

Retro aortic left renal vein – a case report

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Abstract: The growing use of invasive diagnostic and interventional methods in cardiovascular ailments makes it necessary that the kind and frequency of vascular versions are nicely documented and understood. With the introduction of laparoscopic renal surgical procedures and donor nephrectomies, it will become obligatory for the surgeons to apprehend the abnormality or editions in the renal vasculature. Otherwise, renal transplant might also be jeopardized by using the presence of aberrant vessels. During pursuits dissection we encountered variant in the direction of left renal vein. The estimated prevalence of retro aortic left renal vein is 0.5 to 6.8%. However, with the growing use of state-of-the-art diagnostic technological know-how like computed tomography and magnetic resonance imaging these anatomical variants are greater regularly diagnosed. The majority of venous anomalies are asymptomatic, then again, these editions can purpose atypical drainage, which should lead to medical signs related with the dysfunction of the vascular system. Venous anomalies of the renal veins are clinically necessary in retroperitoneal surgical procedures and renal transplantations. These anomalies must now not be misdiagnosed for different pathological causes.

Key words: renal vein; retro aortic vein; venous anomaly

Introduction

Variant patterns of the arteries and veins are normally viewed extra often in abdomen than in any different regions of the body. The renal veins lie anterior to the renal arteries and open into the inferior vena cava nearly at proper angles. The left renal vein is nearly three instances longer than the right renal vein and for this purpose the left kidney is desired for stay donor nephrectomy. From its beginning in the renal hilum the left renal vein runs posterior to the splenic vein and the body of pancreas, then it runs throughout the anterior element of the abdominal aorta, simply under the origin of superior mesenteric artery. The left gonadal vein and the left suprarenal vein drains into the left renal vein nearer to the midline before left renal vein drains into the inferior vena cava. The left renal vein enters the inferior vena cava a little most efficient to the right. The left renal vein enters the inferior vena cava a little superior to the right. The right renal vein is in the back of the 2d part of the duodenum and every now and then the lateral part of the head of the pancreas.

Minor deviations from the normal embryological development of the renal veins can lead to deviations of renal vein origins, pathways and endpoints. Renal vein changes can lead to unusual symptoms, depending on the type, degree, and course. The left renal vein may be double, with one vein running posteriorly and the other anteriorly to the abdominal aorta to join the inferior vena cava, which is called a 'renal collar' persistence. The anterior vein may be absent, leaving his one post-aortic left renal vein. These variations can lead to many clinical complications (1,2).

Case report

During a routine gross anatomy of abdominal dissection for undergraduate medical students on a 55-year-old male cadaver, we observed changes in the routing of the left renal vein of a 55-year-old male cadaver. After exiting the hilum of the kidney, the left renal vein runs downward medially behind the aorta and empties into the inferior vena cava at the level of L3, or the beginning of the inferior mesenteric artery. During its course, it received a left adrenal vein, a left third lumbar vein, and a right third lumbar vein. It was also observed an additional small left renal vein, which it started in front of the left kidney and emptied into the left adrenal vein. After dissection, the left renal vein and its tributary pathways were photographed. Venous anomalies of the renal vein are of clinical importance, especially in retroperitoneal surgery and renal transplantation. These abnormalities should not be misdiagnosed with other pathological causes.

Discussion

In our study we have mentioned the presence of an anomalous left renal vein passing dorsal to the abdominal aorta. During its course it received the left suprarenal vein, left 3rd lumbar vein and right 3rd lumbar vein. We also observed an additional small left renal vein emerging from the anterior surface of the left kidney and opening into the left suprarenal vein.

Although the vein in question is referred to as a retroaortic left renal vein and is not extremely rare anomaly, it is important to be aware of this vein for retroperitoneal surgeons and radiologists. The incidence of this anomaly reported in the literature ranges from 1.8% to 4.0% on dissections (3). In about 2% of cases, the left renal vein may be retroaortic or circumaortic. The right renal vein may be doubled, even though the left renal vein is usually single is usually single. The left renal may anastomose with splenic vein and receive lumbar veins (4). Unlike the right, it receives numerous tributaries. Along its upper margin it receives the left suprarenal vein (and the left phrenic vein), capsular veins, and the intermediate root of the hemiazygos vein. Dorsally it receives the second lumbar segmental vein; caudally, the gonadal, capsular and ureteric veins. In persistent left inferior vena cava or circumaortic venous rings, these roots may also join the left renal vein. Occasionally (in 2% of cases) the left renal vein may be entirely retroaortic (5). Because of its anatomical location, the retroaortic left renal vein, and anomalous left renal vein coursing behind the abdominal aorta, has received a clinical attention for the surgical retroperitoneal operations and the misinterpretation of clinical diagnosis as well as the rise in internal pressure of the left renal vein (6). Widespread use of diagnostic multidetector computed tomography in retroperitoneal diseases, particularly kidney tumors, can identify changes in the renal vascularization more easily, and thus allows urologists to plan a safe and less complicated aortic, renal, and retroperitoneal surgery. For patients

with gross hematuria or flank and inguinal pain, individualized treatment such as conservative care, pyeloplasty, varicocelectomy, and nephrectomy should be selected (7).

Anbumalar B and Sujatha K in their study found out that the incidence of Retro aortic left renal vein was 2%. It was terminating into the Left Common iliac vein which is a very rare variant. Retro aortic left renal vein is the developmental anomaly, which can lead to Left Renal Vein hypertension (Nutcracker syndrome). Knowledge of such variation is important for surgeons, which can cause technical difficulties during renal and aortoiliac surgeries. Thus, we can avoid severe injuries and catastrophic sequelae following surgeries (8).

The left renal vein is normally located in front of the aorta. However, the retro-aortic renal vein may course posterior to the aorta due to embryological developmental anomalies. The double retro-aortic renal veins coursed behind the aorta to drain into the inferior vena cava. The superior retro-aortic renal vein drained into the inferior vena cava at the lower border of the L2 vertebra, and the inferior retro-aortic renal vein drained into the inferior vena cava at the upper border of the L4 vertebra. Awareness of venous variations in kidney may be useful because its variation could enhance iatrogenic injuries or complications during several invasive procedures and influence hemodynamic problems with unexplained symptoms (9).

The possible embryological bases for the presence of retroaortic left renal vein is that during the development of the inferior vena cava, the renal collar forms a circum-aortic ring, which is contributed by sub-cardinal veins and inter-subcardinal anastomosis anteriorly, by supra-cardinal veins and inter-supracardinal anastomosis posteriorly, and on each side by supracardinal-subcardinal anastomosis. The bilaterally symmetrical cardinal venous system converts into unilateral right sided inferior vena cava at around 8 weeks. Sometimes veins on the left side fail to disappear completely, leading to left sided inferior vena cava. The present case could be due to persistence of the anastomosis between the subcardinal and supracardinal veins resulting in varied formation and termination of left renal vein and in its retro-aortic course (10).

According to Namburu BSP et al the left renal vein anomalies are classified into 4 types by some authors but broadly come under 2 categories i.e.; retro aortic and circumaortic types. The Retro aortic type can be subdivided into 3 types based on level of termination into inferior vena cava. Racial differences in the incidence of these anomalies are a notable feature. Knowing the variable expressions of the renal venous system allows better understanding of the clinical events. Pre-operative CT can be considered mandatory as it helps in safe surgical outcome (11).

Conclusion

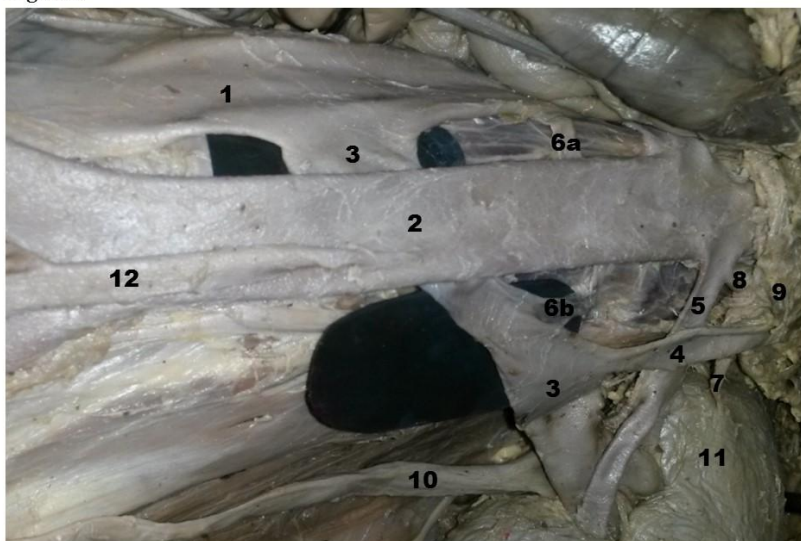
Knowledge of retro- aortic left renal vein is an important vascular variation and the detection of which is crucial to avoid the complication of catastrophic haemorrhage. Awareness of venous variations in kidney may be useful because its variation could enhance iatrogenic injuries or complications during several invasive procedures and influence hemodynamic problems with unexplained symptoms. These anomalies though mostly asymptomatic, occasionally may pose life threatening situation during surgeries of retro peritoneal region when ignored. Knowing the variable expressions of the renal venous system allows better understanding of the clinical events. Pre-operative CT can be considered mandatory as it helps in safe surgical outcome. Knowledge of anomalies of left renal vein is essential for radiologists, endocrinologists, fertility specialists, urologists and surgeons, in determining the feasibility of complication-free surgical interventions in this region as well as the post-operative management and also for anatomists.

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Retro-aortic left renal vein

Figure 1



Retro-aortic left renal vein

Figure 1

Legend

1. Inferior vena cava
2. Abdominal aorta
3. Left renal vein
4. Left suprarenal vein
5. Left renal artery
- 6a. Right 3rd lumbar vein
- 6b. Left 3rd lumbar vein
7. Vein from the surface of the kidney opening into left suprarenal vein
8. Inferior suprarenal artery
9. Left suprarenal gland
10. Left ureter
11. Left kidney
12. Inferior mesenteric artery

Figure 1

