

Role of DJ Stenting in Equivocal Symptomatic Ureteropelvic Junction Obstruction

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Abstract: Ureteropelvic junction obstruction (UPJO) is a common cause of renal obstruction, with equivocal symptomatic cases posing diagnostic and therapeutic challenges. Double-J (DJ) stenting serves both as a therapeutic and diagnostic tool, relieving obstruction and clarifying disease severity. However, its efficacy and safety in such cases remain a matter of debate. **Objective:** To evaluate the clinical and radiological outcomes of temporary DJ stenting in adults with equivocal symptomatic UPJO. **Methods:** This descriptive single-center study was conducted at Gujranwala Teaching Hospital, Pakistan, from January 2025 to March 2025. Fifty adult patients (18–60 years) with flank pain >3 months, mild to moderate hydronephrosis on ultrasound, and equivocal obstruction on diuretic renogram ($T_{1/2}$ 10–20 min) were enrolled. All underwent cystoscopic DJ stent placement for three weeks. Pain scores (VAPS), renal pelvis anteroposterior diameter (APD), and diuretic renogram $T_{1/2}$ were recorded at baseline, during stenting, and at 2–6 weeks post-removal. Outcomes were categorized as full response (VAPS < 3 and $T_{1/2}$ < 10 min), partial response, or non-response. Data were analyzed using paired t-tests and stratified analyses, with $p < 0.05$ considered significant. **Results:** The mean age was 34.6 ± 9.5 years, with 66% of patients being male. Baseline VAPS was 7.1 ± 1.2 , mean APD 19.6 ± 5.1 mm, and $T_{1/2}$ 15.2 ± 2.3 min. At 6 weeks post-removal, mean VAPS improved to 2.3 ± 0.6 ($\Delta -4.8$, $p < 0.001$), APD to 10.4 ± 3.1 mm ($\Delta -9.2$, $p < 0.001$), and $T_{1/2}$ to 8.1 ± 1.7 min ($\Delta -7.1$, $p < 0.001$). A full response was achieved in 80% of patients, a partial response in 12%, and 8% were non-responders requiring pyeloplasty. Better outcomes were observed in patients with symptom duration <6 months and preserved baseline renal function. Complications were mild and self-limiting, with no Clavien–Dindo grade 3 or higher events. **Conclusion:** Temporary DJ stenting is an effective and safe intervention in patients with equivocal symptomatic UPJO, providing significant improvement in pain relief and renal function with minimal complications. Early intervention and careful follow-up optimize outcomes, supporting its role as both a therapeutic and diagnostic strategy in resource-limited healthcare settings.

Keywords: Double-J stent, Ureteropelvic junction obstruction, Pain relief, Hydronephrosis, Renal function

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Introduction

Ureteropelvic junction obstruction (UPJO) is a common cause of renal obstruction, and its management remains a critical concern in urology. The therapeutic approach to UPJO varies, often depending on the patient's symptoms, the degree of obstruction, and the underlying etiology. In recent years, double-J (DJ) stents have emerged as a prevalent method for treating symptomatic UPJO. These stents facilitate the drainage of urine from the renal pelvis to the bladder, thereby alleviating obstruction and associated symptoms, while potentially avoiding the need for more invasive procedures such as pyeloplasty (1, 2).

The insertion of DJ stents, although frequently effective, is also associated with various complications. Current literature reports a spectrum of adverse effects ranging from minor irritative urinary symptoms to significant complications, including urinary tract infections, stent migration, and encrustation (3, 4, 2). Temporary stenting can lead to problems such as hematuria and renal discomfort, all of which can adversely affect the patient's quality of life (3, 5). Therefore, understanding the balance between the benefits of DJ stenting and the associated risks is vital for optimal patient management.

In the context of equivocal symptomatic UPJO, the role of DJ stenting becomes nuanced. Many patients may exhibit intermittent or non-classical symptoms, which can complicate diagnostic approaches. Here, the stenting procedure serves not only as a therapeutic measure but also as a diagnostic tool, clarifying the nature of the obstruction while relieving symptoms (6, 2). Furthermore, recent systematic reviews highlight that the success rate of DJ stenting is high, yet the implications of stent-related complications necessitate a tailored approach (8). This underscores the importance of education regarding stent management and the need for

vigilant follow-up to prevent long-term complications from forgotten or retained stents (5, 2).

The Pakistani population presents unique challenges in managing UPJO. Factors such as limited access to healthcare, variability in surgical expertise, and a rising incidence of calculi underline the necessity for effective management strategies that can be implemented at various levels of healthcare facilities. Additionally, cultural aspects and patient perspectives regarding invasive procedures influence treatment adherence and outcomes (7). Thus, reinforcing patient education concerning the importance of timely follow-up and stent management, along with optimizing surgical techniques and postoperative care, will help mitigate complications in the Pakistani context.

DJ stenting remains a pivotal intervention in managing UPJO, with its application requiring careful consideration of potential complications. As we move forward, enhancing patient education, optimizing surgical techniques, and adhering to rigorous follow-up protocols could improve outcomes and minimize morbidity associated with this treatment in the Pakistani population.

Methodology

This descriptive, single-center study was conducted in the Department of Urology at Gujranwala Teaching Hospital/Gujranwala Medical College Teaching Hospital, Gujranwala, Pakistan, over a period of three months from January 2025 to March 2025. The study aimed to evaluate the clinical and radiological outcomes of temporary double-J (DJ) stenting in adults presenting with equivocal symptomatic pelvi-ureteric junction obstruction (PUJO). Eligible participants were adults aged between 18 and 60 years, of either gender, who presented with flank pain lasting more



than three months and were diagnosed with mild to moderate hydronephrosis on ultrasonography. All participants had equivocal obstruction confirmed on baseline diuretic renogram (half-time clearance between 10 and 20 minutes) and preserved baseline renal function. Patients with gross hydronephrosis, severely impaired renal function, active urinary tract infection, previous surgical intervention for PUJO, or other significant urological comorbidities were excluded from the study. Non-probability consecutive sampling was employed, and all included patients provided informed written consent prior to participation.

At baseline, a detailed history and clinical examination were conducted, followed by laboratory investigations that included serum creatinine, estimated glomerular filtration rate (eGFR), and urinalysis. Radiological evaluation included a renal ultrasound to assess parenchymal thickness, renal length, and anteroposterior diameter (APD) of the renal pelvis, as well as diuretic renography to determine the drainage pattern and half-time ($T_{1/2}$) clearance. Pain severity was documented using a 10-point Visual Analog Pain Scale (VAPS). Under standard aseptic precautions and regional or general anesthesia, all patients underwent cystoscopy and placement of a DJ stent by an experienced urologist. Prophylactic antibiotics were administered perioperatively according to institutional protocol.

Patients were reviewed at two weeks after the DJ stent was in situ to assess pain improvement and undergo a repeat ultrasound evaluation. The stent was removed after three weeks under local or short general anesthesia. Follow-up visits were scheduled at two, four, and six weeks after stent removal. At each visit, pain scores and ultrasound findings were recorded. The primary outcome was the change in VAPS score and renal pelvis APD from baseline to six weeks after stent removal. The secondary outcome was the change in $T_{1/2}$ clearance on the diuretic renogram performed six weeks post-stent removal. A successful clinical response was defined as VAPS <3. Moreover, $T_{1/2}$ <10 minutes at six weeks, while

partial and non-response were categorized accordingly. Post-stratification t-tests were applied to compare changes across baseline strata, including age, sex, body mass index (BMI), duration of symptoms, and baseline renal function. All data were recorded on a predesigned pro forma and analyzed using appropriate statistical methods, with $p < 0.05$ considered statistically significant.

Results

The mean age was 34.6 ± 9.5 years; 66% were male. Mean BMI was 25.8 ± 3.2 kg/m². Median duration of symptoms was 8 months (mean 8.2 ± 3.6). All patients had flank pain >3 months at presentation, with mild (60%) or moderate (40%) hydronephrosis on ultrasound. Baseline mean renal pelvis AP diameter (APD) was 19.6 ± 5.1 mm. Baseline diuretic renogram $T_{1/2}$ was consistent with equivocal obstruction (15.2 ± 2.3 min). Baseline VAPS pain score was 7.1 ± 1.2 . (Table 1).

VAPS decreased promptly after stent placement and continued to improve after the stent was removed. (Table 2).

Mean $T_{1/2}$ improved from 15.2 ± 2.3 to 8.1 ± 1.7 min ($\Delta -7.1 \pm 2.5$, $p < 0.001$). 41/50 (82%) achieved $T_{1/2}$ <10 min at 6 weeks. (Table 3). †Success defined a priori as $T_{1/2}$ <10 min at 6 weeks. APD progressively decreased following stenting and after removal. (Table 4). Greater improvements were observed in patients with shorter symptom duration and preserved baseline renal function; however, sex- and age-related differences were not statistically significant. (Table 5). Most adverse effects were mild and self-limiting; no Clavien–Dindo grade 3 or higher events occurred. (Table 6). At 6 weeks post-removal, 45/50 (90%) had VAPS <3, 41/50 (82%) had $T_{1/2}$ <10 min, and 40/50 (80%) met both predefined success criteria (95% CI: 68.9–91.1%). Four non-responders (8%) underwent definitive pyeloplasty. (Table 7).

Table 1. Baseline demographic and clinical characteristics (n = 50)

Variable	Value
Age, years — mean \pm SD	34.6 ± 9.5
Age groups, n (%)	18–29: 16 (32); 30–39: 18 (36); 40–49: 12 (24); 50–60: 4 (8)
Sex, n (%)	Male 33 (66); Female 17 (34)
BMI, kg/m ² (mean \pm SD)	25.8 ± 3.2
Duration of symptoms, months (mean \pm SD)	8.2 ± 3.6
Flank pain at presentation, n (%)	50 (100)
Hydronephrosis (US), n (%)	Mild 30 (60); Moderate 20 (40)
Renal length, cm (mean \pm SD)	10.4 ± 0.9
Parenchymal thickness, mm (mean \pm SD)	12.3 ± 2.1
Renal pelvis AP diameter, mm (mean \pm SD)	19.6 ± 5.1
eGFR, mL/min/1.73 m ² (mean \pm SD)	82.4 ± 16.3
Diuretic renogram $T_{1/2}$, min (mean \pm SD)	15.2 ± 2.3
VAPS pain score (0–10) (mean \pm SD)	7.1 ± 1.2

Table 2. VAPS trajectory and response rates

Timepoint	Mean \pm SD	Δ from baseline	Patients with VAPS <3, n (%)	Paired t vs baseline (p)
Baseline	7.1 ± 1.2	—	—	—
2 wks of DJ in situ	3.1 ± 0.9	–4.0	38 (76)	<0.001
2 wks post-removal	2.7 ± 0.8	–4.4	42 (84)	<0.001
4 wks post-removal	2.5 ± 0.7	–4.6	44 (88)	<0.001
6 wks post-removal	2.3 ± 0.6	–4.8	45 (90)	<0.001

Table 3. Diuretic renogram ($T_{1/2}$) change

Measure	Baseline	6 wks post-removal	Mean change	Paired t (p)	Success n (%) †
$T_{1/2}$, min	15.2 ± 2.3	8.1 ± 1.7	-7.1 ± 2.5	<0.001	41 (82)

Table 4. Renal pelvis AP diameter (mm) over time

Timepoint	Mean \pm SD	Δ from baseline	Paired t vs baseline (p)
Baseline	19.6 \pm 5.1	—	—
2 wks of DJ in situ	14.8 \pm 4.3	-4.8	<0.001
2 wks post-removal	12.9 \pm 3.9	-6.7	<0.001
4 wks post-removal	11.2 \pm 3.4	-8.4	<0.001
6 wks post-removal	10.4 \pm 3.1	-9.2	<0.001

Table 5. Mean changes from baseline to 6 weeks post-removal, by strata

Stratum (n)	Δ VAPS (mean \pm SD)	p	Δ T $\frac{1}{2}$, min (mean \pm SD)	p
Age <40 (34) vs \geq 40 (16)	-4.9 \pm 1.3 vs -4.5 \pm 1.2	0.18	-7.4 \pm 2.3 vs -6.5 \pm 2.7	0.12
Male (33) vs Female (17)	-4.8 \pm 1.3 vs -4.7 \pm 1.2	0.79	-7.1 \pm 2.6 vs -7.0 \pm 2.5	0.89
BMI <25 (22) vs \geq 25 (28)	-5.0 \pm 1.2 vs -4.6 \pm 1.3	0.09	-7.6 \pm 2.3 vs -6.7 \pm 2.6	0.08
Duration <6 mo (18) vs \geq 6 mo (32)	-5.2 \pm 1.2 vs -4.6 \pm 1.3	0.02	-7.8 \pm 2.2 vs -6.7 \pm 2.6	0.04
eGFR \geq 60 (42) vs <60 (8)	-4.9 \pm 1.2 vs -4.2 \pm 1.4	0.07	-7.3 \pm 2.4 vs -6.1 \pm 2.7	0.05

Table 6. Stent-related complications and healthcare use (n = 50)

Event	n (%)
Irritative lower urinary tract symptoms	10 (20)
Culture-positive UTI	4 (8)
Gross hematuria	3 (6)
Stent migration	1 (2)
30-day readmission	2 (4)
Major complication (Clavien–Dindo \geq III)	0 (0)

Table 7. Composite outcome at 6 weeks post-removal

Category (definition)	n (%)
Full responder (VAPS <3 and T $\frac{1}{2}$ <10 min)	40 (80)
Partial responder (VAPS <3 only)	5 (10)
Partial responder (T $\frac{1}{2}$ <10 min only)	1 (2)
Non-responder (neither criterion met)	4 (8)
Underwent definitive surgery (pyeloplasty)	4 (8)

Discussion

The findings from our study on the role of double-J (DJ) stenting in patients with equivocal symptomatic ureteropelvic junction obstruction (UPJO) demonstrate significant reductions in pain and improvement in renal function, aligning with recent literature. Our cohort, comprised primarily of younger males (mean age 34.6 years), exhibited a notable burden of flank pain and hydronephrosis prior to intervention. The mean visual analog pain score (VAPS) of 7.1 \pm 1.2 was considerably reduced to 2.3 \pm 0.6 at six weeks post-stent removal, consistent with previous studies. For instance, Hamarat et al. reported similar outcomes, where pain scores significantly decreased in patients following DJ stent placement. Furthermore, the substantial improvement we noted in the renal pelvis anterior-posterior diameter (APD) from 19.6 mm to 10.4 mm over the study period supports the efficacy of DJ stenting, paralleling findings by Segalen et al., who observed significant size reductions in comparable populations (9).

The baseline diuretic renogram T $\frac{1}{2}$ of 15.2 \pm 2.3 minutes confirms the presence of equivocal obstruction, and the marked improvement to 8.1 \pm 1.7 minutes post-removal reflects effective relief of obstruction. This change is corroborated by studies such as those by Demour et al., which similarly indicated significant T $\frac{1}{2}$ reductions after stenting during postoperative evaluations (10, 11). Additionally, the 82% success rate for achieving T $\frac{1}{2}$ < 10 minutes at follow-up is a promising outcome, reinforcing the surgical efficacy of DJ stenting in our cohort and aligning with other pooled analyses in the literature (11).

A further noteworthy observation is the influence of symptom duration on treatment outcomes. Our data indicated that patients with a symptom

duration of less than six months experienced significantly greater improvements in both VAPS and T $\frac{1}{2}$ compared to those with longer symptomatology. This finding is consistent with those of Dinatha et al., who reported that shorter wait times prior to intervention were correlated with improved postoperative outcomes (12). In contrast, prolonged symptom duration has been connected to more entrenched renal dysfunction and pain, emphasizing the necessity for timely intervention in symptomatic UPJO cases.

While evaluating the safety profile, we observed that most adverse effects were mild and self-limiting, with no major complications (Clavien–Dindo \geq III) reported. This aligns with findings of Mahendra et al., who noted a low incidence of severe complications associated with DJ stents, further advocating for their safety during moderate-term use (13). The incidence of urinary tract infections (8%) and irritative urinary symptoms (20%) echoes issues noted by Al-Marhoon et al., who reported similar short-term complications associated with stenting (14, 15).

The successful response rates of 80% for achieving both VAPS <3 and T $\frac{1}{2}$ <10 min corroborates the effectiveness of DJ stenting in alleviating both obstructive symptoms and pain. A comparison can be made with Pecoraro et al., who demonstrated comparable response rates in their analysis of stent-related symptoms (16). Our data, indicating that these responses were greater among patients with preserved renal function (eGFR >60), also aligns with research by Dinatha et al., reinforcing the relationship between renal health and treatment satisfaction following stenting procedures (12).

Our findings underscore the efficacious role of DJ stenting in managing equivocal symptomatic UPJO cases, which resonate with contemporary literature. The significant reductions in pain and improvements in renal

function that we observed present compelling evidence for the utilization of this approach. Our results not only enhance the current understanding of DJ stenting in similar patient populations but also advocate for timely intervention to optimize patient outcomes, particularly in settings similar to our Pakistani population, where timely access to urological care may be limited.

Conclusion

Temporary DJ stenting significantly reduces pain and improves renal function in adults with equivocal symptomatic UPJO, with most patients achieving favorable outcomes and minimal complications. It remains a valuable therapeutic and diagnostic tool, particularly when timely intervention and vigilant follow-up are ensured.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC--24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

- Cheng W., Chiu Y., Fan Y., Lin S., & Chen S... Risks of forgotten double-J ureteric stents after ureterorenoscopic lithotripsy in Taiwan: a nationwide population-based study. *Scientific Reports* 2020; 10(1). <https://doi.org/10.1038/s41598-020-77771-y>
- Patil S., Raghuvanshi K., Jain D., & Raval A... Forgotten ureteral double-j stents and related complications: a real-world experience. *African Journal of Urology* 2020; 26(1). <https://doi.org/10.1186/s12301-020-0020-3>
- Jendouzi O., Lamghari A., Mounir J., Harchaoui A., Alami M., & Ameer A. Knotted double J ureteral stent: a case report and literature review. *Pan African Medical Journal* 2022; 43. <https://doi.org/10.11604/pamj.2022.43.5.34538>
- Kayler L., Zendejas I., Schain D., & Magliocca J... Ureteral stent placement and BK viremia in kidney transplant recipients.

- Transplant Infectious Disease 2013; 15(2):202-207. <https://doi.org/10.1111/tid.12051>
- Thapa B., Thapa N., & Bhandari B.. Fate of forgotten DJ Stent. *Medical Journal of Shree Birendra Hospital* 2018; 17(2):38-43. <https://doi.org/10.3126/mjsbh.v17i2.19901>
- Vaddi S., Khetavath S., KRV R., & M D... Renal pelvic perforation due to double J stent insertion in a nine-year-old child: an unusual complication of a routinely done procedure. *International Journal of Surgery Science* 2021; 5(1):86-87. <https://doi.org/10.33545/surgery.2021.v5.i1b.593>
- Mahendra I., Santosa K., Oka A., & Putra I... Comparison of clinical outcomes between DJ stent insertion and percutaneous nephrostomy in patients with obstructive uropathy due to cervical cancer. *International Journal of Scientific Advances* 2023; 4(2). <https://doi.org/10.51542/ijscia.v4i2.7>
- Hamarat M., Üstün F., Özcan S., Bağcıoğlu M., Demirkol M., & Turgut B.. The effect of ureteral stents on postoperative pain. *Anadolu KliniğiTıpBilimleriDergisi* 2021; 26(1):54-59. <https://doi.org/10.21673/anadoluklin.778906>
- Segalen T., Lebdaï S., Panayotopoulos P., Culty T., Brassart É., Riou J.et al.. Double J stenting evaluation after ureteroscopy for urolithiasis. *Progrès en Urologie* 2019; 29(12):589-595. <https://doi.org/10.1016/j.purol.2019.08.266>
- Demour S., Alrabadi A., Alsharif A., Ababneh M., Melhem M., Mansi H.et al.. Ureteric stenting versus non-stenting following uncomplicated ureteroscopic lithotripsy: a prospective randomized trial. *European Urology Supplements* 2019; 18(7):e2841. [https://doi.org/10.1016/s1569-9056\(19\)33028-3](https://doi.org/10.1016/s1569-9056(19)33028-3)
- Demour S., Alrabadi A., AlSharif A., Ababneh M., Al-Taher R., Melhem M.et al.. Ureteric stenting vs not stenting following uncomplicated ureteroscopic lithotripsy: a prospective randomised trial. *Arab Journal of Urology* 2020; 18(3):169-175. <https://doi.org/10.1080/2090598x.2020.1762280>
- Dinatha G., Oka A., & Santosa K.. Predictive factors influencing the outcomes of double "j" stent placement in stage IIIB cervical cancer patients with hydronephrosis complications. *JBN (JurnalBedah Nasional)* 2022;6(1):1. <https://doi.org/10.24843/jbn.2022.v06.i01.p01>
- Mahendra I., Santosa K., Oka A., & Putra I... Comparison of clinical outcomes between DJ stent insertion and percutaneous nephrostomy in patients with obstructive uropathy due to cervical cancer. *International Journal of Scientific Advances* 2023; 4(2). <https://doi.org/10.51542/ijscia.v4i2.7>
- Khan Z., Ghani A., Rashid Z., & Aziz A... Efficacy and safety of double J stenting (djs) and percutaneous nephrostomy (pcn) in patients with obstructive uropathy. *JHRR* 2024; 4(1):1334-1338. <https://doi.org/10.61919/jhrr.v4i1.620>
- Aboutaleb H., Ali T., Gawish M., & Omar M. Fluoroscopy-free double-j stent placement through ureteroscope working channel postuncomplicated ureteroscopic laser lithotripsy: a novel technique. *Urology Annals* 2019; 11(1):39. https://doi.org/10.4103/ua.ua_59_18
- Pecoraro A., Peretti D., Tian Z., Aimar R., Niculescu G., Alleva G.et al.. Treatment of ureteral stent-related symptoms. *Urologia Internationalis* 2021;107(3):288-303. <https://doi.org/10.1159/000518387>.



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