

The effect of ureteral double J stent insertion on work performance in patients undergoing endoscopic stone treatment

Muhammed Emin Polat¹, Mustafa Karaaslan², Mehmet Yilmaz³, Erkan Olcucuoglu¹, Mehmet Emin Sirin⁴

¹Department of Urology, Ankara City Hospital, University of Health Sciences, Ankara, Turkey

²Department of Urology, Bingol State Hospital, Bingol, Turkey

³Department of Urology, Asklepios Klinik Triborg, Triborg, Germany

⁴University of Health Sciences, Diskapi Yilidirim Beyazit Research and Training Hospital, Ankara, Turkey

Citation: Polat ME, Karaaslan M, Yilmaz M, Olcucuoglu E, Sirin ME. The effect of ureteral double J stent insertion on work performance in patients undergoing endoscopic stone treatment. Cent European J Urol. 2024; 77: 117-121.

Article history

Submitted: June 16, 2023

Accepted: Dec. 10, 2023

Published online: Jan. 31, 2024

Corresponding author

Muhammed Emin Polat
Ankara City Hospital
Department of Urology
1604 Üniversiteler Mahallesi
06800 Ankara, Turkey
emnplt25@gmail.com

Introduction Despite the developments in the material of the double J (DJ) stents and the production of thinner ones of desired sizes, patients continue to experience troublesome DJ stent-related symptoms in their lives. This study aimed to determine how DJ stenting affects patients' work performance after endoscopic stone surgery.

Material and methods A total of 107 patients underwent placement of a ureteral stent after ureterorenoscopy (URS)/retrograde intrarenal surgery (RIRS), and only active and full-time working patients were included. All patients were asked to complete the validated Turkish version of the work performance score (WPS) questionnaire in the Ureteral Stent Symptom Questionnaire (USSQ) the day before stent removal and again one month after stent removal.

Results Of the participants, 32.7% (n = 35) were female and 67.3% (n = 72) were male; the mean age was 41 (19–80) years. The workday loss had no statistically significant correlation with patient BMI, stone size, or stent indwelling time (p >0.005); however, a statistically significant negative correlation was detected with patient age (r = -0.335, p <0.001). The medians of WPSs with the stent and without the stent were 6 (3–15) and 3 (3–12), respectively (p <0.001).

Conclusions Although DJ catheterization is a crucial tool for urological practice, it may increase the social and economic burden of patients due to reduced work performance and lost workdays. Therefore, limiting the duration of the DJ stent's stay and providing treatments to minimize patient symptoms will positively impact their professional lives. It would be beneficial to avoid DJ stenting in routine practice unless medically necessary.

Key Words: DJ catheterization ↔ work-performance ↔ stone ↔ endoscopic treatment

INTRODUCTION

When Zimskind et al. introduced the concept of the ureteral stent in 1967, they probably did not expect its use to become so widespread [1]. The Double J (DJ) stent is used in urology practice for many reasons, including surgeries for ureteral-renal stones and to treat ureteral strictures and retroperitoneal pathologies that affect ureters [2]. DJ stents, which are now

crucial tools in daily urology practice, have undergone substantial developments, especially when Finney and Hepperlen solved the slip and migration problem of straight ureteral stents by adopting DJ-featured stents in 1978 [3]. However, even with improvements in the material of the stents and the production of thinner ones of desired sizes, patients still experience problems in their daily lives after DJ stent implantation, regardless of the primary pathology [4, 5, 6].

Almost 90% of patients complain of at least one irritative symptom, and some of them experience quality of life problems [4, 5]. The main complaints are increased frequency, urgency, dysuria, flank pain, suprapubic pain, and hematuria due to bladder wall and trigone irritation [4, 5, 7, 8]. Joshi et al. evaluated the ureteral stent-related symptoms by defining and validating the Ureteral Stent Related Symptom Questionnaire (USSQ) in 2003 [9]. The USSQ has been translated into different languages, including Turkish (USSQ-T), and has been widely used in clinical trials to examine patient discomfort [10]. Although some medications, such as α -blockers, antimuscarinics, phosphodiesterase inhibitors (PDEIs), and anti-inflammatory drugs, are used to manage these troublesome symptoms, DJ stent-induced symptoms remain an unpleasant condition for patients [11, 12].

The symptoms caused by the DJ stent do not only affect the personal lives of the patients, but they also affect their professional lives [6]. The loss of workdays and work performance negatively affect the personal and national economic burdens imposed by ureteral stents [13]. In the literature, many studies have reported symptoms after DJ stent placement; however, studies focusing on the effects of the DJ stent on work performance are lacking [11, 14]. The present study aimed to focus on the impact of symptoms caused by DJ stenting on patients' work performance after endoscopic urinary stone surgery.

MATERIAL AND METHODS

This study was approved by the Ankara City Hospital Institutional Review Board (IRB number: E2-23-3309). The data of patients who underwent ureterorenoscopy/retrograde intrarenal surgery (URS/RIRS) for ureteral or kidney stones between 01.06.2022 and 01.01.2023 were retrospectively analyzed. Overall, 107 patients who underwent placement of a ureteral stent (4.8 F, 26 cm standard stent, made of polyurethane) after URS/RIRS were eligible for inclusion in the study. The study group consisted of patients who had active working lives and were working full time. Patients who had missing clinical data, who were younger than 18 years of age, who were students, retired, or part-time workers, or who had a previous ureteral stenting, pregnancy, bilateral ureteral stenting, or obstruction due to malignancy were excluded. Patients' characteristic data (age, gender, body mass index (BMI), and education level), stone size, operation type, lost workdays, stent indwelling time, pain localization (flank, back, suprapubic, or groin/testicular), and work performance scores (WPSs) were recorded. The WPS is a subtitle of the USSQ and includes three questions assessing

changes in work quality and performance, changes in work hours due to difficulty in concentrating, and functional limitations in the patient's work life due to urinary symptoms. All patients were asked to complete the validated Turkish version of the WPS questionnaire rated from 3 (very good job performance) to 15 (very poor job performance) in the Ureteral Stent Symptom Questionnaire (USSQ) the day before stent removal and at follow-up one month after stent removal. Pain localization was evaluated as local or multiple sites (2, 3, or 4). The effects of demographic and clinical factors on lost work days and WPS were evaluated by univariate analysis. The WPS evaluated with the ureteral stent in place was compared with the WPS evaluated 1 month after ureteral stent removal (i.e., without the stent). The Statistical Package for Social Sciences (SPSS), version 22.0 (SPSS, Inc.), was used for statistical analysis. The distribution of the data was tested using the Kolmogorov–Smirnov test. Categorical variables were presented as numbers and percentages. Continuous data were presented as medians (range). The means of parameters that were not normally distributed were compared using the Mann–Whitney U-test and Kruskal–Wallis test. Two different

Table 1. Demographic, clinical and laboratory results of the patients

	Mean(range)
Age, year	41 (19–80)
BMI, kg/m ²	28.34 (17.6–37.6)
Indwelling time, day	23 (7–183)
Stone size, mm	8 (5–40)
Lost workday	4 (0–30)
WPS with stent	6 (3–15)
WPS without stent	3 (3–12)
Gender, F/M	35/72
Pain localization	
Flank pain	9 (8.4)
Back pain	19 (17.8)
Suprapubic pain	9 (8.4)
2 sites	23 (21.5)
3 sites	17 (15.9)
4 sites	18 (16.8)
Education level	
illiterate	6 (5.6)
elementary or middle school	42 (39.3)
high school	32 (29.9)
university	27 (25.2)
Operation type	
URS	31 (29)
RIRS	76 (71)

BMI – body mass index; WPS – work performance score; URS – ureterorenoscopy; RIRS – retrograde intrarenal surgery

Table 2. Comparison of WPS with stent, WPS without stent and workday loss according to demographic and clinical factors of patients

	Lost workday	p	WPS with stent	p	WPS without stent	p
Gender		0.05		0.8		0.64
Male	4 (0–30)		6 (3–15)		3 (3–12)	
Female	2 (0–20)		6 (3–14)		3 (3–8)	
Education level		0.1		0.97		0.31
illiterate	1 (0–7)		6 (3–8)		3 (3–8)	
elementary or middle school	2.5 (0–20)		6 (3–15)		3 (3–8)	
high school	4.5 (0–20)		6 (3–15)		3 (3–7)	
university	5 (0–30)		6 (3–15)		3 (3–12)	
Operation type		0.97		0.99		0.51
URS	4 (0–30)		6 (3–15)		3 (3–12)	
RIRS	3.5 (0–25)		6 (3–15)		3 (3–8)	
Pain localization		0.22		0.13		0.59
Flank pain	2 (0–10)		4 (3–8)		3 (3–4)	
Back pain	5 (0–20)		7 (3–15)		3 (3–7)	
Suprapubic pain	10 (1–20)		6 (3–10)		3 (3–3)	
2 sites	2 (0–30)		6 (3–13)		3 (3–12)	
3 sites	5 (0–21)		6 (3–15)		3 (3–8)	
4 sites	4.5 (0–15)		7.5 (3–15)		3 (3–6)	

WPS – work performance score

Table 3. Correlation analysis of patients' demographic and clinical data with WPS with stent, WPS without stent and lost workday

	Lost workday		WPS with stent		WPS without stent	
	r	p	r	p	r	p
Age, year	-0.335	<0.001	-0.155	0.11	0.02	0.84
BMI, kg/m ²	-0.167	0.09	-0.033	0.74	0.193	0.05
Stone size, mm	0.035	0.72	0.004	0.97	0.022	0.83
Indwelling time, day	-0.087	0.37	0.009	0.93	-0.044	0.66

BMI – body mass index; WPS – work performance score

Table 4. Comparison of WPS with stent and WPS without stent

	With stent	Without stent	p
WPS	6 (3–15)	3 (3–12)	<0.001

WPS – work performance score

lost workday parameters (with and without ureteral stent) were compared using the Wilcoxon test. A value of $p < 0.05$ was considered statistically significant.

RESULTS

A total of 107 patients who had stents placed after stone operations were included in the study. The characteristics of the patients are shown in Table 1. Of the participants, 32.7% ($n = 35$) were female, and 67.3% ($n = 72$) were male; the mean age was 41 (19–80) years. Cases with DJ stent had

an average of 4 (0–30) days of work loss and no days of work were lost after DJ stent removal. Table 2 shows the comparison of the WPS with stent in place, the WPS without the stent (one month after ureteral stent removal), and the lost workdays, according to gender, education level, type of operation, and pain localization. No statistically significant difference was found among these variables ($p > 0.05$). The relationship between workday loss and WPS with patient age, BMI, stone size, and stent indwelling time were examined using Spearman correlation analysis, and the findings are presented in Table 3. Neither the WPS with the stent nor the WPS without the stent showed any statistically significant correlation with patient age, BMI, stone size, or stent stay ($p > 0.05$). Workday loss did not show a statistically significant correlation with patient BMI, stone size, or stent indwelling time ($p > 0.005$); however, a statistically significant negative correlation was detected with patient age ($r = -0.335$, $p < 0.001$). Table 4 shows the WPSs for patients with and without the stent. The median WPSs with the stent and without the stent were 6 (3–15) and 3 (3–12), respectively ($p < 0.001$).

DISCUSSION

DJ stents are symptomatic in up to 90% of patients, and the symptoms affect the patients' quality of life, thereby imposing social and economic costs [4, 5, 6]. These economic and social burdens have prompted a search for solutions to the complications of catheterization [13]. However, finding a solution requires

an investigation of the reasons for the decreases in work performance among the patients and the resulting increased cost caused by the catheterization, as well as the effects of complications [6, 13]. In our study, we found the mean number of lost workdays was 4 days for the catheterized patients. We also noted that younger patients had a greater tendency toward workday losses, in agreement with the current literature [6, 13]. Leibovici et al. have reported almost 50 % of patients lost a minimum of 2 workdays during the first two weeks after ureteral catheterization due to different pathologies [6]. Another study by Staubli et al. reported that the most substantial reason for economic loss was the loss of workdays associated with work incapacity among younger patients during the patient's catheterization period [4, 13].

Today, studies are frequently carried out on the cost-effectiveness of many treatment methods. When calculating costs in the health field, individual costs are roughly divided into two main groups: direct and indirect costs. The direct costs consist of inpatient treatment, outpatient treatment, and drug costs, whereas the indirect costs include lost workdays, caregiver costs, and other costs [14]. In addition to lost workdays, the importance of the poor performance that patients will experience in their professional lives in the post-operative period cannot be neglected. Patients with DJ stents may experience a decrease in work concentration and functional capacity due to symptoms such as flank pain, dysuria, etc., as well as a decrease in the time spent actively at work during the working day due to urgency and frequent urination. All these reasons can lead to a decrease in the quality and efficiency of the work performed, even if it is not observed as a loss of working days [9]. In our current study, when we compared the WPS scores of the patients in the stented and stent-free periods, we found that the WPS scores were statistically significantly higher in the stented period than in the stent-free period. From this point of view, it can be concluded that DJ stents cause a decrease in work performance as well as a loss of workdays in patients.

We still do not have an ideal stent; therefore, we can only try to reduce the symptoms and shorten the indwelling time [2, 13], and some studies have recommended a few solutions [2, 4, 5, 13]. In their meta-analysis of 490 studies, Tang et al. found no significant difference in post-operative complications between the group that underwent DJ stenting and the group that did not undergo DJ

stenting after uncomplicated endoscopic stone surgery. Nonetheless, the group that received DJ stent experienced worse LUTS scores [15]. In a prospective randomized trial, Bach et al. compared DJ stenting with post-operative 6-hour ureteral catheter placement. The results showed a statistically significant loss of seven workdays in the DJ stent group compared to three days in the ureteral catheter group [16]. These findings suggest that avoiding the use of a DJ stent when unnecessary could allow patients to return to work earlier without additional risk of complications. If the patient has been catheterized, assigning an appointment day for removal of the DJ stent when patients are discharged from hospital becomes important to avoid exceeding the set catheterization time and thereby avoiding symptom-induced limitations [13]. Furthermore, informing patients about DJ stents and the symptoms that the stents may cause increases cooperation during the postoperative course [4]. For symptomatic improvements, the use of analgesics, α -blockers, PDEIs, and antimuscarinic drugs or intravesical instillations is recommended in some studies [2, 11, 12, 17]. In recent years, emerging technologies, such as computer-assisted stent tracking methods or the development of softer distal coiled stents, are also being investigated to address stent problems [5]. Our study has some limitations, including its retrospective design and the small number of patients included. Another is that the stone localizations and their intraoperative statuses (impacted, infected, etc.) were not evaluated separately. Third, the occupations of the patients were not assessed according to their daily active working hours and working patterns or whether they held office jobs or jobs that required physical strength. A further limitation was the subjective nature of the questionnaire.

CONCLUSIONS

Although DJ catheterization is a crucial tool for urological practice, it may increase the social and economic burden of patients due to reduced work performance and lost work days. Therefore, limiting the duration of the DJ stent's stay and providing treatments to minimize patient symptoms will positively impact their professional lives. It would be beneficial to avoid DJ stenting in routine practice unless medically necessary.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

References

1. Zimskind PD, Fetter TR, Wilkerson JL. Clinical use of long-term indwelling silicone rubber ureteral splints inserted cystoscopically. *J Urol.* 1967; 97: 840-844.
2. Geavlete P, Georgescu D, Multescu R, Stanescu F, Cozma C, Geavlete B. Ureteral stent complications- experience on 50,000 procedures. *J Med Life.* 2021; 14: 769-775.
3. Mumtaz H. Efficacy of Alpha Blockers in Relieving Symptoms of JJ Stent. *J Sur Anesth Res.* 2021; 2: 1-5.
4. Beysens M, Tailly TO. Ureteral stents in urolithiasis. *Asian J Urol.* 2018; 5: 274-286.
5. Ilie VG, Ilie VI. Ureteric Stent Use- Part of the Solution and Part of the Problem. *Curr Urol.* 2018; 11: 126-130.
6. Leibovici D, Cooper A, Lindner A, et al. Ureteral stents: morbidity and impact on quality of life. *Isr Med Assoc J.* 2005; 7: 491-494.
7. Joshi HB, Okeke A, Newns N, Keeley FX, Jr., Timoney AG. Characterization of urinary symptoms in patients with ureteral stents. *Urology.* 2002; 59: 511-516.
8. Thomas R. Indwelling ureteral stents: impact of material and shape on patient comfort. *J Endourol.* 1993; 7: 137-140.
9. Joshi HB, Newns N, Stainthorpe A, MacDonagh RP, Keeley FX, Jr., Timoney AG. Ureteral stent symptom questionnaire: development and validation of a multidimensional quality of life measure. *J Urol.* 2003; 169: 1060-1064.
10. Tanidir Y, Mangir N, Sahan A, Sulukaya M. Turkish version of the Ureteral Stent Symptoms Questionnaire: linguistic and psychometric validation. *World J Urol.* 2017; 35: 1149-1154.
11. Aggarwal SP, Priyadarshi S, Tomar V, et al. A Randomized Controlled Trial to Compare the Safety and Efficacy of Tadalafil and Tamsulosin in Relieving Double J Stent Related Symptoms. *Adv Urol.* 2015; 2015: 592175.
12. Moradi M, Abdi H, Ebrahimi S, Rezaee H, Kaseb K. Effects of Tamsulosin and Tolterodine on double J stent-related symptoms: A double-blind, randomized, placebo-controlled trial. *SAGE Open Med.* 2017; 5: 2050312117696436.
13. Staubli SE, Mordasini L, Engeler DS, Sauter R, Schmid HP, Abt D. Economic Aspects of Morbidity Caused by Ureteral Stents. *Urol Int.* 2016; 97: 91-97.
14. Akkoç N, Direskeneli H, Erdem H, et al. Direct and indirect costs associated with ankylosing spondylitis and related disease activity scores in Turkey. *Rheumatol Int.* 2015; 35: 1473-1478.
15. Tang L, Gao X, Xu B, et al. Placement of ureteral stent after uncomplicated ureteroscopy: do we really need it? *Urology.* 2011; 78: 1248-1256.
16. Bach P, Reicherz A, Teichman J, et al. Short-term external ureter stenting shows significant benefit in comparison to routine double-J stent placement after ureterorenoscopic stone extraction: A prospective randomized trial- the Fast track stent study (FaST). *Int J Urol.* 2018; 25: 717-722.
17. Beiko DT, Watterson JD, Knudsen BE, et al. Double-blind randomized controlled trial assessing the safety and efficacy of intravesical agents for ureteral stent symptoms after extracorporeal shockwave lithotripsy. *J Endourol.* 2004; 18: 723-730. ■