# OUTCOMES OF LAPAROSCOPIC PYELOPLASTY AT A TERTIARY CARE CENTRE IN KATHMANDU

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## ABSTRACT

Ureteropelvic junction obstruction (UPJO) causes hydronephrosis and is often diagnosed in childhood, though many cases present in adulthood as undetected congenital disease. While open pyeloplasty has been the traditional gold standard with high success rates, laparoscopic pyeloplasty offers comparable outcomes. Since 2022, our institution has adopted this approach, and this study retrospectively evaluates our initial experience. This was a single-center, retrospective study of patients who underwent laparoscopic pyeloplasty at the Department of Urology, KIST Medical College and Teaching Hospital, Lalitpur, Nepal. The study was conducted on cases performed from January 2022 to March 2025. Median age was 23 years with male predominance (60%). Right-sided UPJO was more common (54%). Flank pain predominated (74%) the presenting symptoms. Mean operative time was 152 minutes. Open conversion occurred in three cases. Symptom relief occurred in 88.6%, with improved split renal function and eGFR. Laparoscopic pyeloplasty is feasible at KIST Medical College and Teaching Hospital, with satisfactory short-term outcomes despite an initial learning curve. Larger prospective studies with longer follow-up are needed to validate long-term efficacy.

## KEYWORDS

Laparoscopy pyeloplasty, PUJO, outcome, Nepal

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## INTRODUCTION

Ureteropelvic junction obstruction (UPJO) is a common cause of upper urinary tract obstruction, leading to hydronephrosis and, if left untreated, progressive renal deterioration.[1] It can be classified as either primary, often a congenital anomaly, or secondary, resulting from an extrinsic or intrinsic pathological process.[2] The incidence of primary UPJO has been reported to be approximately 1 in 1,000 live births, making it one of the most common congenital urological anomalies.[3] While typically diagnosed in childhood, many cases present later in life, often representing an undiagnosed congenital condition. The clinical presentation is varied and may include flank pain, recurrent urinary tract infections, pyelonephritis, or a palpable mass, with the potential to culminate in chronic kidney disease and end-stage kidney disease.[4]

For many years, open pyeloplasty has been the gold standard for the surgical management of UPJO, boasting a high success rate exceeding 95.0%. However, this approach is associated with significant morbidity, including a large incision, increased postoperative pain, a prolonged hospital stay, and an extended recovery period.[5] The introduction of minimally invasive techniques has revolutionized the field of urology. The first successful laparoscopic pyeloplasty was performed by Schuessler *et al*[6] in the early 1990s. This technique has since gained widespread acceptance, offering numerous advantages over the open approach, such as reduced postoperative pain, shorter hospital stays, a quicker return to daily activities, and improved cosmetic outcomes.[7] Multiple studies have demonstrated that the success rates of laparoscopic pyeloplasty are comparable to those of open surgery. However, the procedure has a steep learning curve, particularly regarding advanced intracorporeal suturing skills, which are critical for successful anastomosis.[8]

At KIST Medical College and Teaching Hospital, laparoscopic pyeloplasty has been adopted as a standard surgical procedure for UPJO since 2022. While its efficacy is well-established internationally, there is a limited body of evidence regarding its outcomes in the Nepalese population and, more specifically, within our institution. This study aims to address this knowledge gap by retrospectively analyzing our initial experience. The primary objective of this study is to evaluate the clinical outcomes, including the success rate and complication profile, of laparoscopic pyeloplasty performed at KIST Medical College and Teaching Hospital. Secondary objectives include a review of the perioperative parameters, such as operative time, estimated blood loss, and length of hospital stay.

## MATERIALS AND METHODS

This was a single-center, retrospective chart review study of patients who underwent laparoscopic pyeloplasty at KIST Medical College and Teaching Hospital, Lalitpur, Nepal. The study was conducted on cases performed from January 2022 to March 2025. Ethical approval for the study was obtained from the Institutional Review Committee (IRC) of KIST Medical College. Patient confidentiality was maintained throughout the study.

*Patient selection:* Patient data were retrieved from the medical records section of the hospital. A total of 40 patient records of laparoscopic pyeloplasty were initially identified and screened for eligibility. Five cases were excluded because they did not meet the inclusion criteria, resulting in a final study cohort of 35 patients.

Patients aged 18 years or older who underwent laparoscopic Anderson-Hynespyeloplasty with complete medical records and comprehensive data with a complete outpatient department (OPD) follow-up file were included in the study. Patients undergoing redo or repeat pyeloplasty, cases that required conversion to open surgery and incomplete follow-up data were excluded from the study.

*Preoperative diagnosis and evaluation:* Patients typically presented to the outpatient department or emergency room with symptoms of flank pain, fever, or were incidentally diagnosed with hydronephrosis during an ultrasound (USG) for other medical conditions. The diagnosis of UPJO was confirmed using a combination of imaging modalities, including USG, CT KUB (Kidney, Ureter, Bladder) with or without contrast, or CT intravenous urogram (CT IVU), followed by a diuretic renogram (DTPA scan).

Surgery was performed only after the diagnosis of UPJO was confirmed by a DTPA scan. The criteria for a positive diagnosis on the DTPA scan were a diuretic washout half-time (T½) of greater than 20 minutes or an obstructive pattern with a persistently rising time-activity curve following diuretic administration. All patients were informed of the risks and benefits of the procedure, and written informed consent was obtained.

*Surgical technique:* All procedures were performed by the same surgical team. A standard transperitoneal laparoscopic Anderson-Hynes pyeloplasty was performed using a three-port technique. Following the mobilization of the colon along the white line of Toldt, the ureter was identified and traced proximally to the renal pelvis. The entire renal pelvis, including the lower pole, was mobilized. The stenotic segment of the UPJ was then excised, along with a portion of the redundant renal pelvis. The ureter was spatulated posterolaterally, and a tension-free ureteropelvic anastomosis was created in a standard fashion using 4-0 polyglactin 910 suture. A 5 Fr, 26 cm double-J (DJ) stent was placed routinely in all cases.

*Post-operative management and follow-up:* A surgical drain was removed when the output was less than 50 ml per day. The Foley catheter was removed following the drain removal, and patients were typically discharged on the third post-operative day.

The follow-up schedule was standardized. The first follow-up visit was scheduled one week after discharge. The DJ stent was removed approximately six weeks after the surgery. A follow-up DTPA scan was performed three months after stent removal to assess for the resolution of the obstruction.

*Outcome measures:* The success of the procedure was evaluated based on both clinical and radiological outcomes:

*Clinical success:* Defined as the complete resolution of preoperative symptoms, such as flank pain or fever.

*Radiological success:* Defined as a decrease in the grade of hydronephrosis on follow-up imaging and the absence of obstruction on the follow-up DTPA scan. The assessment also included improvement or non-deterioration of renal function on a new DTPA scan.

Complications were categorized and graded according to the Clavien-Dindo classification system.

*Statistical analysis:* Statistical analysis was conducted using SPSS-20. The distribution of variables was assessed using the Shapiro-Wilk test. Continuous variables were presented as mean ± standard deviation (SD) for normally distributed data and as median with interquartile range (IQR) for non-normally distributed data. Categorical variables were reported as frequencies and percentages.

## RESULTS

A total of 35 patients underwent laparoscopic pyeloplasty during the study period. The median age of the patients was 28 years (range 15-55). Of these, 21 patients (60.0%) were male and 14 (40.0%) were female. Ureteropelvic junction obstruction involved the right kidney in 19 cases (54.0%) and the left kidney in 16 cases (46.0%) (Table 1).

**Table 1: Perioperative demography, laboratory, and radiology characteristics of patients undergoing laparoscopic pyeloplasty (n = 35)**

| Variables | Values |
|---|---|
| Age (years) | Median 28 (range 15–55) |
| Gender | Male: 21 (60%)<br>Female: 14 (40%) |
| Laterality | Right: 19 (54%)<br>Left: 16 (46%) |
| USG hydronephrosis grade | Grade II: 7 (20%)<br>Grade III: 18 (51%)<br>Grade IV: 10 (29%) |
| Split renal function of affected side (%) | Median 38 (range 20–55) |
| Serum creatinine at surgery (mg/dl) | Median 1.0 (range 0.6–1.8) |
| Mean GFR of affected side (ml/min ± SD) | 34.5 ± 9.2 |
| Stone | Yes: 5 (14%),<br>No: 30 (86%) |

Preoperative imaging revealed mild hydronephrosis in 7 kidneys, moderate hydronephrosis in 18 kidneys, and severe hydronephrosis in 10 kidneys. Flank pain was the most common presenting symptom, reported in 26 patients (74.0%) (Table 2).

The mean operative time was 152 minutes. Conversion to open surgery was required in 3 cases. In the immediate postoperative period, port-site pain was the most common complication. Abdominal distension was observed in 9 patients, while postoperative fever occurred in 5 patients (Table 3).

**Table 2: Presenting symptoms of patients undergoing laparoscopic pyeloplasty (n = 35)**

| Symptoms | n (%) |
|---|---|
| Flank pain | 26 (74%) |
| Urinary tract infection (UTI) | 5 (14%) |
| Incidental finding | 2 (6%) |
| Palpable mass | 1 (3%) |
| Gross hematuria | 1 (3%) |

**Table 3: Pre-operative and post-operative changes**

| Parameter | Pre-operative | Post-operative |
|---|---|---|
| Symptom relief | - | 31 (88.57%) |
| Hydronephrosis decreased | - | 19 |
| Hydronephrosis remained same | - | 13 |
| Hydronephrosis increased | - | 3 |
| GFR (ml/min) | 28.45 | 37.29 |
| Split renal function (%) | 31.54 | 38.22 |
| T½ Improved | - | Improved |

**Table 4: Post-operative complications according to the Clavien–Dindo classification after laparoscopic pyeloplasty (n = 35)**

| Clavien–Dindo Grade | Complication | Patients (n) | % |
|---|---|---|---|
| Grade I | Fever | 5 | 14.3 |
| | Urine leak | 3 | 8.57 |
| Grade II | Abdominal distension / ileus | 9 | 25.7 |
| Grade IIIa | Urine leak managed conservatively | 3 | 8.6 |
| Grade IIIb | Treatment failure requiring surgical re-intervention | 4 | 11.4 |
| Grade IV–V | — | 0 | 0.0 |

During follow-up, symptomatic relief was achieved in 31 patients (88.57%). Mean split renal function improved from 31.54% preoperatively to 38.22% postoperatively. Similarly, the mean estimated glomerular filtration rate increased from 28.45 ml/min to 37.29 ml/min (Table 4).

## DISCUSSION

The surgical management of UPJO has evolved significantly. For decades, open pyeloplasty remained the gold standard due to its consistently high success rates, often reported to be greater than 95.0%.[5] However, the procedure carries the inherent disadvantages of a large surgical incision, prolonged recovery, increased postoperative pain, and a longer hospital stay. The introduction of laparoscopic pyeloplasty (LP) in the 1990s by Schuessler *et al*[6] addressed these limitations, yet its widespread adoption was initially hindered by a steep learning curve, particularly the technical demands of intracorporeal endosuturing.[7] This

article reflects upon our initial institutional experience, documenting the challenges encountered, the complications observed, and the technical lessons learned during the establishment of our LP program.

In our initial experience of 35 consecutive cases, the overall success rate was 87.45%. We rigorously defined success using both clinical criteria (absence of flank pain or fever) and an objective radiological assessment by diuretic renogram (DTPA scan). While a direct comparison is challenging due to variability in outcome criteria, our rate is slightly lower than the higher reported success rates of 95.0% by Shahnawaz *et al*,[9] and 96.0% by Hopf *et al*.[10] This marginal difference may be attributable to our stringent dependence on the DTPA scan as the final arbiter of radiological success, which not all comparative studies utilize, often relying solely on a reduction in hydronephrosis grading.

The overall mean operative time for the cohort was 152 minutes. As is typical for a new procedure, the initial cases exceeded three hours, highlighting the technical challenges and time required to overcome the learning curve.[11] However, with increasing surgical experience, the mean operative time demonstrated a decreasing trend.

The most time-consuming and technically demanding step of the procedure was identified as intracorporeal endo-suturing, followed by ureteral spatulation and DJ stent insertion. Our experience aligns with global observations that right-sided pyeloplasty is ergonomically easier for a right-handed surgeon.[12] Difficulty was primarily noted during the spatulation and handling of the ureter after dismemberment, leading to an increased risk of ureteral rotation. To mitigate this, we modified our technique, adopting an approach similar to that described by Zain *et al*,[13] involving incomplete dismemberment of the ureter. This modification helped stabilize the ureter, facilitated easier spatulation, and prevented axial rotation.

Regarding port placement, we primarily utilized a three-port triangulation technique, establishing a diamond-shaped working field centered on the PUJ. While supplementary ports (5 mm) were occasionally required in the initial phase to facilitate complex steps like DJ stent insertion, subsequent cases demonstrated proficiency with the standard three-port configuration. The major difficulty with DJ stent insertion was attributed to the lack of proper alignment between the suction tube (used for stenting) and the spatulated ureter. This required putting an additional port for precise alignment in several early cases.

Intraoperatively, we encountered complications such as bleeding during the mobilization of crossing vessels in 3 cases, which were managed meticulously to preserve the vessels whenever feasible. Difficulty in approximating the renal pelvis and ureteric stump, especially after transecting the stenotic segment, was overcome by wide mobilization of both the kidney and the proximal ureter. Sharma *et al*,[14] reported similar complications, which was managed using a similar technique. In our series, the severity of complications, as graded by the Clavien-Dindo classification, included Grade IIIa: 3 (8.8%) and Grade IIIb: 4 (11.4%) and no Grade IV and Grade V complications.

In the post-operative period, the main issues were pain and abdominal distension. Pain management primarily relied on the administration of injection tramadol three times daily. Abdominal distension was frequently linked to hypokalemia, which was observed in 7 (20.0%) of patients. Other possible causes of post-operative abdominal distension include residual intraperitoneal gas following pneumoperitoneum, bowel mobilization during surgery, and the effects of anesthetic agents, all of which can contribute to temporary abdominal bloating. The use of tramadol may further inhibit bowel peristalsis, thereby exacerbating abdominal distension.[15,16] Implementation of enhanced recovery after surgery (ERAS) protocols has been increasingly adopted to address these issues and promote faster postoperative recovery.[17,18] Urine leakage, a critical complication due to its association with increased morbidity and potential for stricture formation, was observed in 3 cases. All these cases were managed conservatively with prolonged Foley catheter drainage until the leak ceased. We attribute this complication to technical factors, primarily tension at the anastomosis and suboptimal suturing technique in the initial phase of the learning curve. Ozayar *et al*[19] reported a urine leakage rate of 9.6%, managed by inserting percutaneous nephrostomy tube (PCN).

Fever (temperature >100°F) was recorded in 5 patients in the immediate postoperative period. While 2 patients showed pyuria (pus cells >5/hpf) despite negative urine cultures, the fever was generally self-limiting, likely representing

a generalized postoperative inflammatory response. Chan reported fever in 5.2% of patients, with the underlying reason being urinary tract infection, surgical site infection and anastomotic leak.[20]

DJ stents were removed at six weeks post-surgery. Success was re-assessed via DTPA scan three months post-stent removal. Of the 35 cases, 27 patients presented for this critical follow-up imaging. The failure rate was observed in 4 patients. One patient showed complete obstruction and required open revision pyeloplasty. Three patients showed a pattern of partial obstruction on DTPA scan; however, they remained asymptomatic with stable split renal function and GFR, leading to their management under close surveillance. Failure rates in other series, such as Elbaset *et al*,[21] observed a failure rate of 8.82%, with partial obstruction noted in 7 cases, which were also managed by observation.[21]

The robust documentation of patient records and the use of the DTPA scan to objectively determine success are major strengths of this study. However, limitations include its retrospective design and the small sample size, characteristic of the initiation phase of any new surgical program. As this study captures our initial learning curve, future prospective studies with a larger patient cohort and extended follow-up are essential to firmly establish the long-term efficacy of laparoscopic pyeloplasty at KIST Medical College and Teaching Hospital.

In conclusion, this study confirms the feasibility of laparoscopic pyeloplasty at KIST Medical College and Teaching Hospital. Despite the initial steep learning curve characterized by longer operative times and early technical complications, our short-term success rate is satisfactory. The rigorous use of DTPA scanning strengthens our data. Further prospective studies with larger cohorts and extended follow-up are essential to ensure our long-term outcomes consistently meet global efficacy standards.

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