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.

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

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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
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 26 and 27 ng/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 hydroureteronephrosis 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...
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, 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, age 50 years or greater, and having had a kidney transplant for at least 5 years. Other risk factors for inguinal herniation of a transplant ureter may include an excessive ureteral length, placement of the donor ureter anterior to the spermatic cord, and obesity, which were not present in our patient. Our patient’s history of polycystic kidney disease 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 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, 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
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References

1. Ciancio G, Burke GW, Nery J, Huson H, Coker D, Miller J. Positional obstructive uropathy secondary to ureteroneocystostomy herniation in a renal transplant recipient. J Urol. 1995;154(4):1471-1472.
2. Osman Y, Ali-El-Dein B, El-Leithy R, Shokeir A. Sliding hernia containing the ureter—a rare cause of graft hydroureteronephrosis: a case report. Transplant Proc. 2004;36:1402-1404.
3. Sanchez AS, Tebar JC, Martin MS, et al. Obstructive uropathy secondary to ureteral herniation in a pediatric en bloc renal graft. Am J Transplant. 2005;5(8):2074-2077.
4. Furtado CD, Sirlin C, Precht A, Casola G. Unusual cause of ureteral obstruction in transplant kidney. Abdom Imaging. 2006;31(3):379-382.
5. Verbeeck K, Niedercorn JB, Mc Intyre D, Pouthier D, Lamy S. Assessment of renal graft obstruction due to ureteral inguinal hernia: US detection and 3D MR confirmation. JBR-BTR. 2007;90(2):132-134.
6. Ingber MS, Girdler BJ, Moy JF, Frikker MJ, Hollander JB. Inguinal herniation of a transplant ureter: rare cause of obstructive uropathy. Urology. 2007;70(6):1224.e1-1224.e3.
7. Otani LH, Jayanthi SK, Chiarantano RS, Amaral AM, Menezes MR, Cerri GG. Sonographic diagnosis of a ureteral inguinal hernia in a renal transplant. J Uroltrasound Med. 2008;27(12):1759-1765.
8. DiCocco P, Orlando G, Bonanni L, et al. Scrotal herniation of the ureter: a rare late complication after renal transplantation. Transplant Proc. 2009;41(4):1393-1397.
9. Azhar R, Boutros M, Hassanain M, et al. A rare case of obstructive uropathy in renal transplantation: ipsilateral indirect inguinal herniation of a transplant ureter. Transplantation. 2009;88(8):1038-1039.
10. Odisho AY, Freise CE, Tomlanovich SJ, Vaghei PA. Inguinal herniation of a transplant ureter. Kidney. 2010;78(1):115.
11. Tran D, Gaboriault J, Collette S, et al. Obstructive uropathy caused by an inguinal hernia in a kidney transplant recipient: report of hernia cure by the Shouldice technique. Dialysis Transplant. 2011;40(9):413-414.
12. Pourafkari M, Ghofrani M, Rahi M. Inguinal herniation of a transplant kidney ureter: a case report. Iran J Radiol. 2012;10(1):48-50.
13. Vyas S, Chabra N, Singh SK, Khandelwal N. Inguinal herniation of the bladder and ureter: an unusual case of obstructive uropathy in a transplant kidney. Saudi J Kidney Dis Transpl. 2014;25(1):153-155.
14. Hakeem AR, Gopalakrishnan P, Dooldeniya MD, Irving HC, Ahmad N. Inguinal herniation of a transplant ureter: lessons learned from a case of “water over the bridge.” Exp Clin Transplant. 2016;14(1):473-494.
15. Cheung F, Debartolo MM, Copertino LM, et al. Different management options for transplant ureteral obstructions within an inguinal hernia. Case Rep Transplant. 2016;2016:4730494. doi:10.1155/2016/4730494.
16. Soleymanaian T, Kalantarian T, Radmard A. Report of a kidney recipient with inguinal herniation of the transplant ureter. Saudi J Kidney Dis Transpl. 2016;27(3):614-616.
17. Coelho H, Nunes P, Canhoto C, Temido P. Inguinal hernia containing bladder and ureteroneocystostomy: a rare cause for acute renal graft dysfunction. BMJ Case Rep. 2016. doi:10.1136/bcr-2016-214466.
18. Ross JT, Orandi BJ, Lin MY, Roll GR. Ureteral obstruction and new groin pain in a kidney transplant recipient. Am J Transplant. 2017;17(4):1139-1141.
19. Lobo N, McCaig F, Olshburgh J. Contralateral inguinal herniation of a transplant ureter causing obstructive uropathy in a renal transplant recipient. BMJ Case Rep. 2017;2017. doi:10.1136/bcr-2016-218071.
20. du Toit T, Kaestner L, Muller E, Kahn D. Inguinal herniation containing bladder, causing contralateral allograft hydroureteronephrosis: a case report and literature review. Am J Transplant. 2017;17(2):565-568.
21. Morris-Stiff G, Coles G, Moore R, Jurewicz A, Lord R. Abdominal wall hernia in autosomal dominant polycystic kidney disease. Br J Surg. 1997;84(5):615-617.