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A Case Report of Herniation of Transplant Kidney Ureter

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Abstract

Transplanted kidney ureteral inguinal hernia is a rare but serious complication where the transplant ureter protrudes into the inguinal canal. This poses a high risk of obstruction, hydronephrosis, and graft loss. Diagnosis is often delayed, as symptoms mimic common issues. A high clinical suspicion and CT urography are key for identification, showing the ureter's course into the canal. Treatment involves open surgical repair. This includes reducing the hernia, freeing the ureter (ureterolysis), and reinforcing the inguinal canal, usually with mesh, to prevent recurrence. Early recognition and intervention are vital to protect the transplanted kidney's function.

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Introduction

Herniation of the ureter from a transplanted kidney, referred to as transplant kidney ureteral hernia, represents an exceptionally uncommon yet clinically significant complication following renal transplantation. In this condition, the ureter of the grafted kidney deviates from its intended anatomical course and protrudes through a defect or weakened segment of the abdominal wall fascia. Such displacement may result in urinary outflow obstruction, progressive injury to the transplanted kidney, and, in severe or delayed cases, eventual graft failure [1].

During kidney transplantation, the graft is typically positioned within the iliac fossa—most commonly on either the right or left side—and the ureter is implanted directly into the urinary bladder. Unlike the native ureter, the transplanted ureter lacks substantial periureteral adipose tissue and does not benefit from multiple native vascular sources. Instead, its blood supply depends exclusively on the arterial circulation of the transplanted kidney. This limited vascularization ren-

ders the ureter particularly susceptible to ischemic injury and mechanical compromise [1,2].

Epidemiology and Incidence [3]

Transplant ureteral herniation is considered an extremely rare complication, with only a limited number of documented cases worldwide. It may occur at any point following transplantation, ranging from the immediate postoperative period to several years or even decades later. The majority of reported cases involve male patients, and the herniation typically develops on the same side as the transplanted kidney.

Types and Anatomical Locations of Herniation [2]

Inguinal Hernia (Groin Region)

This is the most frequently reported form. In such cases, the ureter traverses the inguinal canal and may extend toward the scrotum in men or the labia majora in women.

Femoral Hernia (Upper Thigh Region)

Occurring through the femoral canal, this type is less common than the inguinal variant.

Herniation Through Prior Surgical Defects

The ureter may protrude through previous surgical incision sites or areas of weakened fascia created by earlier operations.

Internal (Intraperitoneal) Hernia

This presentation is exceedingly rare and involves displacement of the ureter into the peritoneal cavity.

Clinical Presentation [2,4]

Symptoms Related to Urinary Obstruction Include:

- Marked reduction in urine output from the transplanted kidney
- Pain localized to the graft site, sometimes resembling renal colic
- Elevation in serum creatinine levels
- Ultrasonographic evidence of hydronephrosis

Local Hernia-Related Findings May Include:

- A palpable mass in the inguinal or adjacent region
- Enlargement of the mass with increased intra-abdominal pressure
- Variable reducibility upon physical examination

Late or Progressive Manifestations May Involve:

- Recurrent urinary tract infections
- Development of urosepsis
- Gradual deterioration of graft function

Diagnostic Evaluation [3]

Initial Imaging

- Color Doppler Ultrasound: May reveal varying degrees of hydronephrosis and occasionally diminished diastolic flow in the transplant renal artery.

Targeted Imaging Studies

- **Retrograde Cystourethrography (Gold Standard):**

Demonstrates looping of the ureter within the hernia sac and precisely identifies the site of obstruction.

- **AntegradePyelography:**

Performed through a nephrostomy tract or during percutaneous nephrostomy (PCN) placement.

- **Contrast-Enhanced CT Urography:**

Provides three-dimensional visualization of the ureteral course and confirms its presence within the hernial canal.

- **Renal Nuclear Scan (DTPA or MAG3):**

Shows delayed tracer secretion and excretion, clearly indicating obstructive pathology.

Additional Investigations

- Cystoscopy with retrograde ureteral catheterization
- Laboratory assessment of graft function

Differential Diagnosis [3,5]

- Ureteral stricture (the most common cause of obstruction after transplantation)
- Compressive lymphocele
- Recurrence of the primary renal disease
- Vesicoureteral reflux
- Extrinsic compression from hematoma or mass
- Ureteral calculi

Management Strategies [4,5]

The cornerstone of treatment is preservation of graft function. Prompt relief of urinary obstruction and careful anatomical correction—without jeopardizing ureteral vascularity-are essential.

Emergency and Initial Management

- Image-guided percutaneous nephrostomy under ultrasound or fluoroscopic guidance
- Decompression of the collecting system to stabilize renal function

Definitive Surgical Treatment

A. Open Surgical Repair

- Direct incision over the hernia site
- Careful ureterolysis, given the delicate blood supply
- Repositioning of the ureter into its anatomical location
- Fascial defect repair, with or without mesh reinforcement
- Possible fixation of the ureter to prevent recurrence

B. Laparoscopic Repair

- Suitable for selected patients
- Offers improved visualization and reduced tissue trauma
- Requires significant expertise in transplant and advanced laparoscopic surgery

C. Ureteral Reconstruction or Replacement

- Indicated in cases of ureteral injury or secondary stricture
- May necessitate redo ureteroneocystostomy
- A Boari flap may be utilized when additional length is required

Renal Re-transplantation

Reserved for cases with irreversible graft damage or when anatomical correction cannot be achieved.

Outcomes and Prognosis [2,3,5]

Prognosis largely depends on the timing of diagnosis and intervention. Early recognition and appropriate management are associated with favorable outcomes and preservation of graft function. Conversely, delayed diagnosis may result in permanent graft injury. Potential surgical complications include infection, recurrence of herniation, and ureteral damage. Overall success is influenced by diagnostic timing, surgical expertise, and the patient's general health status.

Case Presentation

A 68-year-old man with a history of kidney transplantation performed 18 years earlier presented with a serum creatinine level elevated to 7 mg/dL. He also reported a noticeable reduction in urine output. Initial evaluation included color Doppler ultrasonography of the transplanted kidney, which demonstrated hydrocalyx of the upper pole while showing preserved renal perfusion.

Subsequently, contrast-enhanced CT imaging of the abdomen and pelvis was obtained. The scan revealed marked hydroureteronephrosis of the transplanted kidney. Additionally, an incidental but significant finding was identified: herniation of the transplant ureter into the inguinal canal (Figures 1,2). Upon further questioning, the patient disclosed that he had experienced scrotal swelling for approximately one month but had not sought medical evaluation.

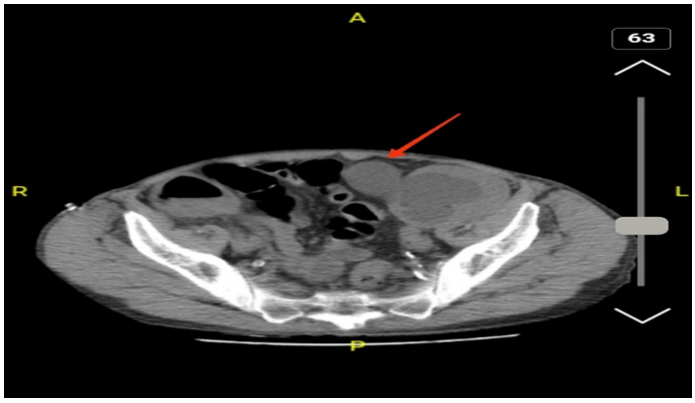

Figure 1: Cross-Section of CT Scan of the Abdomen and Pelvis. Severe Kidney Transplanted Hydroureteronephrosis

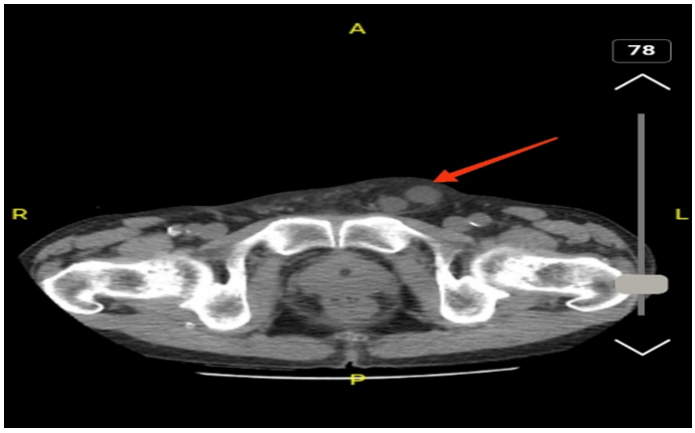

Figure 2: Presence of the Ureter Inside the Inguinal Canal

Voiding Cysto Urethro Graphy (VCUG) was performed and demonstrated vesicoureteral reflux into the transplanted kidney, as well as visualization of the ureter extending into the scrotal sac (Figure 3).

Figure 3: VCUG

An ultrasound-guided percutaneous nephrostomy was placed to decompress the obstructed system. Following this intervention, the patient's serum creatinine decreased to 2 mg/dL. After stabilization, he underwent definitive herniorrhaphy. Postoperative ultrasonography confirmed resolution of hydronephrosis, and the scrotal swelling subsided completely.

Discussion

Transplanted ureteral inguinal herniation is an uncommon but clinically meaningful cause of late graft dysfunction. Up to 2023, only approximately 25–31 cases had been described in the literature. The condition can result in ureteral obstruction, progressive hydronephrosis, and impaired renal graft function if not promptly addressed [1].

Summary of Selected Reported Cases

Case 1 (2025) – First Documented Recurrence After Primary Repair [2]

A 57-year-old man presented 30 years after transplantation with anuria and acute kidney injury. CT imaging established the diagnosis. Initial decompression was achieved via percutaneous nephrostomy. Due to excessive ureteral length, ureteral reimplantation was performed. Graft ح recovered, and no recurrence was observed at four months.

Case 2 (2023) – Robotic-Assisted Repair [1]

A ◦63-year-old male developed bilateral ureteral herniation approximately nine years post-transplant. CT imaging demonstrated mild hydronephrosis. Ureteral stenting with indocyanine green fluorescence was performed, followed by robotic inguinal hernia repair utilizing real-time ureter visualization technology. The patient was discharged the same day.

Case 3 (2018) – Diagnostic Challenge [3,4]

A 75-year-old man presented six years after transplantation. Ultrasound was inconclusive, and CT imaging ultimately confirmed the diagnosis. Antegrade stenting was initially performed, followed by open mesh hernioplasty. Renal function returned to baseline.

Case 4 (2017) – Combined Bladder and Ureter Involvement [5]

An 82-year-old patient developed symptoms 14 years post-transplant. CT imaging revealed concurrent bladder and ureter herniation. After nephrostomy and ureteral stenting, preperitoneal mesh repair was performed with restoration of kidney function.

Case 5 (2012) – Conservative Strategy [3]

A 50-year-old man presented 12 years after transplantation. Imaging confirmed hydronephrosis secondary to ureteral herniation. Because of significant comorbidities, major surgery was not pursued. Long-term Double-J stenting was chosen. Although hydronephrosis improved, the patient died four months later from cardiac arrest unrelated to the hernia.

Collectively, these reports emphasize that transplant ureteral inguinal herniation, although rare, must be considered in transplant recipients presenting with hydronephrosis or acute kidney injury—particularly when an inguinal hernia is present. CT imaging plays a pivotal diagnostic role. Effective management requires immediate relief of obstruction followed by definitive hernia repair, occasionally combined with ureteral reconstruction [1,3,4].

Conclusion

Ureteral herniation involving a transplanted kidney is an infrequent yet potentially serious complication. Early recognition is crucial to prevent irreversible graft damage. Any transplant recipient presenting with signs of urinary obstruction should be evaluated for this possibility. Detailed preoperative imaging and meticulous surgical technique aimed at preserving ureteral vascular supply are fundamental for successful treatment. Optimal outcomes are achieved through coordinated collaboration among transplant nephrologists, urologists, and transplant surgeons to safeguard both patient health and graft longevity.

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