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Common iliac vein thrombosis as a result of proximal venous stenosis following renal transplantation: A case report

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ABSTRACT

Proximal iliac vein stenosis resulting in iliac vein thrombus and venous outflow obstruction in renal transplant patients is an exceedingly rare occurrence. We present a case of a 63-year-old male who underwent deceased donor renal transplantation and presented 12 days later with ipsilateral lower extremity swelling and plateauing serum creatinine. Further work-up demonstrated proximal iliac vein deep venous thrombosis and anticoagulation was initiated. However, propagation of the thrombus developed despite receiving therapeutic anticoagulation. Subsequent venography demonstrated proximal iliac venous stenosis and the patient underwent successful catheter-directed alteplase thrombolysis, inferior vena cava filter placement and iliac vein stenting with salvage of the renal allograft. A diagnostic strategy and management algorithm for iliac vein stenosis and thrombosis in a renal transplant recipient is proposed.

1. Introduction

Venous thromboembolic (VTE) events in renal transplant recipients are not uncommon with a 4.5% incidence of deep venous thrombosis (DVT) and 1.7% incidence of pulmonary embolism (PE) of 1.7%[1]. Though renal vein thrombosis is a recognized phenomenon occurring in 3.4% of transplant recipients [2], post-transplantation proximal iliac vein thrombosis is exceedingly rare with 2 case reports in the literature, one of which occurred following a total hip replacement in a renal transplant recipient [3,4]. As a result, there is a paucity of literature regarding recognition and appropriate management of this complication. Furthermore, the presence of proximal iliac vein thrombosis has the potential for additional devastating consequences exclusive of DVTs and PEs, including propagation of thrombus to extend to the transplant renal vein and loss of the transplant graft from subsequent venous outflow obstruction. For this reason, early recognition and prompt institution of therapy is essential for potential graft salvage.

We report a case of proximal iliac vein stenoses resulting in a propagating iliac vein thrombus in a renal transplant recipient who failed anticoagulation. Potential therapeutic options and a proposed management algorithm has been outlined with utilization of anticoagulation, catheter-directed therapy (CDT) utilizing alteplase, inferior vena cava (IVC) filter, and iliac vein stenting.

2. Case report

A 63-year-old male was referred to our institution for his candidacy as a potential renal transplant recipient. He had previously donated a kidney to his sister in 2004 at a referring institution after which both he and his sister did very well. However, he was diagnosed with hypertension 3 years after his donation which was poorly controlled. Five further years later, the patient became symptomatic reporting fatigue, insomnia, and dyspnea requiring hemodialysis initiation. He was subsequently evaluated and listed for renal transplantation. Of note, during pre-transplantation work-up, the patient was found to have prostatic adenocarcinoma and underwent robotic-assisted laparoscopic prostatectomy with bilateral pelvic lymph node dissection. He denied having any femoral venous catheters in the past.

The patient subsequently underwent successful deceased donor renal transplantation 1 year later with an uneventful operative course. The donor kidney was a left kidney with 2 renal arteries and a single renal vein with a 9 h 15 min cold ischemia time. Recipient transplant

Abbreviations: CDT, catheter-directed therapy; DVT, deep venous thrombosis; IVC, inferior vena cava; VTE, venous thromboembolism

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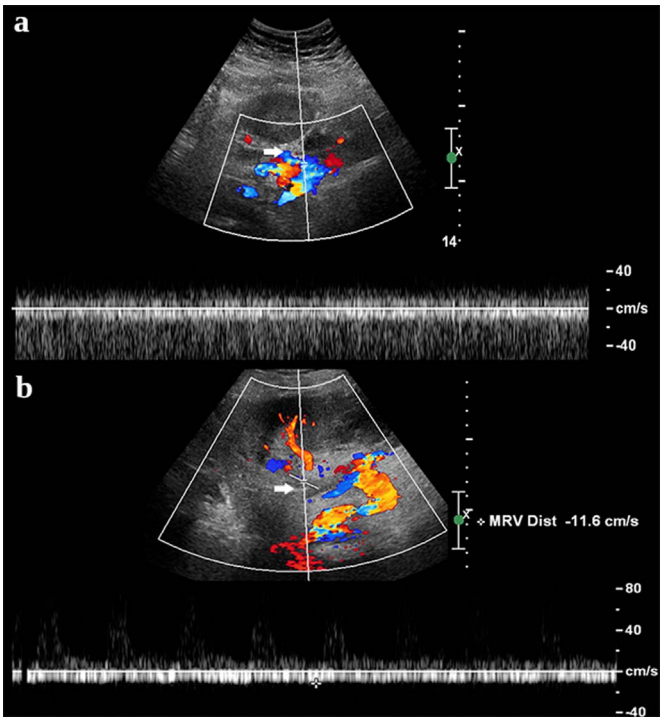

Fig. 1. Transplant renal duplex Doppler sonogram. **a.** Post-transplant day 12 demonstrating partial thrombosis of iliac vein (white arrow) adjacent to renal vein anastomosis and associated lack of pulsatility in waveform. **b.** Post-transplant day 18 demonstrating propagation of iliac vein thrombus (white arrow) with lack of color flow and venous waveforms throughout transplant kidney.

location was in the right iliac fossa with a single external iliac-renal end-to-side venous anastomosis performed followed by Carrel patches singular for the external iliac-renal end-to-side arterial anastomoses. The anastomotic time was 42 min and the kidney re-perfused well, there was an excellent thrill in the hilum with parenchymal pulsation and urine production at the conclusion of the operation.

Post-operatively, the patient's hospital course was initially uneventful. For immunosuppression, the patient received antithymocyte globulin and methylprednisolone for induction immunosuppression and mycophenolic acid, prednisolone, and tacrolimus for maintenance immunosuppression. Low-dose aspirin was initiated per institutional protocol and the patient was discharged on post-operative day 6. During follow-up clinic appointments, the patient was noted to be having a slow downtrend in serum creatinine decreasing from 9.6 mg/dL pre-operatively to 5.8 mg/dL on post-transplantation day 12 in addition to new-onset right lower extremity edema. These findings prompted a renal and lower extremity duplex Doppler ultrasound which revealed a non-occlusive thrombus of the iliac vein and a patent transplant renal vein (Fig. 1-a). The patient was admitted for anticoagulation with a heparin infusion and a thrombophilia work-up panel was performed which was normal.

The patient underwent serial renal duplex Doppler sonographic examinations every 48 h with no evidence of change but continued tardy downtrend in creatinine. Repeat renal duplex Doppler ultrasound 1 week later demonstrated propagation of the iliac vein thrombosis with an additional thrombosis in the common femoral vein extending to the saphenous veins in conjunction with lack of flow in the renal vein (Fig. 1-b). There was additionally a peri-renal inferior pole fluid collection adjacent to the common iliac vein proximal to the anastomotic region that was not felt to be causing compression. A percutaneous drain was placed in the fluid collection first to rule out any extrinsic compression. He was then taken for arteriogram which demonstrated patent transplant renal arteries and a venogram with a patent renal vein (Fig. 2-a). However, there was an associated near-occlusive thrombus involving the proximal right common iliac vein along with drainage through regional collateral veins (Fig. 2-b). A percutaneous drain was placed into the fluid collection and an intravenous infusion catheter was placed in the iliac vein for CDT using alteplase. Additionally, an IVC filter was placed given failure of anticoagulation for this thrombus. The patient was admitted to the ICU following the procedure and received CDT using alteplase but shortly thereafter developed oliguria along with a hemoglobin drift from 9.1 to 6.9 g/dL. He was subsequently taken back emergently to the interventional radiology suite for concern of ongoing hemorrhage where he was noted to have areas severe common iliac vein stenosis proximal to the anastomotic region which were felt to be contributing to a low-flow venous state with resultant distal thrombus development and propagation (Fig. 2-c). Bare metal stents (16×90 mm and 16×60 mm Wallstents) were placed in the common and external iliac veins and completion venogram demonstrated adequate follow through the iliac veins with restitution of normal vein caliber (Fig. 2-d). The previously identified retroperitoneal fluid collection was stable in size and there was no further concern for hemorrhage. The patient was returned to the ICU for recovery.

Post-procedure duplex Doppler sonography confirmed widely patent iliac veins, and the patient had significant reduction in right lower extremity edema along with a downtrending serum creatinine level and resolution of oliguria. He was bridged from heparin infusion to warfarin therapy for anticoagulation and discharged 8 days following stent placement with a serum creatinine of 1.8 mg/dL. The patient has done well since this time and at 1 year follow-up has a well-functioning graft with a serum creatinine of 1.2 mg/dL.

3. Discussion

Proximal iliac vein stenosis and thrombosis in a renal transplant recipient is exceedingly rare with 2 prior reports in the literature, one of which the patient was 8 days post-operative from a total hip replacement [3,4]. To our knowledge, this represents the first report of proximal iliac vein stenosis treated with anticoagulation, CDT, and iliac vein stenting in a renal transplant recipient. Humar et al. identified risk factors associated with the development of DVTs in renal transplant recipients, and noted that these patients may in fact be at a higher risk than the general surgical population for the development of VTE due to an acquired hypercoagulable state despite the derangement of hemostasis that is present in the setting of uremia in renal failure [1]. This is particularly the situation within the first 6 months and there is a 2.5 times higher risk of developing a DVT on the side of the allograft. The hypercoagulable state appears to be multifactorial with corticosteroids, immunosuppressive agents though the risk is potentially reduced with Tacrolimus, pre-transplant peritoneal dialysis utilization, and, later on, development of post-transplant erythrocytosis all implicated [5]. Our patient was of increased risk being older age (> 40) and had prior pelvic surgery from his prostatectomy and pelvic lymph node dissection that included internal iliac artery dissection, but not involving the external or common iliac arteries. Given the lack of proximal dissection, his iliac vessels were not imaged preoperatively for the presence of stenosis. There were no other specific risk factors for the presence of proximal iliac vein stenosis identified in our patient preoperatively, which was undoubtedly contributory to a low-flow state and resultant thrombosis in this patient. Specifically, the patient denied any history of femoral venous catheters which may have prompted a screening work-up for proximal venous stenosis. Additionally, if the occurrence was on the left side, May-Thurner syndrome would have been considered. However, given the close proximity of the internal iliac artery to the iliac venous bifurcation, vascular screening would have been prudent for this patient. If the stenosis was identified preoperatively, treatment could have been pursued with angioplasty with or without stenting as appropriate. Alternatively, the graft could have been placed on the