

Multimodal management of forgotten encrusted ureteral stents

Dongol UMS¹, Ghimire R²

¹Udaya Man Singh Dongol, Associate Professor; ²Roshan Ghimire, Assistant Professor, Department of Urology, Kathmandu Medical College and Teaching Hospital, Kathmandu.

Abstract

Background: Forgotten ureteral stents are seen in urologic practice because of ignorance of patients or failure of physician to counsel the patients. They can cause significant morbidity and pose a management and legal dilemma.

Objectives: To evaluate the efficacy and feasibility of different endourological approaches like percutaneous nephrolithotomy, ureteroscopic lithotripsy, cystolithotripsy and extracorporeal lithotripsy in the treatment of forgotten encrusted ureteral stents.

Methods: Total 10 patients with forgotten encrusted double J stents from January 2013 to Nov 2015 were included. Mean age of the patients was 38.4 years (1.5 -5 years). All patients were evaluated for stent encrustation and associated stone burden by X-ray KUB and Intravenous Urography. Combined endourological procedures like percutaneous nephrolithotomy, ureteroscopic lithotripsy, cystolithotripsy and extracorporeal lithotripsy and even open surgery was done to remove these stents. The patients characteristics, indications for stenting, indwelling time, site of encrustation, hospital stay etc were all noted.

Results: Total 10 patients presented with forgotten Double J stents. Out of three patients with large encrustations both in renal pelvis and urinary bladder, one patient underwent percutaneous nephrolithotomy and cystolithotripsy. Rest two patients underwent extracorporeal lithotripsy for two sessions for renal pelvic encrustation and cystolithotripsy for urinary bladder encrustation. Four patients underwent ureteroscopic and cystolithotripsy. Two patients in whom all fractured coils were in urinary bladder, underwent cystolithotripsy. All the stents were removed under C-arm fluoroscopic guidance. In one patient, open ureterotomy was done to remove the knotted stent.

Conclusion: The use of Double J stent should be limited. The combination of various endourological techniques and extracorporeal lithotripsy can achieve effective stent and stone treatment with minimal morbidity and hospital stay.

Key words: Cystolithotripsy, Extracorporeal shock wave lithotripsy, Percutaneous nephrolithotomy, Retrograde ureteroscopy, Ureteral stents

INTRODUCTION

The use of Double J ureteral stent (DJ stent) has become an integral part of the urological practice. It allows good urinary drainage from kidney to bladder and is generally safe and well tolerated. They are mainly indicated after ureteral and renal surgery and are used for managing ureteral obstruction due to stones, strictures, ureteropelvic junction obstruction, and retroperitoneal fibrosis etc¹⁻⁵. They are also used after iatrogenic injuries to ureter and before any

complex abdominal procedure for identification and protection of ureters⁶. However different complications may occur with use of these DJ stents. Short term placement complications like flank pain, haematuria, dysuria, frequency, urinary tract infection etc are quite common. Where these stents are left in place for long time, it results in significant morbidity like stent encrustations, stent fragmentation, and recurrent urinary tract infection etc⁷. Forgotten stent is frequently very complicated and poses a management and legal dilemma. However endourological methods like cystolithotripsy (CLT), retrograde ureteroscopy with intracorporeal lithotripsy (URSL), percutaneous nephrolithotripsy (PCNL) can be used for retrieval of these encrusted stents. Occasionally, extracorporeal shock wave lithotripsy (ESWL) and open surgery may be needed⁸⁻¹².

Address for correspondence

Dr. Udaya Man Singh Dongol
Associate Professor, Department of Urology,
Kathmandu Medical College and Teaching Hospital, Sinamangal,
Kathmandu, Nepal.
E-mail: dongoludaya@gmail.com

MATERIALS AND METHODS

It is a prospective study. Ten patients with forgotten ureteral stents with severe encrustations presenting to Kathmandu Medical College Department of Urology between Jan 2013 and Nov 2015 were our study population. Mean age of patient was 38.4 years (range 26-62 years) and average indwelling time of the stent was 2.8 years (1.5 years – 5 years). All these stents were placed somewhere else except one patient who was treated in Kathmandu Medical College and Teaching Hospital and had gone abroad (middle east.) for job and had forgotten. Ignorance by the patient and proper counselling by the surgeon were the main reasons for retention of stents.

All patients were evaluated for stent encrustation and associated stone burden by plain X-ray KUB and Intravenous Urography (IVU). There was no need for us to do Tc 99m diethylenetriaminepentaacetate (DTPA) scan. Treatment decisions were made depending on clinical and radiological findings. Before intervention, all patients had negative urine culture and antibiotic prophylaxis was given in all cases. Combined endourological procedures like percutaneous nephrolithotomy (PCNL), cystolithotripsy (CLT), retrograde ureteroscopy with intracorporeal pneumatic lithotripsy (URSL) and even open ureterotomy was done. Percutaneous nephrolithotomy was performed using 20Fr nephroscope (Wolf) and ureteroscopy was done with 8/9.8Fr semirigid ureteroscope (Wolf). In case of large encrustation around the loop in pelvis of kidney and fragmented loop in urinary bladder, cystolithotripsy was first done in lithotomy position and then standard PCNL in prone position and fragmented upper coil removed. Ethical clearance was taken from the institutional review committee of Kathmandu Medical College. Informed written consent was taken from the patient.

Data were statistically analyzed using SPSS 18. Analytical

evaluation was carried out using chi-square and independent T test.

RESULTS

Out of 10 patients, seven were female and three male, and all were from rural places. The patient's characteristics, indications for stenting, indwelling time, site of encrustation, procedure performed, and duration of hospital stay were all noted. Majority of patients had undergone stone surgery and one patient had undergone open pyeloplasty for pelviureteric junction stenosis.

In four patients, body and lower coil of the stent had encrustations. In one patient, stent was fractured, the proximal coil having large encrustation and the distal coil in urinary bladder also having large encrustation. In another two patients, encrustations were seen both in renal pelvis and in urinary bladder. In two patients, stents were fractured, all portions were in bladder with significant encrustations. In one patient knotting of stent was seen in mid ureter where endourological management failed and the stent was removed by open ureterotomy. The patient with large encrustation both in pelvis and urinary bladder underwent percutaneous nephrolithotomy (PCNL) and cystolithotripsy (CLT). Two other patients first underwent extracorporeal shockwave lithotripsy (ESWL) for two sessions and then cystolithotripsy and stents removed successfully. The remaining patients were treated with cystolithotripsy and ureteroscopy. All the stents were removed under C-arm fluoroscopy guidance.

DISCUSSION

Forgotten ureteral stents are seen in urologic practice because of ignorance of patients or failure of physician to counsel the patients¹³. The available literature shows that Double J stents had been missed for a maximum of 23 years¹⁴.

Table 1: Different variables of the patients with forgotten encrusted DJ stents

No of patients	Indications of stenting	Site of encrustation	Indwelling time (years)	Procedure performed
3	Open pyelolithotomy	Vesical +renal pelvis	1.5 -3	CLT, ESWL+PCNL
4	URSL	Vesical body part	2-3	CLT+URSL
1	Ureterolithotomy	Vesical	3.5	CLT
1	Pyeloplasty	Vesical		CLT
1	URSL	Knotting of stent	2.5	Open ureterolithotomy

CLT: cystolithotripsy, ESWL: extracorporeal shockwave lithotripsy, PCNL: percutaneous nephrolithotomy, URSL: ureteroscopic lithotripsy



Figure 1: The patient with knotted and fragmented DJ stent and large vesical stone. He underwent cystolithotripsy for vesical stone and open ureterotomy for removal of the knotted stent.

The presentation of forgotten stents varies. They can produce considerable morbidity due to extensive encrustations, knot formation, fragmentation and proximal migration¹⁵. Damiano et al observed flank pain in 25.3%, encrustation in 21.6%, irritative bladder symptoms in 18.8%, haematuria in 18.1%, fever more than 104°F in 12.3% and stent migration in 9.5% of patients¹⁶. In our study, irritative voiding symptoms and haematuria were the predominant presentation.

Encrustation of forgotten stents with large stone burden is a serious problem due to complications like recurrent urinary tract infection, haematuria, obstruction and renal failure¹⁷. The deposition of encrusted material on retained ureteral stents can occur both in sterile and infected urine¹⁸. Common risk factors for encrustation include indwelling time, urinary sepsis, history of recurrent stone disease, metabolic predisposition to stone diseases, chemotherapy, pregnancy and congenital renal anomalies¹⁹.

Fragmentation is another important complication and is due to loss of tensile strength. It also depends on the type of material of stents. Silicon was found to be least prone to encrustation followed by polyurethane, silitek, percuflex and hydrogel coated polyurethane. Fragmentation of polyurethane stents is four times as frequent as the silicon stents^{20,21}.

Forgotten ureteral stent with encrustation is a challenge and may require multimodal endourological approaches, even open surgery. Extracorporeal shock wave lithotripsy is the initial treatment for stents with minimal encrustation²². In our study, extracorporeal shockwave lithotripsy was needed in two patients for two sessions for proximal loop encrustations and cystolithotripsy was done for distal loop encrustations. In one patients with large encrustations both in renal pelvis and bladder, stent was removed completely by percutaneous nephrolithotomy and cystolithotripsy. In rest of the patients stents were removed by cystolithotripsy and ureteroscopic lithotripsy except in one patient where the knotted stent was removed by open ureterotomy. Awad Kaabneh et al reported doing percutaneous nephrolithotomy in eight patients and open ureterotomy in one patient out of 15 patients²³. In a study by Arora Shorab et al, five patients underwent percutaneous nephrolithotomy and one patient underwent extracorporeal lithotripsy in 12 patients with forgotten DJ stent¹⁴.

The mean number of procedures was 1.6 per patient that included four sessions of ESWL, one percutaneous, seven cystoscopic, three ureteroscopic interventions and one open ureterotomy. It was 1.25 per patient in study by Arora Sohrab et.al¹⁴.

CONCLUSION

Although DJ ureteral stents have become an integral part of urological armamentarium, their use should be limited to those patients in which the benefits override possible complications. The combination of various endourological techniques and ESWL can achieve effective stent and stone treatment with minimal morbidities and hospital stay.

Maintenance of efficient "Stent register" log book under closed supervision of operating surgeon and proper counselling of patient is needed to prevent these complications. Treatment of all patients of urinary stone diseases with placement of DJ stent should be considered incomplete unless the stent is removed.

REFERENCES

1. Rk JH, Lee YT. Percutaneous nephrostomy versus indwelling ureteral stent in patients with bilateral nonSaltzman B. Ureteral stents. Indications, variations and complications.
2. Chew BH, Knudsen BE, Denstedt JD. The use of stent in contemporary urology. *Curropin urol.*2004;14:111-5.
3. Hepperlen TW, Mardis HK, Kammandel H. The pigtail ureteral stent in the cancer patients. *J. Urol.*1979;121:17-8.
4. Gogas J, Markopoulos C, Kousos E, Gogas H, Kariaou V. Metastatic retroperitoneal and mediastinal fibrosis as first sign of recurrence of breast cancer. *Eur.J.surg.*2001;167:715-18.
5. Park DS, Pa genitourinary malignant extrinsic obstruction. *J Endourol.* 2002;16:153-54.
6. Kuno k, Menzin A, Kauder HH, Sison C, Gol D. Prophylactic Ureteral catheterization in gynecologicsurgery. *Urology.* 1998;52:1004-8.
7. Schulze KA, Wettlaufer JN, Oldani G. Encrustation and stone formation: complications of indwelling ureteral stents. *Urology.* 1985;25: 616-19.
8. PillaiK M, Keeley FX, Moussa SA, Smith G, Tolley DA. Endourological management of severely encrusted ureteral stents. *J Endo urol.* 1999;13:377-79.
9. Flam TA, Brochard M, Zerbib M, Debre B, Steg A. Extracorporeal shockwave lithotripsy to remove calcified ureteral stents. *Urology.* 1990;36:164-65.
10. Somers WJ. Management of forgotten or retained indwelling ureteral stents. *Urology.* 1996;47:431-35.
11. Borboroglu PG, Kane CJ. Current management of severely encrusted ureteral stents. *J. urol.* 2000;164:648-50.
12. Lam JS, Gupta M. Tips and tricks for the management of retained ureteral stents. *J. endourol.* 2002;16:733-41.
13. VR, Murthy S, Reddy J, DV Prasad. Endourological management of forgotten encrusted ureteral stents. *Int. Braz J urol.* 2010;36:167-70.
14. Arora S, Srivastava A 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.
15. Eisner B, Kim H, Sacco D. Repeat Knot formation in a patient with an indwelling ureteral stent. *Int. Braz J Urol.* 2006;32:308-9.
16. Damiano R, Olivia A, Esposito C, Sio DM, Autorino R, Armiento DM. Early and late complications of double pigtail ureteral stents. *Urol Int.* 2002; 69(2) : 136-40.
17. Singh V, Srinivastava A, Kapoor R, Kumar A. Can the complicated forgotten, indwelling ureteric stents be lethal ? *Int. Urol. Nephrol.* 2005;37:541-46.
18. Wollin TA, Tieszer C, Riddell JV, Deustedt DJ, Reid G. Bacterial biofilm formation, encrustation and antibiotic adsorption to ureteral stents indwelling in humans. *J.Endourol.* 1989;12:101-11.
19. Ahallal Y, Khallouk A, El FassiMJ,Farih MH. Risk Factor analysis and management of ureteral J stent complications. *Rev Urol.* 2010;12(2-3):147-51.
20. Monga M, Klien E, Castaneda -zuniega WR, Thomas R. The Forgotten indwelling ureteral stents: a urological dilemma. *J Urol.* 1995;153:1817-19.
21. Tunney MN, Keane PF, Jones DS, Gorman SP. Comparative assessment of ureteral stent, biomaterial encrustation. *Biomaterials.* 1996;17:1541-46.
22. Lai CJ, Wong WJ, Tsai P, Wu HC, Chen J. Management of a retained double J Catheter with severe encrustations. A case report. *JTUA.* 2009;2018-19.
23. Kaabneh A, Qumar AA, Hamouri F, Abbadi B. Multimodal management of urolithiasis for forgotten severely calcified ureteral JJ Stent: Our Experience at king Hussein medical center. *J Royal Medical Services.* 2011;18(4):38-42.