Original Article
Özgün Araştırma

Endourol Bull. 2024;16(2):58-63. doi: 10.54233/endourolbull-1442984

Approach to Forgotten Ureteral Stents: A Single Tertiary Center Experience of 49 Cases

Unutulmuş Üreteral Stentlere Yaklaşım: 49 vakalık Üçüncü Basamak Tek Merkez Deneyimi

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ÖZET

Amaç: Double J (DJ) stentler üroloji pratiğinde sıklıkla kullanılmaktadır. Çıkarılması unutulan DJ stentler ciddi komplikasyonlara neden olabilir. Bu çalışmada kliniğimizde opere edilen 49 unutulmuş üreteral stent vakalarıyla ilgili deneyimlerimizi paylaşmayı amaçladık.

Gereç ve Yöntemler: Kliniğimizde 2013-2023 yılları arasında unutulmuş üreteral stent nedeniyle opere edilen hastaların verileri retrospektif olarak toplandı. Yaş, cinsiyet, taraf, başvuru şikayeti, stent kalış süresi, stent endikasyonu, uygulanan cerrahi, komplikasyon, ek girişim ve taşsızlık durumu kaydedildi.

Bulgular: Unutulmuş stent nedeniyle opere edilen 49 hastanın 19'u (%38,8) kadın, 30'u (%61,2) erkekti. Hastaların ortalama yaşı 47,06±14,11 (min:18/max:79) idi. Ortalama stent kalış süresi 16,2±21,1 (min:3/max:120) aydı. Otuz hastaya taş cerrahisi nedeniyle stent takılırken, 9 hastaya profilaktik, iki hastaya üreter yaralanması ve 8 hastaya da hidronefroz nedeniyle takılmıştı. Hastaların 9'una sistolitotripsi, 26'sına üreteroskopi (flexible üreterorenoskopi dahil), birine perkütan nefrolitotomi, 11'ine endoskopik kombine tedavi, ikisine ise açık cerrahi uygulandı.

Sonuç: Unutulmuş üreteral stentler ciddi komplikasyonlara neden olabilmektedir. DJ stent takılan hastalar unutulmuş stentlere bağlı komplikasyonlar hakkında bilgilendirilmelidir.

Anahtar Kelimeler: Üreteral kateter, unutulmuş DJ, taşlaşma, stent kalış süresi

Cite As: *Çanakcı, C., Dinçer, E., Doğrusever, B., Mert, M.S., Özkaptan, O. (2024) Approach to Forgotten Ureteral Stents: A Single Tertiary Center Experience of 49 Cases. Endourol Bull. 2024;16(2):58-63.* https://doi.org/10.54233/endourolbull-1442984

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Received : February 26, 2024 ***Accepted*** : May 20, 2024

ABSTRACT

Objective: Double J (DJ) stents are widely used in urology practice. Forgotten ureteral stents can cause serious complications. We present our experience about forgotten ureteral stents with 49 cases.

Material and Methods: The data of patients who were operated due to forgotten encrusted ureteral stents were examined retrospectively. Age, gender, side, presenting complaint, indwelling time, stent indication, surgery performed, complications, additional interventions and stone-free status were evaluated. For descriptive statistics, the mean, standard deviation, minimum and maximum frequencies and percentages were used.

Results: Nineteen (38.8%) patients were female and 30 (61.2%) patients were male. The mean age of the patients was 47,06±14,11 (18-79). The mean indwelling time was 16.2±21,1 (3-120). Stents were placed in 30 patients due to stone surgery, 9 patients due to prophylactic before oncologic surgery, 8 patients due to hydronephrosis and two patients due to ureteral injury. For the treatment of the forgotten stent, ureteroscopy (including flexible ureterorenoscopy) was performed in 26 patients, endoscopic combined treatment in 11 patients, cystolithotripsy in 9 patients, open surgery in two patients and percutaneous nephrolithotomy in one patient.

Conclusion: Removal of forgotten impacted ureteral stents can cause serious complications. The patients who were placed stents should be informed about the complications associated with forgotten encrusted stents.

Keywords: Ureteral Stents, Forgotten DJ, Encrustation, Indwelling Time

INTRODUCTION

Ureteral stents were first used in 1967 and have become an indispensable part of many urological surgeries (1). Besides being used for decompression of obstruction, it can also be used in stone surgery, ureteral injuries and even for comlicated obstretric or colorectal surgeries prophylactically (2). In recent years new stent types have been designed with significant technological innovations and developments to increase patient tolerance and overcome stent-related problems. However, symptoms and complications related to ureteral stents cannot be prevented (3). Although forgotten dj stents are sometimes asymptomatic, they can cause various complications such as hematuria, obstruction, infection, migration, encrustation, kidney failure, sepsis and even death (4,5).

Treatment of forgotten dj stents can sometimes be difficult and complicated for urologist depending on the degree of encrustation and the complications (1,6). Percutaneous nephrolithotomy (PCNL), ureteroscopy (URS), retrograde intrarenal surgery (RIRS), transuretral cystolithotripsy and the combine surgeries can be used for removal of encrusted stents. Secondary surgical intervention may be required depending on the location and degree of encrustation (7). In the current study, we aimed to describe the types of treatments applied to patients with forgotten ureteral stents, the complications and results in a tertiary care center.

MATERIAL AND METHODS

Data of 49 patients who underwent surgery due to forgotten ureteral stent (>3 months) between January 2013 and January 2023 were examined retrospectively. This study was conducted in accordance with the Declaration of Helsinki (193/2013), approved by our Institutional Review Board (2023/514/262/5). The patients' age, gender, side, medical and surgical history, indwelling time of stent, present complaint, indication of indwelling stent, complications, and stone-free status were evaluated. Stent indwelling time was calculated as the time between stent placement and removal. All patients' complete blood count (CBC), creatinine and midstream urine culture were evaluated. Patients with positive urine culture were treated with antibiotics preoperatively and negative urine cultures were obtained in all patients before surgery.

Encrustation was comfirmed with kidney-ureter-bladder graphy (KUB) and non-contrast computed tomography (CT). Tc99m dimerkaptosuccinic acid (DMSA) was performed to evaluate renal function in patients with several parenchymal damage. Treatment decision were based on the degree and location of encrustation. Ureteroscopic lithotripsy, RIRS, cystolithotripsy, PCNL, open surgery and endoscopic combine surgeries was performed for removal of stents.

The postoperative outcomes including fever, hospitalization time, transfusion rates, kidney function tests and complications were recorded. Postoperative complications were evaluted based on Clavien-Dindo Classification. Postoperative stone-free status were confirmed by KUB and CT. For descriptive statistics, the mean, standard deviation, minimum and maximum frequencies and percentages were used. Statistical analyses were performed using SPSS 26.0.

RESULTS

Nineteen (38.8%) female and 30 (61.2%) male had undergone surgery due to forgotten ureteral stents. The mean age was 47.06±14.11(18-79). The present symptoms are given in Table 1. The mean indwelling time of stents was 16.2±21.1(3-120). Stents were placed in 30 patients due to stone surgery, 9 patients due to prophylactic before oncologic surgery, two patients due to ureteral injury and 8 patients due to hydronephrosis. It was observed that the stent which was placed 60 months ago due to ureteral injury during hysterectomy was broken into three pieces. For the treatment of the forgotten encrusted stent, cystolithotipsy was performed in 9 patients, ureteroscopy (including flexible ureterorenoscopy) in 26 patients, percutaneous nephrolithotomy in one patient, endoscopic combined treatment in 11 patients, and open surgery in two patients.

Mean KUB score was 8.14±3.59. In 7 of 19 patients with a KUB score ≥9 auxillary intervention was essential. Endoscopic combine surgery was performed in 3, PNL in one, and URS in three patients. Stone freeness was achieved in three of the seven patients. Clinically significant resudial fragments (>4 mm) was recorded in 7 (15%) patients. Postoperative fever was observed in 12 (24%) patients (grade 1). Blood transfusion or antibiotic treatment were required in four patients (grade 2). Dj stent was placed in one patient (grade 3a) and acute kidney failure was detected in two patients (grade 4a). A total of three patients requiring urosepsis were treated in intensive care (Table-2).

Table 1. Presantation symptoms

Symptoms	Number of cases (%)
Irritative voiding symptoms	15 (30)
Hematuria	8 (16)
Infection	9 (18)
Abdominal-Lomber pain	18 (36)
Renal failure	3 (6)
Incontinence	2 (4)
No symptoms	8 (16)

Table 2. Demographic and peroperative data

Age	47.06±14.11 (min-18/max-79)	
Gender- Female/Male	19/30	
Laterality- Right-Left	22/27	
Stent indication	Stone surgery- 30 Profilactic- 9 Ureteral injury- 2 Hydronephrosis- 8	
İndwelling time	16.2±21.1 (min-3/max-120)	
KUB Score	9≤ 17 9≥32	8.14±3.59
Preoperative infection treatment	23/49 (%46)	

Complication/Clavien-Dindo (%)	
Grade 1(Fever)	12 (24)
Grade 2 (Blood transfusion, antibiotics)	4 (8)
Grade 3a (Dj stent insertion under local anesthesia)	1 (2)
3b (Intervention under general anesthesia)	0
Grade 4a (Acute kidney failure)	1 (2)
4b (Intensive care unit)	3 (6)
Grade 5 (Death)	0
Auxiliary surgery	7/49 (%14)
Stone-free	42/49 (%85)

Table 3. Methods of treatment

Treatment	Number of cases
Cystolithotripsy	9
Ureteroscopy	26
Percutaneous nephrolithotomy	1
Endoscopic combine surgery	11
Open surgery	2

DISCUSSION

Dj stents are widely used in endourology. Urolithiasis is endemic in our region, and due to the increasing rate of endourological surgery, the rate of forgotten stents is also increasing. It may occur due to the patient negligence or inadequate clinician-patient communication (5,8).

Although patients are sometimes asymptomatic, it can cause irritative symptoms, hematuria, urinary tract infection, ureteral obstruction and renal failure (9). Irritative symptoms of forgotten stents were reported as 19-42% in some studies. In our study, presence of irritative symptoms were found 30%. Another common symptom was lomber pain and it was reported as 19-32% in literature (10). However, we found this ratio as 36% in our study. As stent indwelling time increased, complication rates also increased. Stent migration and spontaneous disintegration are seen rarely (11). We determined spontaneous stent disingtegration in only 1 patient who had a stent placed due to ureteral injury during histerectomy.

Removal of forgotten stents can be a hard challenge due to encrustation and stone formation. El-Faqih et al. found that encrustation rate was 9.2% when stent indwelling time was less than 6 weeks. They also reported that the rate could increase up to 47.5% when the time was between 6-12 weeks and up to 76.3% when the time longer than 12 weeks (12). The most important factor for encrustation and stone formation is stent indwelling time. Beside that, the quality of stent material, infection, patients with high risk factors for urolithiasis and pregnancy are also other risk factors (13).

There are various treatment options for forgotten encrusted ureteral stents. Extracorporeal shock wave lithotripsy can only be used for encrustation located in the upper 1/3 of the stent. When the encrustation is located only in the bladder, cystolithotripsy can be a good choice for treatment. Encrustations in ureter can be fragmantated with a laser lithotripter. In case of stone burden in renal pelvis, it can be treated by RIRS or PCNL. Endoscopic combined intrarenal surgery (ECIRS) may be preferred in cases of high encrustation and stone burden in the ureter and renal part (6,10). Today, although the rates of endourological approaches have increased, open surgery is still a good option in difficult

cases (1). In our clinic, minimally invasive methods are primarily used but in the present study, open surgery was performed in 2 patients due to serious stone burden in bladder.

Various scoring systems have been defined to grade stent encrustation. Miranda et al. defined Forgotten-Encrusted-Calcified System (FECal) which is a 5-stage classification extending from minimal encrustation of the coil parts of the stent to encrustation of the entire stent. In FECal, a treatment algorithm has been defined according to degree of encrustation (3). In Visual Grading for Ureteral Encrusted Stent (V-GUES), gradings are defined from A to D according to severity of encrustation. Type D is associated with low stone-free rates and multiple interventations (14). Arenas et al. defined a 15-point scoring system called Kidney-Ureter-Bladder (KUB). In this scoring system, scoring is based on the location and the degree of encrustation. It was reported that KUB score above 9 was associated with multiple interventations, mean operation time over 180 minutes and low stone-free rates. The need for auxiliary interventions was 4 fold higher for patients with >9 KUB scores (7). In our study 7 of 19 patients (36%) required auxillary intervention. These classification systems may be useful in informing patients preoperatively.

Another serious complication of removing forgotten stents is sepsis. Weedin et al. reported that positive midstream urine culture rates was 75.2% and 13% of the patients admitted to clinics because urinary infection or sepsis (15). Infective obstructive hydronephrosis can be occured due to encrusted stents. Sepsis can be seen despite antibiotic treatments before the surgery. Examination of stent culture may be an important parameter in the treatment of sepsis that may occur postoperatively. In our study, preoperative positive midstream urine culture was found to be 46%. Postoperative fever was seen 24% of the patients despite appropriate antibiotic treatment and negative urine culture before the surgery. Three patients required intensive care for multiple organ failure due to urosepsis.

We have some limitations in this study. First, the nature of study is retrospective. Second limitation is the small number of patients. The surgical interventions were performed by different urologists. There is not enough data about long-term follow-up of patients, renal functions and long term complications.

CONCLUSION

Forgotten ureteral stents can cause serious morbidities. Combined treatments or multiple interventions may be required to remove forgotten stents. Patients should be carefully informed about the stent in the postoperative period, and the complications that the stent may cause in the long term should be explained.

Financial Disclosure: The authors declared that this study has received no financial support.

Ethics Committe: Dr. Lütfi Kırdar Kartal City Hospital Clinical Trials Ethics Committee Date Protocol: 2023/514/262/5.

Conflict of Interest: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Funding / support: The authors report no involvement in the research by the sponsor that could have influenced the outcome of this work.

REFERENCES

1. Al-Hajjaj M, Alam OA, Abu-Hussein B, Al Husein HM. Forgotten Double-J ureteral stent: An analysis of 25 cases in a tertiary hospital. Ann Med Surg (Lond) 2022;31:80:104223. https://doi.org/10.1016/j.amsu.2022.104223.
2. Adanur S, Ozkaya F. Challenges in treatment and diagnosis of forgotten/encrusted double-J ureteral stents: the largest single-center experience. Ren Fail 2016;38:920-6. https://doi.org/10.3109/0886022X.2016.1172928.
3. Miranda AMA, Milner J, Turk TMT. The FECal Double-J: a simplified approach in the management of encrusted and retained ureteral stents. J Endourol 2009;23:409-15. https://doi.org/10.1089/end.2008.0214.

4. Mulay A, Kapoor R, Sharma S, Asabe S, Belagali H, et al. Strategy to track double-J stents placed during COVID-19 using smartphone-based stent tracker application to prevent forgotten double-J stent in a high-volume centre: a smart solution. Afr J Urol 2021;27:110. https://doi.org/10.1186/s12301-021-00212-3.

5. Sohrab A, Aneesh S, Sureka SK, Varun M, Nitesh P, et al. Forgotten Reminders: an Experience with Managing 28 Forgotten Double-J Stents and Management of Related Complications. Indian J Surg 2015;77:1165-71. https://doi.org/10.1007/s12262-015-1229-4.

6. Jones PJ, Pietropaolo A, Æsøy MS, Ulvik O, Beisland C, et al. Endourological management of encrusted ureteral stents: an up-to-date guide and treatment algorithm on behalf of the European Association of Urology Young Academic Urology Urolithiasis Group. Cent European J Urol 2021;74:571-578. https://doi.org/10.5173/ceju.2021.0264.

7. Arenas JL, Shen JK, Keheila M, Abourbih SR, Lee A, et al. Kidney, Ureter, and Bladder (KUB): A Novel Grading System for Encrusted Ureteral Stents. Urology 2016;97:51-55. https://doi.org/10.1016/j.urology.2016.06.050.

8. El-Tatawy H, El-Abd AS, Gameel TA, Ramadan AR, Farha MOA, et al. Management of 'forgotten' encrusted JJ stents using extracorporeal shockwave lithotripsy: A single-centre experience. Arab J Urol 2019;17:132-137. https://doi.org/10.1080/2090598X.2019.1595485.

9. Singh V, Srinivastava A, Kapoor R, Kumar A. Can the complicated forgotten indwelling ureteric stents be lethal? Int Urol Nephrol. 2005;37:541–546. https://doi.org/10.1007/s11255-004-4704-6.

10. Geavlete P, Georgescu D, Mulțescu R, Stanescu F, Cozma C, et al. Ureteral stent complications - experience on 50,000 procedures. J Med Life 2021;14:769-775. https://doi.org/10.25122/jml-2021-0352.

11. Soyupek S, Oksay T, Kosar A. Fragmentation of a forgotten double J stent and excreted with urine: case report. Int Urol Nephrol 2003;35:91–2. https://doi.org/10.1023/a:1025966110195.

12. El-Faqih SR, Shamsuddin AB, Chakrabarti A, Atassi R, Kardar AH, et al. Polyurethane internal ureteral stents in treatment of stone patients: morbidity related to indwelling times. J Urol 1991;146:1487-91. https://doi.org/10.1016/s0022-5347(17)38146-6.

13. Cicione A, Stira J, Tema G, Franco A, Ghezzo N, et al. Ureteral stent encrustation: evaluation of available scores as predictors of a complex surgery. Minerva Urol Nephrol 2023;75:359-365. https://doi.org/10.23736/S2724-6051.22.04999-0.

14. Manzo BO, Alarcon P, Lozada E, Ojeda J, Morales C, et al. A Novel Visual Grading for Ureteral Encrusted Stent Classification to Help Decide the Endourologic Treatment. J Endourol 2021;35:1314–9. https://doi.org/10.1089/end.2020.1225.

15. Weedin JW, Coburn M, Link RE. The impact of proximal stone burden on the management of encrusted and retained ureteral stents. J Urol 2011;185(2):542-7. https://doi.org/10.1016/j.juro.2010.09.085.