

Knotted ureteral stent: a rare complication of ureteral stent usage

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Abstract The use of ureteral stents has become a routine urological practice. There are many different complications with ureteral stent use. One rare complication is knotting, which can be a very difficult condition to treat. We report a case in which a complete knot was found in the proximal part of an indwelling ureteral stent with a proximal ureteral stone.

Keywords Double-J stent · Ureteral stone · Knot

Use of a permanent ureteral stent was first described by Zimskind et al. [1] in 1967. Over the years, advances in surgical techniques have led to an increase in the indications for ureteral stent use, which has become an indispensable part of current urological practice. Ureteral catheters are mainly indicated for the treatment of urinary system calculi and ureteral stricture and obstructions, to ensure post-operative drainage and for urinary diversion [2, 3]. Use of a permanent ureteral stent may cause a number of complications, such as irritative urinary symptoms, colic pain, vesicoureteral reflux, malposition, hematuria, urinary tract infections, bacteriuria, fever, incrustation, stent migration, ureteral perforation, erosion and development of fistula [4]. Another rarely seen complication is stent knotting within the ureter. Sixteen cases with stent knotting have been described in the literature.

Although stent extraction is a routine procedure, extraction of the knotted stent may be complicated. Here, we present a case with a ureteral stent knotted in the proximal ureter.

A 53-year-old male presented to our clinic with right side pain, nausea and vomiting. A 10-mm ureteral stone in the upper end of the right ureter was identified in his intravenous pyelogram. ESWL therapy was planned for the ureteral stone and a 4.7-F 28-cm double-J stent (Geotek, Ankara, Turkey) was installed in the right ureter before ESWL. Direct urinary system X-ray obtained for control purposes after the second session of ESWL therapy revealed that the double-J stent had migrated to the proximal ureter and that the stone was not completely broken (Fig. 1). An endoscopic intervention under general anesthesia was planned to extract the migrated stent and to access the ureteral stone. During ureterorenoscopy, the stent was visualized in the right proximal ureter. We attempted to extract it using foreign body forceps. The stent could not be extracted by simple traction. The ureteral stone was therefore accessed by moving across the stent using renoscopy. Ureteral stone was treated using a holmium:YAG laser lithotripter, and the stone fragments were removed using the renoscopy forceps. A further attempt was made to extract the stent using foreign body forceps and it was successfully removed in one piece. The extracted double-J stent was knotted in the proximal part of the ureter (Figs. 2, 3). Follow-up was unproblematic, and the patient was discharged with no problems.

Ureteral stent knotting was first reported by Groeneveld et al. [5] in 1989 and was successfully treated by simple traction. To date, 16 cases have been reported in the literature, and several techniques have been used to remove these knotted ureteral catheters. Knotting was reported in the proximal ureter in 14 patients, in the middle ureter in 1 and in the distal ureter in 1. The patients with knotting in

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Fig. 1 Appearance of the knotted double-J stent at a direct urinary system X-ray

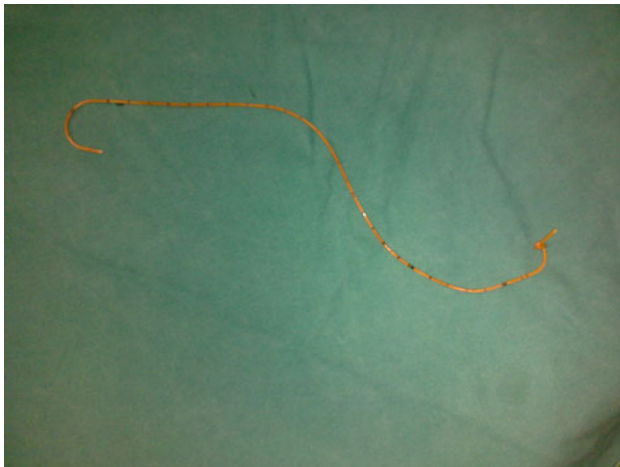


Fig. 2 Complete removal of the knotted double-J stent

the middle and distal ureters were treated with simple traction [6, 7].

As in our case, the majority of knots occur in the proximal ureter. Several techniques have been used to remove the knotted catheter. Simple traction was successful in three cases with knotting in the proximal ureter [5, 8, 9]. Braslis et al. removed a knotted ureteral stent via percutaneous access. In later years, Kundargi et al. used the same method in the cases they reported [10, 11]. Methods such as ureteroscopy, ureterotomy, guidewire-assisted removal and short- or long-term simple traction have been used to remove stents knotted in the proximal ureter [12–15]. In two subjects, the knotted double-J stent was removed by breaking it into pieces using a holmium laser [16, 17]. Migration of the ureteral stent toward the



Fig. 3 Appearance of the complete knot in the proximal part of the indwelling double-J stent

proximal ureter and the presence of stone in the ureter may be the factors that facilitate the knotting of the stent. In our case, ureteral stone may have caused the knotting of the stent. One of the reasons why the simple traction method, which we tried first, failed was the presence of ureteral stone. In addition, stent length and coil configuration have also been suggested as facilitating factors for stent knotting [6].

Knots may occur during the implantation of the ureteral stents, in which the stent stays implanted, or during the removal of the stent. Stent knotting is a rarely seen and difficult-to-treat complication in endourological practice. If there is no obstructive pathology in the distal part of the knotted stent, such as narrowness or stones, simple traction should be considered. If resistance is experienced during traction, given the likelihood of ureteral damage and avulsion, the procedure should be ended and alternative methods should be tried.

It will be useful to select a stent of appropriate length during the stent insertion procedure, to control the position of the stent and to ensure that both ends are properly curled after the procedure. In all cases with ureteral stent in which difficulty is experienced during removal, the possibility of stent knotting should always be kept in mind and therapy planned accordingly.

Conflict of interest None.

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