



Original Article

LAPAROSCOPIC PYELOPLASTY - OUR EARLY EXPERIENCE

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Abstract:

Objectives: To present our initial experience with laparoscopic pyeloplasty and to evaluate the safety and short-term outcome of this technique.

Methods: Five patients underwent laparoscopic dismembered pyeloplasty for the management of ureteropelvic junction obstruction (UPJO) at Chittagong between July'2007 to Mach'2009. Patient age at surgery was 8–22 years. There were two boys and three girls. All had unilateral UPJO with a normal contralateral kidney. We used 5 mm instruments for grasping, blunt dissection, incising and suturing to facilitate safe and precise surgery. The outcome was measured by the operative time, perioperative complications and resolution of obstruction and symptoms.

Results: Mean operative time was 195 minutes (range 175–220 min). No major perioperative complications occurred in any cases. Overall, successful resolution of UPJO was observed in all the five cases evident by renogram.

Conclusions: Laparoscopic pyeloplasty represents a safe and effective option in the surgical treatment of UPJO.

Key words: laparoscopic, pyeloplasty, ureteropelvic junction obstruction, renogram.

Introduction:

Ureteropelvic junction obstruction (UPJO), which is defined as the restricted flow of urine from the renal pelvis to the ureter, remains the most common obstructive uropathy in children. Although various surgical procedures have been described for repairing UPJO, open pyeloplasty is still the gold standard with a success rate exceeding 90%¹. Technologic advances in instrumentation provided the foundation

for endourologic and more recently, laparoscopic techniques for addressing the obstructed pelviureteral junction.

Laparoscopic pyeloplasty (LP) was first described in 1993 by Schuessler and associates². Recently, LP has gradually gained acceptance as a feasible and reliable treatment associated with minimal morbidity in the pediatric population of Western countries since its first report for children in 1995³. A recent report obtained from the pediatric health information system in the USA showed that 6.2% of procedures were performed laparoscopically from 2002 to 2007⁴. The main advantage of a laparoscopic approach to UPJO over other minimally invasive alternatives such as endopyelotomy is the ability to replicate each step of the open surgical procedure. Thus, laparoscopy provides a combination of the excellent success rates of open surgery with the advantages of decreased pain, improved cosmesis, short hospital stay, and an early return to full activity for the patient. We first performed laparoscopic pyeloplasty LP on July 2007. Here we present our little experience of this procedure to date.

Patients and Methods:

Five patients underwent laparoscopic dismembered pyeloplasty for the management of UPJO at different hospitals of Chittagong city between July'2007 to Mach'2009. Patient's age at surgery was 8-22 years and there were 2 boys and 3 girls. All had unilateral UPJO with a normal contralateral kidney, 3 were on the right and two on the left. All patients had symptomatic UPJO and all were underwent preoperative radiological imaging, including ultrasonography and diuretic renography for the diagnosis of UPJO. The indications of surgery included an increasing degree of hydronephrosis, a low split renal function (<40%) and/or an obstructive pattern on diuretic renography and/or symptoms such as pain or urinary tract infection.

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Laparoscopic dismembered pyeloplasty was carried out in the lateral position under general anesthesia. We performed all the cases through transperitoneal approach. First 10 mm port was placed pararectally just cephalad to the umbilicus or at the umbilicus for younger patients by open technique and pneumoperitoneum was conducted at 10 to 12 mm of Hg, then abdominal cavity was inspected using a 10 mm, 0-degree scope. Two additional 5 mm trocars were inserted (Fig. 1 and 2). The peritoneum overlying the kidney was incised to expose the UPJO with medial mobilization of the colon. The stenotic segment was excised and the ureter spatulated (Fig. 3). The lower corner of the ureter was sutured to the lower edge of the pelvis with an everting 5-0 vicryl suture. After completing the posterior layer of anastomosis with the same suture using continuous stitch a 5 Fr double-J stent was inserted in an antegrade fashion over a guidewire. Ureteropelvic anastomosis was then completed by suturing the anterior layer with continuous 5-0 vicryl sutures. The renal pelvis was then closed with a running 5-0 vicryl suture. Modest reduction of the renal pelvis is routinely performed. An intra-abdominal drain was left in all patients through a port site. We evaluated patient's demographic data, preoperative investigations, operative details, hospital course, and complications for all 5 patients. The double-J catheter was removed after six to eight weeks. Postoperative ultrasonography was performed at 3 months and a diuretic renogram was performed at 6 and 12 months. The criteria for short-term success were a marked reduction of hydronephrosis on ultrasonography, preservation of split renal function and improvement in the drainage curve on diuretic renography, and symptom resolution at 6 months.

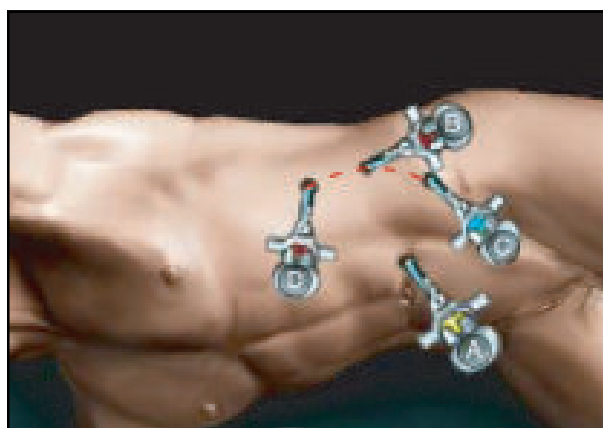


Fig-1: Placement of ports (Port B is optional and we did not use this port)

Results:

All operations were completed by laparoscopic dismembered pyeloplasty following the principles of the open Anderson-Hynes procedure. Mean operative time was 195 min (range 175–220). There was no difference in the operating time between right and left-sided procedures. No aberrant crossing vessel was observed in any cases. No patient required open conversion. Liquid diet was started 6 h after operation in all patients and was rapidly increased if tolerated by the patients. Feeding began after a mean of 1.5 (0–3) days. The urethral catheter was removed after a mean of 2.8 (2–4) days. Children passed stools after a mean of 2 (1–3) days. Minor operative and postoperative complications occurred in 1 (needle lost and retrieved) and 2 (port site infection-1 and mild haematuria 1) patients respectively. No major perioperative complications occurred in any cases. No patient had postoperative urine leakage and none had paralytic ileus. Postoperative pain management was optimal using only nonsteroidal anti-inflammatory drugs for a few days. No patient required treatment for urinary tract infection with oral antibiotics while the Double-J catheter was indwelling. All the cases are still our follow up. On ultrasonography, the size of the pelvis has been reduced in all the 5 cases. Successful resolution of UPJO was observed in all five cases as evident by improved split renal function on renogram and pattern of the drainage curve. The wound was smaller in all and the cosmetic appearance of wounds were good in all cases.

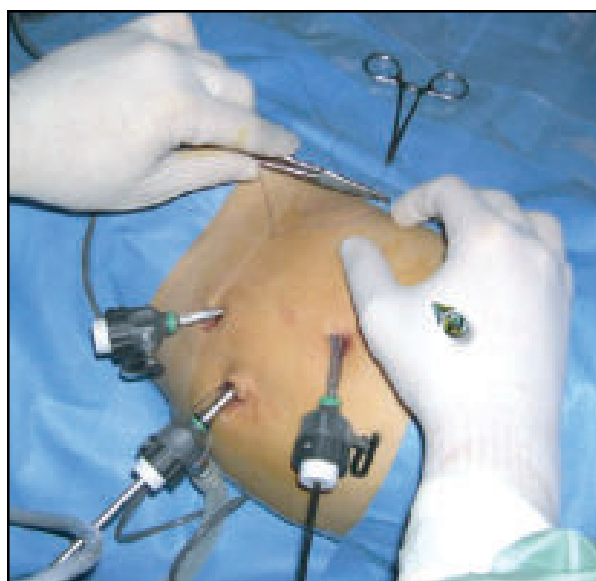


Fig-2: Placement of ports in younger patients

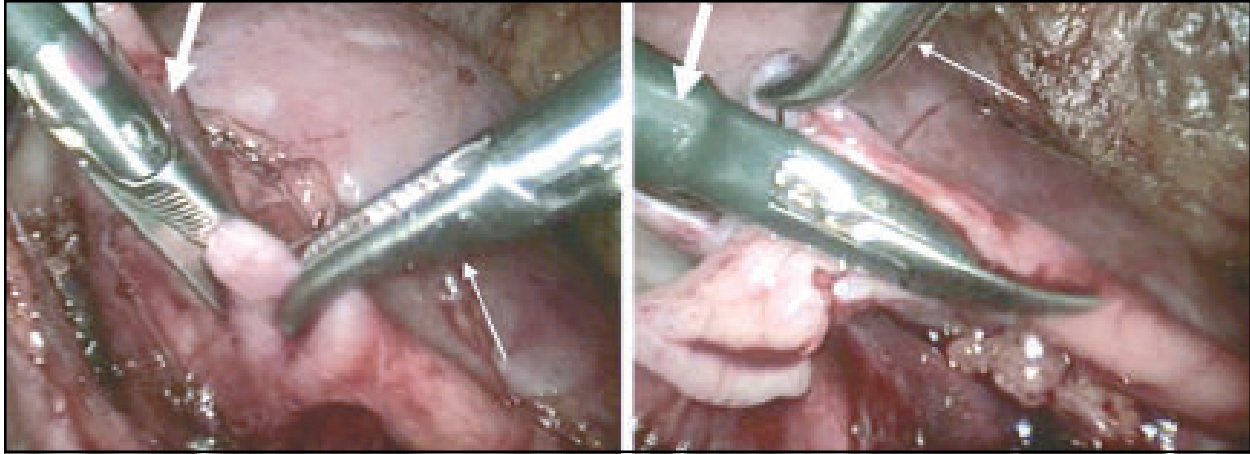


Fig.-3: Laparoscopic pyeloplasty for children with ureteropelvic junction obstruction. The stenotic segment is excised and the ureter was spatulated

Discussion:

LP can be performed via both a transperitoneal and a retroperitoneal route. The preferred approach is usually dictated by the training of the surgeon involved, but many urologists find that the increased working space and the more familiar anatomy provided by the transperitoneal approach gives it a distinct advantage. Davenport and colleagues⁵ found that despite initial extensive training on retroperitoneal laparoscopy, the results using this approach were lower than expected, leading them to adopt the transperitoneal approach after 17 cases. We do perform retroperitoneoscopy for other procedure like urinary stone surgery but for LP, we found that transperitoneal is the satisfactory approach. In the transperitoneal approach, the UPJ can be accessed in either a retrocolic or a transmesenteric fashion. Romero and co-workers⁶ state that the solitary indication for transmesenteric access to the UPJ in their hands is recognition of the renal pelvis and or ureter through a relatively transparent descending colonic mesentery. In a retrospective review of cases, they found that the transmesenteric route was more commonly applied in younger persons and males, and for pathologic conditions on the left side and malrotated kidneys. The technique was found to decrease the operative time by a mean of 22.5% without an increase in complications. We did all the cases by mobilizing the colon in a retrocolic fashion. We prefer transperitoneal approach because of the large working space for suturing especially in the younger patients. But in other literature no difference is reported between the retroperitoneoscopic and laparoscopic approaches;

both procedures are considered today as feasible and safe in well-trained hands⁷⁻⁹, although the average operative time for the retroperitoneoscopic approach was significantly longer than that for the laparoscopic approach because of the larger working space for suturing, the perceived ease of antegrade stent placement and the subjective improvement in cosmetic outcome⁹.

In this study, we demonstrated the short-term outcome of laparoscopic pyeloplasty both in children and adult. The success rate in this very small series was 100%, similar or higher to that of open and laparoscopic pyeloplasty reported previously¹⁰. No open conversion or perioperative major complication was observed. We documented its efficacy and safety in children and adult in our series, and whether it could become the minimal invasive treatment of choice. There are several advantages of laparoscopic pyeloplasty in children as well as adults. First, laparoscopic pyeloplasty has an advantage with regard to pain and cosmetic value. Even a 3–5-cm posterior lumbodorsal incision for open pyeloplasty necessitates several weeks before a return to normal activity and a flank incision requires even more time³, because significant tissue retraction is needed to expose the field and the muscle incision and damage is often more than that anticipated. On the other hand, laparoscopic surgery needs only a 5–10-mm skin incision and less muscle damage corresponds to the skin incision and can be performed safely with good exposure and other authors described 3-5 mm skin incision where they used 5 mm telescope and 3 or 5 mm grasper or scissors¹⁰. The second main

advantage is that all medical staff, including the surgeon, assistant, anesthesiologist, nurses, residents and medical students share the same real-time operative view through the monitor. This enables us not only to avoid complications and technical insecurity, but also better educates residents and medical students. On the other hand, several disadvantages of LP have been pointed out in different reports. The disadvantage of LP is that operative times are significantly higher than open pyeloplasty^{11,12}. In particular, laparoscopic suturing particularly for children is challenging and time-consuming and requires a learning curve¹¹, however, it significantly improved, even with pediatric LP, with increased experience in previous reports^{11,13}. Open pyeloplasty is performed through the retroperitoneal approach, which has the advantage of less risk of intraperitoneal organ injury, postoperative ileus, and avoidance of potential deleterious effects of peritoneal exposure to blood and urine. Although adhesions may occur with urological laparoscopic procedures, the incidence appears lower than would be expected with open exploration¹⁴. Laparoscopic dismembered pyeloplasty is an acceptable option for UPJO in infants and younger children¹³⁻¹⁵. A recent report has demonstrated that laparoscopic dismembered pyeloplasty is technically possible in infants younger than 6 months¹⁶. The difficulty in performing LP that we found at the beginning of the series was in performing the anastomosis, but we completed with patience with relatively longer operating time but other author converted to open operation for difficulty in anastomosis¹⁷. The use of 3-mm trocars are recommended to perform this procedure^{15,18}, but we used one 10 mm for camera port and two 5 mm port as we are lacking 5 mm telescope and 3 mm port and grasper as well. Double J catheter placement during LP is another recommendation, since it prevents urinary leakage and obviates the need for a perianastomotic drain^{13,19}. In our series, we put JJ stent in all five cases. Metzelder et al.¹³ described postoperative urine leakage in three of 46 children who underwent LP, two of them requiring operative interventions. We don't have this sorts of complications. We excised redundant pelvis in all the five cases but Reismann et al.²⁰ showed, on a functional basis, that excision of the pelvis is not necessary in LP. Decreased hydronephrosis and resolution of symptoms occurred in all patients who had also improved PUJ drainage on isotope renography or sonography. Late recurrences although uncommon are possible²¹, and long-term follow-up is necessary.

Conclusion :

In conclusion, LP is a safe and effective option in the surgical treatment of UPJO with minimal morbidity and gives excellent short-term results. The transabdominal approach revealed good exposition without disadvantage to the patient. However, the LP is more difficult and the operative time remains longer than for open pyeloplasty. Recently, several reports have shown that robot-assisted pyeloplasty was another safe and effective modality for treating children with UPJO^{22,23}, having improved the surgical manipulation of laparoscopic surgery and provided short-term results similar to those of conventional laparoscopic pyeloplasty in Western countries but not feasible for our country.

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