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CASE REPORT

A Case of Recurrent Episodes of Acute Renal Allograft Failure Caused by Renal Pedicle Tortion

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Abstract

Background: Acute allograft failure which occur intermittently after renal transplantation caused by graft tortion is a very rare entity. We here report highly unusual case of recurrent episodes of acute allograft dysfunction two years after kidney transplantation secondary to ischemic tubular necrosis caused by tortion of renal pedicle due to rotation of the allograft with body movements. *Case Presentation*: A 55 year-old male patient with living unrelated kidney transplantation for chronic renal failure caused by autosomal dominant polycystic kidney disease had presented recurrent acute deteriorations in renal functions. All laboratory values were within normal limits except elevated serum creatinine levels, acute tubular necrosis in graft biopsy, and detection of pelvic dilatation in renal ultrasonography from time to time. Changes in axis of graft in nuclear medicine scans taken at different times during the same study made us bring to mind the diagnosis of renal pedicle tortion. Renal blood flow measurements with Doppler ultrasonography in different body positions helped to reach the final diagnosis of mobile kidney right on time. The patient is now well after prompt surgical treatment with nephropexy. *Discussion*: Unfortunately, tortion of allograft once occurred is associated with very high rate of graft loss due to arterial compromise and infarction and it is very difficult to diagnose without high level of suspicion. We discuss the causes of renal allograft tortion and the measures to prevent its occurrence and the methods to diagnose.

Keywords: kidney transplantation, nephropexy, renal allograft failure, tortion, transperitoneal approach

INTRODUCTION

Acute tortion of renal transplant pedicle resulting in renal necrosis and graft removal was initially described in a patient with purine-belly syndrome.[1] It is very rare for kidney transplant graft to rotate around its vascular pedicle. But when it occurs, it leads to vascular compromise and infarction. Unfortunately this tortion of allograft is associated with very high rate of graft loss and it is very difficult to diagnose without high level of suspicion of renal pedicle tortion.[1,2]

Tortion around the vascular pedicle has the potential to occur with intraperitoneal renal transplantation. Intraperitoneal placement of the kidney in recipients may not allow stabilization of the graft which occurs with retroperitoneal approach.[2] Intraperitoneally implanted allograft might lead to mobility of transplant kidney and hence, kinking of transplant renal artery may occur.

We here report highly unusual case of recurrent episodes of acute allograft dysfunction two years after kidney transplantation secondary to ischemic tubular necrosis caused by tortion of renal pedicle due to rotation of the allograft with body movements.

CASE PRESENTATION

A 55 year-old male patient received kidney from a living nonrelated donor harvested from his wife in May 2010 for chronic renal failure caused by autosomal dominant polycystic kidney disease due to which he had been

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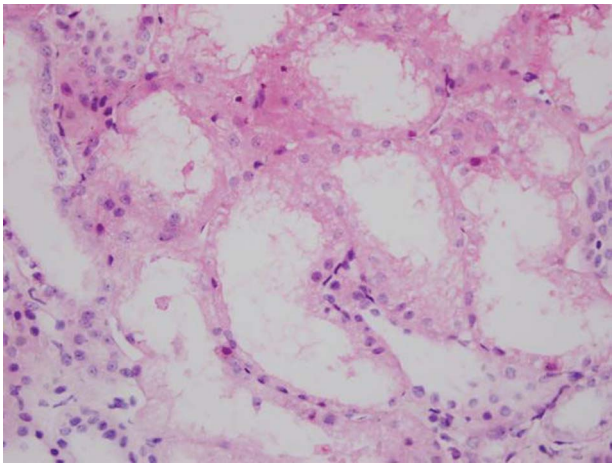


Figure 1. Desquamation, necrosis and vacuolar changes in proximal tubular epithelium (HE X 400).

maintained on hemodialysis for 12 months. The operative procedure which also included bilateral nephrectomy of large polycystic kidneys with transperitoneal approach was uneventful. The transplanted kidney functioned immediately. The early postsurgical status was uneventful. In his posttransplant history, he was diagnosed with invasive pulmonary aspergillosis and cytomegalovirus (CMV) pneumonia one month after transplantation and treated with bilateral total hip replacement surgery due to bilateral avascular necrosis one year after transplantation.

Immunosuppressive regimen included cyclosporine, mycophenolate mofetil, and prednisone. Until two months ago, he was well with mean serum creatinine levels of 1.4 mg/dL. Since then he was presented intermittently with acute deteriorations in graft functions. All laboratory values were within normal limits, including

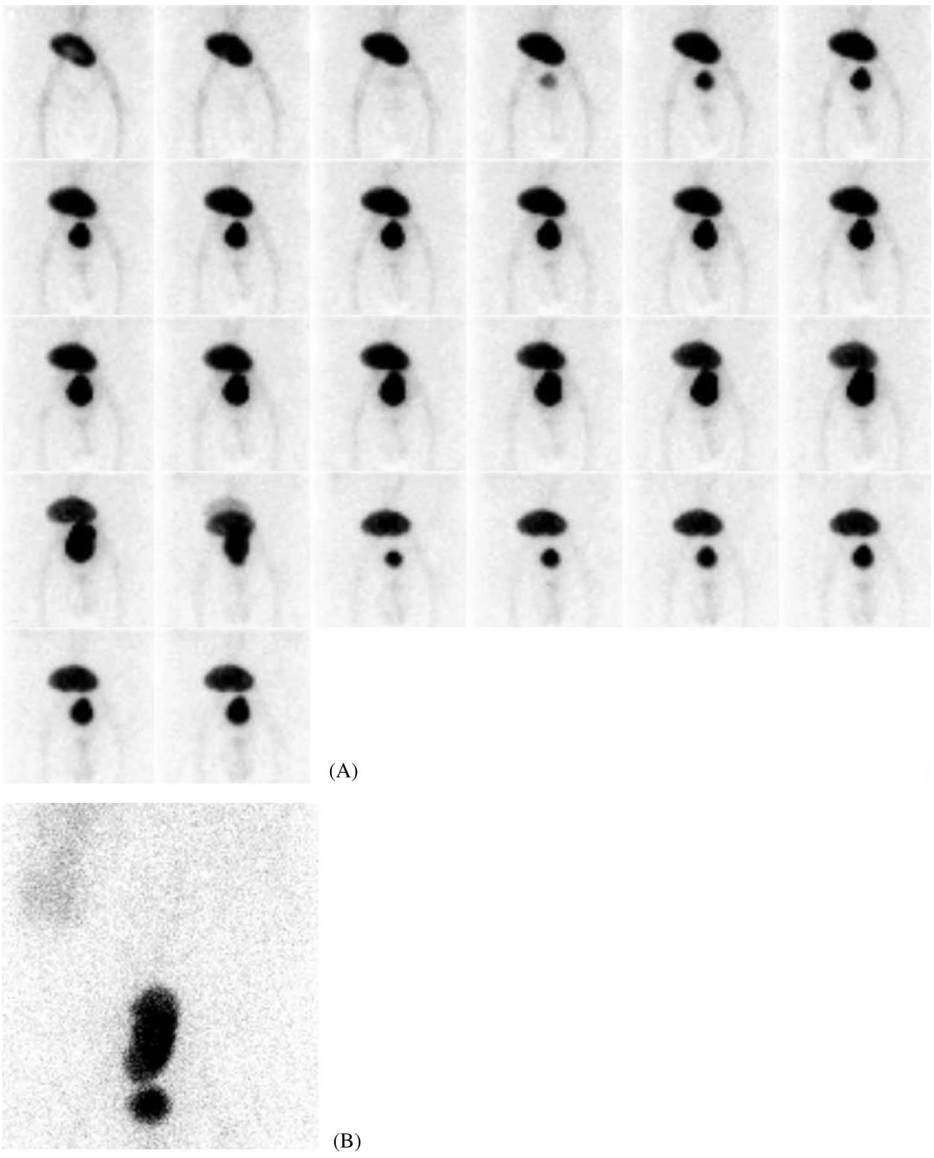


Figure 2. Changes of allograft position in the early (Figure 2A) and late (Figure 2B) renal scintigraphy with Tc 99m MAG3 in supine position.

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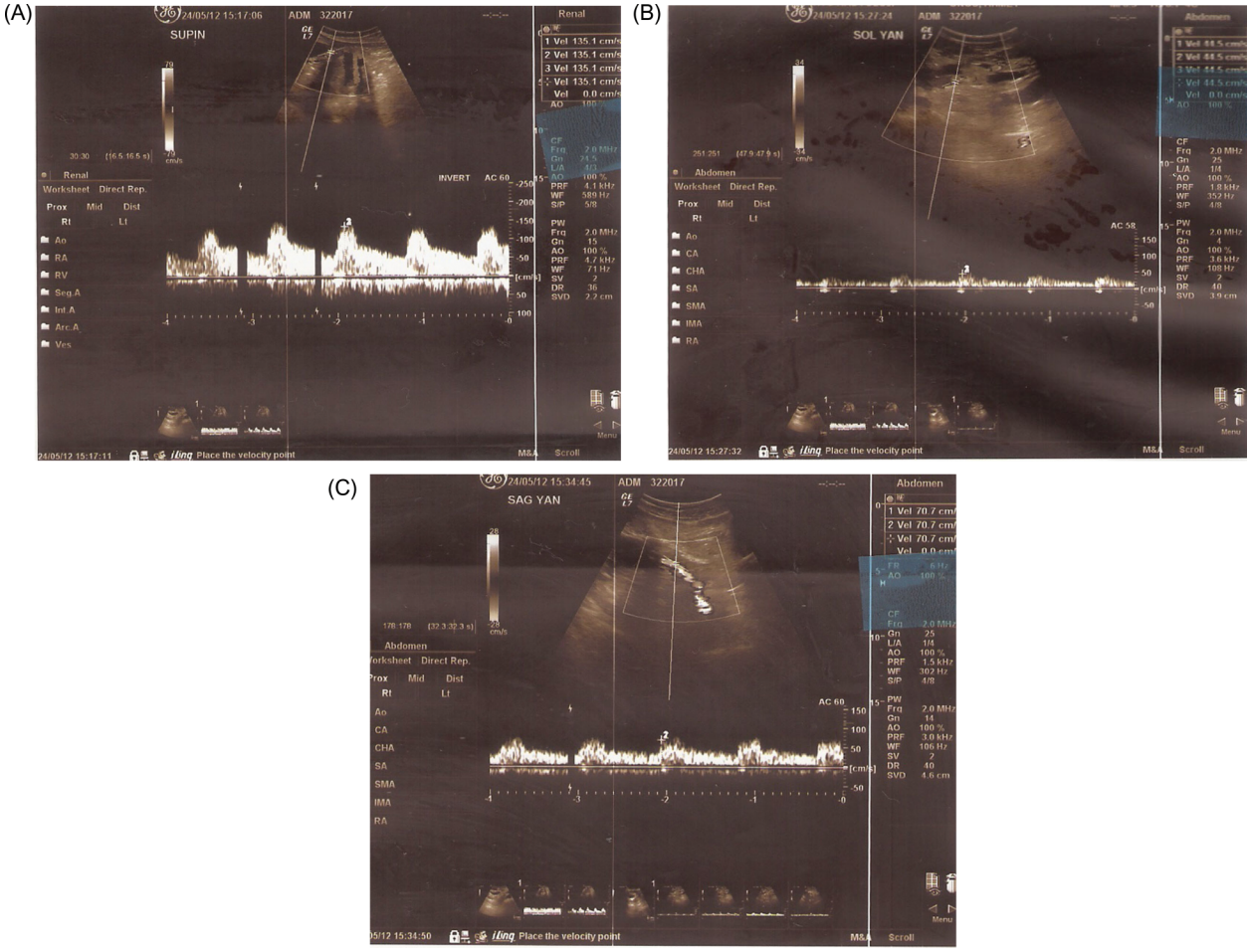


Figure 3. Peak sistolic velocity measurements of 135 (Figure 3A), 44 (Figure 3B) and 70 (Figure 3C) cm/s in supine, left lateral recumbent, and right lateral recumbent positions in Doppler ultrasonography.

opportunistic virus DNA levels like CMV, BK polyomavirus, serum cyclosporine levels, body fluid cultures, serum C-reactive protein levels with the exception of mild anemia of chronic disease, intermittent elevations in serum creatinine levels with the highest level of 4.42 mg/dL and lowest level of 1.32 mg/dL.

Serial evaluations with ultrasonography revealed graft size of 103 × 46 mm with increased parenchymal echogenicity in right iliac fossa. The anterior–posterior diameter of the pelvis of the graft was detected in the range of normal to 15 mm with renal ultrasonography taken at different times. Magnetic resonance imaging revealed no partial or complete obstruction in urinary tract. Voiding cystourethrography excluded vesicoureteral reflux. Transplant renal artery Doppler evaluations found normal flow uninterruptedly. Acute tubular necrosis was diagnosed with renal biopsy (Figure 1). No biopsy proven acute rejection or viral cytopathic effect was detected with immune fluorescence studies. On 99mTc MAG3 scan, the transplanted kidney showed good radionuclide uptake, with minimal pelvis stasis which was responsive to diuretics. However, changes in the axis of graft in nuclear medicine scans taken at different times during same study were striking (Figure 2). Afterwards, with transplant renal artery Doppler ultrasonography, peak systolic velocity measurements were 135, 44, and 70 cm/s in supine, left lateral recumbent, and right lateral recumbent positions, respectively (Figure 3). The anterior–posterior diameter measurements of renal pelvis were 12, 15, 20 mm in supine, left lateral recumbent, and right lateral recumbent positions, respectively. After multimodality imaging studies, diagnosis of tortion of transplant kidney caused by rotation of renal pedicle due to mobile graft was made. The patient underwent surgery for nephropexy.

First, nephroptosis was diagnosed with transurethral retrograde pyelography. Floating intraperitoneal kidney with pinpoint scattered dark red spots (petechial hemorrhage) due to twisted graft around its pedicle was observed during open surgery (Figure 4). Volvulated transplant kidney with no compromise to the vascular structures had induced a rotational obstruction of the transplant ureter. The tortion was straightened. After retro-peritonealization of kidney, nephropexy, and marsupialization in order to prevent lymphocele development was performed. Kidney functions significantly

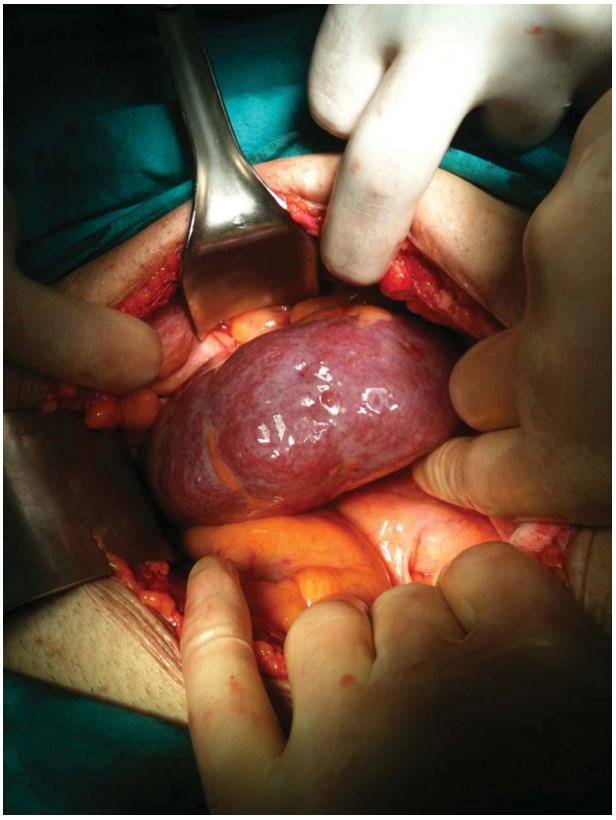


Figure 4. Kidney allograft with petechial hemorrhage due to ischemia during open surgery.

improved after surgery. Serum creatinine level decreased from preoperative level of 4.4–1.6 mg/dL on the seventh day after nephropexy.

DISCUSSION

There may be many reasons for the malfunctioning of kidney allograft, such as acute rejection, acute tubular necrosis, infections, drug toxicities, metabolic disturbances, hypervolemia, and congestive heart failure. Renal transplant torsion around its pedicle is one of the very rare reasons of kidney allograft malfunction. Tortion of kidney transplant refers to rotation of the kidney transplant graft around its vascular pedicle resulting in vascular compromise and infarction. Unfortunately, the presence and significance of this entity is highly underestimated and missed. Clinical presentation and diagnostic imaging modalities are nonspecific, and surgical exploration is, therefore, often delayed. Most of the cases in the literature were reported to be diagnosed during laparotomy when grafts underwent nephrectomy due to renal infarct.[1–3]

The length of the vascular pedicle, excess ureteral length, paucity of adhesion secondary to steroid administration, and intraperitoneal placement of allograft are factors that contribute to the abnormal mobility of the kidney allograft.[3] In our case, the etiology underlying the renal pedicle tortion was intraperitoneal placement of allograft. Transperitoneal approach is generally preferred in simultaneous kidney and pancreas transplantations, in cases with low compliance bladders in need of ureterocystoplasty and in patients who have indications for native nephrectomy, as in our case.[3–5] The interval from kidney transplantation to occurrence of renal pedicle tortion is variable from 1 week to 10 years.[6,7] So, it is never too early or too late for renal tortion to occur. This time period for our case was two years.

In order to prevent this highly unwanted complication, prophylactic nephropexy is suggested for grafts with renal pedicle longer than 5 cm and those with discrepancy more than 2 cm between the length of the artery and the vein.[8] Prophylactic nephropexy should also be remembered in renal transplantations with transperitoneal approach. The ideal diagnostic method is renal blood flow measurements with Doppler ultrasonography in different body positions and renal axis evaluations with nuclear medicine scan taken after body movements.

To the best of our knowledge, in the literature, 17 cases of renal allograft tortion was reported. We here report the 18th case of renal graft tortion. However, because of difficulties in prompt diagnosis of renal graft tortion due to low level of consideration, we believe clinicians might miss some of the cases and might lose grafts. With this report, we want to alert the transplant surgeon and nephrologist to recall graft tortion and nephropexy for kidney transplantations with transperitoneal approach.

***Declaration of interest statement*:** The results presented in this paper have not been published previously in whole or part, except in abstract format. No conflicts of interest were declared.

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