

Laparoscopic Pyeloplasty: A Prospective Randomized Comparison Between the Transperitoneal Approach and Retroperitoneoscopy

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Purpose: A prospective randomized study was performed to compare the results of laparoscopic dismembered pyeloplasty using transperitoneal and retroperitoneal approaches.

Materials and Methods: A total of 40 patients with primary ureteropelvic junction obstruction were included in the study. The patients were prospectively randomized between transperitoneal (20 patients, group 1) and retroperitoneal (20 patients, group 2) laparoscopic Anderson-Hynes pyeloplasty. All the patients were assessed preoperatively by excretory urography, diuretic isotope renography and computerized tomography angiography. The patients were followed at 3 and 6 months postoperatively, and then every 6 months. Evaluation was performed by excretory urography and diuretic renography. Both approaches were compared regarding operative time, morbidity, hospital stay, convalescence and functional outcome. The preoperative demographic data of the patients and radiological and operative findings were statistically correlated to the operative time.

Results: The preoperative data of both groups were comparable. All the procedures were successfully completed with laparoscopy. Mean operative times were 149 and 189 minutes for the transperitoneal approach and retroperitoneoscopy, respectively ($p = 0.02$). In groups 1 and 2 there were complications in 3 and 5 patients, respectively. Morbidity, hospital stay, convalescence and success rate had no significant differences between the groups. None of the patient parameters apart from the approach had a significant impact on operative time.

Conclusions: Laparoscopic dismembered Anderson-Hynes pyeloplasty has a satisfactory functional outcome and low morbidity regardless of the approach. Nevertheless, with early experience retroperitoneoscopy is associated with a longer operative time.

Key Words: ureteral obstruction, laparoscopy, peritoneal cavity

Laparoscopic pyeloplasty was initially introduced by Schuessler et al for management of UPJO.¹ This minimally invasive technique combines the advantages of the high success rate of open surgery and the low morbidity of endopyelotomy.²⁻⁵ The procedure could be performed through a transperitoneal approach or retroperitoneoscopy. The choice depends basically on surgeon preference and experience. Other factors such as previous laparotomy, morbid obesity and presence of crossing vessels may also have a role. It is difficult to compare the 2 techniques because most of the published series used 1 approach with a variety of pyeloplasty techniques and more than 1 surgeon. Therefore, we conducted a prospective randomized study to compare the techniques with all procedures performed by 1 surgeon and with the principles of A-H pyeloplasty.

PATIENTS AND METHODS

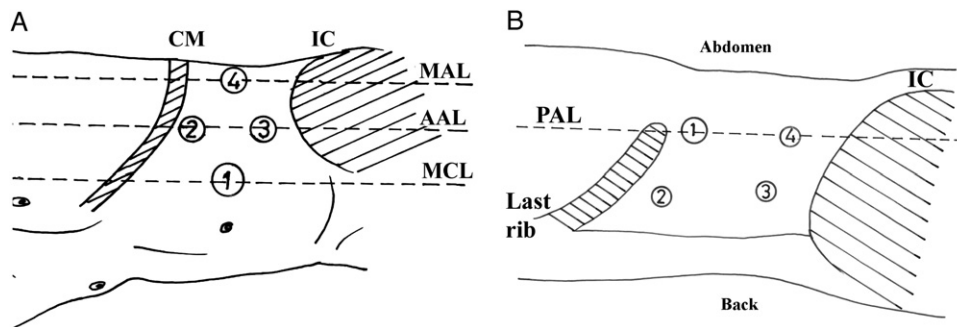
Between February 2002 and July 2006 a total of 40 consecutive patients with symptomatic primary UPJO were included in the study. The patients were assessed preoperatively by routine laboratory investigations, IVU, diuretic

renogram using ⁹⁹Tc-mercaptoacetyltriglycine and CT angiography for detection of crossing vessels. The degree of hydronephrosis on the IVU was evaluated according to the Talner classification.⁶ The included cases had 1 or more specific criteria of hugely dilated pelvis, crossing vessels at UPJ and/or compromised function of the affected renal unit (the split renographic clearance was 25% or less). Exclusion criteria were uncontrolled bleeding, diathesis and previous renal surgery. The ethical committee of the hospital reviewed and approved the study protocol. After taking written consent the patients were prospectively randomized to undergo transperitoneal (group 1) or retroperitoneal (group 2) laparoscopic dismembered A-H pyeloplasty. Each group included 20 cases. Randomization was performed by closed envelopes and all procedures were performed by 1 surgeon (AMS). All procedures were performed with the patient under general anesthesia with epidural analgesia. The operations were performed through 4 ports (see figure). A 6Fr Double-J® catheter was placed just before the procedures using cystoscopy in all cases. The procedures were done as described in the literature.^{7,8} Nevertheless, the principle of A-H pyeloplasty was applied in all cases. The redundant pelvis was trimmed and the crossing vessel was transposed if found. Ureteropelvic reanastomosis was performed by intracorporeal free hand suturing using 4-zero polyglactin sutures. The associated renal stones were removed during the procedure using ordinary laparoscopic instruments. Flexible

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Study received hospital ethical committee approval.

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A, position of patient for transperitoneal approach. B, position of patient for retroperitoneal approach. 1, site of trocar for telescope (10 mm). 2 and 3, sites of trocars for surgeon (10 mm). 4, site of trocar for assistant (5 mm). CM, costal margin. IC, iliac crest. MAL, midaxillary line. AAL, anterior axillary line. MCL, midclavicular line. PAL, posterior axillary line.

nephroscopy was not used. The peripheral caliceal stones were left in situ and managed by SWL 2 weeks after the procedures. The DJ was left until complete fragmentation of the stones. The patients commenced oral intake on postoperative day 1 and the urethral catheter was removed after 2 days. The tube drain was left in place until it stopped draining. The tube was also removed if it drained serum for 2 consecutive days (as proved by estimation of the creatinine content). Operative time, intraoperative and postoperative complications, and hospital stay were recorded. Estimation of the surgical duration started with the introduction of the first port and ended with closure of the port sites. Operative time did not include the time required for DJ fixation. Four weeks later the DJ was removed unless required for SWL.

All the patients were evaluated by IVU and diuretic renogram at 3 and 6 months postoperatively, and then every 6 months. A change in the renographic split function of less than 5% was considered insignificant to allow for the inherent potential error of gamma camera renogram data.⁹ The objective outcome of the patients was assessed based on the results of the most recent radiological investigations. Success was considered an improvement in the radiographic findings (stable or less hydronephrosis, patent UPJ and nonobstructed diuretic renal scan with improved or stable split renographic clearance). Failure was defined as deterioration in 1 or more of the radiological results (more hydronephrosis, deterioration of the split renographic clearance or obstructed diuretic renal scan). Equivocal results were considered in the patient(s) with stable or improved hydronephrosis and split renographic clearance but with incomplete drainage on diuretic renogram. The equivocal cases were closely followed every 3 months by diuretic renogram with no active intervention as long as the split renographic clearance of the affected side remained stable or improved.

The 2 groups were compared in terms of the variables of operative time, morbidity, hospital stay, convalescence and objective outcome. The variables showing significant differences were further evaluated. The effect of preoperative and intraoperative patient data on these variables was assessed.

Statistical analysis was performed with SPSS® software using the Fisher exact, chi-square and Mann-Whitney U tests for independent groups where appropriate with $p < 0.05$ considered statistically significant. Correlation among the different continuous parameters was assessed by the Pearson correlation coefficient test. Correlation was con-

sidered strong if the correlation coefficient (r) was greater than 0.5 or less than -0.5.

RESULTS

The preoperative demographic and radiological data of both groups were comparable with no statistically significant differences (table 1). The anterior crossing vessels were detected by computerized tomography angiography in 13 and 12 patients from groups 1 and 2, respectively. Intraoperatively the vessels were seen in 11 cases of each approach (table 1). Posterior crossing vessels were not detected in any cases. The overall sensitivity and specificity of computerized tomography angiography were 100% and 86%, respectively. Three patients with UTI were simply treated with the proper antibiotics before the operations. All the procedures could be completed with laparoscopy with no need for con-

TABLE 1. Preoperative demographic, laboratory and radiologic data

	Group 1	Group 2	p Value
Mean pt age ± SD	29 ± 13	34 ± 15	0.3
Mean mg % serum creatinine ± SD	0.86 ± 0.2	0.9 ± 0.2	0.6
Mean ml/min glomerular filtration rate on affected side ± SD*	31.7 ± 12	32 ± 11	0.9
Mean % split renal function on affected side ± SD	35 ± 11	34 ± 11	0.3
No. sex (%):			
Male	11 (55)	10 (50)	1
Female	9 (45)	10 (50)	
No. side (%):			
Rt	9 (45)	6 (30)	0.5
Lt	11 (52)	14 (70)	
No. stones (%):			
Yes	4 (20)	4 (20)	1
No	16 (80)	16 (80)	
No. UTI (%):			
Yes	3 (14)	0 (0)	0.2
No	17 (86)	20 (100)	
No. hydronephrosis (%):			
Grade II	12 (60)	6 (30)	0.1
Grade III	8 (40)	14 (70)	
No. crossing vessels as radiologic finding (%):			
Yes	13 (65)	12 (60)	1
No	7 (33)	8 (40)	
No. crossing vessels as operative finding (%):			
Yes	11 (55)	11 (55)	1
No	9 (45)	9 (45)	

* Measured by ⁹⁹Tc mercaptoacetyltryglycine.

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