Int Surg 2015;**100**:381–385
DOI: 10.9738/INTSURG-D-13-00248.1

Manual Replacement of Double J Stent Without Fluoroscopy

(*Double j stent replacement*)

Osman Kose, Sacit Nuri Gorgel, Sait Ozbir, Sekan Yenigurbuz, Cengiz Kara

Department of Urology, Ataturk Research and Training Hospital, Izmir Katip Celebi University, Izmir, Turkey

It is not always possible to replace a ureteric stent with a new one due to the fact that tumoral effect increases in ureter with time. We present our experience of manual replacement of double J stent without fluoroscopy. The data from 23 female patients who underwent double J stent replacement with a total of 110 times was retrospectively analyzed. The steps of technique are as follows: take out distal end of the double J stent through urethra to external urethral meatus cystoscopically, insert a 0.035-inch guide wire through double J stent to the renal pelvis or intra pelvicaliceal system, take out old double J stent over guide wire, slide new stent over guide wire and at external meatus level take out guide wire while gently sliding distal end of double J stent over guide wire into urethra. The mean age was 58.39 ± 9.21 years. Cervical, endometrial, and ovarian cancer were diagnosed in 16, 4, and 3 patients respectively. The mean follow-up and indwelling period were 13.8 ± 5.2, 3.8 ± 0.6 months, respectively. Increased pelvicaliceal dilatation, serum creatinine level, or renal parenchymal loss was not observed. Replacement of double J stents with this technique is easy and can be used successfully in distal ureteral obstructions.

Key words: Gynecologic malignancies – Double J stent – Stent replacement – Ureteral stent – Ureteral obstruction

Patients with malignant ureteric obstruction often have a poor life expectancy, and renal failure may develop as a result of urinary obstruction. The obstruction can be relieved by placement of a percutaneous nephrostomy tube or a ureteric stent. After Zimskind *et al* described ureteral stents first in 1967,[1] stents have been become widely used to eliminate the obstruction due to malignant or benign causes in any level of ureter for internal urinary diversion.

Corresponding author: Osman Kose, MD, FEBU, Izmir Katip Celebi University Ataturk Research and Training Hospital, Department of Urology, Ataturk Research and Training Hospital, Izmir Katip Celebi University, Basın Sitesi, 35360, Izmir, Turkey.
Tel.: +90 530 696 6022; Fax number: +90 232 243 1530; E-mail: oskose@gmail.com

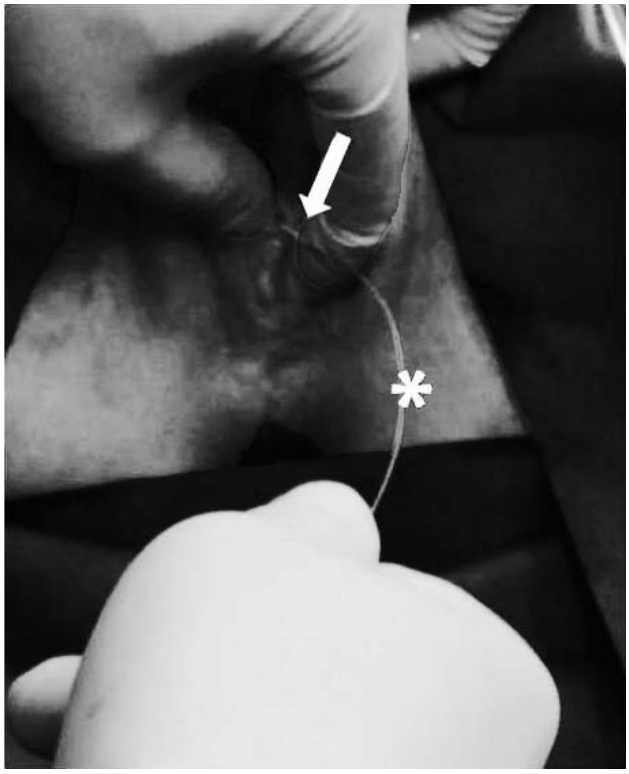

Fig. 1 Distal tip of old double J stent (shown with arrow) was taken out and 0.035-inch guide wire (*) was inserted through the double J stent to the renal pelvis or intra pelvicaliceal system.

Fig. 2 Insertion of the new double J stent over guidewire.

Though there are many kinds of stents that are being produced, it is not always possible to get special double J stents, such as metallic, for malignant obstructions in every case. In addition to that, standard double J stents are used commonly in medical centers.

The main trouble is that these standard stents have to be replaced within 4–6 months to avoid stent related complications such as encrustation, stone formation, obstruction, or infection.[2] But especially in obstructions caused by malignancies, it is not always possible to place the new stent after removal of the old one. We report our experience of replacement of double J stents with our technique, applied on 23 female patients with malignant ureteric obstruction.

Materials and Methods

Institutional review board approval was obtained to retrospectively review the medical records. Between 2010 and 2013, 23 women (37 renal units) who underwent 2 open-end ureteral double J stent placements due to gynecologic malignancies were included in this retrospective study. Written informed consent was obtained from all patients. All procedures were performed by the same surgeon (Kara C.) in the operating room. Patients were placed in lithotomy position and after local asepsis was provided, local anesthesia was achieved by applying transurethral lidocaine gel. The steps of technique for replacement stent are as follows: take out the distal end of double J stent through urethra to external urethral meatus cystoscopically, insert a 0.035-inch guide wire through the double J stent to the renal pelvis or intra pelvicaliceal system (Fig. 1), take out the old double J stent over the guide wire, slide the new stent (Geotek, 4.7 Fr, 26 cm, 2 open-end double J stent; Geotek, Turkey) over the guide wire (Fig. 2), and take out the guide wire at external meatus level while gently sliding the distal end of the double J stent over the guide wire into the urethra.

Results

Patients' characteristics, patients' values at pre-double J stent insertion and last visit were

Table 1 Patient characteristics and pre-/postoperative values

Age (years)	58.39 ± 9.21 (40–74)
Side (number of patients)	
Right	6
Left	3
Bilateral	14
Hydronephrosis (renal unit)	
Grade II	24
Grade III	13
Creatinine (mg/dL)*	
Pre-double J stent	1.70 ± 0.75 (0.80–2.80)
Last visit	1.60 ± 0.60 (0.85–2.70)
Renal parenchymal thickness (mm)**	
Pre-double J stent	13.86 ± 2.61 (9–20)
Last visit	13.60 ± 2.29 (10–19)
Etiology (number of patients)	
Cervix cancer	16
Endometrial cancer	4
Ovarian cancer	3
Comorbidities (number of patients)	
Hypertension	11
Diabetes mellitus	6
Cerebrovascular disease	1
Chemotherapy (number of patients)	13
Radiotherapy (number of patients)	5
History of urinary system disease (number of patients)	
Urolithiasis	3
Replacement number	2.90 ± 1.20 (1–5)
Operation time (minute)	8.60 ± 3.80 (4–13)
Stent indwelling time (months)	3.80 ± 0.60 (3–5)
Follow up (months)	13.80 5.20 (6–28)

*$P = 0.194$ (paired sample student t test); **$P = 0.208$ (paired sample student t test)

summarized in Table 1. The mean age of patients was 58.39 ± 9.21 years (40–74 years). Twenty-three women (37 ureteral units) underwent double J stent replacement due to gynecologic malignancies for 110 times. Sixteen patients had cervical cancer, 4 patients had endometrial cancer and 3 had ovarian cancer. The mean follow-up and indwelling period are 13.8 ± 5.2 (6–28), 3.8 ± 0.6 months respectively. The mean replacement number is 2.9 ± 1.2 (1–5) times per renal unit. In 4 patients, first double J stent was placed in another medical center initially. General anesthesia or sedation was not required in any patient. All double J stent positions were controlled with kidney, ureter, and bladder film postoperatively. Just in 28 of 110 cases proximal tip of double J stent was placed in the upper caliceal system and the others were located in renal pelvis. Migration of double J stent during replacement was not observed in any case. All cases were completed without any complications. The mean operation time was 8.6 ± 3.8 minutes for each renal unit. And all patients were discharged from hospital after procedure. The mean creatinine level of patients before double J stent insertion and at last visit were 1.70 ± 0.75 (0.80–2.80) and 1.6 ± 0.6 (0.85–2.70) g/dL (*P*: 0.194) respectively. Increase of pelvicaliceal dilatation or renal parenchymal loss was not observed during follow-up period. Renal parenchymal thickness pre stenting and at last visit were 13.86 ± 2.61 and 13.60 ± 2.29 respectively (*P*: 0.208).

Discussion

The goal of treatment in patients with malignant ureteric obstruction is to offer symptomatic relief, avoid complications from renal failure, or allow further oncologic systemic therapy. The obstruction can be relieved by means of nephrostomies (surgical or percutaneous) or double J stents. But complications and morbidity of nephrostomies are high and contribute to a deteriorating quality of life.[3] On the other hand, ureteral double J stents have been widely used for internal urinary diversion for ureteral obstructions with an acceptable morbidity. Prevalence of complications such as infections, stone formation, or obstruction increases with time. Therefore replacement of stents is mandatory. Although execution time may vary by properties of stents, replacement was recommended within an acceptable time period.[4] Though Singh *et al* recommended exchange period as 8 weeks, several investigators reported the optimum indwelling period of about 2 to 4 months.[5] In our series, the mean stent duration was 3.8 ± 0.6 months. Just in 1 case we had to replace the stent at the first month because of an urinary infection. Stone formation or stent obstruction was not observed during follow-up period.

Cystoscopic technique is the standard for placement of ureteral double J stent. But investigators tried to develop less invasive, safer, easier, and feasible techniques. In 1991, Yedicka *et al* described a technique of fluoroscopic retrograde exchange of ureteric double J stent with snare catheter.[6] Then de Baere *et al* reported exchange of double J stent under fluoroscopic control as an effective alternative technique to cystoscopy with 97% success (165 renal units).[7] In this technique, stents were extracted from the bladder through the urethra under fluoroscopic monitoring by using a lasso made of a 0.018-inch guide wire and a 7 Fr catheter. Then a new stent was placed over a 0.035-inch guide wire that had been previously coiled in the renal pelvis. Four techniques were implemented to remove or exchange

these stents: simple snare technique, modified snare technique, guide-wire lasso technique, and direct grasping technique by Park *et al* and they reported that fluoroscopic guidance procedures were safe and effective.[8] Recently, Kawahara *et al* described a new ureteral stent exchange technique using a crochet hook under fluoroscopic guidance.[9] All investigators reported highly successes with acceptable rate of complications. But in all of these techniques fluoroscopy and special equipment were essential. In our technique, we use cystoscope just at the beginning of the procedure to take out the distal tip of old double J stent; afterward we did not need any special equipment or fluoroscopy except standard 2 open-end double J ureter stents. As Chang *et al* reported[10] and also in our experience, inflammation of bladder made the mucosa look like a battlefield and hampered visualization of the ureteral orifices, or invasion of primary tumor to ureter impeded pushing forward the double J stent or guide wire during replacement. Even though antegrade percutaneous double J stent replacement was an option in these cases,[3] high complication rates of procedure have to be kept in mind. With our simple technique, the proximal tip of the stent stays on the proximal side of the stenotic ureteral area during guidewire insertion, so we do not have to face such difficulties. In our small series, replacements of stents were completed without problem and successfully within 8.6 ± 3.8 minutes for each renal unit.

A potential complication of stent replacement in fluoroscopic technique is migration of distal tip of stent[8,10] and, in this case, to take out the stent ureterorenoscopically was not always possible because of ureteral invasion or calibration. In our technique we slide the stent over guidewire with hand manipulations instead of pusher until the external ureteral meatus, not until the bladder lumen. And this prevented the migration. In 12 cases, distal tip of stent stayed in the urethra and these were easily pushed into bladder with the cystoscope or any surgical clamp or forceps. And stent malposition was not detected after the procedure in any case.

The literature suggests that platinum based chemotherapy had an absolute increase of 15% in 5 years for survival in cervical cancer patients.[11] But main point for these patients is to maintain an adequate renal function, which is necessary for an effective chemotherapy. In a recent study, it was reported that a creatinine level below 1.8 g/dL can be maintained with metallic ureteral stents during chemotherapy.[12] However 13 of the patients (56%) underwent chemotherapy, yet none of the patients had serum creatinine deterioration during a 6- to 28-month follow-up period. Also in our series, increase of pelvicaliceal dilatation or renal parenchymal loss was not observed.

The certain limitation of this study is that we apply our technique first instead of standard double J stent replacement. If we used the standard technique, it would be completed successfully. But in our experience during follow-up of patients with double J stent, we might have to face these difficulties. We could minimize this risk before it is too late for both patient and the surgeon. In addition, this technique can also be used in males that need double J stent replacement under fluoroscopic guidance.

Conclusion

Two open-end ureteral stents can be applied first in female patients who had distal ureteral obstruction because of pelvic malignancies and who are candidates for chemotherapy. Replacement of double J stents with this technique is easy and successfully applicable in distal ureteral obstructions in female patients that require prolonged follow-up with ureteral stent.

Acknowledgments

There was no conflict 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**(5): 840–844
2. Wetton CW, Gedroyc WM. Retrograde radiologic retrieval and replacement of double -J ureteric stents. *Clin Radiol* 1995;**50**(8): 562–565
3. Hausegger KA, Portugaller HR. Percutaneous nephrostomy and antegrade ureteral stenting: technique-indications-complications. *Eur Radiol* 2006;**16**(9):2016–2030
4. el-Faqih SR, Shamsuddin AB, Chakrabarti A, Atassi R, Kardar AH, Osman MK *et al*. Polyurethane internal ureteral stents in treatment of stone patients: morbidity related to indwelling times. *J Urol* 1991;**146**(6):1487–1491
5. Singh I, Gupta NP, Hemal AK, Aron M, Seth A, Dogra PN. Severely encrusted polyurethane ureteral stents: management and analysis of potential risk factors. *Urology* 2001;**58**(4):526–531

6. Yedlicka JW Jr, Aizpuru R, Hunter DW, Castañeda-Zúñiga WR, Amplatz K. Retrograde replacement of internal double -J ureteral stents. *AJR Am J Roentgenol* 1991;**156**(5):1007–1009
7. de Baere T, Denys A, Pappas P, Challier E, Roche A. Ureteral stents: exchange under fluoroscopic control as an effective alternative to cystoscopy. *Radiology* 1994; **190**(3): 887–889
8. Park SW, Cha IH, Hong SJ, Yi JG, Jeon HJ, Park JH *et al*. Fluoroscopy-guided transurethral removal and exchange of ureteral stents in female patients: technical notes. *J Vasc Interv Radiol* 2007;**18**(2):251–256
9. Kawahara T, Ito H, Terao H, Yamashita Y, Tanaka K, Ogawa T *et al*. Ureteral stent exchange under fluoroscopic guidance using the crochet hook technique in women. *Urol Int* 2012; **88**(3):322–325
10. Chang RS, Liang HL, Huang JS, Wang PC, Chen MC, Lai PH *et al*. Fluoroscopic guidance of retrograde exchange of ureteral stents in women. *AJR Am J Roentgenol* 2008;**190**(6):1665–1670
11. Dueñas-Gonzalez A, Cetina L, Mariscal I, de la Garza J. Modern management of locally advanced cervical carcinoma. *Cancer Treat Rev* 2003;**29**(5): 389–399
12. Modi AP, Ritch CR, Arend D, Walsh RM, Ordonez M, Landman J *et al*. Multicenter experience with metallic ureteral stents for malignant and chronic benign ureteral obstruction. *J Endourol* 2010;**24**(7):1189–1193