

**Research Article****Open Pyeloplasty Revisited in Low-Resource Settings****Dilip Kumar Pal<sup>1</sup>, Vijay Kumar Sharma Madhuri<sup>2</sup>, Bastab Ghosh<sup>3</sup>**<sup>1</sup>Professor & Head, <sup>2</sup>Post Doctoral Trainee, <sup>3</sup>Assistant Professor, Dept. of Urology, Institute of Post Graduate Medical Education & Research, Kolkata**\*Corresponding author**

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**Abstract:** Urologic surgery has undergone a sea change in the last few decades. With the advent of laparoscopic surgery and more recently, robotic surgery, the focus is now to achieve best possible outcomes with minimal morbidity. However, many low resource settings in the world may not have the necessary equipment and expertise required for minimally invasive surgery. We aim to show that open procedures, specifically, open pyeloplasty still is a valuable procedure for the urologist practicing in low-resource settings.**Keywords:** Pyeloplasty, laparoscopic, open, low-resource, rural, community.

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**INTRODUCTION**

Ureteropelvic junction obstruction (UPJO) is said to be present when there is a functionally significant impairment of urinary transport from the renal pelvis to the ureter. Congenital obstruction is the most common cause. Other causes include stone disease, postoperative or inflammatory stricture or an urothelial neoplasm. The role of crossing vessel in producing a UPJO is controversial.

Historically, open procedures were described for relieving UPJO. Out of the many procedures described, the most preferred is the dismembered Anderson-Hynes pyeloplasty. Nowadays, the preferred approach to treat UPJO is by the laparoscopic approach, or in advanced centers, by the robotic approach.

A literature search on Pub Med reveals that most of the contemporary literature is dominated by laparoscopic and robotic pyeloplasty. Through this study we aim to show that open pyeloplasty still has a valuable role to play in settings where equipment and expertise are not available.

**MATERIALS AND METHODS**

A retrospective chart review of cases done from Nov 2009 to Dec 2014 was performed and data was extracted. The patients had radiographic evidence of UPJO on diuretic renography or hydronephrosis with delayed function on IVP in conjunction with signs and symptoms or deterioration of renal function. In total, records of 101 patients were included in the study. All patients underwent intravenous pyelography (IVP) and DTPA renal scan to document the anatomic site of obstruction and the function of the obstructed kidney.

Laparoscopic pyeloplasty was done by the transperitoneal route. Patients were placed in left lateral position. 4-5 trocars were placed to enable dissection, retraction and identification of PUJ. If the pelvis was redundant then a reduction pyeloplasty was done otherwise a standard dismembered Anderson Hynes type pyeloplasty was done. Anastomosis was done with 4-0 polyglactin over a DJ stent. A drain and a Foley's catheter were left in situ. Foley's catheter was removed on POD 2. Drain was removed usually on POD 3 if there was no increase in drain output, else it was left in situ till the drain output decreased to <20 ml/day. Stent was removed after 6-8 weeks of laparoscopic pyeloplasty. Standard open Anderson Hynes pyeloplasty, spiral flap or VY plasty was done depending on anatomic consideration. Patients were serially followed up with urea/creatinine measurements, USG abdomen, IVP study and DTPA scan after 3 months of surgery. Perioperative parameters were compared in Table-1. Success was defined as a patent, unobstructed PUJ on radiologic study, improved or maintained renal function on DTPA scan and improvement in patients' symptoms and signs.

**RESULTS**

Records of 101 patients were included in the study. Seventy six patients presented with flank pain and 36 presented with flank lump. Fifteen patients presented with UTI. The age distribution ( $p=0.435$ ) and male-to-female ratio ( $p=0.765$ ) was not significantly different between the open and laparoscopic pyeloplasty groups. Complication rates, including anastomotic urinary leakage, stenosis and infection were not

significantly different between the two groups (p=0.748).

**Table -1 shows the age range, average operative time, hospital stay and complications.**

	Open pyeloplasty group (n=50)	Laparoscopic pyeloplasty group (n=51)	P value
M:F	Males-24,females-26	Males-26,females-25	0.765
Age range (yr)	6-72	10-55	0.435
Operative time range, (mean)	120-185 (144.8 min)	140-190 (161.1 min)	0.001
Hospital stay (days)	3-8	3-6	0.007
No of complications	8	7	0.748
Success rate	N=43	n=41	0.451

The success rate (p=0.451) was also not significantly different between the two groups. The operative time was significantly more in the laparoscopic group (mean-161.1 min) as compared to the open group (mean-144.8 min); (p=0.001). The hospital stay was significantly more in the open group (mean-4.6 days) as compared to the laparoscopic group (mean-4.1 days); (p=0.007).

**DISCUSSION**

The first reconstructive procedure for UPJO was performed by Trendelenburg in 1891. The first successful dismembered pyeloplasty was performed by Kuster in 1891. The Y-V pyeloplasty was introduced by Schwyzer in 1916, which was further modified by Foley in 1937. Culp and Deweerd introduced the spiral flap in 1951 and Scardine and Prince introduced the vertical flap in 1953 [1].

In 1949, Anderson and Hynes described a modification of the dismembered technique that involved anastomosis of the spatulated ureter to a projection of the lower aspect of the pelvis after a redundant portion was excised [1] Laparoscopic pyeloplasty provides a minimally invasive method to treat UPJO and since its introduction for the first time in 1993 by Schuessler and colleagues, has rapidly been adopted by urologists and has become the preferred method for treating UPJO. The advantages of laparoscopic pyeloplasty are less morbidity, short hospital stay, lower post-op analgesic requirement, better cosmetic as compared to the open approach [1].

A literature search on pub med reveals most of the current literature is dominated by laparoscopic or robotic pyeloplasty studies. Few studies were found which compared open and laparoscopic pyeloplasty, which are discussed subsequently Wang *et al.* retrospectively compared 113 patients who underwent retroperitoneoscopic pyeloplasty with 59 patients who underwent open dismembered pyeloplasty. They reported shorter operative time and mean hospital stay in the retroperitoneoscopic group. They noted success

in 98% of the open group and 98.1% of the retroperitoneoscopic group [2]

Umari *et al.* Reported their experience with open and laparoscopic pyeloplasty over a 10 year period in 49 patients. The success of laparoscopic procedure was comparable with that of open procedure. The laparoscopic procedures were associated with longer operating times and shorter hospital stays [3].

Boylu *et al.* compared surgical and functional outcomes of minimally invasive and open pyeloplasty in 20 patients. The success rate was 95% in the minimally invasive group and 95.5% in the open group. Minimally invasive pyeloplasty was associated with lower morbidity, shorter length of stay, and lesser blood loss compared with open surgical repair [4].

Bansal *et al.* reported their single centre experience of laparoscopic and open pyeloplasty over a three year period. The operative time was greater in the laparoscopic group. The duration and dosing of analgesic requirement was significantly less in the laparoscopic group as compared to the open group [5].

Penn *et al.* performed a prospective randomized trial comparing laparoscopic with open pyeloplasty in children. 19 children underwent open surgery and 20 patients underwent laparoscopy. There was trend toward longer operative times in the laparoscopic group but a shorter overall hospitalization [6].

In the present study, the results obtained are similar to those reported in literature. The complication and success rates of both open and laparoscopic pyeloplasty are not significantly different. However the operative time is significantly more in the laparoscopic pyeloplasty group and the hospital stay is significantly lesser in the laparoscopic pyeloplasty group.

**CONCLUSION**

In remote areas, especially in underdeveloped and developing countries, medical resources are often

scarce and overburdened. The expertise and equipment necessary to perform laparoscopic surgery may not be available everywhere. Also, not every patient can afford the cost associated with laparoscopic surgery. Hence, it's not necessary to advise every patient for a minimally invasive pyeloplasty for PUJO. If the patient is well informed, then open pyeloplasty should definitely be given as a treatment option, since it offers similar success rate to the current "fashion" of laparoscopic pyeloplasty.

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