Obstructing ureteral calculus causing massive hydronephrosis in a renal allograft

Adam J. Sharbaugh, MD,[1] Daniel L. Pelzman, MD,[1] Michelle Jo Semins, MD[1,2]

[1]Department of Urology, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA

[2]Department of Urology, West Virginia University Medicine, Morgantown, West Virginia, USA

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Nephrolithiasis is a rare complication of renal transplantation. Patients with an obstructing calculus in a renal allograft often lack the usual renal colic symptoms, and therefore present with atypical symptoms. Treatment of obstructing calculi is imperative to prevent renal allograft failure and other complications. We report the case of a 46-year-old man who presented 28 years after renal transplant with renal failure and massive hydronephrosis secondary to an obstructing calculus.

Key Words: nephrolithiasis, renal transplant, hydronephrosis

Introduction

Nephrolithiasis in renal transplantation is a rare complication occurring in approximately 1% of renal allografts.[1-3] These stones may be donor-gifted or de novo stones formed in a transplant kidney.[3] Patients with renal allograft nephrolithiasis do not typically experience renal colic associated with obstructing stones. They may be diagnosed incidentally on routine imaging or present with oliguria or anuria, renal failure, painful graft, hematuria, or sepsis secondary to obstruction. Diagnosis of an obstructing calculus may be challenging due to the atypical presentation, which can lead to delayed treatment, prolonged obstruction, renal failure, and other complications.[1,3-5]

Here we describe a case of a patient with a renal transplant who was diagnosed with massive hydronephrosis and acute renal failure secondary to an obstructing calculus. He was successfully treated with urgent decompression with a nephrostomy tube into the renal allograft followed by endoscopic management of the obstructing calculus.

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Address correspondence to Dr. Michelle Jo Semins, 20 Medical Park, Medical Tower 2, Suite 201, Wheeling, WV 26003 USA

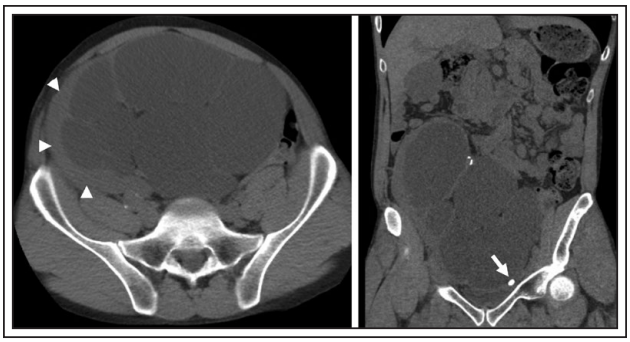

Figure 1. CT of the abdomen and pelvis without contrast demonstrates a right lower quadrant renal allograft with massive dilation of the collecting system and thinning of the renal parenchyma **(arrow heads)**. A 7.3 x 8.5 mm calculus is identified in the distal ureter and observed on the coronal image **(arrow).**

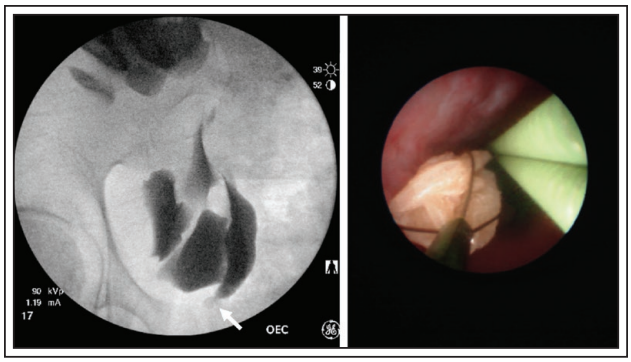

Figure 3. Nephrostogram **(left)** demonstrates a dilated and redundant renal collecting system as well as a dilated ureter down to the level of the radiopaque calculus **(arrow)**. Intra-operative image **(right)** of the calculus being basketed and moved to a location where it was treated with laser lithotripsy.

Case report

A 46-year-old male with a history of hypertension and end-stage renal disease status-post cadaveric renal transplant 28 years ago presented with a 2-week history of lower extremity swelling and decreased urine output. He reported increased abdominal girth over the prior few months. Physical exam revealed significant abdominal distension but no tenderness to palpation. Serum creatinine was elevated to 4.2 from a baseline of 1.8.

Computed tomography (CT) imaging of the abdomen and pelvis was obtained and demonstrated a renal allograft in the right lower quadrant with a massively dilated collecting system and hydroureter to the level of a distal ureteral calculus measuring 7.3 mm x 8.5 mm, Figure 1. A nephrostomy tube was promptly placed by interventional radiology. One month later, serum creatinine returned to baseline and repeat CT imaging was obtained, Figure 2. This demonstrated improved hydronephrosis with only minimal dilation of the lower portion of the kidney. The stone was again observed in the distal ureter.

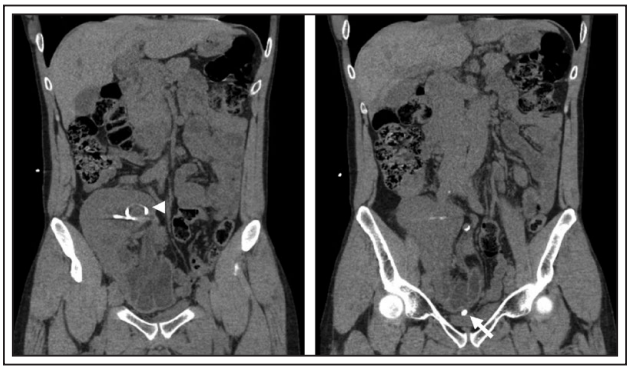

Figure 2. CT of the abdomen and pelvis without contrast approximately one month after nephrostomy tube placement into the renal allograft **(arrowhead)**. The ureteral calculus is noted **(arrow)**.

The patient was taken to the operating room for endoscopic treatment of the stone. A nephrostogram was first performed and demonstrated a dilated and redundant renal collecting system as well as a dilated ureter to the level of the radiopaque calculus, Figure 3. The stone was treated successfully via retrograde ureteroscopy and laser lithotripsy. A ureteral stent was placed, and the nephrostomy tube was removed. The stone composition was calcium oxalate.

Discussion

While urolithiasis in renal transplantation is rare, it can lead to devastating complications, especially if an obstructing stone goes undiagnosed. Urolithiasis in a transplant kidney may be caused by metabolic disease, hyperparathyroidism, chronic urinary stasis from a ureteral stricture, foreign body nidus such as a non-absorbable suture, or may be the result of pre-existing stones within the transplant kidney.[3,4]

Patients with renal allograft nephrolithiasis typically do not experience renal colic associated with obstructing stones because the transplant kidney is denervated.[3,5] Given that these patients functionally have a solitary kidney, a high index of suspicion is

needed to make a prompt diagnosis. Symptoms that should initiate work up include oliguria or anuria, renal failure identified on blood work, painful graft site, hematuria, or sepsis secondary to urinary obstruction.[1,4,5]

Treatment options for urolithiasis within a transplant kidney include extracorporeal shock wave lithotripsy, flexible ureteroscopy with laser lithotripsy, percutaneous nephrolithotomy (PCNL), mini-PCNL, open pyelolithotomy, and ex vivo ureteroscopy with laser lithotripsy at the time of transplantation.[1,4-6] PCNL is recommended for larger stones and open pyelolithotomy should be reserved for large staghorn calculi that cannot be managed with PCNL. These invasive procedures may increase the risk of damage to the renal allograft.[1,3,5] Mini-PCNL, which has been performed on relatively few renal allografts, may carry the advantage of treating larger stones while decreasing the risk of complications compared to standard PCNL due to smaller tract size.[3,5]

This case highlights a patient with massive hydronephrosis and acute renal failure secondary to an obstructing calculus in a renal allograft. Given the severity of collecting system dilation, we suspect his allograft kidney was obstructed for a prolonged period. Fortunately, his renal function recovered after the obstruction was relieved and the stone was treated. Urologists should be aware of the presenting signs and symptoms of urolithiasis in patients with a renal transplant so prompt diagnosis can be made to reduce the risk of prolonged obstruction, renal failure, sepsis, and other complications. □

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