

Treatment of fragmented and severely encrusted ureteral double-J stent forgotten for 11 years through multimodal endourological methods

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Abstract

Ureteral catheters are frequently used in urology clinics for intrinsic or extrinsic pathologies which cause ureteral obstruction to provide urinary drainage from the kidney to the bladder. With the increase in stent use, an increase is observed in complications occurring due to ureteral stents in direct proportion with this increase, and ureteral double-J (DJ) stents forgotten in the urinary system are observed commonly in urological cases when the patients do not refer to a health institution in this condition and may cause severe problems, such as infection, stent fragmentation, migration, kidney failure, encrustation, and hydronephrosis conditions. A 30-year-old male patient referred to our clinic with right-side pain, dysuria, and incontinence complaints. It was learned that the patient had endoscopic stone surgery due to right ureteral stone and kidney stone 11 years before the presentation. In the imaging methods of the patient, it was observed that the DJ stent forgotten had separated into three parts, and stones were observed in the right ureter. Cystoscopy was made under general anesthesia. The torn distal end of DJ stent was observed in distal urethra. The foreign object was removed with forceps. Then with ureterorenoscope, the stones integrated with the stent at the end of the piece of DJ stent in the ureter were fragmented with pneumolithotripter. Stone pieces and the second removed part of the stent were extracted with foreign object forceps. Then using nephroscope through percutaneous intervention, the stones at the end of the third torn piece of DJ stent were fragmented with pneumolithotripter. They were extracted with forceps. After DJ stent installation, each patient should be checked by giving required information and told that the stent must be removed. In cases with forgotten stents and complications, the stents should be removed with suitable medical, endourological, or minimally invasive surgical methods taking care to protect kidney functions.

Keywords: Double-J stent, encrustation, kidney failure

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INTRODUCTION

Ureteral stent location is a procedure frequently used in daily urological surgical application. They are generally

used for opening ureteral obstruction, helping spontaneous passing of stone fragments, fastening postoperative recovery, and providing drainage and preventing ureteral injuries during surgical operations. In the past 10 years,

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important technological innovations and improvement are made to overcome problems on stent manipulation, and patient tolerance has been made in stent design and material.^[1] Severe complications such as migration, fragmentation, encrustation, stone formation, infection, and impaired renal function occur, especially when the stents are forgotten for a long time.^[1,2] Plain abdominal graphy and computed tomography are preferred imaging methods for diagnosing and leading the treatment in these patients.^[3]

Using endoscopic and percutaneous method in the same session, our aim in this case was to show the treatment of double-J (DJ) stent forgotten after the endoscopic intervention made 11 years ago in our patient who had secondary fragmentation, encrustation, and stone formation.

CASE REPORT

A 30-year-old male patient referred to our clinic with right-side pain, dysuria, and incontinence complaints. It was learned that the patient had endoscopic stone surgery due to right ureteral stone and kidney stone 11 years before the presentation. In the direct urinary system graphy [Figure 1] and uncontrasted computed tomography of the patient, it was observed that the forgotten DJ stent was separated into three pieces, and the first piece was in the renal pelvis [Figure 2], the second piece was between the renal pelvis and the medium ureter [Figure 3], and the last piece was between the bladder and the urethra [Figure 4]; there were stones in the right kidney and ureter. One of the stones was nearly 19 mm × 18 mm attached to the end of the stent in the right kidney upper pole [Figure 2] and the other was 7 mm × 6 mm in the right kidney lower pole, and there were two sequential calculi attached to the second torn piece of the stent lying between the renal pelvis and the right medium ureter, and the larger of these calculi had a dimension of nearly 29 mm × 11 mm [Figure 3]. The patient stated that he did not know about DJ catheter. No pathological examination finding for urogenital organs was detected in the physical examination.

According to the biochemical tests, blood urea nitrogen was 70, creatinine: 2, Na (sodium): 143, and K (potassium): 3.7 and hemogram parameters such as hemoglobin: 11.4 and leukocyte: 13,100. There was no reproduction in urinary culture.

Surgical technique

Providing visualization, urethra was entered with 19-F cystoscope in lithotomy position under general anesthesia. Following the torn end of DJ stent in distal urethra, it

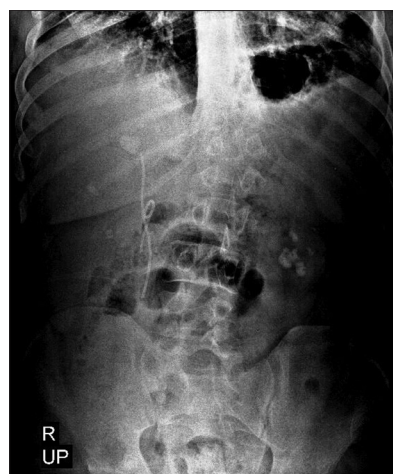


Figure 1: Direct urinary system graphy

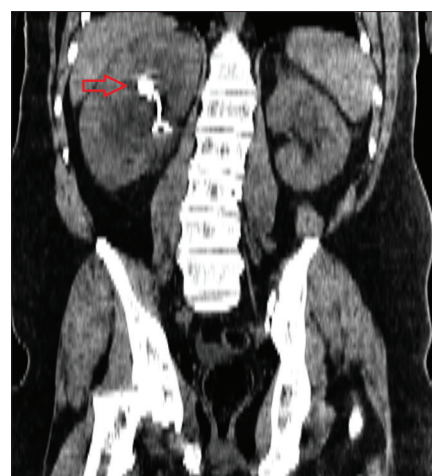


Figure 2: The stones at the end of the third torn piece of double-J stent



Figure 3: The stones integrated with the stent at the end of the piece of double-J stent in the ureter

was extracted with foreign object forceps. Then, it was entered with 8/9.8-F semi-rigid ureterorenoscope (URS). It was observed that DJ catheter was calcified in the right ureter middle section. The calculi were fragmented with

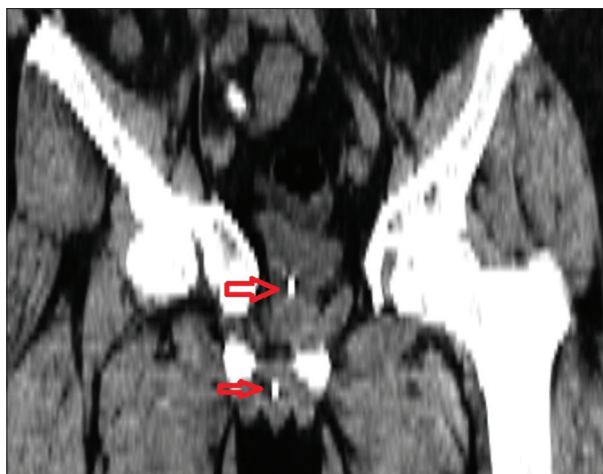


Figure 4: Fragmented distal end of double-J stent in the distal urethra

pneumolithotripter, and DJ catheter segment lying between the ureter and the right renal pelvis was extracted. Then, the last piece of the DJ stent in the right kidney upper pole and a stone in the calculized end were noticed. The patient was placed in prone position after catheter insertion, and using an 18-gauge needle and guidewire, the lower posterior calyx was accessed percutaneously under C-arm fluoroscopy guidance. For tract dilatation up to 12–30 F, amplatz dilators were used. The last piece torn from DJ stent and fragmented stones were removed with pneumatic lithotripter (Lithoclast; EMS, Nyon, Switzerland) and retrieval graspers through a rigid nephroscope (26 F, Karl Storz®). With an antegrade approach and under fluoroscopic guidance through the percutaneous nephrostomy tract, the stent was gently removed.

In dwelling, an 18-Fr re-entry nephrostomy tube was kept for 48 h. To confirm stone-free and stent-free status after the operation, kidney-ureter-bladder radiography was performed. A severe regression was observed in urea (38) and creatinine (1) values of the patient in postoperative biochemical tests, and the patient did not have kidney failure. The next day, the patient was discharged.

DISCUSSION

DJ ureteral stents used for the first time nearly 50 years ago are among the indispensable instruments for urological surgical interventions today.^[1,4] Serious complications such as encrustation, migration, stone formation, fragmentation, and infections can be seen when the stents have been in place for a long time.^[3-5] Different materials and coatings have been designed to avoid them.^[6] Caused by poor patient compliance with the instructions on returning for stent removal and inadequate counseling by practitioners, a forgotten ureteral stent is another challenging concern for the

urologists. However, for the management of these potentially serious problems, no widespread guidelines are available.^[7] Many factors may cause stent encrustation; these: and long indwelling time, previous or concurrent stone disease, urinary sepsis, chemotherapy, metabolic or congenital abnormalities, and chronic renal failure are among common risk factors.^[4]

In previous studies, it was shown that undesired effects of DJ stents in late period increase in direct proportion with the indwelling duration of the stents.^[8] In the study made by Ringel *et al.* on 90 patients who had ureteral stent for 3–12 months, they reported that 10% of the patients had catheter fragmentation, 8.2% had catheter migration, 5.4% had nonrecovering hydronephrosis, and 9.1% had urinary infection, and ureteral catheters were removed in an average of 3.27% of the patients due to the occurring complications.^[9] In another study by Adanur and Ozkaya on 54 patients who had forgotten stents, 7.4% of the patients had fragmentation and 27.7% had urinary infection.^[10] Joshi *et al.* reported that 78% of the 40 patients they included in their study had irritative urinary symptoms, incontinence, and hematuria and the daily activities of >80% were affected by catheter-related pain, 38% had sexual dysfunction, and 58% had lower professional performance.^[11] Long indwelling time and previous or concurrent stones were the significance of our case for encrustation risks. The patient had right-side pain, dysuria, and urinary incontinence complaints and had acute kidney failure at the time of referral. Due to its results, stent encrustations which may be caused by ureteral stents forgotten for a long time constitute one of the most important of these complications. Severe problems such as hydronephrosis, loss of renal function, and urosepsis may occur due to urinary obstruction caused by stent encrustations.^[12,13]

Endourological methods and open surgical methods can be used by themselves or in combination to remove the forgotten stents.^[2] Saha *et al.* retrospectively examined forgotten, encrusted ureteral stents in 29 patients; and 75% of these patients had preoperative ESWL and 29 cases had retrograde ureteroscopy with intracorporeal lithotripsy and 16 cases (55%) had cystolitholapaxy. over three-quarters 22(75.9%) of the patients had undergone extracorporeal shockwave lithotripsy (ESWL) and 10 (34.5%) percutaneous nephrostomy preoperatively. Retrograde ureteroscopy with intracorporeal lithotripsy (URS & ICPL) was done in 29 cases and cystolitholapaxy (CLL) in 16 (55%) cases. Cystolithotomy and percutaneous nephrolithotomy (PNL) were applied rarely. The patients had an average number of 2.8 operations.^[2] In another study by Sen *et al.*, the encrusted ureteral stents were forgotten for 12 months and were separated into four fragments, and vesicle and ureteral fragments were removed by endoscopic

cystolithotripsy and ureterolithotripsy after preoperative ESWL. In the same session, renal fragment was also removed through percutaneous access.^[14] In another multicentered and retrospective observational study, 57 patients were divided into groups considering the stent indwelling times and it was considered that transurethral procedures were sufficient for the treatment of patients who had DJ stent indwelling times <30 months.^[15] In our case, endoscopic and percutaneous surgery was applied to the patient in the same session. The torn lower end of DJ stent was extracted with cystoscope. Then, we applied pneumolithotripter-guided endoscopic URS for the stones in the ureter part of the second torn piece of DJ stent and PNL operation for the upper end and torn piece of DJ stent in the renal pelvis. All three torn pieces were extracted, and all encrustations were cleaned.

The most important issue for preventing ureteral stent complications is informing the patient and their relatives. The necessity of removing or changing the DJ stent at the correct time should be explained in detail, and written informed consent should be taken and the patient should be followed up until the stent is removed. Prevention of the complication is the best treatment. To ensure the removal or changing of the stents at correct time, some authors have proposed to use a computer tracking program.^[16]

In the conclusions, to provide effective stent and stone removal in a single anesthesia session with minimal morbidity and short hospitalization duration, endourological approach combinations can be applied. However, technological availability is also another determining factor for therapeutic strategy. Detailed patient education would be the best treatment to prevent this complication. The importance of ureteral stents should be explained by the urologists to the patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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