

# Transmesocolic Pyeloplasty: Experience of a Single Center

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## ABSTRACT

**Purpose:** We present our experience with dismembered left-sided pyeloplasty using a transmesocolic technique as a way to reduce operative time and facilitate repair by avoiding colon displacement.

**Patients and Methods:** Between January 2004 and January 2006, a total of 11 transmesocolic laparoscopic pyeloplasties were performed by the same surgeon at our institution. The mean patient age was 41.6 years (range 14–65 years). Operative records and follow-up were reviewed.

**Results:** A dismembered Anderson-Hynes pyeloplasty was carried out in nine patients (82%), while a Y-V plasty (9%) and a Fengerplasty (9%) were done in one patient each. Crossing vessels were observed in 8 patients (73%). A ureteral stent was left in all patients. The mean operative time was 88.6 minutes (range 60–125 minutes), and blood loss was minimal. Compared with classic transperitoneal laparoscopic left pyeloplasties, transmesocolic cases showed a significant reduction in operative time (88.6 minutes *v* 117 minutes; *P* < 0.05). There were no intraoperative complications or open conversions. The mean hospital stay was 2.1 days (range 2–3 days). Only 1 patient (9%) demonstrated narrowing of the anastomosis, which occurred 12 months after a Fengerplasty.

**Conclusions:** The transmesocolic approach to a dilated left pelvis enables a shorter operative time without increasing morbidity. More patients and longer follow-up are necessary to determine its effect on convalescence.

## INTRODUCTION

URETEROPELVIC JUNCTION (UPJ) OBSTRUCTION has classically been treated through the standard open approach with outstanding results. Since Anderson-Hynes (AH) reported the first dismembered pyeloplasty, a great number of authors have published excellent results, with overall success rates of 90% to 100%.<sup>1</sup> Nevertheless, the morbidity of this approach propelled several workgroups to create new less-invasive techniques for the treatment of this pathology.

In recent years, with the growth of endourology and laparoscopy, techniques such as ureteroscopic retrograde and percutaneous antegrade endopyelotomy have evolved. With many of these techniques, short-term results comparable to those of the open approach are attained while maintaining reduced morbidity. However, the long-term success rates of endoscopic

techniques are lower than those reported for open pyeloplasty, and the procedures are associated with a greater risk of bleeding when the obstruction is caused by a crossing vessel.<sup>1–3</sup>

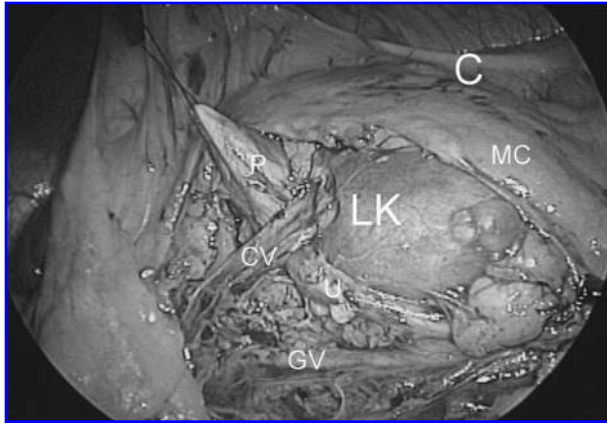
It was Schuessler and colleagues in 1993 who first described laparoscopic pyeloplasty.<sup>4</sup> Their technique respected the basic principles of the open classical approach while providing less morbidity and faster convalescence. Since then, transperitoneal and retroperitoneal approaches have been described and advocated by several authors, with excellent results.<sup>5,6</sup> In order to ease laparoscopic repair and decrease surgical time, many shortcuts, tricks, and even robot assistance have been developed.<sup>1,2,7</sup> These shortcuts help bring the operative time close to that of open surgery, making laparoscopic pyeloplasty a more desirable alternative.

We present our experience with dismembered left-sided pyeloplasty using a transmesocolic technique as a way to re-

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**FIG. 1.** Mesocolic (MC) “window” is created, keeping colon (C) lateral and allowing exposure of left kidney (LK), pelvis (P), aberrant crossing vessel (CV), and ureter (U). Gonadal vein (GV) is seen medially.

duce operative time and facilitate repair by avoiding colon displacement.

## PATIENTS AND METHODS

### *Patients and data collection*

Between January 2004 and January 2006, a total of 11 transmesocolic laparoscopic pyeloplasties were performed by the same surgeon (OC) at our institution. Five patients were men, and six were woman. The mean patient age was 41.6 years (range 14–65 years), and the American Society of Anesthesiologists score was 1 in all patients. All patients had a body mass index between 25 and 27. All pyeloplasties were left sided, and the diagnosis of UPJ obstruction was obtained by renal ultrasonography, excretory urography, and MAG3 renography in all patients.

A database was kept prospectively. Operative time, complications, and outcomes were analyzed. Statistical analysis was performed using the Mann-Whitney test. Cases were not consecutive, and this surgical approach was decided on when a dilated pelvis and a transparent mesocolon were evident during laparoscopic exploration.

### *Surgical technique*

Under general anesthesia, the patient is placed in the lateral decubitus position. Using a Veress needle, pneumoperitoneum up to 15 mm Hg is created. A 10-mm trocar for the 30° laparoscope is placed paraumbilically on the lateral border of the rectus muscle. A 5-mm and a 10-mm trocar are placed subcostally in the midclavicular line and the left flank, respectively.

The first step is the detection of the dilated renal pelvis protruding under the mesocolic fat. Because retrograde stent placement would deflate the otherwise-dilated pelvis, we strongly discourage this practice before the procedure. A mesocolic “window” is opened by carefully dissecting the mesocolon with the Harmonic Scalpel. Care must be taken to avoid injuring major vessels such as the inferior mesenteric vein and tributaries. The gonadal vein is identified, clipped, and divided. The ureter and renal pelvis are carefully dissected to avoid unnecessary damage to their vasculature, whereas for the same reason, the kidney and ureter are not mobilized (Fig. 1). The UPJ is divided proximal to the renal pelvis, and the obstructed part is left attached to the ureter. If necessary, the ureter is transposed over any aberrant vessels. A 2-0 Prolene suture is placed percutaneously on the anterior flap of the sectioned renal pelvis in order to steady the loose pelvis and facilitate the anastomosis.

Then the ureter is spatulated, and the posterior plane of the anastomosis is started with a 4-0 Vicryl® running suture on an SH needle. Once the anastomosis is finished, the ureteral stent is placed by introducing the guidewire through a 16-gauge intravenous catheter sheath placed percutaneously under direct laparoscopic control. We routinely use a 6F 22- to 32-cm Microvasive™ catheter.

The anterior plane of the anastomosis is completed using the same suturing technique as before. The mesocolic window usu-

TABLE 1. TRANSMESOCOLIC PYELOPLASTIES PERFORMED AT OUR INSTITUTION

Case	Age/sex	Crossing vessels?	Technique	Suture	Pelvic reduction?	Ureteral stent?	Operative time (min)	Complications	Follow-up (mos)
1	36F	Yes	AH	Running	Yes	Yes	125	None	24
2	54M	No	Y-V	Interrupted	No	Yes	60	None	14
3	39F	Yes	AH	Running	Yes	Yes	90	None	14
4	42M	Yes	AH	Interrupted	No	Yes	75	None	14
5	23M	Yes	AH	Running	No	Yes	75	None	9
6	50M	No	AH	Running	No	Yes	60	None	9
7	65F	Yes	AH	Running	Yes	Yes	120	None	6
8	60M	Yes	Fenger	Interrupted	No	Yes	90	Anastomotic stenosis	12
9	14F	Yes	AH	Running	No	Yes	90	None	18
10	50F	No	AH	Running	No	Yes	80	None	14
11	25F	Yes	AH	Running	No	Yes	110	None	1

ally is closed with two or three Hem-o-Lok™ clips or using a 3-0 Vicryl interrupted suture after a suction tube has been placed. The port sites are closed.

## RESULTS

A dismembered AH pyeloplasty was carried out in 9 patients (82%), while a Y-V plasty and a Fengerplasty were done in one patient each (9%). The mean operative time was 88.6 minutes (range 60–125 minutes); blood loss was minimal (Table 1). On average, transmesocolic pyeloplasties were 28 minutes shorter than classic transperitoneal laparoscopic left-sided pyeloplasties (88.6 minutes *v* 117 minutes; *P* < 0.05). A running 4-0 Vicryl suture on an SH needle was preferred in eight dismembered pyeloplasties, whereas interrupted suturing was performed on three occasions, one Y-V plasty, one Fengerplasty, and one AH pyeloplasty. Reduction of a severely dilated renal pelvis was needed on three occasions. Crossing vessels were observed in 8 patients (73%). A ureteral stent was left in all patients. There were no intraoperative complications or open conversions. The mean hospital stay was 2.1 days (range 2–3 days); all but one of the patients were hospitalized for 2 days. Ureteral stents were withdrawn on postoperative day 21.

During a mean 21.5 months of follow-up (range 1–24 months), no patients presented with complications, and 91% of the patients demonstrated a patent UPJ. Only 1 patient (9%) was found to have narrowing of the anastomosis, which occurred 12 months after a Fengerplasty.

## DISCUSSION

In recent years, several minimally invasive procedures for the repair of UPJ obstruction have emerged in order to diminish the morbidity associated with the classic open approach. Still, open pyeloplasty remains the gold standard. However, both open and endoscopic interventions have recently been challenged by longer-term data that have emerged from laparoscopic pyeloplasty series.<sup>1,2,8</sup> Laparoscopy has shown the advantage of being able to address both intrinsic and extrinsic causes of obstruction in a manner similar to the open approach.

In order to keep operating times comparable to that of the classic approach, several shortcuts and special techniques have been developed.<sup>7,9</sup> Recently, robot assistance has been used to overcome the technical difficulties of intracorporeal suturing. However, robot availability is limited to a few centers, and additional experience is necessary in order to use the device.<sup>2</sup> Two groups of investigators studied the effects of fibrin glue on pyeloplasty in order to shorten operative times. The data were ambiguous, and one of the groups noted that the anastomosis would weaken during healing. This group concluded that the glue could not replace sutures, although it may improve a sutured anastomosis by making it watertight and avoid the need for a drain.<sup>1</sup>

The transmesocolic approach to the left kidney was first described by Nicol and Smithers.<sup>10</sup> Those authors described their technique as a way of easing renal pedicle access and shortening operative time. Also, in a recent report by Wad-

wha and Hemel,<sup>11</sup> a transmesocolic approach was used for laparoscopic reconstruction of a UPJ obstruction in a pelvic kidney. Nevertheless, in cases where a redundant pelvis is present, mesocolic fat may be very thin or even transparent, making this approach feasible for classic laparoscopic pyeloplasty. This approach avoids colon mobilization and diminishes the operative time.

It is of the utmost importance to avoid preoperative retrograde stenting of the ureter, because this maneuver instantly deflates the dilated pelvis, making the transmesocolic approach impossible. Compared with classic transperitoneal laparoscopic left pyeloplasties performed at our institution, transmesocolic cases showed a significant reduction in operative time (88.6 minutes *v* 117 minutes; *P* < 0.05). This approach created a sufficient operative field to manage crossing vessels with no added difficulty. There was no significant difference in blood loss compared with classic left pyeloplasties performed at our institution.

The advantages of this technique may go beyond the shorter operative time. Avoiding colon mobilization may impact convalescence. However, there was no significant difference in hospital stay or postoperative pain after classic and transmesocolic pyeloplasties.

Transmesocolic pyeloplasty is a feasible and reproducible technique that allows shorter operative times without increasing morbidity. Nevertheless, we believe that it should be performed only for left-side UPJ obstruction and in the setting of a severely dilated pelvis. This approach should be selected intraoperatively and only after a transparent mesocolon and the absence of major blood vessels in the area have been observed. Digging to find the UPJ in patients with a fatty mesocolon may result in wasted time and bleeding.

## CONCLUSION

In the last decade, laparoscopic pyeloplasty has evolved into a feasible and reproducible technique. Recently, long-term data have shown results that compare favorably with those obtained by the classic approach. Robot assistance, different suturing techniques, and even the use of fibrin glue have been advocated to continue diminishing the operative times. The transmesocolic approach to a dilated left pelvis enables a shorter operative time without increasing morbidity. More patients and longer follow-up are necessary to determine its effect on convalescence.

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#### ABBREVIATIONS USED

AH = Anderson-Hynes; MAG3 = 99mTc-mercaptoacetyl-triglycine; UPJ = ureteropelvic junction.

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