Percutaneous removal of impacted double J stent in a transplant kidney

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Abstract

Prophylactic double J (DJ) stent insertion has been adopted as a routine procedure in renal transplant patients for internal urinary diversion and for protecting ureteroneocystostomy anastomosis. The timely and early removal of stent has been proved to reduce the occurrence of stent-associated complications such as migration, encrustation, and infection. The most commonly used procedure of stent removal via retrograde cystoscopic approach can sometimes be technically very difficult leaving antegrade approach as another alternative to open surgery as the last resort. Here, we describe a case of antegradely removed impacted DJ stent by pushing it free into the urinary bladder followed by cystoscopic removal.

Key words: Cystoscopy; DJ Stent; guide wire; transplant kidney

Introduction

Placement of a prophylactic double J (DJ) stent has been adopted as routine procedure in kidney transplantation for protecting ureteroneocystostomy anastomosis. The stent is usually removed retrogradely by performing a cystoscopy. However, in case of impaction or fracture of stent, an antegrade route may be used for its removal. Here, we present a unique case of impacted stent in a transplant kidney, which was removed by antegrade puncture of the pelvicalyceal system.

Case Report

A 23-year-old male patient with chronic kidney disease underwent live renal transplant in May 2014 from his mother as the donor. The surgeons performed prophylactic DJ stenting of the ureter to protect ureteroneocystostomy anastomosis. As per the protocol of our institute, the patient was called for cystoscopic removal of DJ stent after 4 weeks. The procedure was accomplished under local anesthesia taking all aseptic precautions. However, the stent could not be removed even after two consecutive attempts made by experienced urologists. The reason for failure was thought to be inadvertent suturing with biodegradable suture through the lower end of the DJ stent at the vesicoureteric anastomotic site. Considering the nature of biodegradable suture, patient was again called for the stent retrieval after 6 weeks of initial attempt. During the removal attempt, there was inadvertent fracture of the lower J part of the stent. The subsequent limited acquisition of plain computed tomography of the pelvis showed partially fractured distal end of the stent [Figure 1]. No evidence of calcification or encrustation was seen along the stent. Transplant kidney was normal in size, outlines with decompressed pelvicalyceal system. Proximal loop and distal part of

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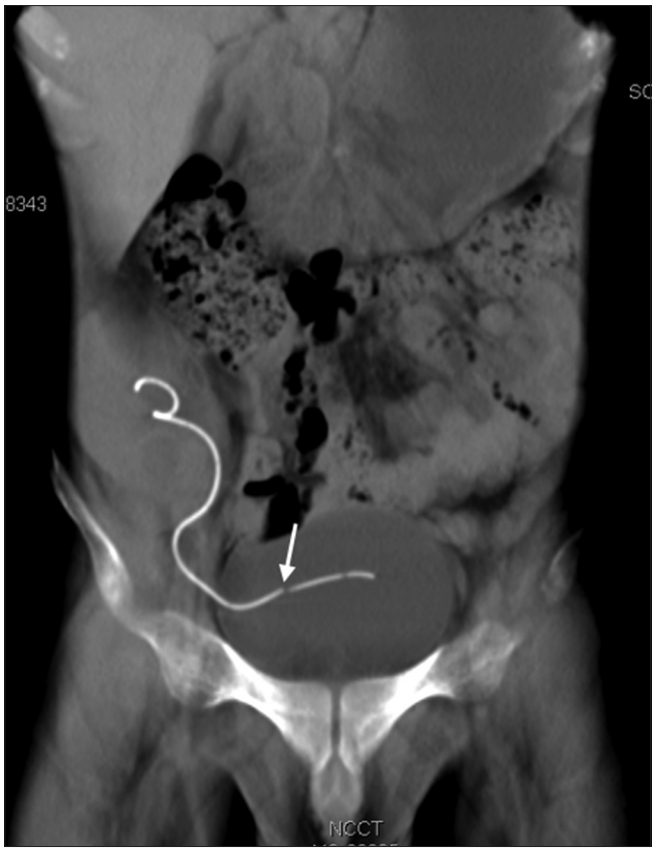

Figure 1: Unenhanced computed tomography of the pelvis in coronal plane showing the impacted stent in the transplant kidney with fractured distal end (arrow)

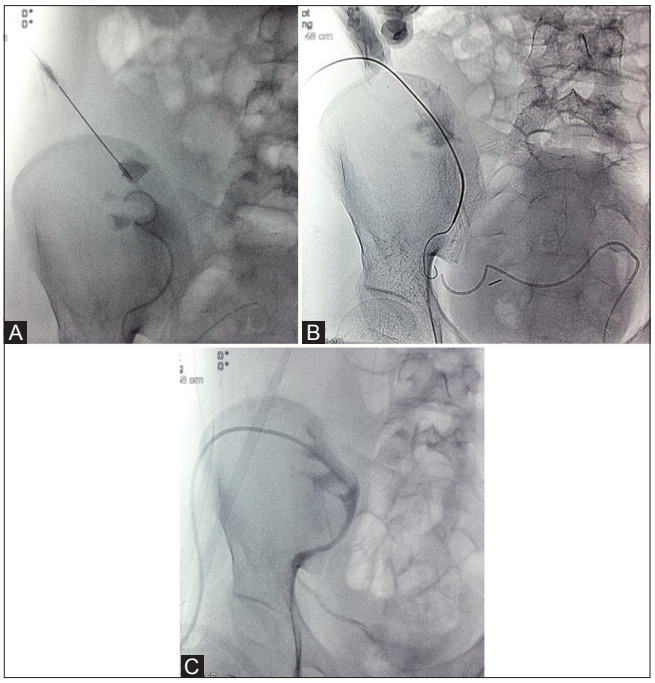

Figure 2 (A-C): Under ultrasonography guidance, the upper pole was punctured with micropuncture needle followed by contrast injection under fluoroscopy (A). After contrast injection, the upper end of the impacted stent could be seen in the middle calyx whereas lower end could be seen in the urinary bladder. Under fluoroscopic guidance, the impacted stent was gradually pushed into the urinary bladder by an Amplatz super stiff guide wire introduced through the MPA catheter (B). Subsequently, cystoscopy was performed and the stent was successfully removed. Anterograde pyelography (C) with nephrostomy tube *in situ* showing the opacification of pelvicalyceal system and ureter without any filling defect

the stent was seen within the renal pelvis and urinary bladder, respectively. Then, the patient was referred to us for percutaneous removal of the impacted stent. The patient was shifted to the angiography suite for the stent retrieval procedure, which was performed under local anesthesia taking all aseptic precautions and informed consent. The transplant kidney pelvicalyceal system was distended by giving intravenous frusemide and subsequently upper pole anterior calyx was punctured under ultrasound (USG) guidance with micropuncture needle [Figure 2A] from anterolateral approach so that the ureter could be negotiated easily through the approach. It was followed by advancement of 5 French multipurpose angiographic (MPA) catheter over 0.035 inch terumo J tip guide wire into the renal pelvis proximal to the tip of DJ stent under intermittent fluoroscopy guidance. The hydrophilic terumo guide wire was exchanged with 145 cm 0.035 inch superstiff Amplantz guide wire with subsequent slow stepwise pushing of the stent distally under fluoroscopic guidance [Figure 2B] by the stiff guide wire. The free delivery of the stent into the urinary bladder was achieved in approximately 15 minutes. Subsequently, cystoscopy was performed and the stent was successfully removed. Anterograde pyelography [Figure 2C] with nephrostomy tube *in situ* showing the opacification of pelvicalyceal system and ureter without any filling defect. No periprocedure complication was encountered.

Discussion

The prevention and treatment of urological complications remains an important area for the renal transplant surgeon.[1] Major vesicoureteric complications (anastomotic leakage and/or strictures) present early after transplantation and contribute to patient morbidity, graft loss, and mortality.[2-5] Ureteric ischemia is considered to be chiefly responsible for the early ureteric complications in post transplantation period.[6] The utilization of the DJ stent has been a particularly important innovation in avoiding and treating these complications.[1] Prophylactic stenting can also treat minor leaks and obstruction at the anastomotic site and has been found to improve renal function.[2,7] Routine anastomotic stenting in renal transplantation has been adopted as usual practice at most of the renal transplant centres but the debate continues.[2] However, using stent is not free from stent-associated complications. The possible complications include increase in the severity of urinary tract infection, persistent hematuria, bladder discomfort, stent migration, breakage, encrustation, and complications

during removal.[7] These possible complications can be avoided by using the stents for the minimal possible duration.

The ureteric stents are routinely removed cystoscopically. Classically, cystoscopic guidance with forceps in the retrograde direction is the standard approach for removal or exchange of an indwelling ureteral stent.[1] Retrograde retrieval, however, can be difficult or impossible because of proximal migration of the stent, encrustation, previous surgery on the bladder, altered anatomic features of the ureter/vesicoureteric anastomosis, inability to maintain lithotomy position, or enlargement of the prostate.[8] Shin *et al*. have also elaborated few other reasons for difficult retrograde stent removal including history of surgery resulting in an inaccessible retrograde route, urethral stricture, fragmentation of the proximal stent, and inability to find the ureteral orifice with a cystoscope.[9] The operative treatment of complicated stent is not advisable because of associated risk of open surgery such as sepsis, and in case of transplant kidney because of associated inflammation and fibrosis around transplant kidney, its blood supply and ureter.[1]

An antegrade approach through a percutaneous nephrostomy is an alternative for retrieval of a ureteral stent in case the retrograde approach fails or is not feasible. Successful removal of proximally migrated stent by percutaneous antegrade approach using semirigid bronchoscopy has also been reported by Lal *et al*.[10] Almost all of the previously described techniques of antegrade stent removal have been performed with the nephrostomy track dilated from 8 to 32 French, logically making the procedure lengthy and tedious with a possible risk of injury to the urothelium.[9] The antegrade stent retrieval by ureteroscopy may also be challenging, especially in postoperative cases.[10] Extensive search on Medline did not show any publication or report describing use of only MPA catheter mounted over a stiff guide wire in pushing the impacted DJ stent antegradely followed by successful retrieval of DJ stent cystoscopically. Although radiation exposure and total duration during other percutaneous antegrade approach of removal of stent in radiology department has not been elaborated in the literature, the use of guide wire in pushing impacted stent followed by retrograde cystoscopic removal simply entails less radiation exposure. Our technique does have certain limitations. Some may argue that the ease and success of this technique may be limited to the transplanted kidney because of its superficial location and cannot be applied to the deeply located native kidney. Second, the procedure has two different phase—fluoroscopic manipulation of stent by guide wire followed by cystoscopic removal. Although the technique is novel, it should only be used in difficult situation where routine procedure fails to remove impacted stent.

Conclusion

This case highlights a new technique of percutaneous pushing an impacted DJ stent free into the urinary bladder followed by successful retrograde retrieval of the stent by cystoscopy, thus avoiding the need of painful percutaneous track dilatation and use of bulky larger instrument and logically preventing possible urothelial injury.

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Conflicts of interest
There are no conflicts of interest.

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