Laparoscopic pyeloplasty is also successful in patients with duplicated collecting systems

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KEY WORDS

laparoscopic pyeloplasty ◗ duplicated collecting systems ◗ ureteropelvic junction (UPJ) obstruction

ABSTRACT

Introduction. Laparoscopic pyeloplasty has been proven to be an effective and minimally-invasive technique in the treatment of ureteropelvic junction (UPJ) obstruction. However, only case-reports are available about the use of this technique in patients with duplicated collecting systems.

Material and methods. Between September 2002 and June 2005, 5 patients with duplicated collecting systems underwent laparoscopic pyeloplasty at our institution. In all cases, UPJ-obstruction was observed in the lower pole moiety. The cause of obstruction was a crossing vessel (3 cases) or an intrinsic stenosis (1 case). These patients were treated with Anderson-Hynes pyeloplasty. One individual presented with a 1 cm stenotic connection between the hydronephrotic lower pole system and a solitary ureter coming from the upper pole. An end-to-side anastomosis between the renal pelvis and the ureter was performed. All intraoperatively placed double pigtail ureteral stents were removed 6 weeks postoperatively.

Results. All operations were performed successfully without complications or conversion to open surgery. Mean operative time including preoperative transurethral ureteral stenting was 175 ±15 min. No urinary leakage was observed. Average hospitalization was 4.5 days. Renal scintigrams, performed 3 months postoperatively, demonstrated improvement of renal function with disappearance of obstruction in all cases. Durable clinical and radiographic success was observed during a follow-up of 4 to 26 months.

Conclusions. The present data demonstrates that laparoscopic pyeloplasty is an applicable tool in patients with upper urinary tract anomalies like duplicated collecting systems. This technique provides excellent clinical results and can be performed in an acceptable operative time without complications.

INTRODUCTION

Several minimally invasive techniques for the repair of ureteropelvic junction (UPJ) obstruction have been developed to reduce the morbidity of open pyeloplasty. Ante- and retrograde endopyelotomy are associated with low morbidity and rapid recovery but provide lower success rates compared to open surgery [1, 2]. Since the first reports in 1993 [3, 4], laparoscopic pyeloplasty has been established as an effective procedure at many institutions worldwide. Increasing experience with laparoscopic suturing provides excellent results comparable to those of open surgery. Meanwhile numerous studies with long follow-ups have been published describing techniques and results of laparoscopic pyeloplasty. However, only case-reports are available about the use of this technique in patients with upper urinary tract abnormalities [5]. In the present study, we describe our experiences with laparoscopic pyeloplasty in patients with duplicated collecting systems.

MATERIAL AND METHODS

During the last 2 years we performed a total of 92 laparoscopic dismembered pyeloplasties. Of those, 3 men and 2 women, 17 to 56 years old (mean age 35), were referred to our hospital for symptomatic UPJ-obstruction in duplicated collecting systems. Major symptoms were back pain and urinary tract infection. Preoperative diagnosis included excretory urography (intravenous pyelography – IVP) as well as diuretic renal scintigraphy demonstrating obstruction in all patients. In all individuals UPJ-obstruction was found in the lower pole system, affecting the left kidney in 3 patients and the right kidney in 2 patients. IVP identified complete duplication in 4 patients and incomplete (Y-type) duplication in 1 patient (Fig. 1). The patient with the incomplete duplication underwent preoperative cystoscopy with retrograde pyelogram. Despite the contrast filling the dilated lower pole system during retrograde pyelography, no connection was found between the ureter and the lower pole moiety by means of ureteroscopy. In the other 4 individuals cystoscopy and retrograde pyelography were performed just before starting laparoscopy. In these patients a duplicated ureteral orifice was found and a stent was introduced into the dilated part of the collecting system.

While under general anesthesia, the patients were placed in a flank position for the relevant side. A pneumoperitoneum was created after periumbilical insertion of a Veress needle. Three 5-11 mm trocars were used, one umbilically for the laparoscope and 2 pararectally for the surgeon. To provide good access to the retroperitoneum, the ascending colon and the duodenum (right side) or the descending colon (left side) were mobilized completely. The ureter was identified and followed cranially towards the renal pelvis. Utmost care was taken to dissect the proximal ureter carefully while retaining adequate periureteral tissue to avoid devascularizing damage. The strictured UPJ was excised completely, the proximal end of the ureter spatulated laterally, and the redundant renal pelvis resected. In 4 cases an Anderson-Hynes dismembered pyeloplasty was performed. Using a 4-0 Vicryl® suture, the dorsal part of the anastomosis was formed in a running fashion. The double-J stent was repositioned and the cranial part of the open renal pelvis closed. Finally, the ventral part of the anastomosis was completed. A drain was inserted and the trocars were removed under visual control. The bladder was drained with a urethral catheter for

three days to prevent vesicoureteral reflux. The ureteral stent was removed 6 weeks postoperatively and a renal scintigram performed after 3 months.

RESULTS

All operations were completed laparoscopically without conversion to open surgery. Mean operative time was 175 ±15 minutes with an estimated blood loss of less than 100 cc. The ureter was easily identified and isolated from the upper pole ureter. In 3 patients ventrally crossing vessels were found as the reason for UPJ-obstruction. In these cases the UPJ was transposed to the opposite side of the vessels. In the 4 patients with complete duplication, an Anderson-Hynes pyeloplasty was performed. In the patient with a single ureter, a short stenotic connection was found between the ureter and the hydronephrotic lower pole system. This segment was resected and the ureter incised laterally. An end-to-side anastomosis was performed between the incised ureter and the open renal pelvis. Contrary to the other patients, the ureteral stent was inserted in an antegrade way under laparoscopic control. All anastomoses were watertight without urinary leakage. No intra- or postoperative complications occurred. Renal scintigrams at 3 months postoperatively showed widely patent UPJs without obstruction.

In single systems, patency was found in 95% of all cases after dismembered pyeloplasty. Mean operative time was 150 ±12 minutes. Neither conversions nor major complications occurred. One patient developed a urinoma requiring percutaneous drainage and resolved spontaneously.

DISCUSSION

Open pyeloplasty represents the traditional therapy for UPJ-obstruction. Meanwhile, laparoscopic pyeloplasty and endopyelotomy have been introduced as minimally invasive alternatives to the open procedure. In 1993, Schuessler was the first to describe a series of laparoscopic dismembered pyeloplasties. This technique combines the advantages of a minimally invasive approach with the excellent results of the open technique. Meanwhile, studies with excellent long-term results are available underlining the suitability of laparoscopic pyeloplasty [6]. At many institutions, laparoscopy has replaced open pyeloplasty as the standard approach in the treatment of UPJ-obstruction. However, only few reports are available addressing the treatment of UPJ-obstruction in patients with urinary tract malformations [7]. Duplication of the renal collecting system is the most common upper urinary tract anomaly [8]. The combination of UPJ-obstruction and duplicated collecting system is rare with an incidence of 2% [9, 10], but should be considered when hydronephrosis involves only one pole of the kidney. However, hydronephrosis of the upper pole moiety is a different entity. It occurs due to an obstruction at the level of the UPJ, either secondary to ureteroceles or ureteral ectopia in completely duplicated systems. In these children there is often lower pole reflux according to the Meyer-Weigert rule.

Lower pole UPJ-obstruction may occur either primarily, due to crossing vessels or intrinsic stenosis, or secondarily, due to high-grade reflux. Since the lower pole moiety is more often refluxing we probably observe UPJ-obstruction more frequently. In our own series of 91 laparoscopic pyeloplasties, 5 patients were found to have a combination of UPJ-obstruction and collecting system duplication. Published data demonstrate that UPJ-obstruction in duplicated systems occurs in the lower pole in most cases [10]. Careful preoperative evaluation with IVP or retrograde ureterography can usually identify the exact site of obstruction. In some cases, however, a more complex situation is present. Bove was the

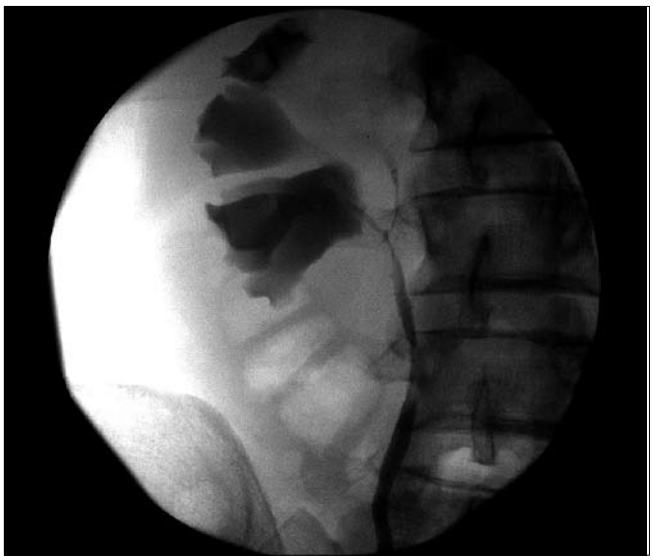

Fig. 1. Incomplete duplication (Y-type) of the collecting system.

first to demonstrate the suitability of laparoscopic pyeloplasty in patients with upper urinary tract anomalies [5]. In his study, he also describes the successful treatment of a patient with duplicated collecting system by means of laparoscopic pyeloplasty. Our observations demonstrate that laparoscopy is suitable even in highly sophisticated cases. The magnification of the laparoscope allows an excellent delineation of the anatomical situation and even difficult surgical solutions can be performed. In our series, anterior crossing vessels were associated with 60% of UPJ-obstructions and could be identified easily. Thus, transperitoneal laparoscopic pyeloplasty offers advantages even when compared to the open retroperitoneal approach, during which these vessels are frequently missed [11].

Meanwhile, endopyelotomy has also been used in the treatment of UPJ-obstruction in duplicated collecting systems. Taniguchi et al. described the case of a patient with lower pole moiety obstruction who was managed successfully by retrograde endopyelotomy using a Holmium:YAG laser [12]. Published data comparing antegrade endopyelotomy with laparoscopic pyeloplasty demonstrate that a success rate of more than 90% can be achieved with both techniques [13]. There were no statistical differences in objective outcomes, blood loss, or average hospital stay. However, these data also demonstrate that patients with a high degree of hydronephrosis are better treated with laparoscopy. Pardalidis achieved excellent results with endopyelotomy for intrinsic UPJ-obstruction with minimal distension of the renal pelvis [14]. However, for extrinsic or complicated stenosis he recommends laparoscopic dismembered Anderson-Hynes pyeloplasty.

CONCLUSIONS

The present study demonstrates that laparoscopic pyeloplasty is a suitable technique in the treatment of UPJ-obstruction in duplicated collecting systems. Laparoscopy provides an excellent delineation of the anatomy even in complex situations. This technique provides adequate clinical results and can be performed in an acceptable operative time without complications.

*JS and CS contributed equally to this article

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