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Case Report: Holmium Laser Removal of Antegrade Ureteral Stent Suture via Ureteroscopy

Paul Chialastri
Rowan University

Jerome Pietras
Rowan University

Thomas Mueller
Rowan University

ROWAN UNIVERSITY
School of Osteopathic Medicine

Case Report: Holmium Laser Removal of Antegrade Ureteral Stent Suture via Ureteroscopy

Paul Chialastri DO, MS[1]; Jerome Pietras DO[2]; Thomas Mueller MD[2]
[1]RowanSOM, Stratford NJ; [2]New Jersey Urology, Voorhees NJ

Abstract

Antegrade placement of ureteral stents is common after nephrostomy tube placement for obstruction in the septic patient and when retrograde placement fails. Ureteral stents have a nylon retaining suture attached to aid in placement. If left in place accidentally, these will not degrade and will become embedded in the renal parenchyma preventing stent removal and potentially leading to infection and stone formation. Ureteroscopic holmium ablation of the residual suture at the level of the parenchyma allows for stent removal and no urothelial defect was noted on repeat ureteroscopy 3 weeks later. Ureteroscopy with holmium lasering of retained suture appears safe for removal of retained stents with no symptoms related to suture left in the renal parenchyma and no visible defect seen on follow-up renoscopy.

Introduction

Ureteral obstruction is caused by malignancy, stones, external compression, congenital defects, and iatrogenic injuries (source). Subsequent hydronephrosis can be decompressed by antegrade or retrograde access. Retrograde access is via cystoscopy, while antegrade access is performed typically by interventional radiology with a percutaneous nephrostomy tube (PCN), percutaneous nephroureteral catheter (PCNU), or percutaneous antegrade ureteral catheter. These are placed over a wire with the Seldinger technique and typically place catheters from 4.7 French to 10 French in size. These are performed under fluoroscopy to ensure positioning. Depending on the catheter used there is a lifespan ranging from 3-12 months prior to necessary removal to avoid encrustation, obstruction, fracture, infection. These stents have a permanent monofilament nylon suture at the end to facilitate placement and subsequent removal of the stent (Bard packaging). When not removed, these sutures can present a difficult challenge for ureteric stent removal.

Case Details

A 95M with ESRD due to HTN on HD for 7 months presented for bilateral JJ stent removal. He had initially been diagnosed with acute renal failure 6 years earlier where he was managed acutely with bilateral PCN and Foley placement. He subsequently underwent a TURP and internal JJ stent placement. At that time, he was diagnosed with chronic kidney disease due to hypertension as well as bilateral UPJ obstructions. He has undergone routine JJ stent changes dozens of times. He acutely presented to the hospital in worsening renal failure with creatinine 6.9 from baseline 5 and started on HD 7 months prior to his stent removal. At that time, he had his Right stent changed but was unable to replace the left JJ stent after removal, therefore Interventional radiology placed a left PCN, which was internalized to an 8 fr x 26 cm JJ stent 3 days later (Figure 1). He was continued on routine HD as an outpatient and treated for enterococcus and pseudomonas UTI. 7 months later he presented for stent removal as he made little urine on HD and nephrology was concerned for infection risk. The patient had no reported issues with the stents, KUB and fluoroscopy saw no malpositioning or encrustation prior or during the case.

The patient was in the dorsal lithotomy position and the right stent was removed with flexible graspers, however the left stent did not come easily and was fixed in position. This was straightened with a wire through the stent but still would not remove despite no retaining curl seen. Ureteroscopy alongside the stent showed a blue string preventing the stent to be removed (Figure 2). We used the holmium laser on dusting settings to cut the proximal part of the string and allow the stent to be removed (Figure 3). We then were able to perform renoscopy and saw that the string was attached to a papilla in the lower pole but was unable to be removed by grasping with ureteroscopic graspers (Figure 4). At this point we again used the holmium laser to cut right on the papilla and remove the remaining string with the graspers (Figure 5). There was a small piece of string left in the parenchyma that was unable to be removed. Gross appearance of the string can be seen in Figure 6.

Due to the amount of trauma to remove the stent, a new left JJ stent was placed with outpatient ureteroscopy performed three weeks later. On repeat renoscopy there were no defects seen in the papilla and the patient was left without ureteric stents. On 10-month follow up the patient is continued on HD and has had no UTI, flank pain, or repeat Urologic interventions.

Discussion

At our institution we commonly enlist Interventional Radiology for internalization of percutaneous nephrostomy tubes to JJ stents. This likely represents an unreported retained suture from the internalized stent that has ingrown into the renal parenchyma. There was no reported difficulty in placement per the procedural note and no skin defect. The incidence of this occurring is unknown and no similar case reports could be found on literature review. The string was unable to be pulled with graspers but laser ablation of the string appeared to remove all components in the collecting system despite likely leaving behind a short segment in the renal parenchyma.

Foreign bodies can become a nidus for stones and infection, however at 10-month follow up the patient has had no UTIs or urologic complications. There was no defect seen on repeat renoscopy and it appears no deleterious effects of whatever retained intraparenchymal string persists, if any. Our case had apparent good success with laser ablation, however it is unclear if ESWL or PCNL would be alternative options if ureteroscopy failed.

On the packaging for ureteric stents it states the suture is monofilament but does not state its material. After discussions with a large JJ stent producing company's representative it was determined to be nylon. This is a non-absorbable suture and likely would not dissolve over time and form stones if not removed promptly. Future production considerations to change the suture to a dissolvable suture would likely eliminate this rare complication.

Conclusions

Retained suture from an antegrade ureteric stent appears to be a rare phenomenon preventing simple cystoscopic stent removal. Ureteroscopy with holmium lasering of retained suture appears safe for removal of retained stents with suture left in the renal parenchyma with no visible defect seen on follow-up renoscopy.

Figure 1: fluoroscopy of left antegrade JJ stent placement

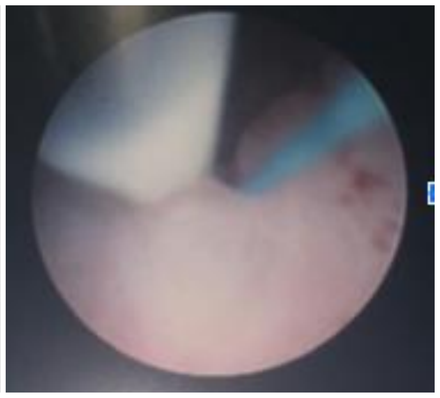

Figure 2: suture seen along JJ stent

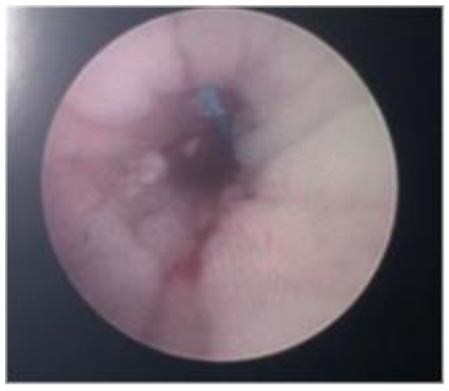

Figure 3: Residual suture after holmium ablation and JJ stent removal

Figure 4: Insertion point of suture in lower pole papilla

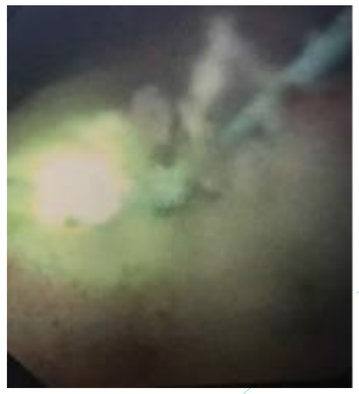

Figure 5: Holmium ablation of residual suture at lower pole papilla

Figure 6: Gross specimen after ureteroscopic extraction

Contact

Paul Chialastri DO, MS
Rowan SOM Urology
Email: Chialastri@rowan.edu

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BARD Inlay Ureteral stent with Suture [package insert]. BARD Medical Division, Covington, GA; 2017._https://www.crbard.com/CRBard/media/ProductAssets/BardMedicalDivision/PF10352/en-US/h0pujdlxc4w0kth3uxqsi3eg9s4d1pyb.pdf