

Surgery | Case report

Double renal vein Anastomosis for rare venous anomaly: A method to achieve good venous outflow in the transplanted kidney

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Abstract

Multi-organ procurement was performed on a 48-year-old donor after the patient was declared brain dead. A standard approach was performed for two dissections of abdominal organs. During the cold phase of dissection, an additional left sided retro-aortic vein was identified. The second vein had separate opening to the inferior vena cava in addition to the normal positioned pre-aortic left renal vein. Both veins were divided close to the origin from the inferior vena cava. During the back table preparation, it was noticed that same volume of preservative fluid was identified to be draining from both veins. Both veins were isolated and anastomosed separately on the 61-year-old recipient. Patient was initiated on anti-platelet therapy and made successful recovery.

Introduction

Renal transplantation is the established treatment for end stage renal disease. Variation in anatomy at time of retrieval and implantation can be challenging. Vascular anomalies are frequently encountered during kidney transplantation and multiple techniques can be adopted to successfully implant the organ. Occasionally non-standard techniques have to be adopted to achieve successful vascular anastomosis.

Anomalies of renal vein are extremely common and have impact on utilization of kidneys for transplantation. The renal vein anomalies occur in close association with the development of vena cava. During the early developmental stage, anomalies in the transverse anastomoses between the subcardinal and inferior cardinal veins result in creation of retro-aortic renal vein, multiple renal veins and circum-aortic venous ring [1, 2][7,8]. These features may

not produce any symptoms to the individuals but during donor nephrectomy the surgeon needs to be aware of the potential anatomical variations to avoid undue dissection of vital venous outflow and arterial inflow to the kidneys. We present a case where a non-standard technique for venous anastomosis was adopted to salvage kidney for a successful transplant.

Case report

A 48-year-old patient was pronounced brain dead following a road traffic accident and as per his prior wishes patient's family choose to donate organs for procurement. Standard approach of dissection of abdominal organs was performed. During the warm phase of dissection, no renal venous anomaly was recognized. Only during the cold phase of dissection an additional left sided retro-aortic vein was identified. This vein had separate opening to the inferior vena cava in addition to the normal positioned pre-aortic

left renal vein. Both veins were divided close to the origin from the inferior vena cava. It was noted that left gonadal vein was draining into the left retro-aortic vein. The back table measurements of the left renal veins are summarized in table 1. When the back table arterial flush was performed same volume of preservative was identified to be draining from both veins. Due to the size and location of the veins (upper and lower pole) it was decided to preserve them and anastomose them separately on the recipient external iliac vein. The recipient was 61-year-old patient undergoing first kidney transplant on a background of diabetes and hypertension. Cold ischemia time was seven hours. Standard exposure for kidney transplant was made to the right iliac fossa and good length of mobilization was achieved for both external iliac vein and artery. Standard non-crushing clamps were used to perform venous anastomosis. Two separate venotomies were made with 11 surgical blade 1.5 cm in length and 6/0 polypropylene was used to complete two separate ends to side venous anastomosis (Figure 1 & 2). Arterial anastomosis with 6/0 polypropylene and ureteric anastomoses with 5/0 monofilament absorbable suture were completed in the standard fashion. The warm ischemia time was 32 minutes. Post-operative day one patient underwent duplex scan of the transplanted kidney which showed patent renal veins of the transplanted kidney with good flow preservation. Patient was discharged on post-operative day four.

Discussion

Multiple renal veins are identified in upto 10 % of deceased donor kidneys [3]. Most deceased donors will not have pre-operative imaging and presence of multiple renal veins will be an incidental finding. The right renal vein has significant anatomical variation with reported incidence upto 30%. The reported incidence of retro-aortic renal vein is < 5% [3]. Previous studies have reported higher incidence of venous thrombosis when using allografts with multiple veins [4]. Two positions of the retro-aortic left renal vein have been described (Table 2). The retro-aortic renal vein should be divided near the inferior vena cava in an exactly similar fashion as the routine pre-aortic left renal vein dissection. Extra care should be taken while separating the aorta and inferior vena cava to avoid injury to the accessory veins.

Various techniques have been described in the literature to utilise allografts with multiple veins. Right vein because of its shorter length is routinely reconstructed with donor inferior vena cava and no association with graft failure has been reported [5]. Also, donor Iliac veins have been used as an interposition grafts without increased risk of venous thrombosis [6, 7].

In presence of multiple renal veins with one large caliber and other small sized vessels, it is advocated to ligate the small veins and anastomose the large caliber vein to external iliac vein to establish venous outflow in the transplanted kidney [8]. Also, where two veins exist and have a common trunk originating from the renal pelvis, without risk of shortening the length, it is proposed to cut back to the level of common trunk and use this a single patch while anastomosing to the external iliac vein [1].

However, in situations where two veins are of equal diameter and have separate origins from the renal pelvis there is no standard of practice in the surgical literature. In our case both veins were of equal diameter and length and also had equal volume and flow of preservative fluid drainage on antegrade flushing of the renal artery. Hence, we decided to implant both veins separately on the external iliac vein. The distance and location of the two veins made it impossible for them to be brought together and anastomosed on the recipient external iliac vein with a single anastomosis.

Various techniques of arterial reconstruction have been defined in the literature when more than one renal artery is identified with the allograft. During liver donor nephrectomy the anatomy and vasculature of the allograft are studied well in advanced. In living donor nephrectomy and arterial reconstruction no aortic patch is available. Depending on the distance and length of the renal arteries the reconstruction is either performed side to side, end to side or two different arterial anastomosis constructed on the recipient artery [9, 10]. There is increased risk of graft thrombosis with increase complexity in arterial reconstruction [11-13]. These patients remain on anti-platelet therapy for a prolonged period of time.

Venous anomalies can be encountered during living and deceased renal procurement. Despite presence of vascular anomalies these allografts can be successfully implanted. Multiple vessels require back-table reconstruction or separate anastomosis guided by the local expertise and skills.

	Retro-aortic vein	Pre-aortic vein
Diameter	1.5 cm	1.6 cm
Length	2.8 cm	2.9 cm

Table 1: The anatomical measurements of the left kidney

Circum-aortic	<ul style="list-style-type: none"> - Two renal veins. - Most common. - Originates from the main renal vein encircles the aorta posteriorly and drains into the inferior vena cava through a separate orifice.
Retro-aortic vein	<ul style="list-style-type: none"> - Single renal vein - Coursing posterior to the aorta and opening into the inferior vena cava. - An oblique course can also be expected where the vein courses obliquely and posterior to the aorta.

Table 2: Anomalies of left renal vein

Data Availability: No data were used to support this study. The figures used to support the findings of this study are included with the article.

Consent: Patient consent was obtained for the publication of the study.

Conflicts of Interest: Authors do not report conflict of interest.

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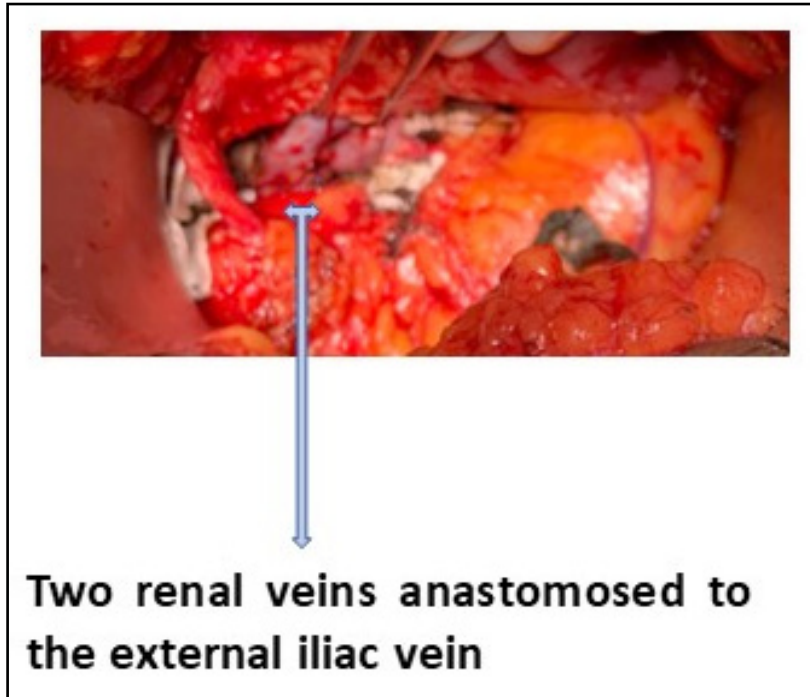


Figure 1: Two renal veins anastomosed separately in end to side fashion on the external iliac vein

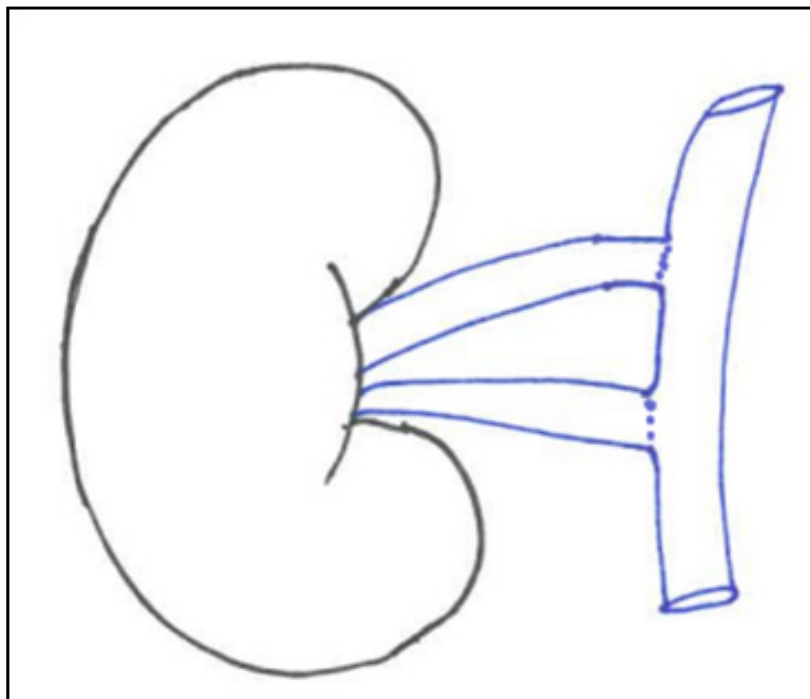


Figure 2: Double renal vein anastomosis to the recipient external iliac vein.