

Case Report: Circumaortic Left Renal Vein

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ABSTRACT

Awareness of the variation and renal vascular abnormality at retroperitoneal space surgeries such as kidney surgery and transplantation is very important and necessary. Complexity in the veins development of the kidney area of fetus leads to a series of changes in the production of these veins, including the extra kidney vein, and the posterior aorta vein. In this case report, we present a case report of a 36-year-old male with a rare renal variation which has been identified with a simple abdominal Computed Tomography (CT) scan (16-slice). In this case report, there is a single renal vein which becomes two branches before drainage into Inferior Vena Cava (IVC) in which one of these branches passes anterior to aorta and the other posterior to aorta which suggests the type of circumaortic left renal vein.

1. Introduction

Understanding diverse renal veins variations in retroperitoneal space operations such as kidney transplantation, kidney operation, abdominal aortic operation, gonadal operation, and Doppler imaging is necessary to diagnose the irregularity in surgical procedures. These variations may lead to heart failure,

bleeding, or even death [1-4]. Left Renal Vein (LRV) is an important variation in the left renal region. It is possible to diagnose haematuria, varicocele [3], pelvic varicose veins, renal vein thrombosis, adrenal adenoma, and hypertension [5-8] based on this abnormality. These variations can be delineated easily by Computed Tomography (CT) angiography and abdominal Magnetic Resonance (MR) venography [9, 10]. LRV variation is more frequent than the right one.

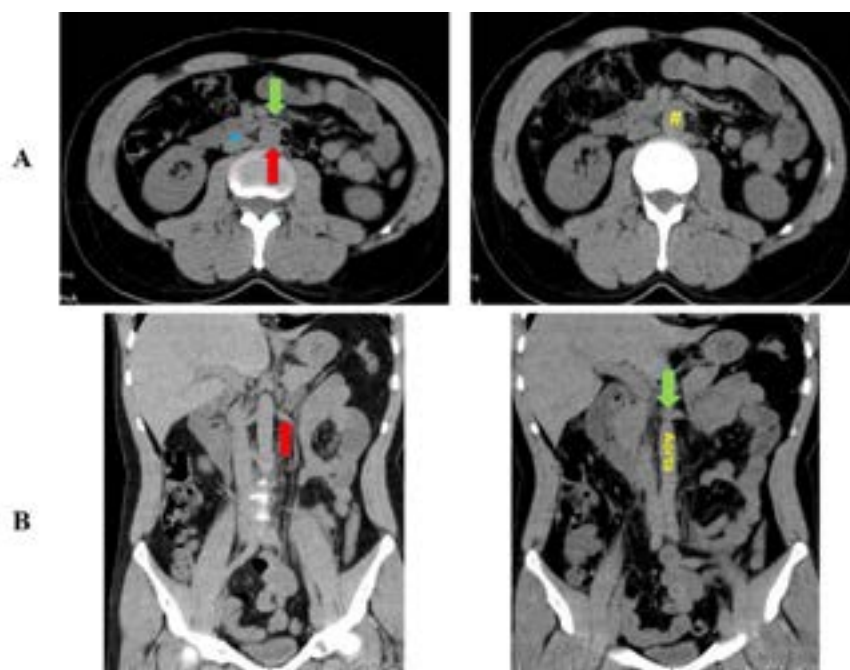
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Figure 1. CT-scan images without the contrast of the abdominal region

(A) Axial and (B) coronal without contrast CT scan (16-slice) revealing an LRV variation which suggested the type of circum-aortic left renal vein. The anterior branch of left renal vein (green arrow), The posterior branch of left renal vein (red arrow), inferior Vena Cava (*) and abdominal aorta (#).

There are rare reports of these abnormalities. A study by Yeşildağ et al. suggested that only 32 (3.2%) out of 982 patients had LRV variation. The same study revealed that 2.3% of these cases related to retro-aortic and 0.9% related to circum-aortic left renal vein [4]. In

another study, the rate of LRV variation was reported to be 0.5% to 3.7% in the healthy population (1.7% and 1.6% in the males and females, respectively) [6, 11, 12]. The present case study reported an anomaly of LRV suggesting a circum-aortic left renal vein.

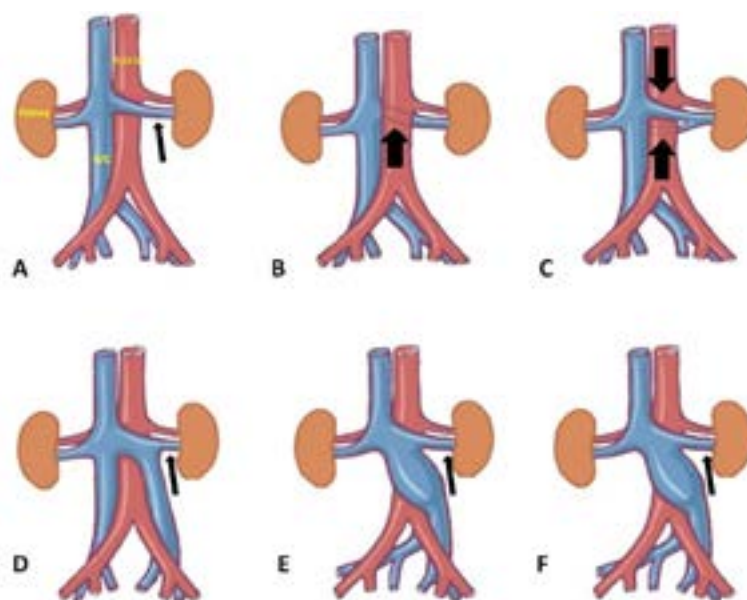


Figure 2. Schematic illustration of 4 different types of LRV anomalies [15]

A. Type I; B. Type II; C. Type III; D, E and F. Type IV; Black arrows show the different types of LRV.

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2. Case Report

The patient was a 36-year-old male who had been referred to the Imaging Centre of Besat Hospital in Sanandaj City, Iran, due to abdominal pain without any histories of trauma, kidney stones, urinary tract infection, genital infection or operations. The patient was completely normal in terms of vital signs including blood pressure, blood oxygen levels, respiration, heart rate, edema blood, as well as stool tests, including creatinine, urea, thyroid, etc. abdominal and pelvic ultrasound were also normal. A simple abdominal CT scan (16-slice) without contrast was requested by the practitioner and performed on the abdomen and pelvis; it indicated an LRV variation which suggested the type of circumaortic left renal vein (Figure 1). Other abdominal and pelvic organs were in normal position.

3. Discussion

LRV is among the most important vascular changes in the body which if detected before the peritoneum operation, can help to prevent many undesired risks like bleeding during operation. The surgeon might observe a preaortic vein, and in the lack of awareness of this extra part in the posterior aortic, it can lead to confusion during the operation [1-4]. Therefore, imaging screening, especially in kidney transplant donors, seems very crucial. These variations are detectable by the emergence of CT angiography, MR venography, or even a simple abdominal CT scan.

During embryo development, there are three main types of renal veins (I, II, III) which are developed based on the movement pattern of the primary branches of renal vein. The most common type is type I, which is a combination of two primary higher and lower branches that create a renal vein. The second common type is created by the combination of higher, lower and lateral branches. The third type contains one extra renal vein [2, 13].

The classic variations involved in the development of LRV [2-4, 14] are shown in Figure 2 [15]. In the first type (Figure 2 A), a single root renal vein passes the front part of abdominal aortic and drains into IVC (normal). In the second type (Figure 2 B), renal vein passes posterior to the aorta. The third type (Figure 2 C) indicates circumaortic left renal vein, where a left renal vein passes posterior to the aorta apart from the normal vein passing anterior to the aorta. The fourth type is the duplication of IVC (Figure 2 D) or IVC relocation (Figures 2 E and F).

Limited case reports are available about the abnormality of renal veins. Brancatelli et al. reported a case study of a patient with the history of abdominal pain, blood in the urine (haematuria), and fever; the images revealed the presence of LRV in conjunction with the common left ventricular vein [16]. Furthermore, Saburi et al. reported a rare case of LRV in the right kidney of a kidney transplant donor [2].

4. Conclusion

In this case report, we presented a renal vein with anterior and posterior plugs; which anterior branch passed the front part of abdominal aorta and the posterior branch passed posterior to the abdominal aorta before draining into IVC; this indicated a circumaortic left renal vein case.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles were considered in this article.

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Authors' contributions

Writing the manuscript: Mohammad Sadegh Gholami Farashah, and Naser Shokrzadeh; Analyzing the images: Susan Mohammadi, Reza Asghari, Fahimeh Rajabi; Supervising the entire study and applying for the research grant: Mohammad Bakhtiar Hesam Shariati.

Conflict of interest

The authors declared no conflict of interest.

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