Management of a patient with a double J stent knotted at the mid-portion

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ABSTRACT

Ureteral stents are safe, and because of their widespread usage, complications associated with stenting increased. Stent knotting is a rare complication that may lead to severe urologic complications that require further endourologic procedures. There are few case reports of knotted stents reported in the literature; nevertheless, the knotting occurred mainly in the proximal loops. This report presents a rare case of a downward migrated stent with knot formation at the mid-portion.

1. Introduction

Ureteral double J stents are widely used in urologic procedures to relieve an obstruction or as an adjunct to other treatments. Unfortunately, due to their widespread use, complications associated with stenting increased. Stent knotting is a rare complication that may lead to severe urologic complications that require further endourologic procedures.

There are few case reports of knotted stents reported in the literature; nevertheless, the knotting occurred mainly in the proximal loops. This report presents a rare case of a downward migrated stent with knot formation at the mid-portion.

2. Case report

A 25-years old female patient presented with complaints of bilateral flank pain. The physical examination and laboratory findings were unremarkable except for microscopic hematuria. The computerized tomography (CT) revealed a left-sided 15 mm and a right-sided 13 mm renal pelvis stone with marked dilatation in both collecting systems, more prominent in the left kidney (Fig. 1). Retrograde intrarenal surgery (RIRS) with laser lithotripsy was performed in the left kidney, and a 4.8F double J ureteral stent was inserted to the right side with a stone-free left kidney. Three weeks after discharge, the patient was re-admitted for a second RIRS to the right kidney, and stent was introduced. This procedure was uneventful, and the patient was discharged the day after surgery. The patient presented to the clinic ten days postoperatively with the complaint of increasing right flank pain.

A plain kidney-ureter-bladder (KUB) X-ray showed a downward migrated ureteral stent (Fig. 2). She was taken to the operating room for stent removal. Cystoscopy was performed, and the migrated stent was gently pulled by grasping forceps under fluoroscopic guidance. However, this maneuver failed. Subsequently, we introduced a guidewire to the right ureter alongside the stent and advanced a 7F semi-rigid ureteroscope with the guidance of the wire gently. We advanced the ureteroscope until we detected a knot formation in the mid-portion of the stent at the level of the distal ureter. Although we reached the knot and noticed that the guidewire passed beyond the knot, the ureteroscope could not pass it. We pulled the ureteroscope and the guidewire out following this maneuver and attempted to remove the stent again by grasping forceps. We could successfully remove the knotted stent probably with the help of the dilating effect of the guidewire and particularly the 7F ureteroscope (Fig. 3). We inserted a 5F ureteric catheter and a 16F Foley catheter; and removed one-day letter successfully.

3. Discussion

Although ureteral stents are usually safe, stent-related complications can occur due to their widespread use in urological practice. Nevertheless, stent knotting is very rare among these complications. It can cause ureteral trauma or avulsion, especially if the stent is not pulled gently. Moreover, it may necessitate further endourologic procedures to remove the stent.
According to the current literature, most knotted stents had knot formation at the proximal loop. In contrast, only two cases of mid-portion and one case of distal loop knot formation cases were reported. In 2002, Quek et al. reported the first case of mid-portion knot formation in a double J stent, and managed successfully by gentle traction. Bhirud et al. reported that they could remove the stent by a percutaneous approach using a 26F nephroscope. In our case, the knotted stent required a ureteroscopy for both diagnosis and facilitating its removal.

There is a male predominance with a ratio of 4:1, and the most common indication of stent insertion was urolithiasis.

Due to the scarcity of this clinical entity, there are no guidelines for removing the knotted stents. In 2021, Lee et al. reported a case report and literature review regarding knotted double J stents. These authors proposed a sequential treatment algorithm to remove knotted stents. They suggested that guidewire insertion and ureteroscopy under fluoroscopy should be attempted as the second-line treatment method in patients whose stent could not be removed by gentle traction. In addition, they recommended laser fragmentation, percutaneous removal, and removal by open surgery as the third, fourth, and fifth-line treatment methods. Our approach was in line with this algorithm.

4. Conclusion

Ureteral stent knotting is a very uncommon complication. This case represents the third case of a double J stent knotted at the mid-portion to the best of our knowledge. Sudden pulling force should never be applied while removing double J stents due to increased risk of ureteral avulsion.

![Unenhanced CT reveals bilateral renal pelvic stones.](image1)

![Plain Kidney-Ureter-Bladder x-ray shows the migrated stent.](image2)
Fig. 3. Postoperative view of extracted knotted stent.

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