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Original Research Article

Transperitoneal laparoscopic pyeloplasty: a single center experience of 28 cases

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ABSTRACT

Background: To evaluate prospectively the results obtained in twenty-eight patients undergoing laparoscopic pyeloplasty through transperitoneal access.
Methods: From January 2014 to June 2016, twenty-eight patients between 12 and 55 years old underwent laparoscopic pyeloplasty for primary ureteropelvic junction (UPJ) obstruction via a transperitoneal approach. Eighteen cases had the obstruction on the left side and the other ten on the right side. All patients had radiographic evidence of obstruction with signs, symptoms or deterioration of renal function. Anderson-Hynes dismembered pyeloplasty was performed in 25 patients and Fenger technique in the other 3 cases. Three patients had non-obstructing renal stones and underwent concomitant pyelolithotomy. Patients were evaluated clinically and by imaging in the postoperative period at 3 and 6 months and then followed-up annually.
Results: The operative time ranged from 190 to 330 min. The average blood loss was 70 mL. Analgesic requirements were also minimal with patients requiring PCA for an average of 1.1 days. Average days to free fluids were 1.5 days. The mean hospital stay was 3.76 days. The time to return to normal activities ranged from 7 to 12 days. Crossing vessels were identified in 16 patients, intrinsic stenosis in 14 patients and 5 patients had high implantation of the ureter. There were no conversions to open. One patient had longer urinary fistula (9 days), 2 patients had prolonged ileus and 3 patients had port site infection. The follow up ranged from 6 to 72 months. From the later postoperative complications, 2 patients had re-stenosis. The success rate was 92.85%.
Conclusions: Laparoscopic pyeloplasty has functional results comparable to conventional open technique. It offers less morbidity, with aesthetic and post-operative convalescence benefits and lower complication rates.

Keywords: Anderson hynes, Laparoscopic pyeloplasty, PUJO

INTRODUCTION

Many procedures are applied for management of pelviureteric junction obstruction (PUJO) including open, laparoscopic and endourological approaches. Trendelenburg performed first reconstructive procedure for PUJO in 1886 and in 1889 Kuster performed first successful dismembered pyeloplasty.[1] It was in the year 1993 when Schuessler reported first successful laparoscopic pyeloplasty (LP).[2] With the refinement of laparoscopic skills including intracorporial suturing technique, laparoscopic pyeloplasty has become procedure of choice for PUJO around the globe. Several series have shown success rate exceeding 90% which is comparable to open dismembered pyeloplasty. Both transperitoneal and retroperitoneal approaches are in use and each has its own merits and de merits. Authors are

reporting this experience of 28 patients who underwent laparoscopic pyeloplasty through transperitoneal access.

METHODS

First laparoscopic transperitoneal pyeloplasty (LP) was performed in this institute in January 2010 and since then we have performed LP on 28 consecutive patients between 12 and 55 years of age, till June 2015. All the patients presented with primary PUJO. Eighteen patients had obstruction on left side and rest 10 patients presented with right side PUJO. Anderson-Hynes dismembered pyeloplasty was performed in 25 patients and Fenger technique in the other 3 cases. Pre-operative investigations included complete blood count, renal function test, coagulation profile, intravenous urogram and DTPA diuretic renogram. All surgeries were performed with the patient under general anaesthesia in lateral position. Antibiotic prophylaxis was given to all patients. All patients had full mechanical bowel preparation with polyethylene glycol on the night before surgery. Patient was placed in lateral position and pneumoperitoneum was created with CO_2 using veress needle. LP was performed with standard four port technique (Figure 1). Double-J stent was placed in all patients. Postoperative analgesia was administered by patient controlled analgesia (PCA). Patient were allowed orally on appearance of bowel sound and allowed to ambulate on first post-operative day. Double-J stent was removed after six weeks followed by ultrasonogram KUB region and DTPA renogram, and IVP repeated at 3months. Sonography was repeated every six months till 3 years.



Figure 1: Port placement for transperitoneal laparoscopic pyeloplasty.

The data collected included patient age, gender, history of previous surgery, result of pre- and postoperative imaging, operation time, time to oral fluids, hospital stay, complications, success rate and follow- up time. Success of LP was defined as complete resolution or marked reduction of pain, improvement of hydronephrosis on follow up ultrasonography, visualization of ureter on radiological imaging, the parameters for success on renal scan were reduction in diuretic renal scan clearance time (T1/2) by a factor of 2 or by a T1/2 value of less than 10 minutes, and an increase in differential renal function (DRF) of greater than 10% postoperatively.

RESULTS

The mean patient age was 37.5 years (Range 12-55 years) and there was no gender difference. Majority of patients presented with flank pain and 25 patients had intermittent vomiting. Three patients had non-obstructing renal stones and underwent concomitant pyelolithotomy. The operative time ranged from 190 to 330 min. The average blood loss was 70ml. Analgesic requirements were also minimal with patients requiring PCA for an average of 1.1 days. Average days to free fluids were 1.5 days. The mean hospital stay was 3.76 days. The time to return to normal activities ranged from 7 to 12 days. Crossing vessels were identified in 16 patients, intrinsic stenosis in 14 patients and 5 patients had high implantation of the ureter. There were no conversions to open. One patient had longer urinary fistula (9 days), 2 patients had prolonged ileus and 3 patients had port site infection. The follow up ranged from 6 to 72 months. From the later postoperative complications, 2 patients had re-stenosis. The success rate was 92.85% (Table 1).

Table 1: Parameters observed for transperitoneal laparoscopic pyeloplasty.

Operative time	Range 190-330(min)
Analgesic requirement (PCA)	1.1 day (Range 6 hours to 3 days)
Days to oral free Fluid	1.5 days (Range 1 to 2 days)
Mean hospital stay	3.76 days (Range 2to 10days)
Time to return to normal activity	8.6 days (Range7 to 12 days)

DISCUSSION

Laparoscopic pyeloplasty was first introduced in 1993 by Schuessler and colleagues and has been developed worldwide as a standard minimally invasive alternative to open pyeloplasty (OP) and endopyelotomy.[1] Relative to open pyeloplasty, LP is associated with greater technical complexity and a steeper learning curve. In the hands of the experienced laparoscopic surgeons, it has been shown to provide lower patient morbidity, shorter hospitalization, and faster convalescence, with the reported success rates matching those of open pyeloplasty (≥90%).[3]

Indication of LP includes clinical symptoms of ureteropelvic junction obstruction, the progressive impairment of renal function, and the development of ipsilateral upper tract calculi or infection. Cases requiring the transposition of crossing vessels obstructing ureteropelvic junction or the size reduction for massively dilated renal pelvis are suitable for the laparoscopic

approach. Absolute contraindications of LP include uncorrected coagulopathy and the presence of cardiopulmonary compromise unsuitable for surgery.[3]

The objective of the laparoscopic surgery is to provide a tension-free, water-tight repair with a funnel-shaped drainage product to relieve clinical symptoms and to preserve renal function.

Most of the complications of LP are similar to those of general laparoscopic procedures including colonic injury, hemorrhage, ileus, pneumonia, congestive heart failure, thrombophlebitis, and urinoma formation. In a series of 100 laparoscopic pyeloplasty performed at Johns Hopkins, such complications occurred in 12% of the patients.[4]

Most of the published LP reports have used the classic Andersen-Hynes dismembered technique because most laparoscopic surgeons' aims at duplicating the well-established principles of open surgery. The mean operative times in various series range from 119 to 252 minutes. In the experienced hands, the entire procedure can be consistently performed in less than 3.5 hours.[4] Perioperative complication rates are low, ranging from 2% to 15.8%, demon-starting the safety of the laparoscopic procedure. Open conversion rates are also low, in the range of 0% to 5.5%. Postoperative analgesic use is generally minimal. Mean length of hospital stay ranges from 2.6 to 4.5 days, and such average has decreased to 3.8 days. Majority of series has reported success rates of greater than 95%.

Failures from laparoscopic pyeloplasty usually occur in the first 2 years, although up to 30% of failed cases may occur after 2 years postoperatively.[5] For the patients who fail laparoscopic pyeloplasty, open surgery has been used as a salvage procedure, with success rates of approximately 86%.[6]

In a retrospective study, Bauer and colleagues compared 42 laparoscopic pyeloplasties and 35 open pyeloplasties. With a minimum follow-up of 12 months for each of the patients, the two groups were found to be equivalent in pain relief (90% vs. 91%, respectively) and relief of obstruction (98% vs. 94%, respectively).[7] In another study, Soulie and colleagues examined 26 laparoscopic pyeloplasties and 28 open pyeloplasties. The two groups were found to be equivalent in mean operating time (165 vs. 145 minutes, respectively); mean blood loss (92 mL vs. 84 mL, respectively); perioperative complication rate (11.5% vs. 14.3%, respectively); mean hospital stay (4.5 days vs. 5.5 days, respectively); and radiologic success (89% vs. 89%, respectively). However, more laparoscopic patients were found to have returned to normal activity by postoperative day 15 (90% vs. 70%, respectively).[8] Klingler and colleagues compared 40 laparoscopic pyeloplasties with 15 open pyeloplasties. In this series the laparoscopic group was found to have lower mean postoperative visual analogue scale score (day 1, 3.5 vs. 5.4; day 5, 0.9 vs. 3.1) and shorter mean hospital stay (5.9 vs. 13.4 days).[9] In another study, Simforoosh and colleagues compared 37 laparoscopic pyeloplasties and 32 open pyeloplasties and found equivalent clinical and radiologic success rates between the two approaches. Success rate as reported by him was 89% and 83.8% for laparoscopic group and 96.5% and 87% for open group, respectively.[10] Calvert and colleagues examined the differences between 49 laparoscopic and 51 open pyeloplasty patients. Compared with open cases, laparoscopic cases were found to have significantly longer mean operating time (159 vs. 91 minutes) and significantly shorter mean time to normal diet (38 vs. 72 hours).[11]

Primary ureteropelvic junction obstruction associated with renal anomalies such as horseshoe kidneys, pelvic kidneys, and anterior crossing vessel have also been managed with laparoscopic pyeloplasty safely and successfully.[3]

CONCLUSION

Laparoscopic pyeloplasty is a minimally invasive, safe and effective therapy for ureteropelvic junction obstruction with low morbidity, shorter convalescence and excellent outcomes comparable to conventional open technique.

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