

Trauma and reconstruction

Page kidney phenomenon in kidney allograft following abdominal trauma

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ABSTRACT

The page kidney phenomenon is often associated in patients with abdominal trauma. External compression from a renal hematoma can cause hypertension, and presentation can be delayed following the initial injury. For patients who have a kidney allograft, page kidneys may lead to renal insufficiency and acute renal failure due to the absence of a contralateral kidney to compensate. This case report discusses the identification and management of a page kidney in a kidney allograft recipient within three months following transplantation.

Introduction

Page kidneys are characterized by hypertension secondary to kidney compression often related to the presence of a renal hematoma.¹ The external compression of the kidney causes renal hypoperfusion and ischemia, which triggers a hypertensive response mediated by the renin-angiotensin-aldosterone axis. Treatment modalities include both nonoperative and operative management. Pharmacologic intervention with angiotensin converting enzyme inhibitors or aldosterone receptor antagonists is the preferred method of treatment; however, invasive options such as hematoma evacuation or capsulotomy are necessary when pharmacotherapy is insufficient (see Fig. 1).²

The etiology of the phenomena is often associated with blunt force trauma. Anatomically, the kidney is a poorly protected organ that is surrounded by a layer of perirenal adipose tissue. Trauma via contact sports and motor vehicle accidents encompass typical presentations of page kidneys.¹ When considering kidney allografts following transplantation, the etiology varies. Common causes are reported from graft biopsies, trauma, or even the transplantation surgery procedure.³ Herein we report the successful identification and management of a page kidney caused by abdominal trauma in a simultaneous kidney-pancreas recipient within three months of transplantation.

Case presentation

A 34 year old male with type I diabetes and end stage renal disease secondary to diabetic nephropathy presented to the emergency room

three months after a successful simultaneous kidney and pancreas transplant. 48 hours prior to admission, the patient was participating in a boxing match where he sustained blunt force abdominal trauma to the lower left quadrant. He complained of worsening pain over the kidney allograft site and decreased urine output. His blood pressure was 160/100, and his creatinine was 3.5mg/dL from base line of 1.0mg/dL. Ultrasound (Panel A) showed an absence of diastolic blood flow to kidney allograft. Abdominal computed tomography (CT) (Panel B) showed a sub-capsular hematoma measuring 7.4 × 5.7 × 2.9 cm resulting in deformity of the kidney. Surgical decapsulation of the transplanted kidney with subsequent evacuation of the hematoma resulted in immediate improvement of urine output, blood pressure, creatinine levels, and restoration of diastolic blood flow (Panel C and D).

Discussion

The page kidney phenomena was first described by Page in 1939 using canine models.⁴ The phenomena was termed in post kidney transplant recipients as a “pseudorejection”.⁵ This characterization was derived from the deterioration of graft function that commonly resembles rejection. While patients with a page kidney are known to exhibit hypertension, renal insufficiency can occur in select settings where only a single functional kidney is present. The external compression leads to a decrease in glomerular filtration rate that is typically compensated by an existing contralateral kidney via hyperfiltration.¹ For kidney transplant recipients with a single functioning kidney, compensation is not a viable option, and transplant recipients

Abbreviations: CT, computed tomography; US, ultrasound.

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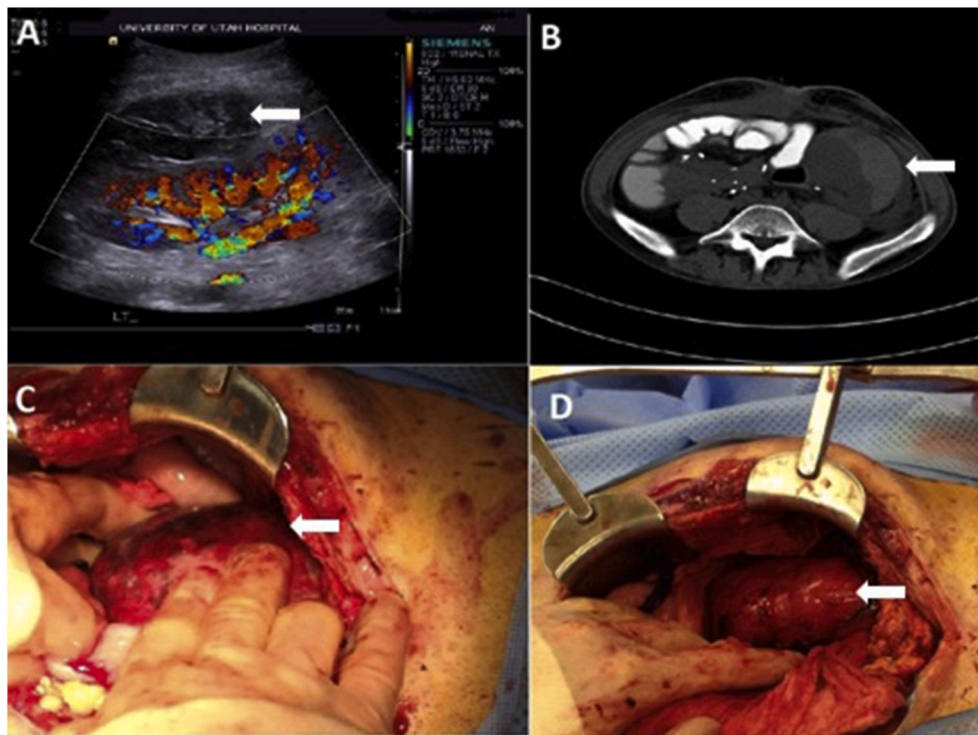


Fig. 1. A-US, B- CT, C-Before decapsulization, D- After decapsulization (white arrows indicate to hematoma).

with page kidneys can quickly develop acute renal failure, requiring immediate intervention.

Diagnostic imaging using Doppler ultrasounds (US) and CT scans are particularly useful in identifying and managing patients with page kidney.³ CT imaging is the preferred modality as it is able to illustrate high resolution images of subcapsular fluid collections with varying densities.¹ Doppler US is another alternative that is cheaper, non-invasive, and readily available; however, it does not produce as high quality of images as CT imaging and may be unable to provide a definitive diagnosis.¹

Kidney transplantation alters the anatomy of where the kidney originally resides in the body. Commonly, retroperitoneal organs are externally injured when trauma occurs from the dorsal aspect of the body. In kidney transplant recipients, any anterior abdominal trauma may directly injure the transplanted kidney. Based on the patient's history as a transplant recipient, we proceeded with immediate operative intervention following diagnosis to preserve graft function. The

patient is currently doing well and continues to have excellent graft function at 1 year postoperatively.

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