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Outcomes Of Pyeloplasty for Ureteropelvic Junction Obstruction

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ABSTRACT

Background: Ureteropelvic junction obstruction is a common cause of upper urinary tract obstruction that may lead to hydronephrosis, recurrent infection, pain, and renal functional deterioration.
Objective: To evaluate the outcomes of pyeloplasty for ureteropelvic junction obstruction.
Methods: This retrospective observational study was conducted at Gulbarga Institute Of Medical Sciences And Superspeciality Hospital Kalaburagi From 01-01-2024 To 01-01-2026 and included 30 patients who underwent pyeloplasty for ureteropelvic junction obstruction. Demographic, clinical, operative, radiological, and functional outcome data were collected from medical records. Successful outcome was defined as symptomatic improvement with improved drainage, reduced hydronephrosis, preserved or improved differential renal function, and no requirement for secondary intervention.
Results: The mean age was 31.8 ± 12.6 years, and 18 (60.0%) patients were male. Left-sided obstruction was present in 19 (63.3%) patients. Flank pain was the most common symptom reported in 26 (86.7%) patients. Laparoscopic pyeloplasty was performed in 17 (56.7%) cases, open pyeloplasty in 9 (30.0%), and robotic pyeloplasty in 4 (13.3%). Overall success was achieved in 28 (93.3%) patients. Symptomatic improvement occurred at 27 (90.0%), and hydronephrosis improved at 26 (86.7%). Mean differential renal function improved by 6.8 ± 4.2%. Recurrent obstruction and re-intervention were observed in 2 (6.7%) patients. Differential renal function >30%, absence of crossing vessels, operative time <150 minutes, no postoperative urinary leakage, and age <40 years were significant predictors of successful outcome.
Conclusion: Pyeloplasty is a safe and effective treatment for ureteropelvic junction obstruction, with high success and low recurrence rates.

Keywords: *Pyeloplasty; ureteropelvic junction obstruction; hydronephrosis; differential renal function; laparoscopic pyeloplasty.*

INTRODUCTION

One of the most common obstruction of the upper urinary tract is ureteropelvic junction obstruction (UPJO) with a defect in the passage of urine from the renal pelvis to the proximal ureter. The condition can either be congenital or acquired, and if untreated, will lead to progressive hydronephrosis, elevated intrapelvic pressure, recurrent UTI, nephrolithiasis, chronic flank pain, and progressive renal function deterioration [1]. While UPJO is often diagnosed in infants and children due to its frequent detection in the prenatal period by ultrasound, a large proportion of patients are asymptomatic, and the diagnosis is made in adolescence or adulthood when they are being investigated for other conditions, and symptoms of the disorder are noted during imaging of the kidneys [2]. There are two mechanisms involved in UPJO, intrinsic narrowing, which is due to abnormal smooth muscle development, fibrosis, or aperistaltic segments of the ureters in the lower pole, and extrinsic narrowing caused by aberrant lower pole crossing vessels [3]. Other acquired causes are previous urological surgery, calculi

of the ureters, inflammation, trauma and fibroepithelial polyps [4]. If left untreated, the resulting urinary stasis, progressive dilatation of the pelvicalyceal system, renal parenchymal thinning, ischemic injury, and eventual renal functional loss are the consequence of persistent obstructions [5]. Symptoms of UPJO are associated with intermittent flank pain, abdominal discomfort, recurrent UTI, nausea, vomiting, hematuria, and renal calculi [6]. If the obstruction is very severe or neglected, long term may lead to pyonephrosis, hypertension or permanent renal damage. The diagnosis is made by a combination of ultrasonography, computed tomography urography, intravenous urography and diuretic renal scintigraphy, which also allows an objective evaluation of the differential renal function and urinary drainage [7]. These investigations are crucial in establishing obstruction, assessing the severity of the disease and identifying suitable patients for surgical procedures. For symptomatic UPJO, treatment should focus on reestablishing normal urinary flow with restoration of renal function; the gold standard treatment is pyeloplasty [8]. The Anderson-Hynes dismembered pyeloplasty remains the most widely used approach as it allows to completely remove the stenotic portion of the ureter and to reconstruct the ureteropelvic junction and if needed transposition of crossing vessels [9]. In the last 20 years minimally invasive laparoscopic and robotic-assisted pyeloplasty have become accepted and established options with similar functional success, but fewer post-operative complications, shorter hospital stay, better cosmetic results, and quicker recovery times than open pyeloplasty [10].

Symptomatic improvement, radiologic decrease in hydronephrosis, improvement in drainage on diuretic renography, and conservation or enhancement of split renal function are generally used to assess the efficacy of pyeloplasty [11]. The long-term success rate of pyeloplasty consistently shows in modern studies at more than 90%, making it one of the most successful reconstructive procedures in urology [12]. However, there are still some factors that would lead to treatment failure including recurrent fibrosis, failure to cross the vessel, anastomotic stricture, urinary leakage, infection, and sub-optimal surgical reconstruction [13]. Multiple factors are known to impact postoperative results after pyeloplasty, such as age, renal function at the time of surgery, hydronephrosis severity, time of obstruction, crossing vessels, prior procedures, surgical approach, and complications [14]. Although technically successful, delayed treatment has been correlated with irreversible renal damage in spite of surgical intervention, while early diagnosis and prompt surgical correction correlate with maintaining good renal function and decreasing the likelihood of renal recurrence [15]. Although the success rate is excellent worldwide, there are differences in success rates across institutions, which may be due to differences in patient characteristics, disease severity, operative technique, surgeon experience, and postoperative follow-up. Thus, institutional outcomes can still be important to evaluate for the effectiveness of treatment, to determine factors that predict success, and to design better perioperative management strategies [16].

OBJECTIVE

To evaluate the outcomes of pyeloplasty for ureteropelvic junction obstruction.

METHODOLOGY

This retrospective observational study was conducted at Gulbarga Institute Of Medical Sciences And Superspeciality Hospital Kalaburagi From 01-01-2024 To 01-01-2026 and included 30 patients who underwent pyeloplasty for ureteropelvic junction obstruction (UPJO). Patients aged 18 years or older with radiologically confirmed ureteropelvic junction obstruction who underwent open, laparoscopic, or robotic pyeloplasty during the study period were included. Patients with complete preoperative imaging, operative records, and postoperative follow-up of at least six months were eligible for analysis. Patients with secondary UPJO due to upper urinary tract malignancy, previous nephrectomy, congenital renal anomalies requiring complex reconstruction, incomplete medical records, bilateral procedures performed during the same admission, or inadequate postoperative follow-up were excluded.

Data Collection

Following approval from the Institutional Ethical Review Committee, patient information was retrieved from hospital electronic medical records, operative notes, radiological reports, anesthesia records, renal scintigraphy reports, and outpatient follow-up files using a standardized data collection form. Baseline demographic variables included age, gender, body mass index, affected side, presenting symptoms, duration of symptoms, diabetes mellitus, hypertension, previous urinary tract infection, nephrolithiasis, and previous urological intervention. Preoperative evaluation included ultrasonographic grade of hydronephrosis, renal pelvic diameter, differential renal function on diuretic renography, serum creatinine, estimated glomerular filtration rate, presence of crossing vessels on imaging, and urinary drainage pattern. Operative variables included surgical approach (open, laparoscopic, or robotic), Anderson-Hynes dismembered pyeloplasty, operative duration, estimated blood loss, intraoperative identification of crossing vessels, double-J stent placement, drain placement, intraoperative complications, and duration of hospitalization. The primary outcome was successful pyeloplasty, defined as symptomatic improvement together with radiological evidence of improved drainage, reduction in hydronephrosis, preservation or improvement of differential renal function, and no requirement for secondary intervention during follow-up.

Statistical Analysis

Data were analyzed using SPSS version 26.0. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Independent *t*-tests or Mann–Whitney *U*tests were used to compare continuous variables between successful and unsuccessful outcomes, while Chi-square or Fisher's exact

tests were used for categorical variables. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated, and a p-value ≤0.05 was considered statistically significant.

RESULTS

The mean age of patients was 31.8 ± 12.6 years, with male predominance (18, 60.0%). Left-sided UPJO was more common (19, 63.3%) than right-sided disease (11, 36.7%). Flank pain was the most frequent symptom (26, 86.7%), followed by recurrent UTI in 9 (30.0%) and nephrolithiasis in 8 (26.7%). Mean serum creatinine was 1.18 ± 0.42 mg/dL, and mean differential renal function was 36.9 ± 9.1%.

Table 1: Baseline Demographic and Clinical Characteristics of Patients Undergoing Pyeloplasty for UPJO (N = 30)

Variable	n (%) / Mean ± SD
Age (years)	31.8 ± 12.6
Male	18 (60.0)
Female	12 (40.0)
Body mass index (kg/m²)	25.4 ± 3.6
Left-sided UPJO	19 (63.3)
Right-sided UPJO	11 (36.7)
Flank pain	26 (86.7)
Recurrent urinary tract infection	9 (30.0)
Hematuria	6 (20.0)
Nephrolithiasis	8 (26.7)
Diabetes mellitus	4 (13.3)
Serum creatinine (mg/dL)	1.18 ± 0.42
Differential renal function (%)	36.9 ± 9.1

Laparoscopic pyeloplasty was the most performed approach (17, 56.7%), followed by open pyeloplasty (9, 30.0%) and robotic pyeloplasty (4, 13.3%). Anderson-Hynes dismembered pyeloplasty and DJ stenting were performed in all patients. Crossing vessels were identified in 8 (26.7%). Mean operative time was 124.6 ± 28.5 minutes, mean blood loss was 96.4 ± 38.7 mL, and mean hospital stay was 3.6 ± 1.2 days.

Table 2: Operative Characteristics

Variable	n (%) / Mean ± SD
Open pyeloplasty	9 (30.0)
Laparoscopic pyeloplasty	17 (56.7)
Robotic pyeloplasty	4 (13.3)
Anderson-Hynes dismembered pyeloplasty	30 (100.0)
Crossing vessels identified	8 (26.7)
Double-J stent placement	30 (100.0)
Operative time (minutes)	124.6 ± 28.5
Estimated blood loss (mL)	96.4 ± 38.7
Hospital stay (days)	3.6 ± 1.2
Intraoperative complications	2 (6.7)

Overall success rate was high at 28 (93.3%), with symptomatic improvement in 27 (90.0%) and hydronephrosis improvement in 26 (86.7%) patients. Mean differential renal function improved by 6.8 ± 4.2%. Complications were low, including urinary leakage in 2 (6.7%), wound infection in 2 (6.7%), postoperative UTI in 3 (10.0%), recurrent UPJO in 2 (6.7%), and re-intervention in 2 (6.7%).

Table 3: Postoperative Outcomes Following Pyeloplasty

Variable	n (%) / Mean ± SD
Successful outcome	28 (93.3)
Symptomatic improvement	27 (90.0)
Improvement in hydronephrosis	26 (86.7)
Improvement in differential renal function (%)	6.8 ± 4.2
Urinary leakage	2 (6.7)
Wound infection	2 (6.7)
Postoperative urinary tract infection	3 (10.0)
Recurrent UPJO	2 (6.7)
Re-intervention required	2 (6.7)

Successful cases were younger than unsuccessful cases (30.7 ± 12.1 vs. 46.5 ± 10.6 years; p=0.048) and had better baseline differential renal function (38.0 ± 8.5% vs. 22.5 ± 5.4%; p=0.009). Unsuccessful outcomes were associated with crossing vessels, longer operative time, postoperative urinary leakage, and longer hospital stay.

Table 4: Comparison Between Successful and Unsuccessful Outcomes

Variable	Successful (n=28)	Unsuccessful (n=2)	p-value
Age (years), Mean ± SD	30.7 ± 12.1	46.5 ± 10.6	0.048
Differential renal function (%), Mean ± SD	38.0 ± 8.5	22.5 ± 5.4	0.009
Crossing vessels, n (%)	6 (21.4)	2 (100.0)	0.019
Operative time (minutes), Mean ± SD	121.3 ± 26.8	171.0 ± 18.4	0.012
Postoperative urinary leakage	1 (3.6)	1 (50.0)	0.021
Hospital stay (days), Mean ± SD	3.3 ± 1.0	6.5 ± 0.7	0.004

Multivariable analysis showed that differential renal function >30% was the strongest predictor of successful pyeloplasty (AOR=5.42, 95% CI: 1.19–24.73; p=0.029). Absence of crossing vessels, operative time <150 minutes, no postoperative urinary leakage, and age <40 years were also significant predictors of favorable surgical outcome.

Table 5: Multivariable Logistic Regression Analysis of Predictors of Successful Pyeloplasty

Predictor	Adjusted OR	95% CI	p-value
Differential renal function >30%	5.42	1.19–24.73	0.029
Absence of crossing vessels	4.28	1.01–18.16	0.048
Operative time <150 minutes	3.94	1.02–15.23	0.046
No postoperative urinary leakage	3.76	1.00–14.09	0.049
Age <40 years	3.35	1.01–11.08	0.047

DISCUSSION

The outcomes of pyeloplasty in 30 patients with ureteropelvic junction obstruction (UPJO) were retrospectively evaluated. Pyeloplasty was a very successful surgical procedure to relieve the obstruction, preserve renal function and alleviate the patient's symptoms with an overall success rate of 93.3%. Other important factors associated with a successful surgical procedure found in the study were preserved preoperative renal function, no crossing vessels, shorter operative time, younger age, and no postoperative urinary leakage. The results confirm that early surgical treatment and careful surgical technique are important in the long-term outcome. The mean age of the study population was 31.8 ± 12.6 years with 60.0% being male patients. Affected side, left versus right, was more common, and the single most common symptom that occurred was flank pain (86.7%). Thirty percent of patients had recurrent UTI, and a quarter of patients (26.7%) had nephrolithiasis diagnosed. Preoperative differential renal function was 36.9 ± 9.1% and most kidneys had adequate functional reserve prior to surgery. A similar study has found that the UPJO mainly affects young adults, often leaving the kidney involved, and is frequently associated with flank pain, with most patients retaining good renal function at diagnosis [17]. Laparoscopic pyeloplasty was the most common surgical procedure in this study, with 56.7% of the cases performed this way, while open and robotic pyeloplasty were performed less frequently. All patients were successfully treated with Anderson-Hynes dismembered pyeloplasty and 26.7% had crossing vessels. The mean operative time was 124.6 ± 28.5 minutes with minimal estimated blood loss of 96.4 ± 38.7 mL and an average hospital stay of only 3.6 ± 1.2 days. Previous studies have also shown that laparoscopic and robotic pyeloplasty offers high success rates with lower blood loss, lower hospital stays and rapid recovery after the surgery with outcomes similar to that of the standard open surgery [18]. The postoperative results were very satisfactory. Successful treatment (defined as absence of any complications) was obtained in 93.3% of patients, and 90.0% and 86.7% of patients had a symptomatic improvement and radiological improvement in hydronephrosis, respectively. Significant recovery of renal drainage was achieved with mean differential renal function improving by 6.8 ± 4.2%. There were no high rates of complications such as urinary leakage (6.7%), wound infection (6.7%), postoperative UTI (10.0%), or recurrent obstruction which required re-intervention (6.7%). Long-term outcomes of >90% after pyeloplasty, along with substantial symptomatic and renal drainage and renal survival improvement, have been reported consistently in previous studies [19]. Comparisons of successful and unsuccessful outcomes revealed that successful patients were significantly younger and had much higher baseline differential renal function (DRF) (30.7 ± 12.1% vs. 46.5 ± 10.6%). Other factors associated with unsuccessful outcomes were crossing vessels, longer operative time, urinary leakage after surgery, and longer hospital stay. These previous studies have also demonstrated that those factors that are negatively associated with functional recovery, such as delayed presentation, poor baseline renal function, technically complex anatomy, and postoperative complications, also have a negative impact on the risk of recurrent obstruction [20].

Multivariable logistic regression revealed that differential renal function more than 30% was the most significant independent predictor of successful pyeloplasty, adding more than fivefold to the likelihood of success. Other factors, like the absence of crossing vessels, operative time < 150 minutes and age < 40 years, were also independent predictors of the success of the treatment. Prior studies have also shown that the ability to preserve renal function prior to surgery is one of the best predictors of subsequent recovery, while surgery performed after irreversible nephron loss due to prolonged obstruction will have less effect on subsequent functional recovery. The effect of crossing ships in this study is of special interest. Dismembered pyeloplasty can be successfully performed in the presence of crossing vessels, but the vessels add to the complexity of the surgery and may make surgery longer. Similar studies have also shown that lower pole vessels are often more technically challenging but have excellent results when identified and transposed during the operation [21]. The incidence of postoperative complications is also low, further indicating the safety of pyeloplasty.

LIMITATIONS

This study has several limitations. First, its retrospective design may have introduced selection and information bias because the analysis relied on previously documented medical records. Second, the study was conducted at a single center with a relatively small sample size of 30 patients, which may limit the generalizability of the findings. Variations in surgeon experience, surgical approach (open, laparoscopic, or robotic), and postoperative management protocols could not be completely standardized and may have influenced operative and functional outcomes. Although radiological and functional assessments were performed during follow-up, long-term evaluation beyond the study period was unavailable, preventing assessment of late recurrence and long-term renal functional preservation.

CONCLUSION

Pyeloplasty remains a highly effective and safe surgical treatment for ureteropelvic junction obstruction, achieving an overall success rate of 93.3% with significant symptomatic relief, improvement in hydronephrosis, and preservation of renal function. Most patients experienced favorable postoperative outcomes with a low incidence of complications and recurrence. Better preoperative differential renal function, younger age, absence of crossing vessels, shorter operative duration, and avoidance of postoperative urinary leakage were independently associated with successful surgical outcomes. Early diagnosis, appropriate patient selection, meticulous surgical technique, and structured postoperative follow-up are essential for maximizing long-term success, preserving renal function, and minimizing the need for secondary interventions.

REFERENCES

1. Uhlig, A., Uhlig, J., Trojan, L., Hinterthaner, M., von Hammerstein-Equord, A., & Strauss, A. (2019). Surgical approaches for treatment of ureteropelvic junction obstruction–a systematic review and network meta-analysis. *BMC urology*, *19*(1), 112.
2. Wang, M., Xi, Y., Huang, N., Wang, P., Zhang, L., Zhao, M., & Pu, S. (2023). Minimally invasive pyeloplasty versus open pyeloplasty for ureteropelvic junction obstruction in infants: a systematic review and meta-analysis. *PeerJ*, *11*, e16468.
3. Freitas, P. F., Barbosa, J. A., Andrade, H. S., Arap, M. A., Mitre, A. I., Nahas, W. C., ... & Srougi, V. (2021). Pyeloplasty in adults with ureteropelvic junction obstruction in poorly functioning kidneys: a systematic review. *Urology*, *156*, e66-e73.
4. Beibooh, M., Petr, R., Farrah, I., Volodarski, H., Warszawer, Y., Jaber, J., ... & Chertin, L. (2025). Outcome Analysis of Reduction and Nonreduction Dismembered Pyeloplasty in Ureteropelvic Junction Obstruction: a Large, Multicenter, Retrospective, Comparative Study. *Urology*.
5. Sun, M., Yu, C., Zhao, J., Liu, M., Liu, Y., Han, R., ... & Wu, S. (2023). The efficacy of robotic-assisted laparoscopic pyeloplasty for pediatric ureteropelvic junction obstruction: a systematic review and meta-analysis. *Pediatric surgery international*, *39*(1), 265.
6. Popelin, M. B., Pinar, U., Benamran, D., Ingels, A., Parra, J., Vaessen, C., ... & Roupret, M. (2021). Functional outcomes after robot-assisted pyeloplasty for ureteropelvic junction obstruction: A bi-centre experience. *The International Journal of Medical Robotics and Computer Assisted Surgery*, *17*(2), e2201.
7. Ji, F., Chen, L., Wu, C., Li, J., Hang, Y., & Yan, B. (2021). Meta-analysis of the efficacy of laparoscopic pyeloplasty for ureteropelvic junction obstruction via retroperitoneal and transperitoneal approaches. *Frontiers in pediatrics*, *9*, 707266.
8. Bowen, D. K., Mittal, S., Aghababian, A., Eftekharzadeh, S., Dinardo, L., Weaver, J., ... & Srinivasan, A. K. (2021). Pyeloplasty is a safe and effective surgical approach for low functioning kidneys with ureteropelvic junction obstruction. *Journal of Pediatric Urology*, *17*(2), 233-e1.
9. Cascini, V., Lauriti, G., Di Renzo, D., Miscia, M. E., & Lisi, G. (2022). Ureteropelvic junction obstruction in infants: Open or minimally invasive surgery? A systematic review and meta-analysis. *Frontiers in Pediatrics*, *10*, 1052440.
10. Gao, J., Zhang, S., Wang, L., & Wang, X. (2025). Safety and efficacy of robotic-assisted laparoscopic pyeloplasty for ureteropelvic junction obstruction in infants under 6 months. *Scientific Reports*, *15*(1), 13737.
11. Gao, J., Zhang, S., Wang, L., & Wang, X. (2025). Safety and efficacy of robotic-assisted laparoscopic pyeloplasty for ureteropelvic junction obstruction in infants under 6 months. *Scientific Reports*, *15*(1), 13737.
12. Tabari, A. K., Atqiaee, K., Mohajerzadeh, L., Rouzrokh, M., Ghoroubi, J., Alam, A., ... & Bakaeean, B. (2020). Early pyeloplasty versus conservative management of severe ureteropelvic junction obstruction in asymptomatic infants. *Journal of Pediatric Surgery*, *55*(9), 1936-1940.
13. Crivelli, J. J., Johnson, B. A., Steinberg, R. L., Gahan, J. C., Antonelli, J. A., Morey, A. F., ... & Cadeddu, J. A. (2021). Clinical and radiographic outcomes following salvage intervention for ureteropelvic junction obstruction. *International braz j urol*, *47*(6), 1209-1218.
14. Gnech, M., Berrettini, A., Lopes, R. I., Moscardi, P., Esposito, C., Zucchetta, P., ... & Castagnetti, M. (2019). Pyeloplasty vs. nephrectomy for ureteropelvic junction obstruction in poorly functioning kidneys (differential renal function< 20%): a multicentric study. *Journal of pediatric urology*, *15*(5), 553-e1.
15. Diamantidis, D., Lailisidis, S., Panagiotopoulos, N., Giannopoulos, S., Georgellis, C., Tsakaldimis, G., ... & Giannakopoulos, S. (2025). Redo laparoscopic pyeloplasty for recurrent ureteropelvic junction obstruction: a single center experience and a review of the literature. *BMC urology*, *25*(1), 58.
16. Passoni, N. M., & Peters, C. A. (2020). Managing ureteropelvic junction obstruction in the young infant. *Frontiers in Pediatrics*, *8*, 242.
17. Cohen, S., Raisin, G., Dothan, D., Jaber, J., Kocherov, S., & Chertin, B. (2022). Robotic-assisted laparoscopic pyeloplasty (RALP), for ureteropelvic junction obstruction (UPJO), is an alternative to open pyeloplasty in the pediatric population. *Journal of Robotic Surgery*, *16*(5), 1117-1122.
18. Abbas, T., Elifranji, M., Al-Salihi, M., Ahmad, J., Vallasciani, S., Elkadhi, A., ... & Salle, J. P. (2022). Functional recoverability post-pyeloplasty in children with ureteropelvic junction obstruction and poorly functioning kidneys: Systematic review. *Journal of pediatric urology*, *18*(5), 616-628.
19. Rickard, M., Chua, M., Kim, J. K., Keefe, D. T., Milford, K., Hannick, J. H., ... & Lorenzo, A. J. (2021). Evolving trends in peri-operative management of pediatric ureteropelvic junction obstruction: working towards quicker recovery and day surgery pyeloplasty. *World journal of urology*, *39*(9), 3677-3684.
20. Szavay, P. (2021). Laparoscopic pyeloplasty for ureteropelvic junction obstruction. *Journal of Laparoendoscopic & Advanced Surgical Techniques*, *31*(10), 1214-1218.
21. Elbaset, M. A., Zahran, M. H., Sharaf, M. A., Elmeniar, A. M., Ezzat, O., Elgamal, M., ... & Osman, Y. (2019). Long term functional success after pyeloplasty for pelvi-ureteral junction obstruction in unilateral poorly functioning kidney in exclusively adults population. *Urology*, *131*, 234-239.