Case – Recurrent ureteral inguinal herniation: A rare presentation of post-kidney transplant anuria and acute kidney injury

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Cite as: MacNevin W, Power L, Harkness L, et al. Case – Recurrent ureteral inguinal herniation: A rare presentation of post-kidney transplant anuria and acute kidney injury. *Can Urol Assoc J* 2025 March 17; Epub ahead of print. http://dx.doi.org/10.5489/cuaj.9090

Published online March 17, 2025

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INTRODUCTION

Acute kidney injury (AKI) is common after kidney transplantation, with only 5% of cases being attributable to ureteric obstruction.[1] Inguinal herniation of the ureter post-transplant is an exceedingly rare cause of AKI secondary to ureteric obstruction with less than 20 cases being reported in the literature.[2] Ureteral inguinal herniation commonly presents with AKI, abdominal/scrotal pain, and a palpable inguinal mass. Prompt surgical intervention is required for these cases to preserve renal function and graft viability.[2]

KEY MESSAGES

- Ureteric herniation should be on the differentiation for post-kidney transplant patients presenting with inguinal hernia, acute kidney injury, and/or decreased urine output.
- Management of ureteric inguinal herniation should be managed with nephrostomy tube decompression, and subsequent ureteric reimplant or pyelocystostomy if required.
- Ensuring adequate ureteric length without redundancy at the time of kidney transplantation should be done to minimize the risk of inguinal herniation of the ureter.

Diagnosis of ureteral inguinal herniation is most often made by ultrasound or computed tomography (CT) imaging in the assessment of AKI or due to the presence of an inguinal hernia on exam.[2] Ureteral herniation is more common post-kidney transplant due to the anterior location of the transplant kidney and ureter with respect to the inguinal canal, as well as potential redundant ureteral length. Treatment primarily includes decompression with a nephrostomy tube (NT) with subsequent inguinal hernia repair with mesh placement.[2,3] Review of the literature supports initial treatment of ureteral inguinal herniation with NT, with 85.7% (n = 12/14) of cases being initially managed by NT in a recent review.[2] The majority of patients proceed with

surgical repair of the hernia and repositioning of the ureter.[2,4] Occasionally, ureteric reimplant is performed if there is ureteric injury, or to move the ureter to a more favourable position.[4,5] As this scenario is rare, descriptive case presentations help provide valuable information on the prevention and management of this clinical entity.

Herein, we present the first case of recurrent ureteral inguinal herniation in a transplanted kidney after previous inguinal hernia mesh repair post-ureteral herniation. Additionally, this case is the first reported presentation of ureteral inguinal herniation with the sole symptom being anuria. This case exemplifies the importance of transplant kidney positioning and leaving appropriate ureteric length during uretero-neocystostomy.

CASE REPORT

A 57-year-old male with a history of living donor kidney transplant performed 30 years prior presented to the emergency department after 3 days of anuria. He had no other symptoms, but was found to have an AKI with a creatinine of 850 µmol/L (baseline 200 µmol/L) and a potassium of 5.2 mmol/L (baseline 4.0 mmol/L). The patient's medical history was significant for Type 2 diabetes mellitus, esophageal reflux, gout, and non-alcoholic fatty liver (Figure 1). The patient had a repair of an inguinal hernia with an entrapped ureter five months prior.

For this presentation, CT imaging was obtained showing moderate hydroureteronephrosis of the transplant kidney with herniation of the ureter into a right inguinal hernia causing obstruction and soft tissue stranding (Figure 2). The patient was transferred to a tertiary care centre and underwent a nephrostogram which demonstrated a massively dilated collecting system but no opacification of the ureteropelvic junction or ureter. Therefore, a percutaneous NT was placed without an antegrade stent (Figure 3). Once decompressed with the NT, the patient diuresed approximately 4 liters of urine over 24 hours and was kept in hospital for monitoring. Once the patient's creatinine was trending towards baseline and other biochemical parameters were within normal ranges, the patient was discharged home with NT in situ.

Approximately 4 weeks later the patient was brought to the operating room and a Gibson incision was used to locate the kidney and ureter. The ureter was significantly dilated and redundant, coursing into the inguinal canal contiguously with a loop of bowel. This bowel loop was then removed from the inguinal canal carefully separated away from the ureter (Figure 4). The distal aspect of the ureter had herniated into the scrotum. A 3-way catheter was placed to facilitate bladder distension, and a methylene blue infusion was used through the nephrostomy tube to opacify the collecting system and locate the renal pelvis. Pyelocystostomy was initially planned, but due to the excessive ureteric length present, ureterectomy, reimplantation, and stent insertion was able to be performed. Care was taken to ensure that there was no redundancy in ureteric length to avoid further episodes of ureteral inguinal herniation. Repeat inguinal hernia repair was avoided at this time due to there being prior mesh placed and concerns of removal and insertion of mesh at the time of a new ureteric anastomosis. The patient recovered from the procedure without complications and was discharged home in stable condition. The patient underwent successful stent removal 4 weeks post-procedure with a creatinine improved to 128

μmol/L. The patient has been doing well without any recurrences in the community at the 4 month assessment.

DISCUSSION

Ureteral inguinal herniation is exceptionally rare after kidney transplantation but should remain on the differential diagnosis for obstructive causes of AKI. Less than 20 cases have been reported in the literature, with the majority of cases being treated with NT placement and subsequent inguinal hernia repair. To date, only 3 cases have been treated with ureteric reimplant, with this case adding to the literature.[4,5] Initially pyelocystostomy was planned, but due to the redundancy in ureteric length and the ability to safely free and mobilize the ureter, this was able to be avoided.

Diagnosis of ureteral inguinal herniation is made from CT imaging in conjunction with physical exam, clinical history, and lab findings. Most commonly, ureteral inguinal herniation presents with AKI and abdominal/inguinal discomfort with hydronephrosis seen on ultrasound or CT imaging.[2] Time from surgery does not appear to predict likelihood of ureteric herniation as presentation of ureteric herniation ranges from 4 months to 29 years in the literature, with this presentation being the longest presentation after transplantation to date.[5,6] This is an exemplary case, as the patient's initial presentation was an inguinal hernia with AKI, while the second presentation was with anuria and AKI. As such, consideration of ureteric herniation should be given in any instance of inguinal hernia or AKI in post-renal transplant patients.

CONCLUSIONS

Ureteric inguinal herniation is hypothesized to be due to the anterior placement of the ureter in transplant kidneys, and due to excessive length and redundancy of the transplant ureter when performing uretero-neocystotomy. Therefore, when performing kidney transplant it is crucial to avoid excessive ureteric length to reduce the risk of ureteric inguinal herniation. Additionally, when performing hernia repair during cases of ureteric inguinal herniation, it is crucial to ensure that the inguinal hernia is repaired securely with mesh and to give consideration to the need for ureteric reimplantation, or pyelocystostomy to mitigate the risk of recurrence.

REFERENCES

1. Giessing M. Transplant ureter stricture following renal transplantation: Surgical options. *Transplant Proc* 2011;43:383-6. https://doi.org/10.1016/j.transproceed.2010.12.014.
2. Merani S, Aufhauser DD, Maskin AT et al. Not as rare as initially described: Transplant ureter incarceration within inguinal hernia. Two cases, literature review, and management algorithm. *Transplant Proc* 2021;53:2285-90. https://doi.org/10.1016/j.transproceed.2021.07.012.
3. Bugeja A, Clark EG, Sood MM et al. As in real estate, location is what matters: A case report of transplant ureteral obstruction due to an inguinal hernia. *Can J Kidney Health Dis* 2018;5:2054358117753620. https://doi.org/10.1177/2054358117753620.
4. Sánchez ASS et al. Obstructive uropathy secondary to ureteral herniation in a pediatric en bloc renal graft. *Am J Transplant* 2005;5:2074-7. https://doi.org/10.1111/j.1600-6143.2005.00973.x.
5. Soleymanian T, Kalantarian T, Radmard A. Report of a kidney recipient with inguinal herniation of the transplant ureter. *Saudi J Kidney Dis Transplant* 2016;27:614. https://doi.org/10.4103/1319-2442.182442.
6. Lobo N, McCaig F, Olsburgh J. Contralateral inguinal herniation of a transplant ureter causing obstructive uropathy in a renal transplant recipient. *BMJ Case Rep* 2017;:bcr2016218071. https://doi.org/10.1136/bcr-2016-218071.

FIGURES AND TABLES

Figure 1. Initial ureteral inguinal herniation with (A) moderate-severe hydronephrosis of transplanted kidney; and (B, C) ureteral herniation through inguinal canal. After mesh repair of inguinal hernia, (D) resolution of hydronephrosis; and (E, F) repositioning of ureter.

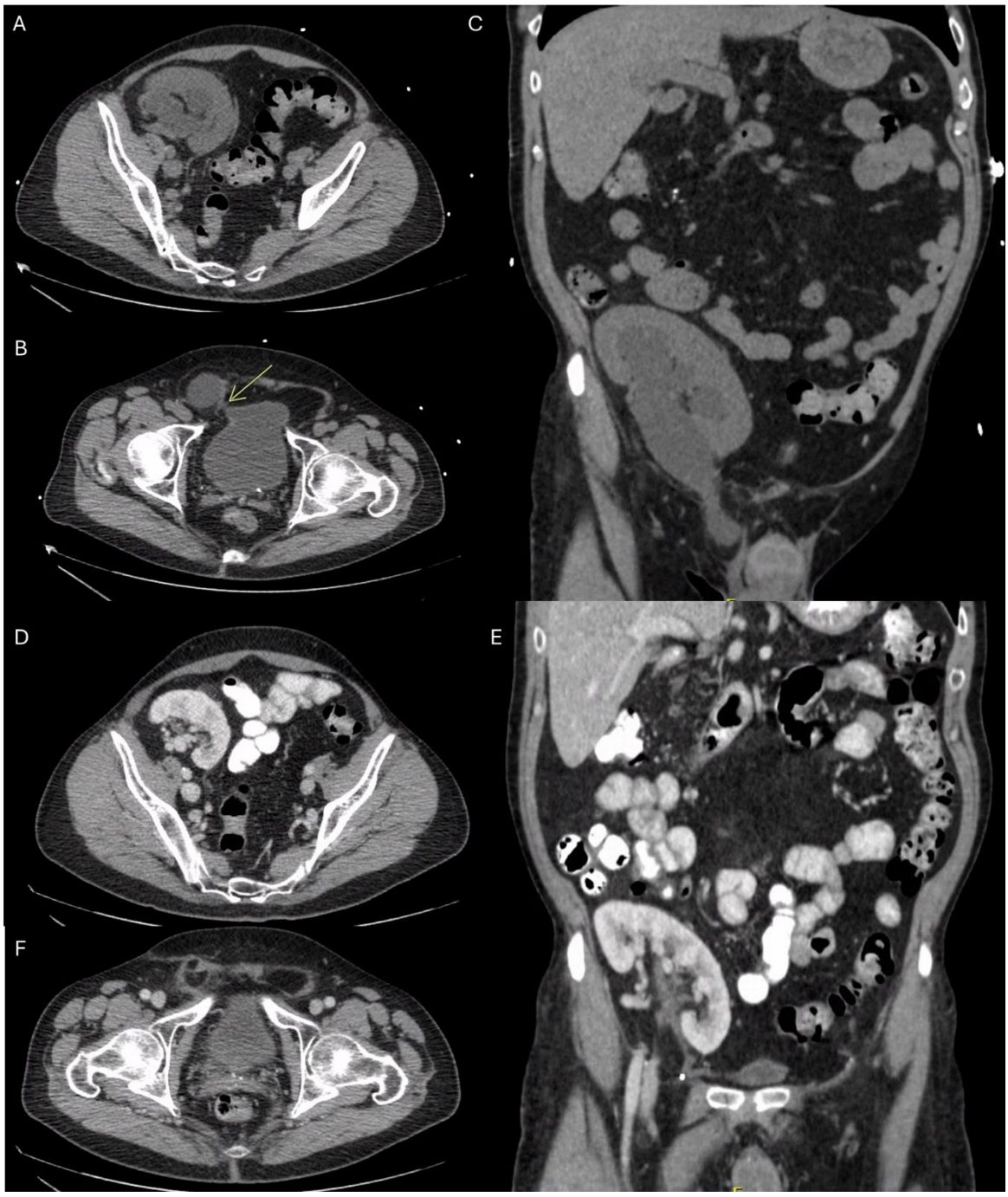

Figure 2. Recurrence of ureteral inguinal herniation, showing (A) severe hydronephrosis; and (B, C) the herniation of the ureter into the inguinal canal.

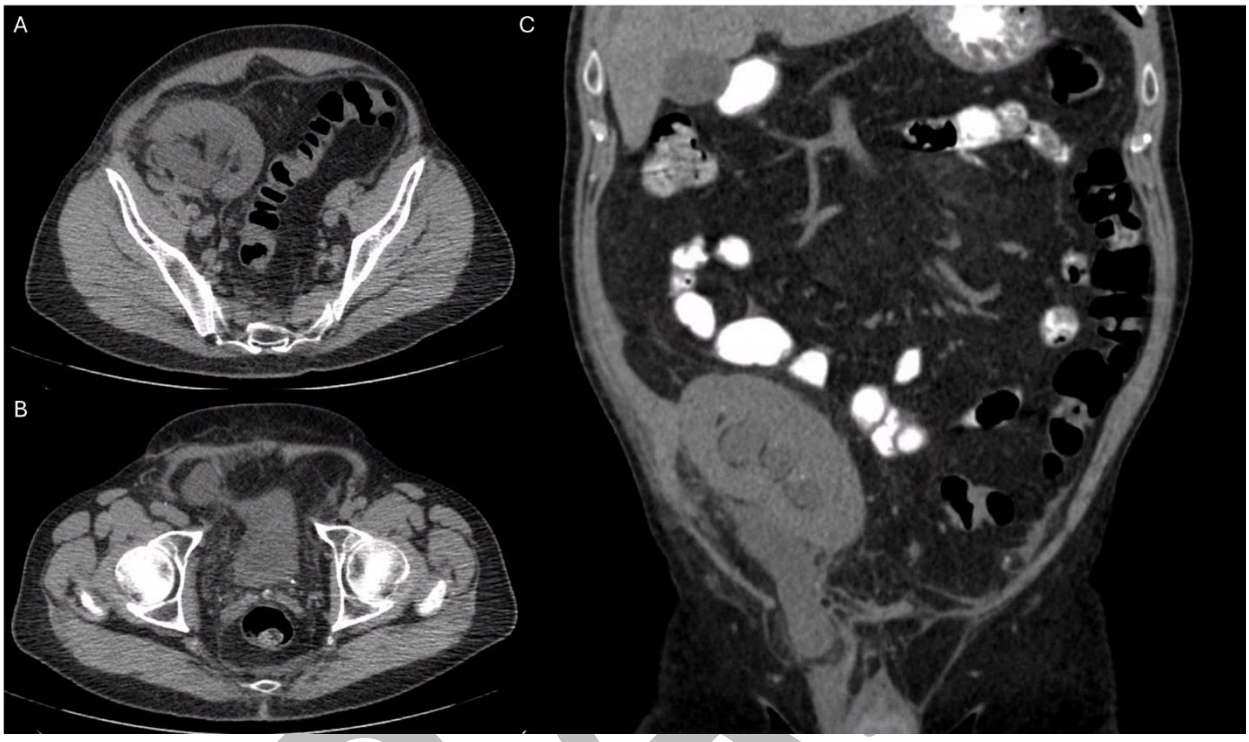

Figure 3. Nephrostogram and placement of nephrostomy tube into transplanted kidney with massively dilated collecting system.

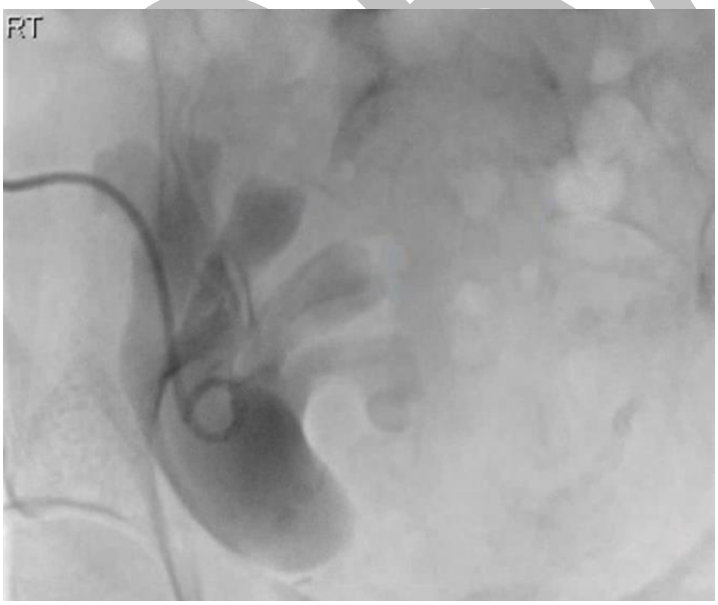

Figure 4. Intraoperative exploration showing severely dilated renal pelvis and ureter, with ureteric herniation into the inguinal canal.