

Anomalous Drainage Of Left Renal Vein

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Abstracts: A rare anatomical variation found during routine anatomical dissection for teaching purposes in which the retro aortic left renal vein opened in to the left common iliac vein instead of inferior vena cava. Retro aortic left renal vein is an uncommon anomaly in the development of Inferior Vena cava (IVC) and its collaterals. It may courses behind the abdominal aorta to enter the IVC. According to the reviewed literature, incidence of a case like this is around 0.16% and is only scarcely described in the literature. The embryological and clinical significance of the above variations have been highlighted in this communication. [Gupta A et al NJIRM 2012; 3(5) : 154-156]

Key Words: Anatomical variation, Inferior vena cava, Renal vein, Retro aortic.

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Introduction: Anomalies of the renal veins or inferior vena cava are rare anatomical variants that result from abnormal development or regression of the fetal venous circulation. Their presence may have significant implications for surgical procedures such as laparoscopic /robotic radical nephrectomy or laparoscopic donor nephrectomy.¹

Renal veins are the large veins which lie in front of the renal arteries and drain in to the inferior vena cava at right angles. The left renal vein is three times longer than the right, crosses the posterior abdominal wall and passes in front of aorta to reach the inferior vena cava.² Retro aortic left renal vein is an uncommon anomaly in the development of Inferior Vena cava (IVC) and its collaterals. It may courses behind the abdominal aorta at the same level of normal left renal vein or courses obliquely to enter the IVC as low as the confluence of the iliac veins. This paper describes a rare anatomical variation, found during routine anatomical dissection in which the retro aortic left renal vein (RLRV) opened in to the left common iliac vein instead of IVC.

RLRV is usually asymptomatic but compression of the RLRV between the aorta and the vertebra is known to be the cause of urological problems such as hematuria and ureteropelvic junction obstruction.³ In addition, vascular dilatation of the afferent venous system can result from increased drainage pressure, which men can suffer from left-sided varicocele and women from pelvic congestion syndrome.⁴

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Case Report: During the routine dissection of a formalized male cadaver performed by students of Adesh Institute of Medical Sciences and Research, Bathinda (India), we found that the left renal vein was retro aortic and 8.1 cm in length. It was seen coming from the hilum of left kidney, behind the left renal artery and the pelvis of the left ureter. Near the hilum the vein received left supra renal vein and double left testicular veins. (Figure-1)

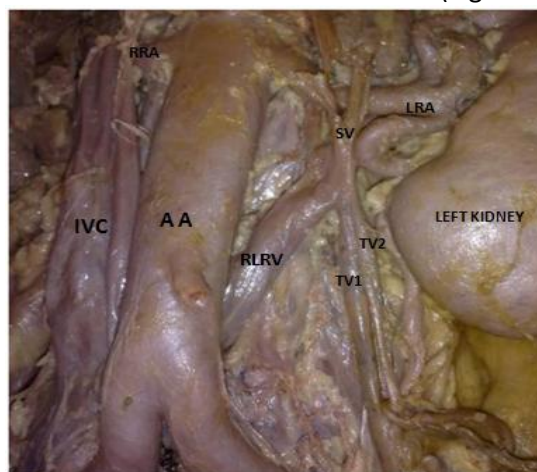


FIGURE-1 showing drainage of double left testicular veins (TV1 & TV2) and Suprarenal vein (SV) into the Retro aortic left renal vein (RLRV). IVC-Inferior vena cava, AA- Abdominal aorta, RRA-Right renal vein & LRV-Left renal vein.

Then it passed downwards and medially behind the aorta, left common iliac artery and terminated by draining in to the left common iliac vein (Figure-2). The course of the right renal vein was normal.

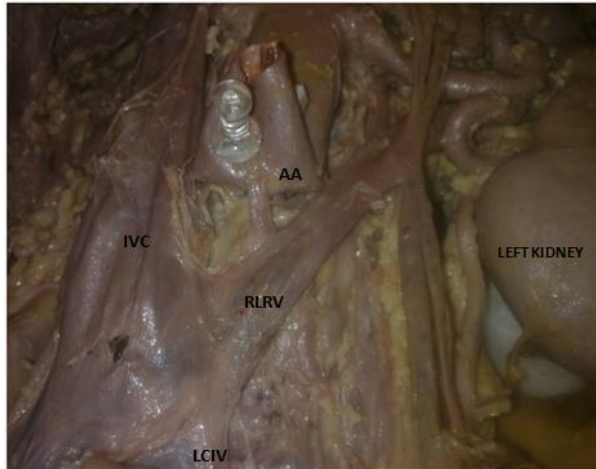


FIGURE-2 Showing drainage of Retro aortic left renal vein (RLRV) in to Left common iliac vein (LCIV). IVC- Inferior vena cava and AA- Abdominal aorta

Discussion: There are many anatomic variations involving the renal vascularization. Misdiagnosis of venous anomalies can have disastrous consequences so that an adequate knowledge of venous anatomy, variations and anomalies is mandatory for angiographic competence in renal and related venography.⁵ Retro aortic renal veins can be mistaken for a retroperitoneal neoplasm or as lymphadenopathy and unawareness of this situation during retroperitoneal surgery can result in bleeding, nephrectomy, and even death.

The development of renal veins, which is a part of the complex developmental process of the IVC, makes it possible to explain the venous variation of our case. The process starts from the fourth week of conception and ends at about the eighth week. The IVC is formed from a complicated process involving development, regression, anastomosis, and replacement of three pairs of parallel veins- the posterior cardinal veins, the subcardinal veins, and the supracardinal veins, in the order of appearance. During development, there are anastomotic communications between the subcardinal and supracardinal channels that form a

collar of veins encircling the aorta. The normal left renal vein is formed by the persistence of the ventral limb and the regression of the dorsal limb of renal collar. If the dorsal limb of this collar persists then the left renal vein is posterior to the aorta, forming a RLRV.⁶ The persistence of the left sub-supracardinal anastomoses and the left supracardinal vein, and obliteration of the intersubcardinal anastomoses during embryogenesis might lead to termination of left renal vein into left common iliac vein, as presented in this case.⁷

According to Nam et al⁴ the left renal vein anomalies are generally classified into four types. The retro aortic left renal vein anomaly in our case is similar to the type IV.

- In type I- The left retro aortic renal vein joins the IVC in the orthotropic position.
- Type II- The left retro aortic renal vein lies at the level of L4 to L5 and joins the gonadal and ascending lumbar veins before joining the IVC.
- Type III - The circumaortic left renal vein or venous collar.
- Type IV- The RLRV courses obliquely and caudally behind the aorta to join the left common iliac vein.

The incidences of RLRV type I, II, III, and IV are 0.3-1.9%, 0.4-0.9%, 1.5-8.7%, and 0.16%, respectively.⁴

In renal transplantation, the morphology of the renal veins has a special significance as abnormalities may greatly influence the technical feasibility of the operation. Surgeons prefer the left renal vein in renal transplantation because of its longer length. Retro aortic left renal vein is a relative contraindication to donor nephrectomies. Furthermore, RLRV poses potential hazards to the surgeon during abdominal aortic surgery. In repair of an abdominal aortic aneurysm where the aorta is mobilized, the RLRV becomes an even larger obstacle. Because of this, it is important to know the course of the left renal vein before the renal surgery.

Conclusion: A deeper understanding of congenital anomaly of the renal vessels is of importance for surgeons, traumatologists, urologists, and radiologists to attain a correct diagnosis during radiologic procedures and to perform complication-free surgery.

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