



RESEARCH ARTICLE

DUPLICATION OF INFERIOR VENA CAVA IN LAPAROSCOPIC DONOR NEPHRECTOMY: CASE REPORT

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ARTICLE INFO

Article History:

Received 20th September, 2020
Received in revised form
16th October, 2020
Accepted 24th November, 2020
Published online 30th December, 2020

Keywords:

Laparoscopy, Donor nephrectomy,
Duplication of inferior vena cava.

ABSTRACT

Congenital anomaly of a great vessel is rare. The presence of Duplicated Inferior vena cava has an incidence of 0.3-3%. Kidney transplantation is one of the mainstay treatment of chronic kidney disease. We herein report a left laparoscopic nephrectomy performed in a donor with duplicated inferior vena cava. Preoperative planning with CT Angiography is a must to accurately delineate anatomy. Duplicated inferior vena cava was clipped and divided just below the confluence with renal vein. The donor made an uneventful recovery. Duplicated inferior vena cava is not a contraindication for left laparoscopic donor nephrectomy.

INTRODUCTION

Duplication of Inferior vena cava (DIVC) is a rare great vessel aberration and is found only in 0.3-3% (1). During preoperative donor workup, CT Angiography delineated this anomaly in a kidney donor, was planned for Laparoscopic donor nephrectomy (LDN). In this anomaly right and left iliac vein drains into ipsilateral vena cava that ascends on either side of abdominal aorta until they form a confluence at the level of renal veins. The inferior vena cava proceeds along its conventional path above renal veins (2). Vascular anomaly is prone to complications due to its anatomical complexity. We report a case of left Laparoscopic nephrectomy in a donor with duplicated inferior vena cava.

Case History: A 61 years gentleman is a voluntary kidney donor. The preoperative routine workup was in normal limits. Ultrasonography abdomen showed normal-sized kidney without any visible abnormality. Diethylenetriamine Penta acetic acid renal scan showed bilateral normal functioning and unobstructed kidney with left glomerular filtration (GFR) rate of 45 ml/min and right side GFR of 55 ml/min. CT Angiography suggested Single renal vein seen on both sides. Duplication of the inferior vena cava (IVC) was noted on the left side (figure 1-2), with the left-sided IVC joining the left renal vein and continuing into right-sided IVC (figure 3). Prominent lumbar vein is seen draining into the left renal vein at this level. Proximally, communication of the left IVC in the pelvic region with right-sided IVC is noted. Double renal arteries on the left side and a single renal artery is seen on the right side.

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Left laparoscopic donor nephrectomy was planned due to the short right renal vein and better functioning kidney on the right side. The patient was positioned in the right lateral. After colon mobilization on the left side, the ureteral gonadal complex was identified and dissected till hilum. Hilar dissection was performed. Renal vein dissected and freed from adrenal and lumbar by clipping them. The left renal vein and the proximal portion of DIVC was dissected till its confluence with renal vein. Two hem-o-Lok was put on the left duplicated limb of inferior vena cava just below its confluence with renal vein and metallic clips towards the renal vein side. The double renal artery and renal vein on the left side were finally isolated, clipped, and cut. The renal graft was transplanted on the right side with renal artery and renal vein anastomosis to external iliac vessels. Donor made an unremarkable recovery and was discharged on 3rd postoperative day. Recipient post-operative period was uneventful.

DISCUSSION

DIVC has a prevalence of 0.3-3% (3) and slight male preponderance. Formation of inferior vena cava begins in 6th weeks and get over by 10th weeks of gestation. Three paired venous structure (Posterior, subcardinal, and supra cardinal) appears and regresses to form inferior vena cava (4). DIVC occurs due to the persistence of both left and right supra cardinal vein. Kidney transplantation being complex surgery, where the donor surgeon needs to have good anatomical knowledge of retroperitoneum and vasculature with its aberrations. The left kidney is preferred for donor nephrectomy due to longer renal vein length, which contributes to the technical ease during nephrectomy and transplantation.



Figure 1. Shows duplicated Inferior vena cava at level of renal hilum



Figure 2. Shows duplicated inferior vena cava with aorta in centre infra hilar level



Figure 3. Reconstructed image showing left duplicated limb of inferior vena cava joining left renal vein and continues as right side inferior vena cava

Although vena cava abnormalities are rare and silent. Pre-operative CT Angiography identifies any aberrations in the vasculature and provide robust data to plan the procedure. DIVC can be ligated to get a good renal vein length but drainage continuity of left-sided duplicated limb of inferior vena cava should be always be checked. In our case left limb of DIVC was communicating to the right side in the pelvic region via a left common iliac vein, hence we clipped and cut duplicated left limb.

If this communication is not there then lower limb venous drainage should be preserved in the form of saving gonadal or lumbar whichever is draining in the duplicated limb of inferior vena cava before clipping.

Otherwise, if the donor surgeon is not well aware of venous anatomy, DIVC can be mistaken and ligated on the presumption that it's an anomalous variation of gonadal vessel. With expertise in laparoscopic donor nephrectomy and good preoperative CT Angiography and imaging, donors with anomalous venous anomaly may be safely offered laparoscopic donor nephrectomy. In the case of DIVC, the left component of inferior vena cava may be divided without major concern to the donors.

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