OUTCOME OF LAPAROSCOPIC PYELOPLASTY FOR URETEROPELVIC JUNCTION OBSTRUCTION: EXPERIENCE WITH 13 CASES

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Abstract:

Background: *Open pyeloplasty has been the gold standard for surgical treatment of ureteropelvic junction (UPJ) obstruction, enjoying a long-term success rate exceeding 90%. Unfortunately, this procedure requires a muscle incision that entails some degree of morbidity. We have, therefore, investigated the feasibility of laparoscopic pyeloplasty for UPJ obstruction and report here the outcomes of our early cases. The median follow-up was 21 months (range, 12–30 months).*

Objectives; *The aim of our study was to explore the safety, feasibility and usefulness of laparoscopic pyeloplasty and to assess the short- term outcome of patients treated with this surgical approach.*

Materials and methods: *This study was performed on 13 patients presenting with symptomatic hydronephrosis, secondary to UPJ obstruction at the Department of Urology, Shahid Sheik Abu Naser Specialized Hospital, Khulna from January 2015 to June 2017. Patients having previous abdominal surgery and sepsis were excluded from this study. Laparoscopic dismembered Anderson–Hynes pyeloplasty was performed in all cases. All procedures were carried out transperitoneally.*

Results: *All procedures were laparoscopically completed with no open conversion. Mean operative time was 272.8 min (range, 175–480 min) and blood loss was minimum. Mean hospital stay was 4.5 days (range,4-11 days). Anomalous vessels were identified in 5 patients. Post-operative complications were noted in two patients (15.4%): one instance of prolonged urine leakage and one anastomotic re-stricture. Twelve of 13 ureters (92.3%) demonstrated a patent UPJ on excretory urography and split renal function and GFR were significantly improved ($p<0.05$) after surgery.*

Conclusions: *Although the procedure requires advanced laparoscopic skills, it can be safely and successfully completed as frequently as the conventional open procedure. Laparoscopic pyeloplasty seems to be a valuable alternative to open pyeloplasty for UPJ obstruction.*

Key words*: Hydronephrosis, Laparoscopy, pyeloplasty, UPJ obstruction*

Bangladesh J. Urol. 2019; 22(1): 69-74

Introduction

Surgical management of ureteropelvic junction (UPJ) obstruction has recently been revolutionized by the introduction and widespread adoption of minimally invasive techniques as alternatives to standard open reconstructive procedures. In particular, the popularity of both antegrade and retrograde endopyelotomy has made endourologic procedures the primary choices for treatment of this disorder in most adults[1-3]. Although these procedures are associated with relatively few complications, brief hospitalization and little disability, the reported success rates (71–88%) have not approached those of open operative intervention. Previous studies have suggested that risk factors for failure might include a high degree of pre-existing hydronephrosis, significantly compromised ipsilateral

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Received: 05 February 2019 **Accepted:** 10 May 2019

renal function, presence of vessels crossing at the UPJ, and a long ureteral obstruction[4,5]. Laparoscopic pyeloplasty was first described in 1993 by Schuessler et al[6]. Since then, several groups have reported its successful use[7-15]. This procedure was originally developed in an attempt to duplicate the results of open pyeloplasty while simultaneously decreasing postoperative morbidity[6]. Although the perioperative success rate seems comparable to that of open pyeloplasty, presentation of long-term results has been limited. Here we present our initial experience, representing 13 laparoscopic pyeloplasties with a median follow-up time of 21 months.

Materials and methods:

Between January 2015 to June 2017, total 13 patients underwent laparoscopic pyeloplasty procedures at the Department of Urology, Shahid Sheik Abu Naser Specialized Hospital, Khulna. Patients were selected by inclusion and exclusion criteria. Patients informed consent and ethical permission was taken. Patients included ten men and three women aged 14–42 years (mean age, 40 years). UPJ obstruction was on the left side in eleven patients, on the right side in two (Table 1). All patients were evaluated by history, physical examination and investigations. Preoperative IVU was done in all patients to see the condition of the kidney. Diuretic DTPA renogram was done in all patients to see the preoperative split renal function (SRF) and glomerular filtration rate(GFR). Patients with documented UTI were treated with appropriate antibiotic before the procedure.

Table-I

Demographic profile of the patients.

Number	
Male	10
Female	3
Age(years)	
Mean	40
Range	14-42
Laterality	
Right	2
Left	11

Fig.-1: *IVU showing UPJ obstruction*

Laparoscopic techniques

Under general anaesthesia and with the patients in lithotomy position, retrotrograde pyelography was done to confirm UPJ obstruction. Then the patients were placed in 45 lateral decubitus position and kidney bridge was elevated. Pneumoperitoneum created by using Veress needle and a pressure of 15 mm Hg was established. A 10 mm camera port was placed on midclavicular line about 3 cm above and lateral to the umbilicus The line of Told was incised and the colon on the affected side was reflected medially. After Gerota's fascia was incised, the ureter and the renal pelvis were freed. Once the UPJ was cleaned of any remaining perirenal fat, a stay suture was placed in the medial edge of the renal pelvis and this was pulled out through the abdominal wall using 2-0 proline suture and fixed with appropriate tension. Laparoscopic scissors were used to dismember the ureter and pelvis and the stenotic ureteropelvic junction segment was excised. The ureter was spatulated longitudinally at lateral aspect towards a point 1 cm below the stenotic segment. Then ureterpelvic anastomosis was performed with continuous 4/0 polyglactin sutures after placement of a double J stent at the ureter. A 5-mm suction drain was inserted through the 5-mm port and

removed when the suctioned material fell to less than 10 ml. A Foley catheter was put in place, usually for 96 hours. The double J stent was removed after 6 weeks.

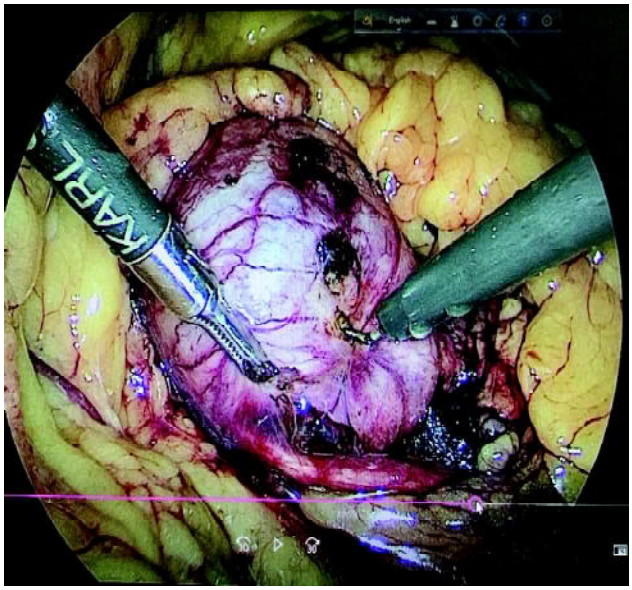

Fig.-2: *laparoscopic view ofdilated renal pelvis and ureter*

Fig.-3: *UPJ after completion of ureteropelvic anastomosis.*

Patients were examined clinically every 3–12 months depending on symptoms. Repeat renal ultrasonography, IVU and DTPA renogram were performed 3 and 6 months postoperatively.

Results

A total of 13 patients underwent laparoscopic Pyeloplasty . All procedures were laparoscopically completed with no open conversion. Dismembered Anderson–Hynes pyeloplasty, was performed on all cases. The operative and postoperative results are distributed in Table-2. Average operating-room time, which includes cystoscopy, retrograde pyelography and stent placement, was 272.8 min (range, 175–480 min) for all procedures.

Table-II

Summary of results of laparoscopic pyeloplasty.

Operative time (Minutes)	
Mean	272.8
Range	175-480
Hospital Stay (Days)	
Mean	4.5
Range	4-11
Complications (in percentage)	
Urine leakage	7.7
Restricture	7.7
GFR (ml/min)	
Preoperative (Mean)	21.05
Preoperative (Mean)	30.24
Split renal function (in percentage)	
Preoperative	29.75
Preoperative	38.46
Success rate (in percentage)	92.3

The median follow-up period was 21 months (range,12–30 months). No wound infection occurred after surgery. The mean hospital stay was 4.5(4-11) days. Urine leakage seen in one case (7.7%) and one patient (7.7%)developed obstruction at anastomotic site after removal of double J stent. In the study group, pre and postoperative split renal function in percentage were 29.75 and 38.46 respectively and GFR were 21.05 ml/min and 30.24 ml/min respectively. Split renal function and GFR were significantly improved after operation ($p<0.05$). Twelve ureters were unobstructed on follow-up radiography, so the success rate was 92.3%.

Fig.-4: *Postoperative IVU showing patent UPJ*

Discussion

Since the first successful reconstruction of a UPJ obstruction was accomplished in 1892, the gold standard therapy has been open pyeloplasty[16]; the success rate of this procedure exceeds 95% in contemporary series[17-19]. Endoscopic incision via retrograde and antegrade approaches was developed to provide a minimally invasive alternative to open surgery[1-3]. However, the overall success rate of this technique can be approximately 10–25% lower than for open pyeloplasty, particularly in circumstances such as marked hydronephrosis, poor renal function and the presence of an anterior crossing vessel[4,5]. In addition, endoscopic incisions are associated with a risk of perioperative hemorrhage, with 3–11% of patients requiring blood transfusion[1,16,20]. Laparoscopy is currently proposed as an alternative to open urologic surgery, especially for ablative procedures such as nephrectomy and adrenalectomy[21]. Since 1993, transperitoneal and more recently retroperitoneal laparoscopic pyeloplasty have been developed in an attempt to combine the success rate of open pyeloplasty with lower morbidity, less postoperative pain and shorter convalescence[6-15]. In the present series, although the number of cases is small and the follow-up period short, the results seem to be comparable to those in previous reports. We experienced only one failure over the course of 13 procedures (overall success rate, 92.3%) with a median follow-up period of 21 months (range, 12–30 months). Laparoscopic pyeloplasty allows the surgeon to perform operative steps similar to those in open pyeloplasty, such as dissection, transection and suturing.

Anderson-Hynes dismembered technique is used in ‘most series of published laparoscopic pyelo-plasties, reflecting an attempt to reproduce the well-established principles of open surgery[21,22]. The dismembered technique should always be considered, even in the presence of anomalous vessel. because in more than half of the cases there is an associated intrinsic stenosis

Laparoscopic pyeloplasty can be performed via a retroperitoneal or a transperitoneal approach. Equivalent success rates have been quoted in the literature for both these methods. The present study used a transperitoneal approach for all the patients, as this approach offered ease in identifying, dissecting and mobilizing ureter and pelvis of the kidney.

The results of laparoscopic pyeloplasty from several institutions which was reported on the adult series, suggested that this procedure was a viable alternative to both open and endoscopic procedures.

In this study, mean operative time was 272.8 minutes. Operative time was significantly longer in

Laparoscopic pyeloplasty like previous studies due to proximal ureteric spatulation and laparoscopic intracorporeal stiching. Bansal observed that total operative time with stent placement in laparoscopic pyeloplasty was 244.2 min (188-300 rnin)[23]. There was a significant and progressive decrease in operative time during this series associated with greater experience acquired by the surgeon.

There is very small port incision and tissue trauma during laparoscopy. So, patient can be discharged early than open surgery. In current study, the mean hospital stay was 4.5 days which was comparable to other published data. Urine leakage was seen in one case of laparoscopic pyeloplasty which might be due to inappropriate ligature and knotting during procedure. In the present study, it was found in 7.7% patients which was also comparable to other study.

Open pyeloplasty has been the gold standard for the treatment of UPJ stenosis since its establishment, with

long-term success rates higher than 90%[24]. However, its morbidity is high especially related to chronic pain, risk of incisional hernia and later return to daily activities[21]. The success rates of laparoscopic pyeloplasty were comparable to those of open surgery with long-term rates as high as 98%. In this series, there was a success rate of 92.3%, consistent with the data presented in the literature for laparoscopic and open pyeloplasty.

Conclusion

Our results demonstrated that laparoscopic pyeloplasty is an excellent treatment option for treating UPJ obstruction because of advantages of minimally invasive approach, less intraoperative bleeding, postoperative pain, earlier return to daily activities and significant superior cosmetic effect. Although the procedure requires advanced laparoscopic skills, it can be safely and successfully completed as frequently as the conventional open procedure. So laparoscopic pyeloplasty seems to be a valuable alternative to open pyeloplasty for the treatment of UPJ obstruction.

Acknowledgment

We are highly grateful to prof. Bhidhan Chandra Ghowshami, Director, SSANSH & department of anaesthesiology, SSANSH, ,Khulna, Bangladesh for their help.

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