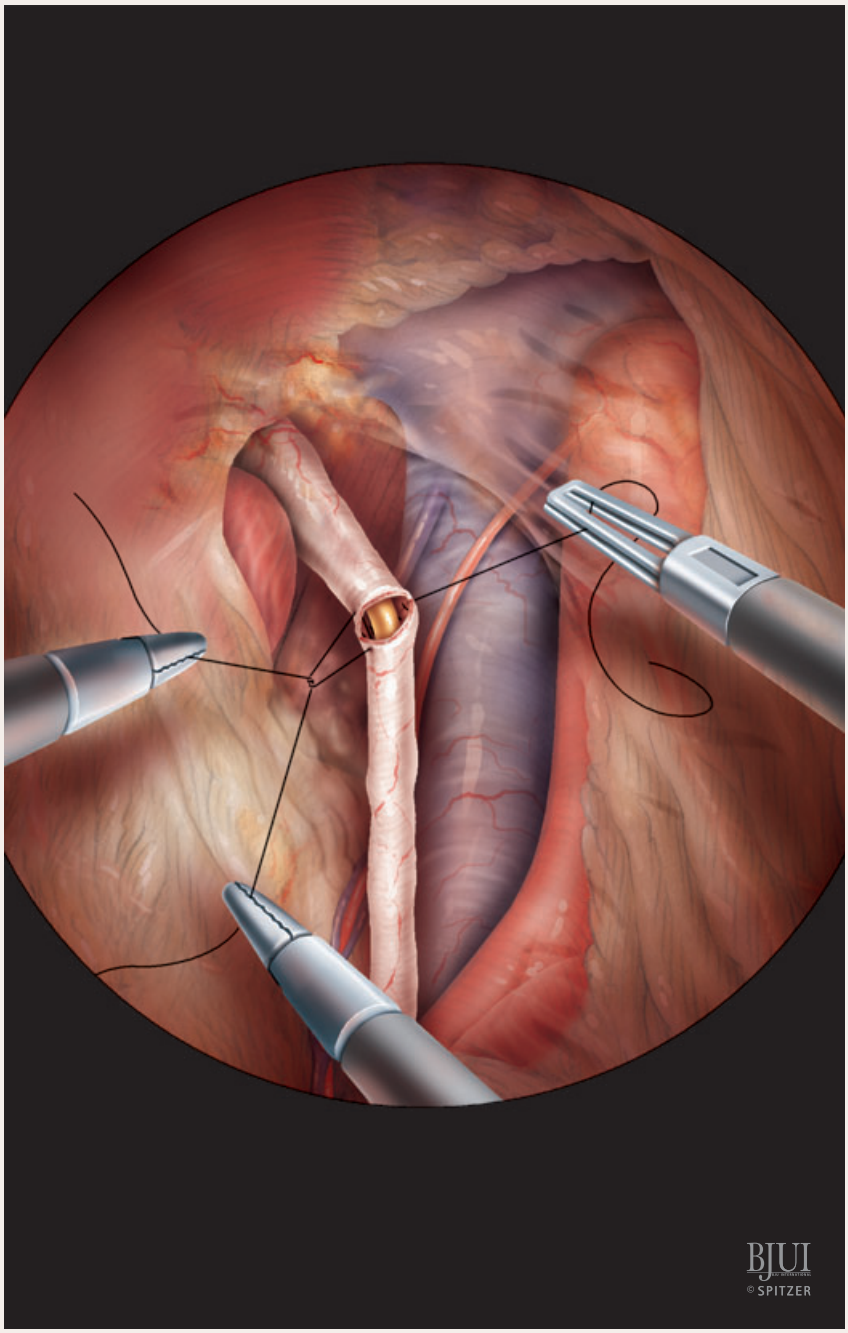
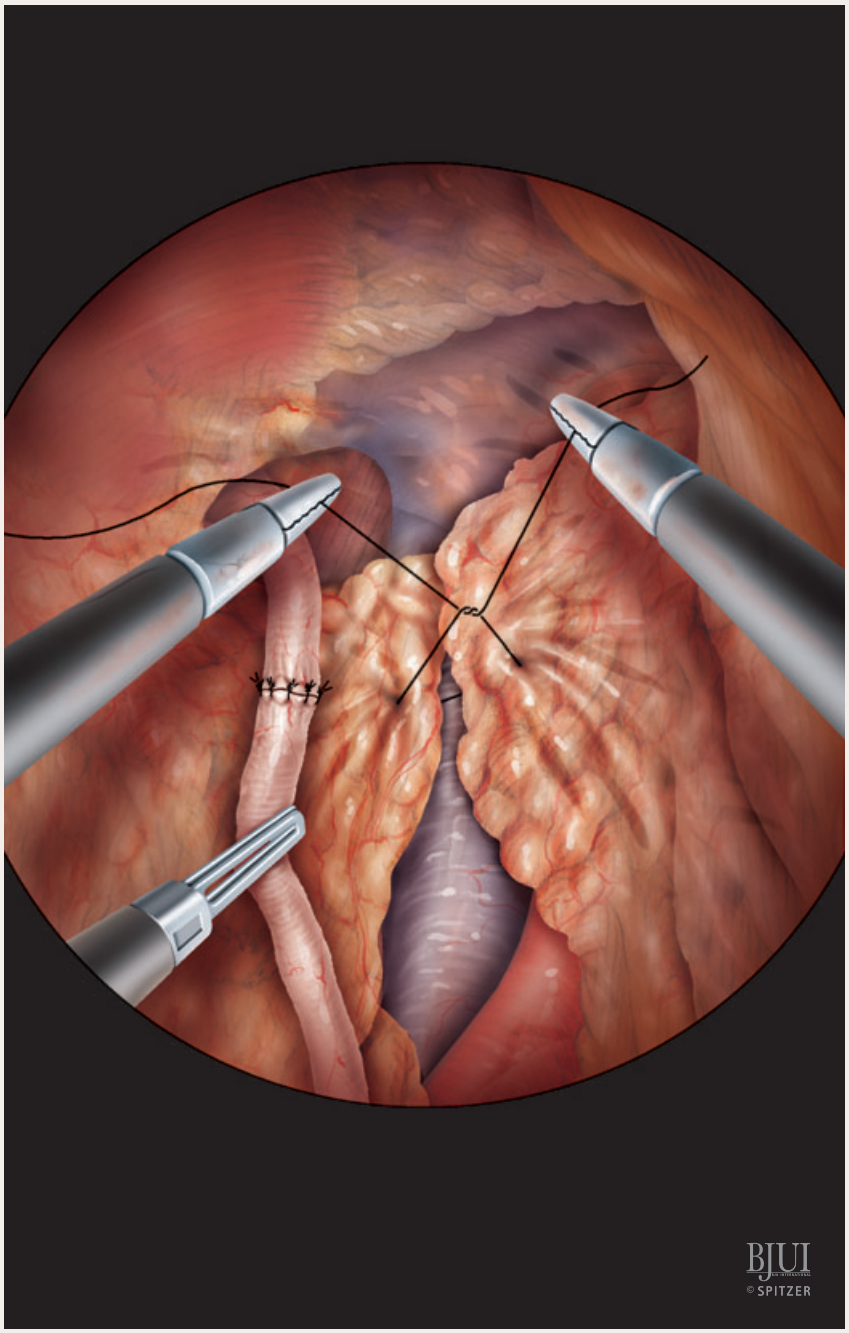


Figure 3

Adipose tissue is interposed between the neoanastomosis and the IVC to avoid their contact during the healing process.



RESULTS

Operative time was 42 min and there was no blood loss or intraoperative complications. The patient had an uneventful postoperative course, with return of bowel function commencing on postoperative day one and discharge on postoperative day two. The drain and JJ stent were respectively removed at 3 days and 3 weeks postoperatively. At the 12-month follow-up visit the renal scan showed no obstruction of the right kidney.

CONCLUSION

Laparoscopic repair of retrocaval ureter requires an extensive dissection both laterally and medially to IVC and thus could be challenging. However, it is feasible and provides the indisputable advantages of minimally invasive approaches. According to other authors [4], in centres with laparoscopic experience, this technique should be considered as the 'gold standard' surgical treatment for cases of obstructing retrocaval ureter.

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Abbreviation: **IVC**, inferior vena cava.