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LETTER TO THE EDITORS

Renal transplantation with unusual vasculature

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Dear Sirs,

Renal transplantation has become the therapy of choice for patients suffering from end-stage renal disease (ESRD). Traditional renal transplantations are positioned heterotopically in the retroperitoneal right iliac fossa near the iliac vessels. However, when the iliac veins are thrombosed, vessel anastomosis in this location becomes difficult. Conventionally, thrombosed iliac vessels have been a contraindication for renal transplantation. Recent case reports have highlighted the benefit of alternate venous systems for allograft drainage in patients with thrombosed iliac veins; renal allografts have successfully been anastomosed to: pelvic or presacral venous collaterals draining into the inferior vena cava [1–3], the right ovarian vein [4,5], and the superior mesenteric vein [6]. To the best of our knowledge, only a single case has also been described using the left gonadal vein [7], and only two cases have been reported using the inferior mesenteric vein (IMV) [8,9].

We report here two patients previously diagnosed with systemic lupus erythematosus (SLE) hypercoagulable states and in need of renal transplantation. Preoperative imaging studies demonstrated thrombosed iliac vessels and the possible routing of allograft venous drainage to either the left gonadal or the IMV.

The first case is regarding a 37-year-old woman with ESRD secondary to SLE nephritis. Her past history was significant for hypercoagulability and thrombosed bilateral common iliac veins. Although stents were previously placed in these veins, physical examination revealed persistent swelling of the lower extremities, indicating reduced iliac vein flow. Computed tomography with IV contrast (Fig. 1a) confirmed the reduced lumen of the common iliac veins and demonstrated good patency of the left gonadal vein.

The operative procedure was initiated through a longitudinal incision along the left flank from just medial to the anterior superior iliac spine to the rib cage. The retroperitoneal space was dissected open, and the left common iliac vein and left gonadal vein were located. The left gonadal vein was confirmed to be dilated at approximately 1 cm in diameter. The allograft's renal artery was then anastomosed end-to-side to the left common iliac artery, and the allograft's renal vein was anastomosed end-to-side to the left gonadal vein (Fig. 1b). The bladder was then mobilized, and the donor ureter was anastomosed to the bladder in the usual fashion. The fascia and skin were then closed in the usual fashion.

Postoperatively, the kidney produced urine consistent with the fluid intake. The creatinine value dropped from a preoperative value of 6.89 mg/dl to 1.54 mg/dl on postoperative day 3. Because of the patient's chronic history of hypercoagulability, anticoagulation with heparin was initiated followed by life-long oral warfarin to maintain INR values between 2.5 and 3.5 times above normal. At a 3-month follow-up, the kidney continued to produce adequate urine, and the creatine value had stabilized at 0.78 mg/dl.

The second case is regarding a 35-year-old woman with ESRD secondary to SLE nephritis. The patient received a prior kidney transplant placed within the right pelvis. However, she later developed a hypercoagulable state, and although an IVC filter was placed, the allograft was not protected from DVT embolization and failed within 1.5 years. Preoperative computed tomography demonstrated a dilated IMV (Fig. 1c).

The operation was initiated through a midline incision extending from the subxiphoid to the pubis symphysis along the linea alba. The intraperitoneal space was entered, and the IMV was noted to be approximately 1.5 cm in diameter. The aorta and IMV were clamped in the usual fashion; the allograft's renal artery was anastomosed end-to-side to the aorta, and the allograft's renal vein was anastomosed end-to-side to the IMV (Fig. 1d). The donor ureter was anastomosed to the bladder in the usual fashion. The donor kidney was placed in the intraperitoneal right iliac fossa, and the fascia and skin were closed in the usual fashion.

Postoperatively, the patient recovered well. Urine production was consistent with the fluid intake. The preoperative creatinine value of 7.21 mg/dl dropped to 1.02 mg/dl on postoperative day 3. The patient was anticoagulated initially with bivalirudin (because of a prior history of heparin antibodies) followed by life-long oral warfarin to maintain INR levels above 3.5. At a 1 year follow-up, the urine production remained normal, and the creatinine value had stabilized at 0.96 mg/dl.

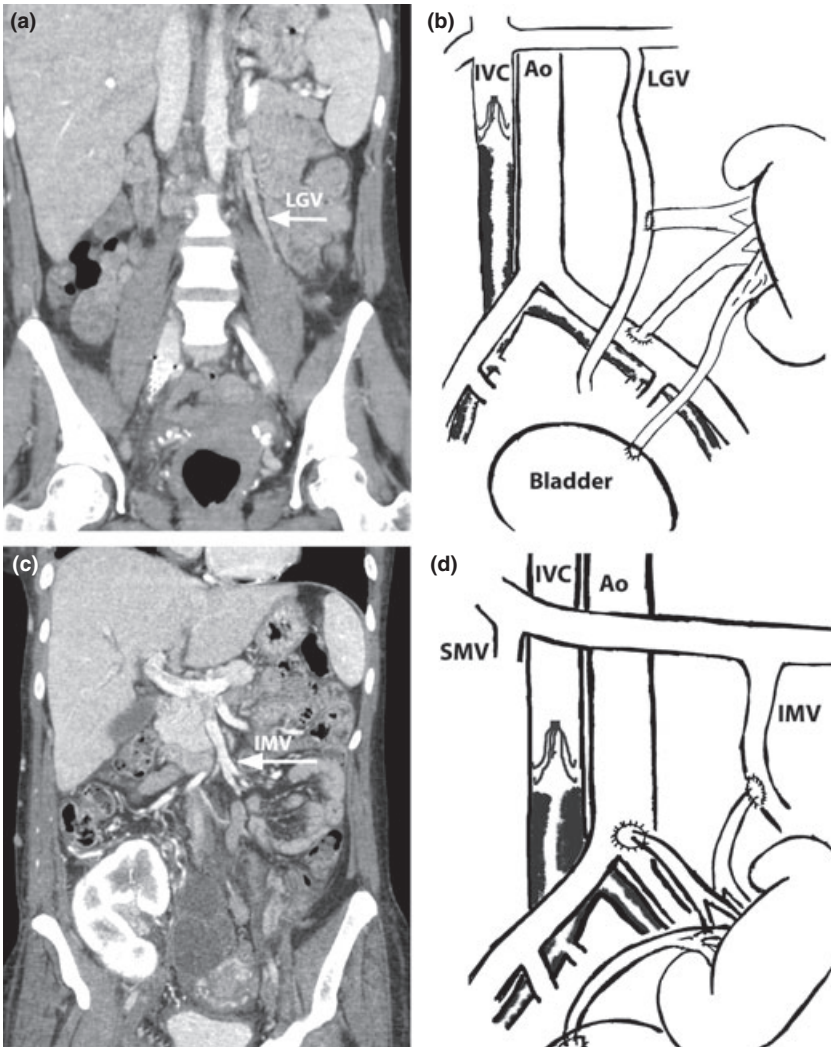

Figure 1 (a) Preoperative coronal CT scan on first patient with venous contrast, demonstrating an unusually dilated left gonadal vein with similar caliber as the external iliac vein. (c) Preoperative coronal CT scan with venous contrast on patient 2 showing dilated inferior mesenteric vein. (b & d) Postoperative diagrams depicts the flow circuits after implantation of the allograft. Prior IVC filter & thrombotic pathology are also depicted, emphasizing the advantage of bypassing this pathology via the LGV and IMV. IVC, inferior vena cava; Ao, aorta; LGV, left gonadal vein; SMV, superior mesenteric vein; IMV, inferior mesenteric vein.

In summary, we have successfully bypassed thrombotic iliac vessels in two patients requiring renal transplantation via either the left gonadal vein or the IMV. Both kidneys appeared pink, well-perfused, and produced adequate urine postoperatively. These two cases highlight the importance of considering alternative allograft flow circuits in patients with significant history of iliac vessel thrombosis. An increasing body of evidence is surfacing suggesting that appropriate allograft flow can be achieved using the pelvic venous collaterals [1–3], the right ovarian vein [4,5], or superior mesenteric vein [6]. The two cases we present here also strengthen the extremely limited evidence in support of the left ovarian and the IMV as additional allograft venous drains.

The gonadal veins and IMV can be good choices for allograft venous drainage if they are determined to be large for adequate perfusion. Of note, these veins are relatively easy to locate and are in close proximity to large arterial supplies (aorta or iliac arteries), reducing warm ischemia time. Further, this venous anatomy is usually preserved among individuals, helping to reduce intra-operative time and complications.

The approach to any patient suffering from thrombosed iliac vessels and in need of a kidney transplant should first begin with noninvasive preoperative imaging. The ultimate goal is to locate an appropriately large vein that would allow for adequate allograft flow. Computed tomography or magnetic resonance imaging are appropriate initial

imaging modalities. Use of intravenous contrast agents can further improve visualization of the vasculature. In comparison, ultrasound is of lesser value because of the reduced vascular resolution.

In our two cases, careful preoperative review of the venous anatomy indicated the potential use of the left gonadal and the IMVs for use in successful heterotopic renal transplantation.

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Conflict of Interest

No conflict of interest for all authors.

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