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Watch that ureter: Can an inguinal hernia become a ureteric sink hole in renal transplant patients - A Case Report

Catherine Wright¹, Numa Rajab², George Neelankavil Davis¹, Shafaque Shaikh¹

Abstract

This case is of a 63-year-old male with a history of renal transplant for IgA nephropathy (June 1, 2009) who presented to the renal unit with an acute kidney injury related to an unusual complication – an indirect ipsilateral inguinal hernia causing obstructive hydronephrosis of the transplanted kidney. Successful open surgical repair resolved the obstruction and restored renal function. This is a case demonstrating the importance of timely intervention in high-risk hernias while balancing the need for specialist input in complicated cases.

Keywords:

Hernia repair, inguinal hernia, renal transplant, ureteric obstruction

Introduction

Patients who have had a renal transplant are susceptible to various complications, more commonly urinary tract infections, blood clots in the renal vessels, and stenosis. A less common complication is that of hydronephrosis of the transplanted kidney caused by a ureteric obstruction secondary to an indirect inguinal hernia. In this case report, we review a 63-year-old male presenting with this complication 14 years after his transplant in 2009.

Case Presentation

The patient initially presented while on holiday in Spain to a local hospital complaining of malaise, myalgia, and reduced appetite. On admission, blood tests demonstrated an acute kidney injury so the patient went for a computed tomography (CT) which demonstrated an obstructed, hydronephrotic transplant kidney secondary to an indirect inguinal hernia containing the ureter [Figure 1]. He

then discharged himself against medical advice to return to the UK [Figure 2]. He presented to the renal unit in the UK where further management of his condition was discussed and agreed on. A repeat CT was ordered which showed an obstructed transplant kidney within the right iliac fossa, with hydronephrosis and hydronephrosis. This was secondary to an indirect inguinal hernia containing the ureter. The efferent loop of the ureter exiting the hernia was collapsed. The vascular pedicle was not herniated and is patent [Figure 3]. With this CT report, the patient was urgently referred to the surgeons. The patient presented with a body mass index of 26.2 kg/m².

History of Presenting Complaint

Initially, while on holiday in Spain, the patient presented with reduced appetite and oral intake compounded subsequently with by generalized myalgia and fatigue. He also developed urinary urgency and noticed the formation of a lump in his groin.

¹Department of General Surgery, Aberdeen Royal Infirmary,

²Sulaiman AlRajhi University, Saudi Arabia

Address for correspondence:

Dr. Catherine Wright,
Department of General Surgery, Aberdeen Royal Infirmary, Foresterhill, Aberdeen AB25 2ZN, UK.
E-mail: catherine.wrightcorker@nhs.scot

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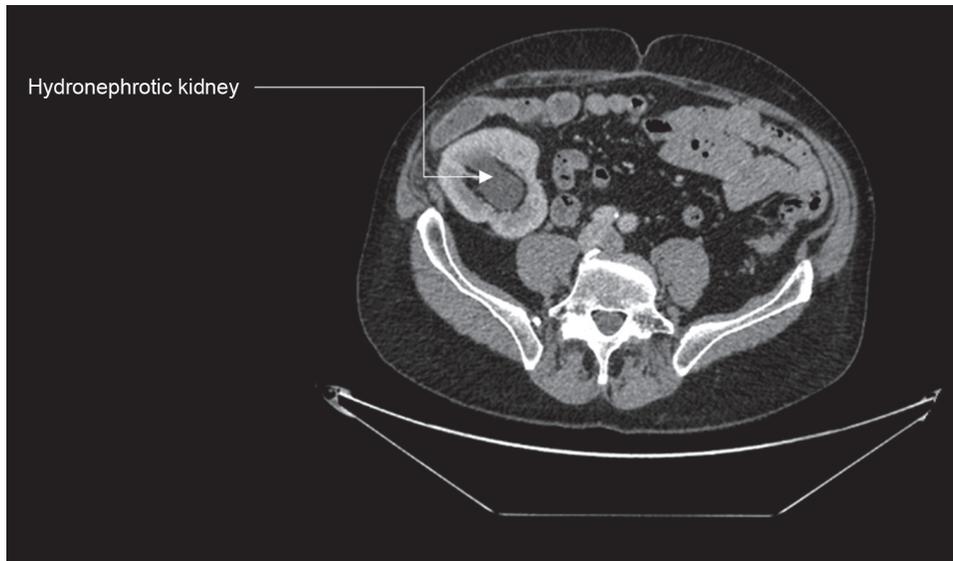


Figure 1: Hydronephrotic kidney

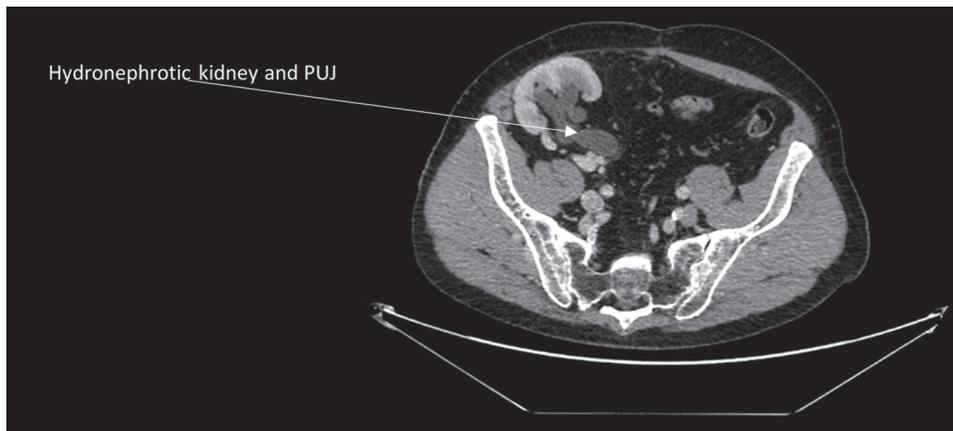


Figure 2: Hydronephrotic kidney and pelvi-ureteric junction

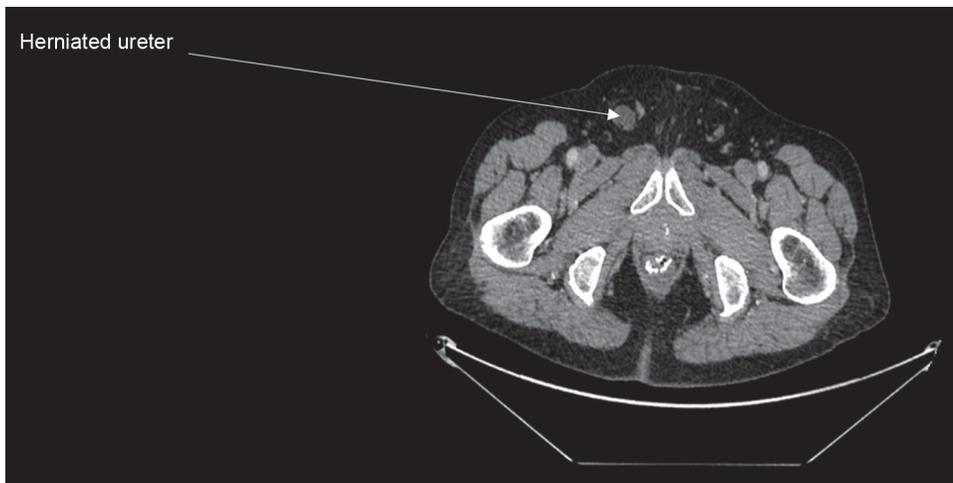


Figure 3: Herniated ureter

Diagnostic Journey

Blood tests on admission showed a significant drop in estimated glomerular filtration rate (eGFR) from >60

to 35 so an ultrasound kidney was performed which showed upstream hydronephrosis due to obstruction. The patient was admitted on January 12, 2024, at 4 pm from renal clinic where hydronephrosis was seen on

US. An urgent CT was requested and on report of the CT at 9 pm, a transplant specialty trainee in Edinburgh was contacted. The CT showed an obstructed transplant kidney within the right iliac fossa, with hydronephrosis and hydroureter. This was secondary to an indirect inguinal hernia containing the ureter. The efferent loop of ureter exiting the hernia was collapsed. The vascular pedicle was not herniated and was patent.

Management/Interventions

The conversation held with a transplant surgical registrar in Edinburgh, suggested arranging for the general surgery team in Aberdeen Royal Infirmary (ARI) to assess the need for hernia repair. If not feasible in ARI, advised to contact them back, and they would arrange it next week or the week after. Considering the improvement in kidney functions, it was suggested that there was no need for immediate urological intervention to decompress the transplant urinary tract. However, monitoring kidney functions closely is recommended, and if deterioration occurs over the weekend, an update will be provided to decide on any surgical intervention in consultation with the urology team. The general surgery team in ARI was called to assess that night at 21:21. The general surgery specialty trainee assessed at 22:00 noting input from transplant team. There was no indication for emergency surgery overnight, and the surgery needed careful planning given anatomy and risk to functioning kidney. The patient went as an emergency to theater the morning of January 13, 2024. Intravenous co-amoxiclav was given on induction of anesthesia. The patient was positioned supine, and a right groin skin crease incision was made. The inguinal canal was entered through the layers to find indirect inguinal hernia with ureter as content. The sac was reduced and deep ring tightened with interrupted stitches. A small direct hernia which was fixed interrupted stitches. A 12 cm × 10 cm prolene mesh was used to reinforce posterior layer and was fixed to the pubic tubercle, inguinal ligament, and posterior wall using prolene. The external oblique closed with vicryl after hemostasis was achieved and then an ilioinguinal block was administered. The wound was closed in layers. The total operation time was 2h.

Follow-up and Monitoring

The patient's kidney function improved to baseline and so it was deemed that there would be no need for further renal or surgical intervention at the current time. He was discharged with close monitoring of renal function to be done in the community with an option for further surgical intervention should this have been required. He was followed up in the renal clinic shortly after his surgery where he showed an improved renal function to his baseline.

Discussion

The presented case highlights a rare and unusual complication in a renal transplant recipient – obstructive hydroureteronephrosis caused by an indirect inguinal hernia involving the ureter. The discussion will focus on the diagnostic journey, management, and the implications of this uncommon presentation. Diagnosing ureteral complications in renal transplant recipients can be challenging, especially when symptoms are subtle or nonspecific. In this case, the patient initially presented with malaise, myalgia, and new urinary urgency while on holiday. The drop in eGFR and subsequent imaging, including ultrasound and CT, played a crucial role in identifying the obstructed hydronephrotic transplant kidney. The CT scan provided detailed insights into the anatomical aspects, confirming the presence of an indirect inguinal hernia containing the ureter. While complications such as urinary tract infections are more common posttransplant, an indirect inguinal hernia causing hydronephrosis is a less frequent occurrence. The presentation of this case 14 years posttransplant serves as a reminder that clinicians should maintain a high index of suspicion for less common complications, even in patients with a remote transplant history. This case emphasizes the need for comprehensive imaging, such as CT scans, when investigating unexplained acute kidney injuries in renal transplant recipients. The prompt surgical intervention through an open right inguinal hernia repair with mesh proved to be a successful approach. Addressing the ureteral obstruction led to the resolution of hydronephrosis and the restoration of renal function to baseline. The decision for surgical management was well-supported by the imaging findings, highlighting the importance of integrating diagnostic information into clinical decisions. Postoperatively, the patient's renal function improved, and close monitoring in the community was deemed appropriate. Regular follow-ups in the renal clinic allowed for the assessment of the patient's recovery progress. The case illustrates the dynamic nature of postoperative renal function and emphasizes the importance of continued surveillance, with the option for further intervention if required. Comparison of cases reviewed in our literature review and our case highlights the management strategies that can be utilized to manage ureteric obstructions caused by inguinal hernias and the outcomes associated with these. Our case shares similarities with those reported in the literature regarding the diagnostic journey. Like the cases described by Cheung *et al.*, Vyas *et al.*, and Chang *et al.*, our patient initially presented with symptoms suggestive of urinary tract obstruction, prompting further investigation. The use of imaging modalities such as CT scans was pivotal in confirming the diagnosis of obstructive hydroureteronephrosis secondary to an indirect inguinal hernia containing the ureter. In terms

of management, there are notable differences in the surgical techniques employed across the cases. While immediate herniorrhaphy with ureteral reconstruction is advocated in the literature, our patient underwent an open right inguinal hernia repair with mesh. In addition, preoperative management strategies such as nephrostomy tube placement and antegrade ureteric stenting were consistent among the cases, aiming to alleviate ureteral obstruction and optimize renal function before surgical intervention. Despite differences in surgical techniques, the ultimate goal of restoring renal function and improving patient outcomes remains consistent. Our case, similar to those in the literature, demonstrated favorable postoperative outcomes with resolution of hydronephrosis and restoration of renal function to baseline. Close monitoring in the postoperative period, as highlighted in our case, is crucial for assessing recovery progress and detecting any potential complications. Regular follow-ups in the renal clinic allow for ongoing evaluation of renal function and provide an opportunity for timely intervention if needed. A significant concern in this case is the interval between the initial diagnosis of obstructive hydronephrosis and the surgical intervention. While the patient's symptoms initially presented while he was on holiday in Spain, and he then traveled home to the UK, there was still a delay in the UK based intervention. Ideally, given the presence of a solitary transplanted kidney and the documented hydronephrosis, surgical intervention should have been expedited to minimize the risk of irreversible renal damage. Consultation with transplant surgeons has indicated that this condition should be treated as a surgical emergency. Prolonged obstruction can lead to significant renal parenchymal injury and compromise graft function. While the patient experienced a favorable outcome, this should not diminish the importance of prompt surgical intervention. The decision to observe the patient's renal function over the weekend, while understandable, carries inherent risks. Future management of similar cases should prioritize urgent surgical intervention to prevent potential complications.

Review of Existing Literature

Whilst this presentation is rare, cases have been documented throughout the literature. Cheung *et al.* discusses two cases of ureteral obstruction secondary to inguinal hernias. The first discusses an obese white male presenting with hydronephrosis and an ipsilateral left inguinal hernia contains the distal transplanted ureter. The second case documents an 88-year-old male with a right inguinal hernia containing the transplanted ureter.^[1] Vyas *et al.* documents the case of a 32-year-old obese male who had undergone a renal allograft 7 years earlier. He presented with a right inguinal hernia containing the distal transplanted ureter along with

part of the urinary bladder.^[2] A more recent case of Chang *et al.* reported a case in which a 76-year-old man presented with bilateral pitting edema, reduced urinary output and an ipsilateral right inguinal hernia 3 years after undergoing a living donor kidney transplantation. In this case, their opinion was that the complication was due to abnormal positioning of the graft kidney, in which the ureter was located superficially downwards and was prone to herniation.^[3] Other than this, many other cases are presented.^[4-7] Some symptoms shown to be associated with the presence of the ureter in the inguinal hernia include urosepsis, increased frequency of urination, nocturia, and the feeling of incomplete emptying of bladder. Other symptoms may include bilateral pitting edema of the lower limbs. All patients showed increased levels of creatinine at presentation which subsequently decreased once the therapeutic strategies were carried out. Methods of diagnosis ranged from CT scans to magnetic resonance urography. Preoperative management included the use of the nephrostomy tube with or without antegrade ureteric stent, in which the ureter was re-positioned retroperitoneally. This was usually followed by surgical hernia repair with methods such as the Lichtenstein operation using alloplastic material. It can be observed through the literature that the condition may be associated with the male sex and obesity as well as a delay in the presentation of the hernia from the time of kidney transplantation.^[7] We also see that through general consensus, the treatment of immediate herniorrhaphy with ureteral reconstruction is the way forward for these patients.

Conclusion

This case report underscores the importance of vigilance in diagnosing uncommon complications in renal transplant recipients. The successful surgical intervention in response to an indirect inguinal hernia causing obstructive hydronephrosis highlights the critical role of timely diagnosis and urgent management in preserving renal function. Clinicians should consider atypical causes when presented with unexplained renal complications in transplant recipients, ensuring a comprehensive diagnostic approach for optimal patient outcomes. In conclusion, while our case adds to the existing literature on ureteric obstruction in renal transplant patients, it also underscores the variability in management approaches and surgical techniques. Despite these differences, the successful resolution of obstructive hydroureteronephrosis highlights the importance of prompt diagnosis and appropriate surgical intervention in preserving renal function. Continued research and collaboration are essential for further elucidating optimal management strategies and refining surgical techniques in this rare but clinically significant

condition. Cases such as this should be considered surgical emergencies.

Author contributions

The manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work.

Ethical policy and Institutional Review Board statement

This case study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Declaration of patient consent

All participants provided informed consent before enrollment. Strict measures were taken to ensure the privacy and confidentiality of participant data. This case study is based on a retrospective review of anonymized medical records. No direct patient interaction occurred during the preparation of this study.

Data availability statement

Data sharing is not applicable to this article as no datasets were generated and/or analyzed during the current study.

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Nil.

Conflicts of Interest

There are no conflicts of interest.

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