

Retroperitoneoscopic left donor nephrectomy with duplicated IVC

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ABSTRACT

Vascular anomalies increase the difficulty during live donor nephrectomy. We herein report a left-sided retroperitoneoscopic living donor nephrectomy performed in a donor with a duplicated inferior vena cava (IVC). Computed tomography angiography provided accurate delineation of the venous anatomy and allowed preoperative planning. The duplicated IVC was clipped and divided just below its confluence with the left renal vein. The length of the left renal vein was sufficient for anastomosis in the recipient, and the recipient's serum creatinine was 1.21% on day 7. The donor made an uneventful recovery. Duplicated IVC is not a contraindication for left retroperitoneoscopic donor nephrectomy.

Key words: Laparoscopy, nephrectomy, transplantation

Introduction

Laparoscopic donor nephrectomy is rapidly becoming the standard of care for kidney retrieval during live kidney transplantation. However vascular anomalies can increase difficulty of the operation and lead to an increase in complications. Inclusion of donors with abnormal anatomy allows expansion of the donor pool. We report a case of left retroperitoneoscopic donor nephrectomy in a donor with a duplicated inferior vena cava (IVC).

Case Report

A 48-year-old woman was evaluated as a potential kidney donor for her son. Blood and urine investigations were within normal limits and ultrasound revealed normal sized

kidneys without any abnormality. A diethylene triamine pentaacetic acid renal scan revealed a glomerular filtration rate of 51 ml/min on the right side and 44 ml/min on the left. Computed tomography (CT) renal angiography showed a normal suprarenal IVC with infrarenal duplication. The left renal vein inserted to the normally located right side IVC, and the left IVC was draining into the left renal vein [Figure 1]. Both gonadal and lumbar veins were opening into the left IVC, whereas the adrenal vein was opening into the left renal vein. There were one left and two right renal arteries. Due to the presence of multiple renal arteries and a better function on the right side, it was decided to perform left donor nephrectomy. The patient underwent a retroperitoneoscopic donor nephrectomy. The left renal artery was dissected as usual. The adrenal vein was controlled using a 5-mm LigaSure® probe. The left renal vein and cephalic portion of the duplicated IVC just below its confluence with the renal vein were dissected. Two hem-o-loc clips were applied to control the left IVC just below its confluence with the left renal vein [Figure 2]. Gonadal and lumbar tributaries of the left IVC were preserved to allow for collateral drainage. Subsequently, the artery and renal vein were controlled and the kidney was removed. At bench surgery, the hem-o-loc clip was removed and the large opening in the left renal vein was repaired by continuous running suturing of 6/0 polypropylene. The renal allograft was uneventfully transplanted into the right iliac fossa of the recipient using external iliac vessels for revascularization. The length of the graft renal vein with segment of IVC was adequate and allowed easy

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Access this article online	
Quick Response Code:	Website: www.indianjnephrol.org
	DOI: 10.4103/0971-4065.106054



Figure 1: Venous phase of CT angiography showing confluence of the duplicated left IVC and left renal vein

anastomosis with the external iliac vein. The donor made an uneventful recovery requiring minimal analgesics and was discharged on the second postoperative day. There were no complications in the recipient. Serum creatinine achieved was 1.21 mg % on day 7 and 1.08 mg % at 1 month.

Discussion

Anatomical variations can present challenges to the surgical technique. Recently, the adoption of CT angiography for donor evaluation instead of conventional angiography has allowed the delineation and thus detection of venous anomalies. Although a venous anomaly was present, its accurate anatomical assessment allowed us to proceed with retroperitoneoscopic donor nephrectomy.

Duplicated IVC is a rare anomaly with scant reporting in the literature. It has been estimated to have an incidence of 0.5-3%.^[1] However, we have not encountered this anomaly previously in over 1000 consecutive CT renal angiographies performed in potential renal donors. Anomalies of the IVC include transposition of the IVC, duplication of the IVC, circumaortic renal collar, and retroaortic renal vein. We have described previously the successful procurement of kidney by the retroperitoneoscopic approach when an anomalous renal vein was opening into the common iliac vein.^[2] Development of the IVC occurs between the 6th and 10th weeks of gestation. Three sets of paired venous channels, the posterior cardinal, supracardinal, and subcardinal veins, develop and regress, leading to the formation of the IVC, renal, adrenal, and gonadal veins.^[3] Duplication of the IVC results from persistence of the right and left supracardinal veins.

The venous phase of angiography delineates the anatomy of tributaries of the left renal vein. Most bleeding during laparoscopic donor nephrectomy occurs due to injury of

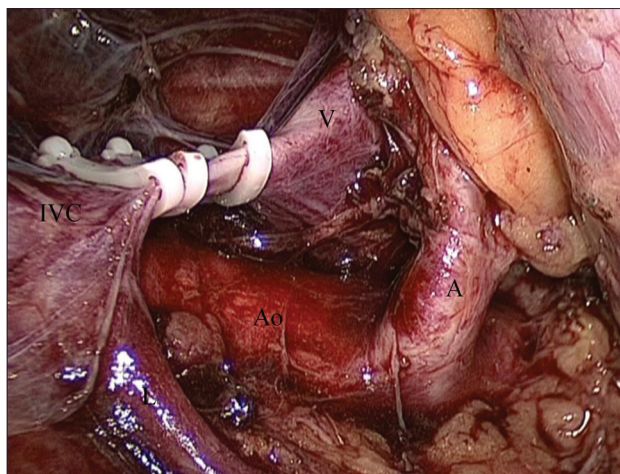


Figure 2: Intraoperative view of clips on proximal portion of the left IVC. A – renal artery, V – renal vein, IVC – duplicated inferior vena cava, Ao – aorta, L – lumbar vein

tributaries of the left renal vein rather than injury to the vein itself. Hence prior study of CT angiography helps us to find out abnormal tributaries.

Two earlier reports describe hand-assisted laparoscopic donor nephrectomy in donors with duplicated IVC.^[4,5] Ours is the first report of pure retroperitoneoscopic left donor nephrectomy in a donor with a duplicated IVC. We favored the retroperitoneoscopic approach because of direct access it provides to the left-sided IVC, left renal vein, and their tributaries. With suitable laparoscopic experience and adequate imaging, donors with anomalous venous anatomy may safely be offered retroperitoneoscopic donor nephrectomy. In the case of duplicated IVC, the left component of the IVC may be divided without deleterious effect to the donor.

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How to cite this article: Rizvi SJ, Prasad TK, Modi PR. Retroperitoneoscopic left donor nephrectomy with duplicated IVC. *Indian J Nephrol* 2012;22:480-1.

Source of Support: Nil, **Conflict of Interest:** None declared.