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Ex Vivo Removal of Stones in Donor Kidneys by Flexible Ureteroscopy Prior to Renal Transplantation: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Male, 33
Final Diagnosis: Donation after cardiac death (DCD)
Symptoms: None
Medication: —
Clinical Procedure: *Ex vivo* removal of stones in donor kidneys by flexible ureteroscop
Specialty: Transplantology

Objective: Rare co-existance of disease or pathology

Background: Because of the shortage of grafts, many attempts have been made to treat calculi in donor kidneys and have achieved successful management. This case report is the first to present removal of stones from bilateral kidneys from a single donor through flexible ureteroscopy before transplantation.

Case Report: The present case report shows the clinical management of bilateral donor kidneys with calculi, which were taken from a 33-year-old man through donation after cardiac death (DCD). Computed tomography showed 2 stones in the right donor kidney and 1 in the left donor kidney. Two stones were removed *ex vivo* using a flexible ureteroscope before transplantation, and the third one turned out to be a renal papillae calcification, which was left in place without surgical treatment. The bilateral donor kidneys were transplanted to 2 recipients.

Conclusions: There is a possibility of increasing the kidney pool by using donor kidneys containing calculi, which should be removed before transplantation.

MeSH Keywords: Endoscopes • Kidney Calculi • Transplantation, Isogeneic

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/902875

Background

Calculi in donor kidneys have been considered a relative contraindication to donation. Calculi in donor kidneys always constitute a significant clinical challenge. Because of the grafts shortage, many attempts have been made to treat calculi in donor kidneys, and many have achieved successful management [1–4]. To the best of our knowledge, this case report is the first to present removal of stones from bilateral kidneys from a single donor through flexible ureteroscopy before transplantation.

Case Report

The present case report shows the clinical management of bilateral donor kidneys with calculi. The bilateral kidneys, which were taken from a 33-year-old man through DCD, were transplanted to a 57-year-old recipient and a 40-year-old recipient. The donor died of multiple traumas.

Computerized tomography (CT) showed 3 stones, 1 in the left renal calyx and the other 2 in the right renal calyx, ranging in largest diameter from 3 to 5 mm (Figure 1). The etiology of the calculi was unknown. Urine culture was sterile. After being harvested, the donor kidneys were biopsied and histology revealed no abnormalities.

After the procedure, the donor kidneys were placed in iced preservation solution. Because the calculi in the renal pelvises were small, we decided to perform flexible ureteroscopy to remove them (Figure 2). We introduced a 9.5 Fr flexible ureteroscope into the calyxes of the 2 kidneys through the ureters. Under direct vision, 1 stone was localized and removed in the right kidney. In this kidney, a renal papillary calcification was noticed and left in place without surgical treatment (Figure 3). The reasons for diagnosis of renal papillary calcification included location consistent with the other stone position shown on CT scan, the color was paler compared with normal surrounding tissue, and the texture felt tough when touched (Figure 3). One stone was localized and removed in the left kidney. The intraoperative view was compared to the CT scan to precisely

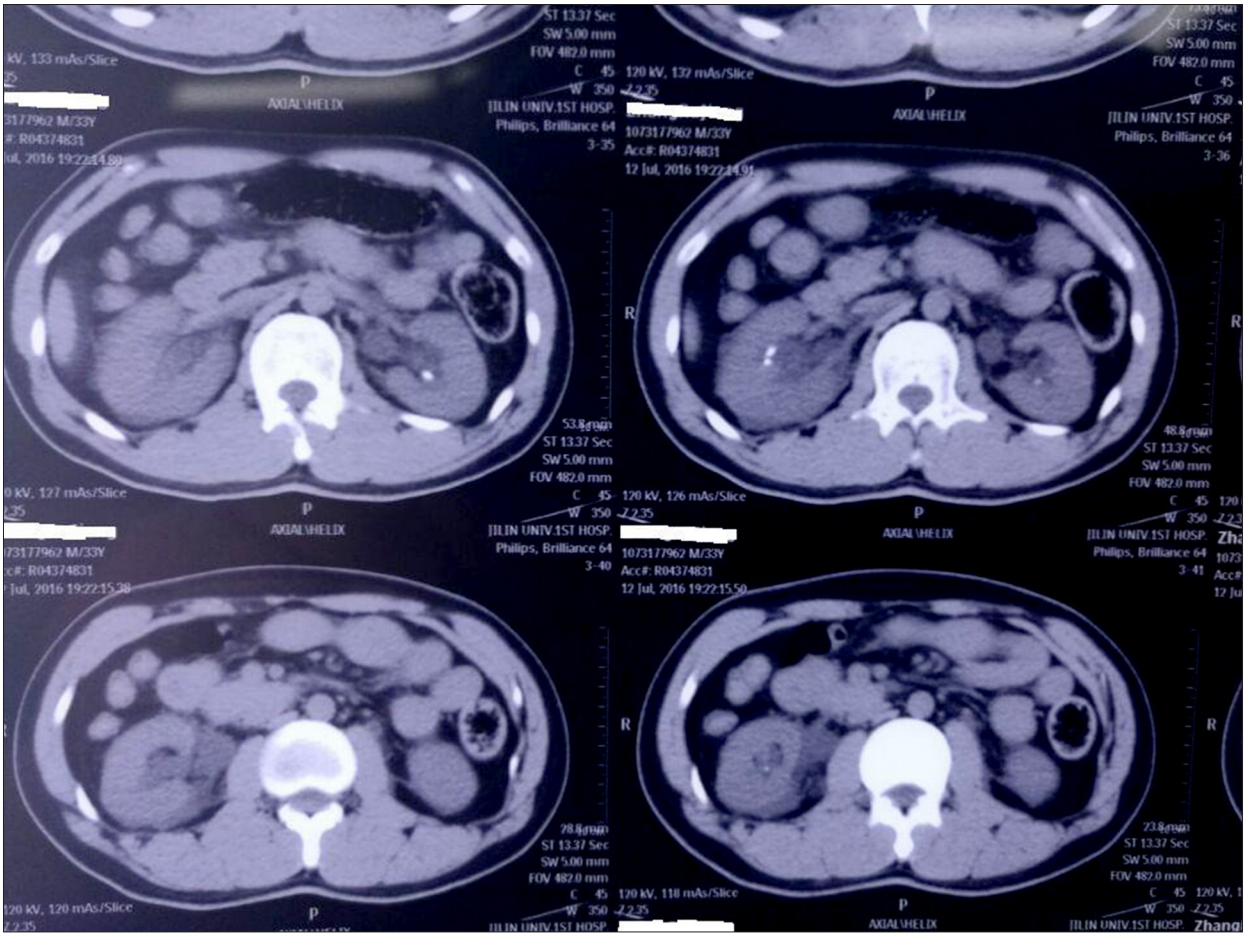

Figure 1. Computerized tomography showed three stones, one in the left renal calyx and the other two stones in the right renal calyx,ranging in largest diameter from 3 to 5 mm.

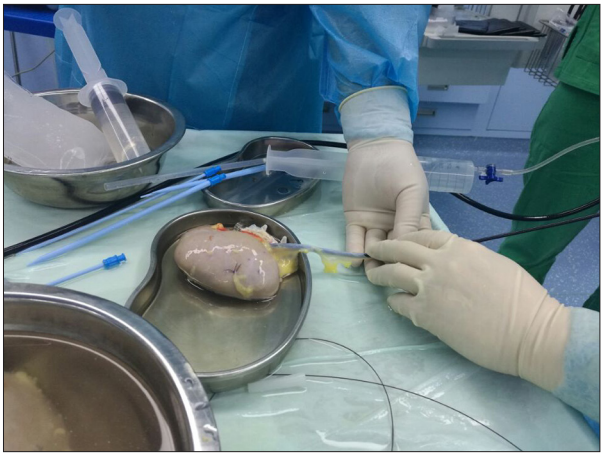

Figure 2. 9.5 Fr flexible ureteroscope was introduced into the calyxes of the two kidneys through the ureters.

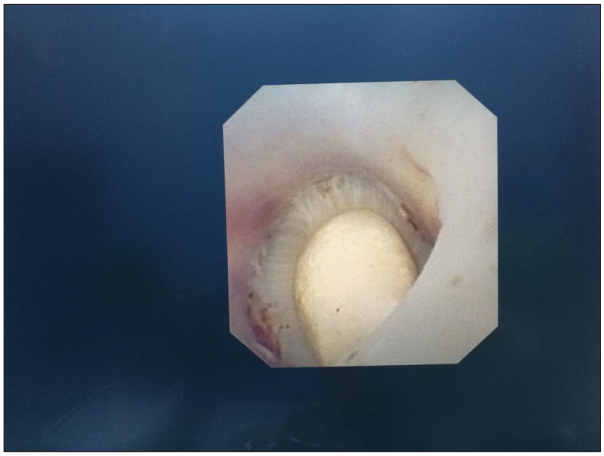

Figure 3. Under ureteroscopy, a renal papillary calcification was noticed in the right kidney.

identify the calculi. The calculi in the bilateral donor kidneys were removed using an endoscopic clamp forceps. During the whole procedure, the kidneys were kept cold in an iced preservation solution bath. It took 8 min in the left donor kidney and 13 min in the right donor kidney to remove the stones. After these procedures, the donor kidneys were preserved in LIFEPORT. Cold ischemia time was 10 h 25 min of the left donor kidney and 10 h 15 min of the right kidney.

The left kidney was transplanted to a 57-year-old man who had been dialyzed for 10 months because of end-stage renal disease caused by hypertensive nephropathy. The right kidney was transplanted to a 40-year-old man who had been dialyzed for 13 months because of loss of function of the first donor kidney transplanted 9 years before. The 2 recipients were both diagnosed with hypertension without contraindications for transplantation.

The donor kidneys, after *ex vivo* stone removal, were transplanted into the right iliac fossa of the recipients. The immunosuppression regimen consisted of basiliximab, tacrolimus, mofetil mycophenolate, and glucocorticoids. Functions of the donor kidneys after surgery were good and hemodialysis was not necessary. Urine volume in the first 24 h after surgery was 15260 ml and 11640 ml, respectively. No gross hematuria was observed. Empiric antibiotic therapy for 48 h was administered for the prevention of infection and the first dose began at 0.5~2 h before the incision.

Ultrasound of the transplanted kidneys was carried out after surgery. No evidence of calculi, dilatation of the renal collecting system, or pathologic fluid reservoirs in the area of the graft were found. However, the renal papillae calcification still can be followed up by ultrasonography. No additional CTs were performed.

The "double-J" stents were left indwelled for 15 days in the 57-year-old patient and for 29 days in the 40-year-old patient because of minor contusion during removal of calculi through the ureter. On the 16th day after the operation, the 40-year-old patient, who received the right donor kidney, was discharged from the hospital in a good general condition. The 57-year-old patient, who received the left donor kidney, was discharged 27 day after the operation because of anemia and delayed removal of drainage tubes. Their serum creatinine levels stayed within normal range after 4 days after the operation. There were no symptoms of kidney disorders.

Discussion

DCD has proven to be an effective and safe way for those in need of transplant to obtain their allografts. Calculi located in the pelvicalyceal system, which are a rare clinical problem in donor kidneys, are a relative contraindication to kidney transplantation. Because of the grafts shortage and the development of contemporary endourological techniques, successful management has been achieved [1–4].

It should be emphasized that there are no diagnostic and therapeutic standards with respect to detection and treatment of nephrolithiasis in donor kidneys [2,3]. In clinical practice, ultrasonography and CT of the abdomen can detect nephrolithiasis if present prior to transplantation. Removing calculi after transplantation is associated with numerous potential complications due to immunosuppressive therapy. The recommended method of stone removal is endoscopic treatment, which may be conducted *ex vivo* before the organ transplantation [1–3]. The method of treating renal calculi depends on the size and location of calculi. According to our clinical experiences and the literature, small and non-obstructive stones with diameters less than 6 mm can be directly removed with

endoscopic clamp forceps using flexible ureteroscopy, and medium stones with diameter more than 6 mm and less than 1 cm can be fragmented *ex vivo* with holmium laser lithotripsy using flexible ureteroscopy [2,3]. Janczak et al. reported that staghorn nephrolithiasis and large stones could be removed *ex vivo* by pyelotomy, nephroscopy, and holmium laser lithotripsy through a rigid ureteroscope [1].

Damage to the ureter or renal pelvis caused by *ex vivo* nephrolithotripsy has rarely been reported [1–3]. No major urinary tract complications were observed in our case during the postoperative period. One of the recipients had a prolonged indwelled "double-J" stent, which normally was indwelled for 14 days in our department, due to suspected ureteral stenosis, which might result from contusion during removal of calculi through the ureter. The 2 recipients were in good general and graft condition at discharge.

At a median follow-up of 63±47.2 months, et al. reported that *ex vivo* ureteroscopy safely renders renal allografts stone-free, with low risk of recurrence [2]. A limitation of our report is that the period after discharge is too short to evaluate long-term outcome.

It must be taken into consideration that renal papillary calcification is associated with the development of renal calculi [5,6]. Therefore, close follow-up is necessary for the donor kidney with renal papillary calcification.

Conclusions

Ex vivo removal of renal calculi in bilateral kidneys through flexible ureteroscopy from a single donor before transplantation is a safe procedure that can expand the kidney donor pool.

Statement

There are no conflicts of interest to disclose.

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