

Comparative Study between Laparoscopic and Retroperitoneoscopic Dismembered Pyeloplasty for Ureteropelvic Junction Obstruction

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Abstract

Introduction and Objectives. The late developments in the laparoscopic field gave urologists the chance to perform reconstructive surgery by retroperitoneal approach. Retroperitoneoscopic or laparoscopic pyeloplasties tend to replace open surgery for uretero-pelvic junction obstruction (UPJO), but require high laparoscopic skills.

The purpose of the study is to evaluate our experience in terms of laparoscopic dismembered pyeloplasty for uretero-pelvic junction obstruction using transperitoneal and retroperitoneal approach.

Materials and Methods. Between January 2014 and February 2017, 34 patients (p) underwent dismembered laparoscopic pyeloplasty for ureteropelvic junction obstruction at our center, 23 p by retroperitoneoscopic approach and 11 p by transperitoneal approach. A retrospective chart review was carried out, including age, sex, ASA score, hydro-nephrosis grade, associated caliceal stones, operative time, hospital stay, analgetic medication and renal function. The perioperative complications were carefully graded using the Clavien-Dindo system.

Results. The mean age of patients with laparoscopic dismembered pyeloplasty was 31.8 ± 8.4 years, with 32.4 ± 7.9 years for transperitoneal subgroup and 30.5 ± 7.2 for retroperitoneal approach. The mean preoperative serum creatinine was similar for both groups of patients. There was no need for open conversion. The cause of UPJO was anterior crossing vessels in 7 cases (20.5%) and caliceal stones were identified in 2 patients (18.1%) in TPP group and 3 patients (13.0%) in RPP group. The total rate of complications using the modified Clavien-Dindo classification was of 29.4% (10/34 patients).

Conclusions. Retroperitoneoscopic laparoscopic dismembered pyeloplasty is superior to transperitoneal approach in terms of postoperative ileus, postoperative analgesic medication and hospital stay. In terms of success rate both approaches presented similar results.

Key-words: ureteropelvic junction obstruction, UPJO, pyeloplasty, laparoscopic, retroperitoneoscopic.

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Introduction and Objectives

The late developments in the laparoscopic field gave urologists the chance to perform reconstructive surgery by retroperitoneal approach. Retroperitoneoscopic or laparoscopic pyeloplasty tends to replace open surgery for uretero-pelvic junction obstruction (UPJO), but requires high laparoscopic skills. According to different authors transperitoneal laparoscopic approach is time consuming but feasible^[1], and retroperitoneoscopic approach is to laborious for becoming a standard procedure^[2]. Multiple studies concluded that transperitoneal pyeloplasty ensures more space for instruments movement and intracorporeal suturing, but with higher complication rate in terms of bowel injuries and pain management in comparison with retroperitoneoscopic approach^[3,4,5].

The purpose of the study is to evaluate our experience in terms of laparoscopic dismembered pyeloplasty for uretero-pelvic junction obstruction using transperitoneal and retroperitoneal approach.

Materials and Methods

Between January 2014 and February 2017 , 34 patients (p) underwent dismembered laparoscopic pyeloplasty for ureteropelvic junction obstruction at our center, 23 p by retroperitoneoscopic approach and 11 p by transperitoneal approach.

A retrospective chart review was carried out, including age, sex, ASA score, hydronephrosis grade, associated caliceal stones, operative time, hospital stay, analgetic medication and renal function.

The perioperative complications were carefully graded using the Clavien-Dindo system.

Transperitoneal laparoscopic pyeloplasty (TPP): the patient was placed in kidney position, and the pneumoperitoneum was created by carbon dioxide insufflation through Veres needle. The 4 ports were put in place, the posterior peritoneum was incised and the colon was reflected. We identified the ureter and dissected the ureteropelvic junction. Anterior crossing vessels were identified in 3 patients in which cases the uretero-pelvic anastomosis was performed in front of the vessel. The obstructed segment was excised, the ureter was spatulated and the ureteropelvic anastomosis was done with 3.0 polydioxanone continuous suture over a 6 Fr / 26 cm double-J stent. Caliceal stones were found in 2 cases and were retrieved using a flexible cystoscope before the anastomosis.

Retroperitoneoscopic laparoscopic pyeloplasty (RPP): with the patient placed in kidney position, we

made an incision at the tip of the 12th rib, the retroperitoneal space was created using blunt finger dissection and the 4 trocars were put in place (photo 1, 2). The rest of the procedure was done similar to transperitoneal approach (photo 3, 4, 5, 6, 7). Anterior crossing vessels were found in 4 cases. Caliceal stones were found in 3 patients and were extracted using the same technique as in transperitoneal pyeloplasty.



Photo 1: Patient position



Photo 2: Trocars placement



Photo 3: Intraoperative UPJ aspect



Photo 4: Renal pelvis excision



Photo 5: Double J placement



Photo 6: Ureteropelvic anastomosis



Photo 7: Postoperative aspect - 3 months

The statistical analysis of this paper was done by using chi-square test, the Fischer exact test and the Mann-Whitney U test for parametric variables. A p value < 0.05 was considered statistically significant.

Results

The mean age of patients with laparoscopic dismembered pyeloplasty was 31.8 ± 8.4 years, with 32.4 ± 7.9 years for transperitoneal subgroup and 30.5 ± 7.2 for retroperitoneal approach. The mean preoperative serum creatinine was similar for both groups of patients. There was no need for open conversion. The cause of UPJO was anterior crossing vessels in 7 cases (20.5%) and caliceal stones were identified in 2 patients (18.1%) in TPP group and 3 patients (13.0%) in RPP group (Table 1).

Mean total operative time and mean intracorporeal suturing time was statistically significant between the 2 groups. Mean paracetamol dose and mean tramadol dose for the first 2 postoperative days was high-

er in the transperitoneal approach. The mean hospital stay was greater in the TPP group (4.9 vs. 4.1 days) (Table 2).

The total rate of complications using the modified Clavien-Dindo classification was of 29.4% (10/34 patients). Grade 1 Clavien-Dindo complications were present in 26.4%, grade 2 in 32.3 % and grade 3 in 8.8%. Temporary ileus was present in 4 patients (36.3%) in the transperitoneal approach. Subcutaneous emphysema was reported in 8 patients (34.7 %) in the retroperitoneoscopic group (Table 3).

Discussions

From the first series of transperitoneal laparoscopic dismembered pyeloplasty presented by Schuessler et al. in 1993^[1] and the first serie of retroperitoneoscopic approach reported by Janetschek et al. in 1996^[2], this types of approach for UPJO are beginning to replace open Hynes-Anderson pyeloplasty.

Table 1 – Preoperative characteristics

	All patients	TPP	RPP	p
Patients	34	11	23	
Mean age (yr)±SD (range)	31.8±8.4 (18-54)	32.4±7.9 (18-54)	30.5±7.2(19-51)	0.74
Mean preoperative creatinine (mg/dl) ±SD (range)	1.23±0.4 (0.7-1.7)	1.29±0.4 (0.7-1.6)	1.22±0.4 (0.8-1.7)	0.79
UPJO side				
Right	14 (41.1 %)	6 (54.5 %)	8 (34.7 %)	0.81
Left	20 (58.9 %)	5 (45.5 %)	15 (65.3 %)	0.84
ASA score				
1	26 (76.4 %)	7 (63.6 %)	19 (82.6 %)	0.79
2	8 (23.6 %)	4 (36.4 %)	4 (17.4 %)	0.84
Mean BMI (kg/m ²)	26.1±2.7	25.7±2.8	26.5±3.0	0.31
Grade of hydronephrosis				
2	18 (52.9 %)	5 (45.4 %)	13 (56.5 %)	0.45
3	12 (35.2 %)	5 (45.4 %)	7 (30.4 %)	0.69
4	4 (11.9 %)	1 (9.2 %)	3 (13.1 %)	0.67
Anterior crossing vessels	7 (20.5 %)	3 (27.2 %)	4 (17.3 %)	0.48
Caliceal stones	5 (14.7 %)	2 (18.1 %)	3 (13.0 %)	0.70

TPP-transperitoneal laparoscopic pyeloplasty, RPP-retroperitoneoscopic laparoscopic pyeloplasty, SD-standard deviation, BMI-body mass index, ASA-American Society of Anesthesiologists

Table 2 – intraoperative and postoperative characteristics

	All patients	TPP	RPP	p
Patients	34	11	23	
Operative time(min)±SD (range)	170.7±42.1(125-240)	174.3±36.2(125-240)	168.5±28.8(130-180)	0.025
Intracorporeal suturing time(min) ±SD (range)	76.8±10.1(60-90)	68.2±9.51(60-85)	74.5±7.82(65-90)	0.032
Mean paracetamol dose day1(mg)	1264.3	1426.4	1215.6	0.021
Mean paracetamol dose day2(mg)	857.4	916.8	796.4	0.037
Mean tramadol dose day1(mg)	157.3	169.3	147.7	0.041
Mean tramadol dose day2(mg)	87.4	99.5	74.6	0.030
Mean postoperative(48h) creatinine (mg/dl) ±SD (range)	1.14±0.5 (0.7-1.4)	1.15±0.5 (0.7-1.4)	1.14±0.4 (0.8-1.4)	0.34
Hospital stay (days)	4.4	4.9	4.1	0.048

TPP-transperitoneal laparoscopic pyeloplasty, RPP-retroperitoneoscopic laparoscopic pyeloplasty, SD-standard deviation

Table 3 – Postoperative complications

Postoperative complications	TPP group	RPP group	Overall	p
Clavien-Dindo grade 1 Subcutaneous emphysema	0	8 (34.7%)	8 (23.5 %)	n/a
Transient hematuria	1 (9.1 %)	0	1 (2.9 %)	n/a
Clavien-Dindo grade 2 Clostridium difficile infection	1 (9.1 %)	1 (4.3 %)	2 (5.8 %)	0.64
Temporary ileus	4 (36.3 %)	0	4 (11.7 %)	n/a
Fever (UTI)	1 (9.1 %)	1 (4.3 %)	2 (5.8 %)	0.46
Prolonged urine drainage	0	3 (13 %)	3(8.8 %)	n/a
Clavien-Dindo grade 3 Persisting UPJO	1 (9.1%)	2 (8.6 %)	3 (8.8 %)	0.77

TPP-transperitoneal laparoscopic pyeloplasty, RPP-retroperitoneoscopic laparoscopic pyeloplasty, UTI – urinary tract infection, UPJO – ureteropelvic junction obstruction

These technique presents advantages and disadvantages according to the type of the approach, transperitoneal pyeloplasty having reported risk for bowel injury, ileus and peritoneal cavity contamination by urine leakage and infection. Meanwhile the retroperitoneoscopic approach presents technical difficulties due to small working space [5-12].

Indifferent of the approach taken we respected the basic principles of Hynes-Anderson open pyeloplasty which is still consider the gold standard treatment for UPJO. In our series the total operative time was greater

in the transperitoneal approach. The main reason for this result is that it was the approach of choice for our initial experience. The mean intracorporeal suturing time was higher in the retroperitoneoscopic group due to limited working space and difficult instrument handling [2,3,6,10,11,12].

The use of antialgic medication was higher in the transperitoneal approach, because of the manipulation of the peritoneum and colon reflexion required for this technique.

Anterior crossing vessels were the reason of the ob-

structed ureteropelvic junction in 7 cases (20.5%), less than the incidence reported in the literature [5,17-12].

Caliceal stones represents an issue that can complicate the procedure, and the incidence is reported to be around 19%. In our study the incidence of caliceal stones was 14.7% (5/34 patients) similar with results from the literature [13].

Complication rate in our study was 29.4 %, higher than the rates reported in the literature ranging between 12.9% and 22.5%, mainly due to high rate of subcutaneous emphysema present in the retroperitoneoscopic approach [4-12].

Persisting ureteropelvic junction obstruction after pyeloplasty was identified using excretory urography and uro-CT in 3 cases (8.8%), which makes our succes rate of 91.2%, similar to those reported in the literature [1-5,7-12]. This cases were treated after 6 mounths by open Hynes-Anderson pyeloplasty.

The limitations of our study are its retrospective nature and the lack of long term postoperative evaluation. Another limitation is the reduce number of cases over time, since LPN is practice in our department from January 2014.

Conclusions

Retroperitoneoscopic laparoscopic dismembered pyeloplasty is superior to transperitoneal approach in terms of postoperative ileus, postoperative analgesic medication and hospital stay. In terms of succes rate both approaches presented similar results.

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