

Proximally migrated Double J stent in hydronephrotic kidneys: Etiological factors and management

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Abstract

Double J stents have become an essential tool in urologist's armamentarium but are never without potential complications. Migration of DJ stent is a recognized complication, though its proximal migration into the upper ureter, pelvicalyceal system is reported rarely. This can add to the cost of patients and increases hospital stay if another general/ regional anesthesia session is required for its repositioning/removal. We successfully repositioned or removed proximally migrated DJ stents ureteroscopically under local anesthesia and analgesia in all of our case series patients on a daycare basis. We emphasize the importance of recordkeeping and follow up of stented patients particularly with those with hydronephrotic systems. In the event of proximal migration of the DJ stent, it can be successfully repositioned or removed under local anesthesia and analgesia.

Keywords: Double J stent, proximal migration, ESWL-Extracorporeal shockwave lithotripsy.

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Introduction

With the advancement in endourology, the indication of DJ stenting has widened. A recent increase in the frequency of DJ stent placement is noticed in COVID - 19 pandemic in our institution due to a variety of reasons, it necessitates familiarity with complications associated with its use. The most fearsome complication would be forgotten and encrusted DJ stent[1]. The forgotten DJ stent invites further complications e.g. encrustation and hence obstruction to urine outflow, stent fracture, and impaction of the stent. DJ stent is a double-edged sword, hence advisable to use judiciously along with counseling of patients and attendants regarding its need and timely removal. The stents double coil design

anchors it proximally in the renal pelvis or calyx and distally in the urinary bladder. This design prevents its migration despite ureteral peristalsis, urine outflow and physical activity[2]. Proximal migration and Erosion of DJ stent is rarely encountered complication in urological practice. In the literature, several theories have been proposed to explain the proximal migration of DJ stents. Herein, we present a case series of five patients whose proximally migrated DJ stent was uretero-scopically repositioned or removed under local anesthesia and analgesia under fluoroscopic guidance and we evaluated factors that might have triggered its upward migration.

Case 1

A 71 years female patient referred to our tertiary care center with right hydronephrosis and residual calculi after undergoing ESWL for right renal stone from the peripheral center. Right DJ stenting was done under fluoroscopic guidance and was planned for PCNL. When she came for readmission after 2 weeks, investigations suggested proximal migration of stent with echogenic debris in dilated pelvicalyceal system and increased TLC. *Figure 1.*

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Fig 1:Right renal stone with proximally migrated right DJ stent

She was planned for DJ stent repositioning ureteroscopically under local anesthesia and analgesia. She was given antibiotics - Ceftriaxone & Amikacin intravenously 30 minutes before the procedure. For analgesia, injection Paracetamol 1 gm and Diclofenac 75 mg were given 10 minutes before repositioning of DJ stent. She was positioned on the operation table and 30 ml of 2% lignocaine jelly was instilled through the urethra, 5 minutes before instrumentation. After cystoscopic localization of the right ureteric orifice, hydrophilic guidewire (0.035 inch) was placed into the right pelvicalyceal system under fluoroscopic guidance. Then 6/7.5 Fr semirigid ureteroscope was advanced up until the lower end of the upmigrated DJ

stent, which was grasped with 2.8 Fr tri prong forceps and taken out in toto. Re-DJ stenting was done and the upper coil of the stent was positioned in the renal pelvis.

Case 2

A 32 years old male presented with bilateral flank pain and vomiting in the emergency department. Investigations suggested bilateral upper ureteric calculus with proximal dilatation of bilateral ureters and PCS. Various treatment options were discussed, he opted for bilateral DJ stenting followed by ESWL. When he was recalled after 21 days for 2nd session of ESWL, the left DJ stent was found to be upmigrated. Figure 2.



Fig 2:Bilateral upper ureteric stones with proximally migrated left DJ stent

He was taken to the operation theatre; the left DJ stent was removed and Re-DJ stenting was done on the left side under fluoroscopic guidance as mentioned in case 1.

Case 3

A 34 years old female presented with left renal calculus and hydronephrosis. After discussing various

treatment modalities, she opted for ESWL after DJ stenting; though she was explained about the requirement of multiple sessions of ESWL and low stone clearance rate because of a large stone burden. Before the 3rd session of ESWL, Xray KUB revealed proximal migration of DJ stent. Figure 3.



Fig 3:Left renal stone with upmigrated left DJ Stent

She was shifted to operation theatre and left DJ stent replacement was done as in case 1.

Case 4

A 38 years tall female patient who had undergone left URSL and DJ stenting for left mid ureteric stone in our

department, presented 3 weeks later for DJ stent removal. On evaluation, stone clearance was seen, but the distal end of the DJ stent had migrated into the mid ureter with proximal HDUN. Figure 4.



Fig 4:Post URSL Patient with proximally migrated left DJ Stent

Proximally migrated DJ stent was removed ureteroscopically under local anesthesia and analgesia.

Case 5

A 25 years old male presented with left flank pain because of left upper ureteric stone of size 1 x 1 cm with proximal hydroureteronephrosis. He opted for

ESWL after DJ stenting. Before the 2nd session of ESWL, the DJ stent was found to have migrated into the proximal ureter which was repositioned ureteroscopically under fluoroscopic guidance. Figure 5.



Fig 5:Patient under C-arm showing upward migration of left DJ Stent after 20 days of ESWL
Stone clearance was achieved after the 3rd session of ESWL.

Discussion

The DJ stents have become one of the valuable tools for providing internal drainage of the upper urinary tract to the urinary bladder, preventing/relieving the complications associated with upper tract injury and ureteral obstruction either internal or external. The ideal DJ stent should be biocompatible, affordable, resistant to migration, have excellent flow characteristics, resistance to encrustation and infection, easily insertable, non-refluxing, and radiopaque. Despite the improvement in designing and material of implanted devices, no currently available device fulfills all the criteria of an ideal stent[2].

DJ stent should be used judiciously as they are not free of complications. Migration of DJ stents is a known complication and it can occur proximally into the PCS or ureter and distally towards the urinary bladder. Proximal migration of the DJ stent is rarely encountered occurring in 0.6- 3.5% of cases[3].

Breau et al reported proximal migration of stent in 2% of patients in their series and suggested that proximal migration occurs when a stent is too short for the ureter or when the indwelling time of stent was prolonged. They concluded that if it is necessary to continue stenting a ureter after the migration has been detected, a longer stent should be placed [4].

According to Slaton et al, DJ stent of shorter than ideal length, inadequate distal curl, and proximal curl of DJ stent in the upper calyx rather than in the renal pelvis appears to be a significant factor responsible for proximal migration of stent [5]. Stent with full coil are less vulnerable to migrate than those with J shape and, polyurethane stent having great memory are less prone to migration as compared to silicon DJ stent with less memory [6,7].

Several other theories have been proposed accounting for proximal migration of DJ stent viz. prolonged stent indwelling time, stent movement in conjugation with kidney movement during respiration, hydronephrosis, and ureteric calculus alongside the stent acting as a jack- allowing only proximal migration of stent during respiration[5,7,8,9]

In a case report, limping which was accompanied by twisting trunk movement on walking of a hemiplegic patient was suggested as a cause for repeated proximal migration of DJ stent .¹⁰ Deep massage has also been reported as a cause of ureteral stent displacement[11].

In our series, ESWL in patients with stented hydronephrotic kidney was a common finding in four patients. Repeated outer force in the form of shock waves of ESWL might be a trigger for the displacement of DJ stent proximally in the setting of a

hydronephrotic kidney. In case number 4, who was a tall female in whom proximal curl of the DJ stent (post URSL) was in the upper calyx of the hydronephrotic kidney rather than in the renal pelvis might be a factor for proximal migration of the stent.

So, we suggest the use of a DJ stent of appropriate length and placement of the proximal curl of the DJ stent in the renal pelvis of a hydronephrotic kidney. Urologists should be conscious when any repeated external force (like shockwaves of ESWL) is delivered to the stented patient and should also check for stone fragmentation as well as the DJ stent migration after a session of ESWL.

Proximally migrated DJ stent rarely causes symptoms; however, it might obstruct urine outflow. Hence, it's repositioning or removal is warranted. Various methods of retrieval of migrated DJ stent e.g. ureteroscopy with tri prong or biprong forceps, helical basket, and ureteral balloon dilator have been described in the literature. In most cases, the distal end of the migrated stent lies in the ureter and can be removed ureteroscopically. In a study on 37 patients, ureteroscopy has been used to retrieve the stents, with a success rate of 91.9% by Livadaet al[12]. However, percutaneous access may be required in the rare event of complete coiling of the stent in the renal pelvis or, may require a combination of multiple procedures including ureteroscopy, percutaneous nephroscopy, intra or extracorporeal lithotripsy, or even open procedures for complicated cases of proximally migrated DJ stents. Roy et al performed percutaneous nephrostomy to remove migrated stents in 13 cases [13]. Migration can be prevented by choosing a stent of appropriate length and a material like polyurethane and should be placed properly. Breau et al advocated direct measurement of ureteral length from Xray and postulated that the optimal stent to ureter length ratio is 1.04, which reduces urinary bladder irritation, as well as migration[4]. Migration, can also be prevented by adding a retrieval suture to the distal end and in event of longer indwelling time, the stent should be changed frequently [14].

Conclusion

Proximal migration of the DJ stent is an uncommon complication, and the patient may be asymptomatic. Migrated DJ stent should be repositioned/ removed as it can obstruct urine outflow, can cause urinary tract infection, and deterioration in renal function. Proximally migrated stent can be repositioned/removed ureteroscopically using tri prong forceps in fluoroscopic control under local anesthesia and

analgesia as in our patients and is a well-tolerated procedure.

References

1. Bultitude MF, Tiptaft RC, Glass JM, Dasgupta P. Management of encrusted ureteral stents impacted in the upper tract. *Urology*. 2003;62(4):622-626.
2. Bansal N, Bhangu G, Bansal D. Postoperative complications of double-J ureteral stenting: a prospective study. *Int Surg J*. 2020;7(5):1397-1403.
3. Smith, M.J.V. Ureteral stent: their use and miss use. *Monogr. Urol*. 1993;14:1.
4. Breau RH, Norman RW. Optimal prevention and management of proximal ureteral stent migration and remigration. *J Urol*.2001; 166:890-893.
5. Slaton JW, Kropp KA. Proximal ureteral stent migration: an avoidable complication? *J Urol*. 1996; 155:58–61.
6. Saltzman B. ureteral stents. Indications, variations, and complications. *Urol clin North Am*. 1988; 15:481-491.
7. El-Faqih SR, Shamsuddin AB, Chakrabarti A, Atassi R, Kardar AH, Osman MK, et al. Polyurethane internal ureteral stents in the treatment of stone patients: morbidity related to indwelling times. *J Urol*. 1991 ;146(6): 1487-91
8. Sarkar D, Dutta A, PAL D.K. Proximal migration of ureteric DJ stent: A case series. *APSP J Case Rep*. 2019; 10:6
9. Ko W, Lee W, Jung J, Lee M. Spontaneous proximal double pigtail ureteral stent migration after shockwave lithotripsy: “Jack” phenomena. *J Urol*.2001; 166:1387
10. Sugiyama M., Fujimura M., Nakamori H., Nishikawa R., Sakamoto S., Sekita N. et al. Repeated spontaneous migration of ureteral stent in hemiplegia patient during ureteral stone treatment. *Urology case reports*.2019; 24:100854.
11. Kerr H.D. Ureteral stent displacement associated with deep massage. *Wis Med J*. 1997; 96 (12):57-58.
12. Livadas K.E., Varkarakis I.M., Skolarikos A., Karagiannis E., et al., Ureterosopic removal of mildly migrated stents using local anesthesia only. *J Urol*.2007; 178:1998-2001.
13. LeRoy A. J., Williams H.J., Jr., Serura J.W., Patterson D.E., Benson R.C. Indwelling Ureteral stents: percutaneous management of complications. *Radiology*.1986;158:219.
14. Smith M.J.V., Short retrieval suture in the prevention of ureteroscopy. *J. Endourol.*, suppl.1990;4:5127

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