Canadian Society of Nephrology/ Société canadienne de néphrologie CSN/SCN

CANADIAN JOURNAL OF KIDNEY HEALTH AND DISEASE
Journal canadien de la santé et de la maladie rénale

Educational Case Report

Canadian Journal of Kidney Health and Disease
Volume 5: 1–4

DOI: 10.1177/2054358117753620
journals.sagepub.com/home/cjk
SAGE

As in Real Estate, Location Is What Matters: A Case Report of Transplant Ureteral Obstruction Due to an Inguinal Hernia

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Abstract

Background: Kidney allograft dysfunction is common and often reversible but can lead to allograft loss if not promptly evaluated. Transplant ureteral obstruction in an inguinal hernia is a rare cause of allograft dysfunction, but early recognition may prevent allograft loss.

Case Presentation: We present a case of a man with acute kidney allograft dysfunction who received a deceased donor kidney transplant 6 years earlier for end-stage kidney disease secondary to polycystic kidney disease. Abdominal ultrasounds revealed hydronephrosis without full visualization of the transplant ureter. Abdominal computed tomography revealed moderate hydronephrosis of the transplant kidney due to obstructed herniation of the transplant ureter in a right inguinal hernia. A stent was inserted into the transplant ureter to prevent further allograft dysfunction and facilitate hernia repair.

Conclusions: Transplant ureteral obstruction is a rare cause of acute kidney allograft dysfunction, and its detection can be challenging. The recognition of transplant ureteral obstruction is vital to timely management for preventing allograft loss.

Abrégé

Contexte: Les dysfonctionnements des allogreffes rénales sont fréquents, quoique souvent réversibles. Ils peuvent toutefois mener à la perte du greffon s'ils ne sont pas décelés rapidement. En présence d'une hernie inguinale, la détection précoce de l'obstruction de l'uretère du greffon, une cause rare de ces troubles fonctionnels, peut prévenir la perte du rein greffé.

Présentation du cas: Nous exposons le cas d'un homme ayant reçu, six ans plus tôt, une greffe de rein provenant d'un donneur décédé pour soigner une insuffisance rénale terminale résultant d'une polykystose rénale. Le patient présentait un cas aigu de dysfonctionnement du greffon. L'échographie abdominale a révélé la présence d'une hydronéphrose sans que l'uretère soit complètement visible. La tomodensitométrie abdominale a quant à elle révélé une hydronéphrose modérée dans le rein transplanté due à l'obstruction de l'uretère dans l'hernie inguinale du côté droit. Une endoprothèse a été insérée dans l'uretère du greffon pour empêcher l'aggravation des troubles fonctionnels et pour faciliter la réparation herniaire.

Conclusion: L'obstruction de l'uretère est une cause rare du dysfonctionnement aigu d'un rein transplanté, et sa détection peut représenter un véritable défi. Le diagnostic de ce type d'occlusion est crucial pour intervenir rapidement et ainsi prévenir la perte du greffon.

Keywords

kidney transplantation, acute kidney injury, allograft dysfunction, hernia, ureteral obstruction

Received August 3, 2017. Accepted for publication September 30, 2017.

What was known before

Kidney allograft dysfunction is common and often reversible but can lead to allograft loss if not promptly evaluated.

What this adds

Although rare, transplant ureteral obstruction must be recognized in the differential diagnosis of hydronephrosis and

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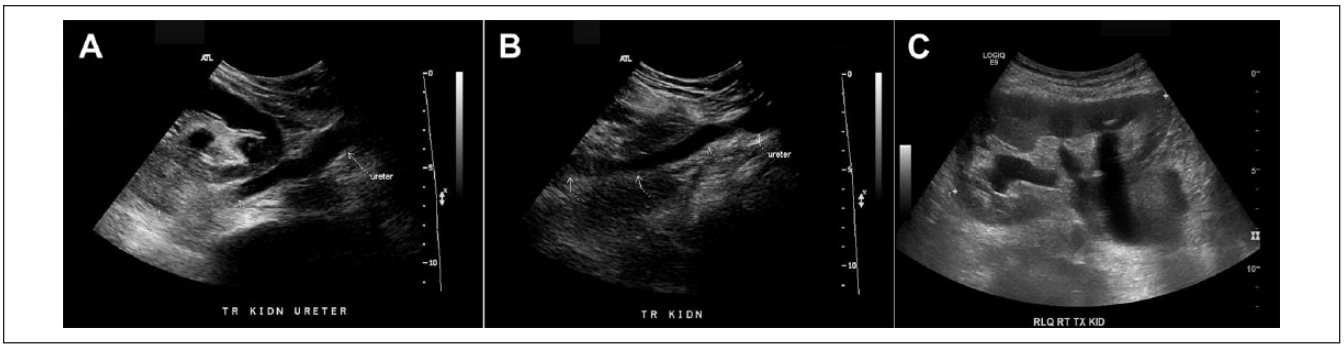

Figure 1. Ultrasound images of transplant kidney 1 week prior to admission, demonstrating mild hydronephrosis and incomplete visualization of distal ureter (A, B). Repeat ultrasound upon admission demonstrating interval worsening of hydroureteronephrosis (C).

acute kidney allograft dysfunction for prompt evaluation and the prevention of graft loss.

Introduction

The most common complication of kidney transplantation is allograft dysfunction. Prompt recognition, diagnosis, and management of allograft dysfunction are vital to preventing allograft loss. We present a rare case of inguinal herniation of a transplant ureter causing ureteral obstruction and acute kidney allograft dysfunction that was not initially detected on abdominal ultrasound.

Case

A 75-year-old man presented with a 2-day history of nonbilious vomiting without abdominal pain. He received a deceased donor kidney transplant in 2010 for end-stage kidney disease secondary to autosomal dominant polycystic kidney disease. His postoperative course had been uncomplicated, and his kidney function had been stable on standard immunosuppressive therapy with prednisone, cyclosporine, and mycophenolate mofetil with a serum creatinine of 150 μmol/L. His history was significant for a myocardial infarction requiring coronary artery bypass and sciatica. Two years prior to kidney transplantation, he had a left nephrectomy for a kidney mass, which was benign, complicated by a ventral hernia requiring repair. Six weeks prior to presentation, his creatinine rose to 200 μmol/L. One week prior to admission, his creatinine rose to 280 μmol/L and an ultrasound of his transplant kidney revealed mild hydronephrosis and the entire length of the ureter was not visualized (Figure 1A and 1B).

His physical examination revealed a nonobese man without any abdominal tenderness to palpation and no evidence of hernia, as assessed by the nephrology and urology teams. Investigations revealed a serum creatinine of 370 μmol/L. Urinalysis was negative for blood and protein. Electrocardiography (EKG) did not reveal any changes compared with 1 year prior, and 2 serial troponin I values were unremarkable at was 26 and 27 ηg/L, respectively. Abdominal ultrasound revealed mild hydroureteronephrosis of the transplant kidney in the right iliac fossa, with tapered dilation of the ureter. The distal ureter was obscured by overlying bowel gas and not seen (Figure 1C). Abdominal computed tomography revealed moderate hydronephrosis of the transplant kidney due to obstructed herniation of the transplant ureter in a right inguinal hernia (Figures 2 and 3). An antegrade double-J stent was percutaneously inserted into the transplant ureter at the level of the obstruction to identify and preserve the transplant ureter at the time of inguinal hernia repair. He subsequently underwent a successful open right inguinal hernia repair with polypropylene mesh reinforcement. The transplant ureter with indwelling stent was palpable within the hernia sac and not felt to be excessive in length, so it was not reimplanted. His creatinine returned to baseline at the time of hospital discharge. Three weeks later, repeat Doppler ultrasound of the transplant kidney showed resolution of the hydronephrosis and his ureteral stent was removed.

Discussion

Our case represents an uncommon cause of ureteral obstruction and acute kidney allograft dysfunction from inguinal herniation of a transplant ureter, with 21 reported cases in the literature.[1-20] This case highlights several learning points. Awareness of transplant ureteral obstruction is important because it is a cause of acute kidney allograft dysfunction that can easily be missed. One of the initial investigations for acute kidney allograft dysfunction is an abdominal ultrasound to look for hydronephrosis. An inguinal hernia may not be appreciated on abdominal ultrasound, and may not be present clinically, so there can be a delay in diagnosing inguinal herniation of the transplant ureter as the cause of hydronephrosis. Another clue to inguinal herniation is the inadequate visualization of the transplant ureter on abdominal ultrasound; in our patient, the abdominal ultrasound done 1 week prior to presentation reported that the ureter was not completely visualized and this should have prompted additional imaging. The inguinal herniation

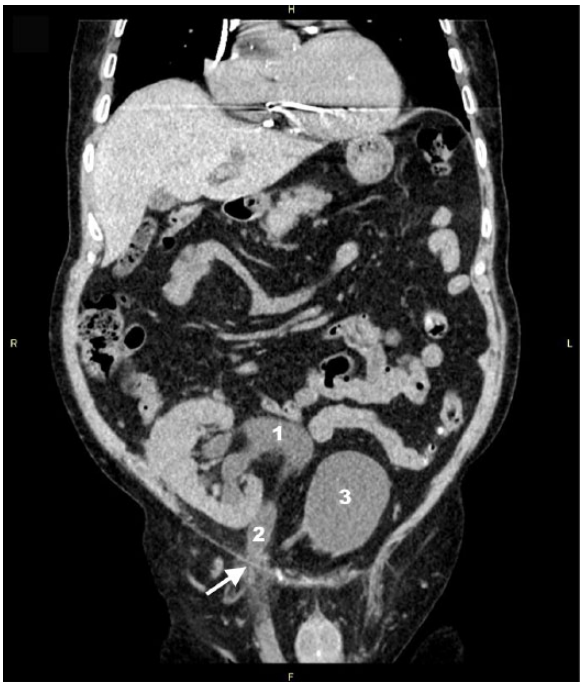

Figure 2. Abdominal computed tomography in coronal view, demonstrating moderate hydroureteronephrosis (1), herniation of the transplant ureter (2) through inguinal ring (arrow), and the urinary bladder (3).

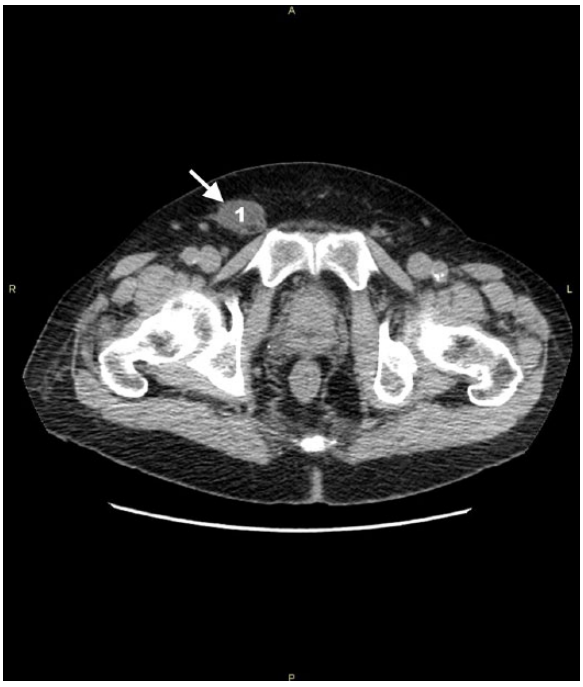

Figure 3. Abdominal computed tomography in axial view, demonstrating a dilated ureter (1) in right inguinal canal (arrow). The contralateral normal inguinal canal can be visualized.

of the transplant ureter in our patient was ultimately diagnosed by abdominal computed tomography. It is important to note that inguinal herniation of a transplant ureter can be accompanied by bladder herniation contralateral to the allograft,[19-20] although this was not the case in our patient as his hernia was ipsilateral to the allograft. A review of previously published case reports suggests several risk factors for the development of inguinal herniation of the transplant ureter that were also present in our patient, including male sex,[1-20] age 50 years or greater,[1,3,5-7,9-12,14,15,17,19,20] and having had a kidney transplant for at least 5 years.[2-15,17-20] Other risk factors for inguinal herniation of a transplant ureter may include an excessive ureteral length,[3,12-14] placement of the donor ureter anterior to the spermatic cord,[3,13,14] and obesity,[3,4,6,13,15] which were not present in our patient. Our patient's history of polycystic kidney disease[16,21] and prior hernia repair were risk factors for the development of the inguinal hernia in the first place.

Management of transplant ureteral obstruction varies among institutions but can include ureteral stenting[1,3,6,8,9,10-12,19] to minimize allograft dysfunction and allow for its identification and isolation during inguinal hernia repair. Nephrostomy insertion may also be necessary for immediate decompression of the collecting system to prevent irreversible graft dysfunction,[1-4,6,8-12,15,17,19,20] while awaiting definite management with hernia repair but was not required in our patient as his creatinine declined following ureteral stent insertion and he underwent a timely hernia repair 5 days after the hernia was diagnosed. Although rare, the important takeaway message is that transplant ureteral obstruction be recognized in the differential diagnosis of hydronephrosis and acute kidney allograft dysfunction for prompt evaluation and the prevention of graft loss.

Ethics Approval and Consent to Participate

Formal research ethics approval was not sought for this case report.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Availability of Data and Materials

All data generated are included in this article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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