Urology Case Reports 47 (2023) 102331

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Endourology

Endoscopic combined intrarenal surgery for renal allograft lithiasis using "sheath-connection technique": A case report

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ARTICLE INFO

Keywords:
Sheath-connection technique
Percutaneous nephrolithotripsy
Endoscopic combined intrarenal surgery
Renal allograft

ABSTRACT

A 66-year-old man was diagnosed with renal allograft lithiasis. Although retrograde intrarenal surgery was attempted, a ureteral access sheath (UAS) was difficult to insert. Subsequently, we planned the endoscopic combined intrarenal surgery (ECIRS) using the "Sheath-connection technique." We indwelled the two UAS anterogradely and retrogradely, unified them at the bladder and the junction of the two UAS was passed through the ureterovesical junction. We successfully performed ECIRS.

1. Introduction

According to a recent meta-analysis, the overall incidence of kidney stones in kidney transplant recipients is 1.0%.[1] For treatment of renal allograft lithiasis (RAL), no consensus has been reached. Generally, transplanted kidneys and ureters are denervated and replaced in an ectopic position. If the RAL does not spontaneously pass, aggressive treatment is necessary due to the risk of various complications. We performed endoscopic combined intrarenal surgery (ECIRS). For RAL treatment, retrograde approaches using a ureteral access sheath (UAS) are often difficult or infeasible because of the ectopic location of the kidney allograft or ureterovesical implantation.[2]

Thus, we introduce the "sheath-connection technique," for a patient with calculi in the transplanted kidney when the insertion of UAS makes ECIRS for RAL difficult.

2. Case presentation

A 66-year-old Japanese man presented with right lower abdominal discomfort. Ten years ago, he was diagnosed with end-stage renal disease caused by diabetic nephropathy with arteriosclerosis obliterans (ASO) and underwent cadaveric renal transplantation at another institution. The Lich-Gregoir technique was performed using ureteroneocystostomy. Computed tomography (CT) showed a 7-mm stone in the transplanted ureter, and his serum creatinine levels were elevated to 2.6 mg/dL. We immediately indwelled a double-J ureteral stent. Subsequently, clinical symptoms and serum creatinine levels improved. Although retrograde intrarenal surgery (RIRS) was attempted twice, UAS could not be inserted into the ureter of the transplanted kidney, and the patient had residual stones. After RIRS, his ASO symptoms worsened, and he was transferred to another institution for ASO treatment. When he revisited our institution, CT showed multiple calculi around the indwelling ureteral stent in the transplanted kidney (Fig. 1A and B). Therefore, we planned to perform ECIRS as it was difficult to treat with this RAL. The patient was placed in the traditional lithotomy position, and we performed the procedure under general anesthesia. First, we removed the previously indwelled double-J ureteral stent using grasping forceps through a 22- Fr rigid cystoscope (Olympus Corporation, Japan), and retrogradely inserted a 0.035″ hydrophilic guidewire (Zipwire™, Boston Scientific, USA) into the implanted ureter. Second, an 18G needle was percutaneously punctured under ultrasound guidance toward the inferior renal calyx to create percutaneous renal access. A metallic guidewire was passed through the 18G puncture needle and was sent down into the renal pelvis. Subsequently, dilatation of the percutaneous tract was performed with an 8mm nephrostomy balloon catheter (Ultraxx™, Cook Medical, USA). Then, a 24Fr working clear vinyl sheath was placed to use a 22Fr nephroscope (Richard Wolf GmbH, Germany). RAL was fragmented using LithoClast® (EMS Electro Medical Systems, Switzerland) and extracted using grasping forceps. The percutaneous approach was not able to remove all stones in the renal calyx. Therefore, we considered that it was necessary to insert a new UAS into the ureter and retrieve all the remaining stones using a ureteroscope. Although an attempt was made using 11/13-Fr UAS (Navigator™, Boston Scientific, USA) to insert the implanted ureter intraoperatively, it could not reach

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https://doi.org/10.1016/j.eucr.2023.102331
Received 7 December 2022; Received in revised form 13 January 2023; Accepted 16 January 2023
Available online 21 January 2023

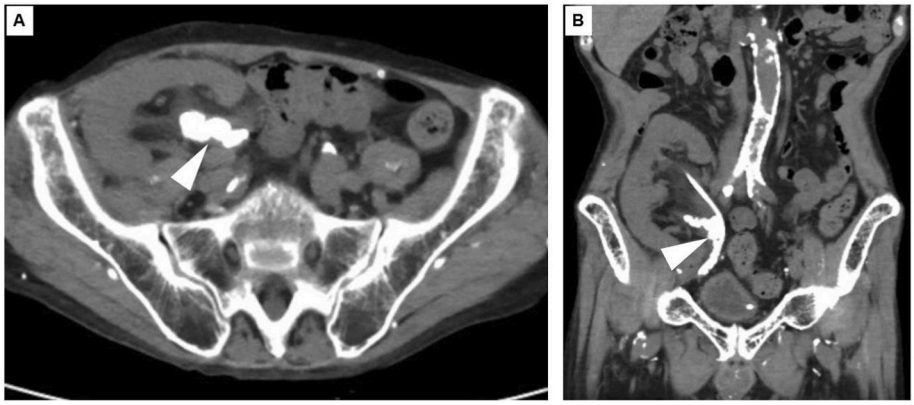

Fig. 1. Preoperative pelvic computed tomography (CT). Pelvic CT showed multiple calculi around the indwelling ureteral stent in the transplanted kidney (white arrowhead).

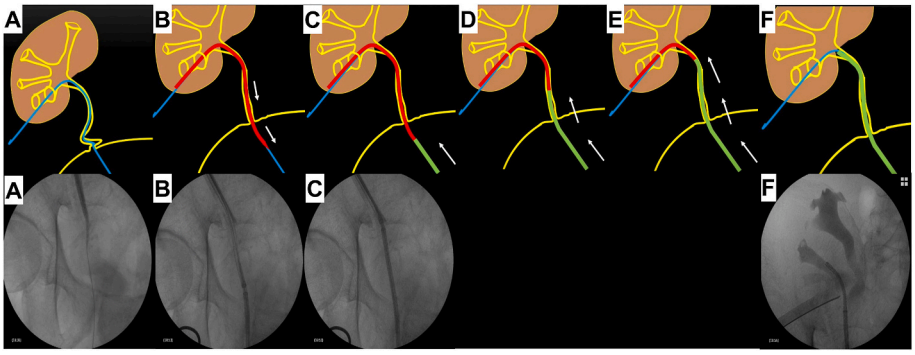

Fig. 2. Procedure of the sheath-connection technique. (A) The guidewire was induced from percutaneous renal tract into the external urethral meatus using grasping forceps. (B) The guidewire was induced to the external urethral meatus using grasping forceps, and the 11/13-Fr UAS was successfully passed through the ureterovesical junction. (C) The 11/13-Fr UAS was passed through the ureterovesical junction antegradely. The second UAS was placed from the urethral side to the renal pelvis. After connecting the two UAS to the bladder. (D, E) The junction of the two UAS was retrogradely passed through the ureterovesical junction, and the UAS was successfully indwelled from the urethra to the renal pelvis. (F) Combined intrarenal surgery was performed using a flexible ureteroscope.

the percutaneous renal tract because of the tortuous implanted ureter (Fig. 2A). Therefore, we inserted a 0.035″ hydrophilic guidewire (Zipwire™, Boston Scientific, USA) from the renal pelvis to the bladder through the clear vinyl sheath. Therefore, we used the sheath-connection technique to insert the UAS through the urethra. The guidewire was induced to the external urethral meatus using grasping forceps, and the 11/13-Fr UAS (Navigator™, Boston Scientific, USA) was successfully passed through the ureterovesical junction (Fig. 2B). The other UAS (Navigator™, 11/13-Fr, 45 cm, Boston Scientific, USA) was placed from the urethral side to the renal pelvis after the withdrawal of its inner dilator. After connecting two UAS into the bladder (Fig. 2C), the junction of the two UAS was retrogradely passed through the ureterovesical junction, and the UAS was successfully indwelled from the urethra to the renal pelvis (Fig. 2D and E). Subsequently, ECIRS was performed using a flexible ureteroscope (URF-V, Olympus Corporation, Japan) (Fig. 2F). Postoperative CT revealed no residual stone fragments. The stone component was calcium oxalate. Three years after surgery, the transplanted kidney function has been maintained without RAL.

3. Discussion

RAL is very rare stone disease.[1] Sarier et al. investigated renal stone outcomes in 31 recipients who received living donor grafts with kidney stones and reported that 92.8% of stones 4 mm or smaller were spontaneously passed, while the rate of stones 4 mm or larger was 0%.[3] According to the European Association of Urology guidelines, selecting the appropriate technique for stone removal in a transplanted kidney is difficult.

ECIRS standardized the combined antegrade and retrograde approach to large and/or complex urolithiasis using both rigid and flexible scopes.[4] Moreover, postoperative complications can be mitigated by reducing the number of required percutaneous tracts, decreasing peri-and postoperative bleeding risk, and lowering intrarenal pressure.[4] For RAL, the key point for achieving successful ECIRS is to ensure a stable pathway for a percutaneous and transurethral approach to the renal pelvis. However, for RAL treatment, retrograde approaches using a UAS are often difficult or infeasible because of the ectopic location of the kidney allograft or ureterovesical implantation.[2] To the best of our knowledge, we did not find any similar reports of our reported procedure on normal kidneys. For this reason, there are few cases in which UAS insertion is difficult when the ureter is in a normal position.

In this case, despite the difficulty of placing a transurethral UAS, the two UAS were coaxially inserted with a guidewire in an antegrade and retrograde manner and connected into a single cylindrical structure. The junction between the two UASs was smoothed and successfully passed through the ureterovesical junction.

4. Conclusions

To the best of our knowledge, this is the first report of ECIRS for RAL using the novel “sheath-connection technique.” The “sheath-connection technique” allows surgeons to perform ECIRS for renal transplanted patients who have difficulty placing a UAS.

References

1. Cheungpasitporn W, Thongprayoon C, Mao MA, et al. Incidence of kidney stones in kidney transplant recipients: a systematic review and meta-analysis. *World J Transplant.* 2016;6(4):790–797.

2. Santillán D, Schernuk Schroh JC, Gutierrez PA, et al. Case Report: mini- endoscopic combined intrarenal surgery in an en-bloc kidney transplant. *Afr J Urol*. 2021;27(1):147.
3. Sarier M, Duman I, Callioglu M, et al. Outcomes of conservative management of asymptomatic live donor kidney stones. *Urology*. 2018;118:43–46.
4. Cracco CM, Scoffone CM. Endoscopic combined intrarenal surgery (ECIRS) - tips and tricks to improve outcomes: a systematic review. *Turk J Urol*. 2020;46:S46–S57. Supp. 1.