

Laparoscopic reimplantation of the strictured ureter

Adam Gołąb, Marcin Słojewski, Bartłomiej Gliniewicz, Andrzej Sikorski

Department of Urology, Pomeranian Medical University in Szczecin, Poland

KEY WORDS

ureter ► reimplantation ► laparoscopy

ABSTRACT

Minimally invasive surgery on the ureter are performed more and more often. Laparoscopic ureterolysis, ureterolithotomy and pyeloplasty have become a standard procedures in many centers. We present a preliminary report on the laparoscopic reimplantation of ureter in patients with stenosis of the distal part.

INTRODUCTION

Laparoscopy successfully replaces the classical open surgical methods in the treatment of urological disorders. Its benefits include reduced postoperative pain, shorter duration of hospitalisation and convalescence, improved cosmetic effects and similar or better functional and oncologic outcomes in the majority of cases [1]. In particular, the increased popularity of laparoscopy observed with ablative procedures, in which most of the indications are strictly specified [2]. In the reconstructive urology, the decisions whether to use the laparoscopic approach are made mainly on a case-by-case basis and are based on the experience of the surgeons of a local center. The most frequent intraureteral procedure are ureterolysis, ureterolithotomy and pyeloplasty [3]. Laparoscopic techniques may also be used successfully in the treatment of the disorders of the distal ureter. A lot of papers were published on this topic that were based on the isolated cases or short series of cases [4, 5]. We present our own experiences in the treatment of the distal ureteral stricture by laparoscopy that were based on the clinical findings of two patients. To the best of our knowledge, it has been the first publication on that topic in the Polish urological literature.

CASE DESCRIPTIONS

Patients: Two male patients diagnosed with left distal ureteral stricture with consequent hydronephrosis were operated on. The patients' demographic and clinical characteristics are summarised in Table 1. In both cases,

the ureteral stricture resulted from the cicatrix following transurethral resection of a superficial bladder cancer located in the vicinity of the ureteral ostium. The diagnosis was confirmed by urography and descending pyelography following implantation of a nephrostomy catheter (Fig. 1). In neither of the patients was it possible to restore patency of the ureter by preoperative deep resection of the cicatrix. Histopathological examination of the resected tissue samples revealed no signs of recurrent cancer.

Surgical technique: The surgical procedure started after general anaesthesia with intubation and cystoscopy. Following examination, a 18F Foley catheter was left in the urinary bladder. Then the patient was placed in the Trendelenburg position with 45° elevation of the operated side, and a 10-mm optical trocar (10 mm camera port) was inserted near the umbilicus. Following CO₂ insufflation (at 12 mmHg), three trocars were subsequently inserted into the peritoneal cavity under endoscopic guidance: a 10-mm trocar halfway between the umbilicus and the symphysis pubis and two 5-mm trocars 4–5 cm apart between the umbilicus and the anterior superior iliac spine. The parietal peritoneum was incised along the Toldt line to release the large intestine and to reveal the area of iliac vessels, where the ureter was localised. The strictured segment had been identified, mobilised to the paravesical level and subsequently excised. The ureteral stump was spatulated. A double-pigtail 6F catheter was passed through one of the ports into the peritoneal cavity and into the lumen of the ureter. The bladder was filled with 250 ml of saline, the peritoneum was incised and the bladder was blunt-dissected with mobilisation of the sides and the Retzius space. Filling the bladder with saline facilitated the selection of an optimal site for non-tension ureteral reimplantation. The next stage involved incision of the detrusor muscle with a diathermic knife over a distance of about 2 cm. The bladder mucosa was cut with scissors without diathermy. Prior to urinary bladder perforation, the Foley catheter was closed to prevent the release of CO₂ from the abdominal cavity. After the bladder was opened, the tip of the double-pigtail catheter was inserted for the drainage of the urinary bladder and a non-tension ureterovesical anastomosis was created. Single Vicryl 3-0 sutures were placed across the entire wall of the ureter and the bladder, including the detrusor muscle and the mucosa. The sutures were applied intracavitary. The procedure was completed by bladder integrity test with filling 200 ml of saline followed by drainage and the abdominal wall was then closed in layers (Fig. 2). The principal details of the course of the surgery are summarised in Table 2.

Table 1. Patient data.

Patient initials	Age (years)	BMI*	History of abdominal surgery	Initial stage of bladder cancer	Length of stricture (cm)
BM	41	30	Negative	pT1N0M0, G1	2
TO	73	23	Negative	pT1N0M0, G2	2

* BMI – body mass index

Table 2. Course of the procedure.

Patient initials	Duration of surgery (min)	Blood loss (ml)	Number of stitches applied per vesicoureteral anastomosis	Intra- and postoperative complications
BM	170	30	6	None
TO	120	20	4	None



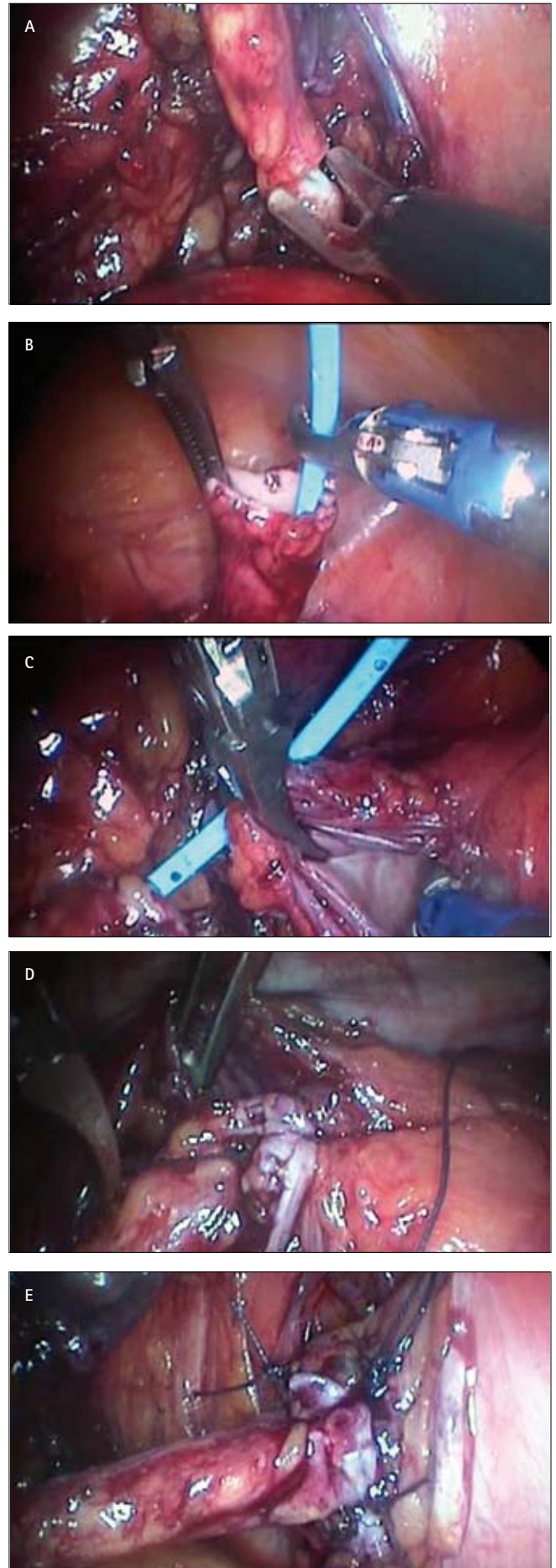
Fig. 1. Preoperative descending pyelography in patients BM (A) and TO (B).

Postoperative course and follow-up: The hospitalisation period was 5 days in both patients. The nephrostomy catheter was removed on the day 1 after operation, drainage on the day 2, Foley catheter 2 weeks after surgery and the double-pigtail catheter after 4 weeks. The efficacy of the treatment was assessed on the basis of the patients' interview and intravenous urography 1-2 days after removal of the ureteral catheter. In both cases normal urine flow from the kidneys to the bladder was confirmed (Fig. 3). Cystoscopy performed 3 months after operation revealed a normal picture of the bladder and the reimplanted ureter in both men.

DISCUSSION

Ureteral reimplantation procedure is usually performed in children with vesicoureteral reflux. Indications for this procedure in adults are less frequent and are usually based on a diagnosis of iatrogenic ureteral damage, ureteral stricture or fistula. Open surgery is the standard technique. First reports of laparoscopic ureteral transplantation were published by Reddy and Evans in 1994 [6]. The few subsequent publications presented short case series of fewer than twenty patients. Some were breakthroughs in terms of the surgical technique and the search for new indications. In 2001 Fergany published a report on first experiences with an animal model involving laparoscopic creation of the Boari flap [7]. Nezhat reported a success in man-

Fig. 2. Laparoscopic reimplantation of the left ureter: A) resection of the strictured ureter; B) insertion of the double-pigtail catheter into the ureter; C) opening of the bladder; D) the first ureterovesical suture; E) outcome following the placement of four vesicoureteral sutures.



aging 6 women with ureteral endometriosis laparoscopically, while Dinlenc performed an anastomosis of the urinary bladder using a robot [8, 9].

According to many authors, laparoscopic procedures in the lower ureter require considerable experience, especially when reimplantation involves creation of a Boari flap or the psoas-hitch procedure [3]. This concern together with the small number of patients being qualified to the ureteral transplantation accounts for the low frequency of this procedure. It is worth noting that when the ureteral defect does not exceed 6 cm, it is possible to perform a direct anastomosis with the urinary bladder [5]. In such cases, the procedure is facilitated by the simple ureterovesical anastomosis without antireflux mechanisms commonly used in the transplantation. Vesicoureteral refluxes of a small amount, provided it does not contribute to urinary tract infections, does not impair renal function in adults [10]. Furthermore, it should be emphasised that laparoscopy provides us with the excellent visualisation of anatomical details, which reduces the risk of complications, especially during the creation of ureterovesical anastomoses. The report, as well as comparison of long-term outcomes of laparoscopy and open surgery, indicate that minimally invasive laparoscopic reimplantation of the ureter is an alternative to open surgery [5].

CONCLUSIONS

Laparoscopic ureteral reimplantation is an effective and safe alternative to open surgery in selected patients in centres that have experience in laparoscopic surgery with endocavitary suturing.

REFERENCES

1. Modi P, Goel R, Dodiya S: *Laparoscopic ureteroneocystostomy for distal ureteral injuries*. Urology 2005; 66 (4); 751-753.
2. Petrasz P, Słojewski M, Sikorski A: *Tumorektomia retroperitoneoskopowa – standard w organooszczędnym radykalnym leczeniu chorych na raka nerki? Doświadczenia jednego ośrodka*. Urol Pol 2008; 61 (Supl. 1); 19.
3. Rassweiler JJ, Gözen AS, Erdogru T et al: *Ureteral reimplantation for management of ureteral strictures: a retrospective comparison of laparoscopic and open techniques*. Eur Urol 2007; 51 (2); 512-522.
4. Modi P, Gupta R, Rizvi SJ: *Laparoscopic ureteroneocystostomy and psoas hitch for post-hysterectomy ureterovaginal fistula*. J Urol 2008; 180 (2); 615-617.
5. Simmons MN, Gill IS, Fergany AF et al: *Laparoscopic ureteral reconstruction for benign stricture disease*. Urology 2007; 69 (2); 280-284.
6. Reddy PK, Evans RM: *Laparoscopic ureteroneocystostomy*. J Urol 1994; 152 (6); 2057-2059.
7. Fergany A, Gill IS, Abdel-Samee A et al: *Laparoscopic bladder flap ureteral reimplantation: survival porcine study*. J Urol 2001; 166 (5); 1920-1923.
8. Nezhat CH, Malik S, Nezhat F, Nezhat C: *Laparoscopic ureteroneocystostomy and vesicopsoas hitch for infiltrative endometriosis*. JSLS 2004; 8 (1); 3-7.
9. Dinlenc CZ, Gerber E, Wagner JR: *Ureteral reimplantation during robot assisted laparoscopic radical prostatectomy*. J Urol 2004; 172 (3); 905.
10. Fugita OE, Dinlenc C, Kavoussi L: *The laparoscopic Boari flap*. J Urol 2001; 166 (1); 51-53.

Correspondence

Adam Gołąb
Klinika Urologii PAM
Al. Powstańców Wielkopolskich 72
70-123 Szczecin, Poland
phone: +48 91 466 11 00
adamgol@cyberia.pl