

Retroaortic Left Renal Vein Identified During Cadaveric Dissection

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Abstract

The retroaortic left renal vein is an uncommon anatomical variant with recognized surgical and radiological implications [1]. During routine cadaveric dissection, a left renal vein coursing posterior to the abdominal aorta before draining into the inferior vena cava was identified. The variation is described with emphasis on its anatomical features and clinical relevance.

Introduction

The left renal vein exhibits considerable anatomical variability due to the complex embryological development of the renal venous system. In the typical configuration, the left renal vein passes anterior to the abdominal aorta before draining into the inferior vena cava [2]. Variants such as retroaortic and circumaortic left renal veins are well documented, although relatively uncommon.

Recognition of these variations is clinically important. Unanticipated renal venous anomalies may increase the risk of vascular injury during retroperitoneal surgery, nephrectomy, renal transplantation, and aortic procedures [1]. In addition, atypical venous courses may lead to diagnostic uncertainty on imaging studies.

We report a retroaortic left renal vein identified during routine cadaveric dissection and discuss its anatomical and clinical significance.

Case Presentation

During routine educational dissection of an embalmed adult male cadaver, an anatomical variation of the left renal vein was observed. Following reflection of the abdominal viscera and exposure of the retroperitoneal structures, the abdominal aorta and inferior vena cava were identified in their expected anatomical positions.

The left renal vein was traced from the renal hilum and noted to course posterior to the abdominal aorta rather than following the typical preaortic pathway. After passing behind the aorta, the vein drained directly into the inferior vena cava, confirming a retroaortic trajectory.

The left gonadal vein and left suprarenal vein drained into the left renal vein in the usual manner. No anterior preaortic limb was present, excluding a circumaortic venous ring. The right renal vein displayed a normal short course to the inferior vena cava.

Discussion

The retroaortic left renal vein is a recognized anatomical variant with a reported prevalence ranging between approximately 1–3% [1]. This configuration arises from persistence of the dorsal limb of the embryonic renal venous collar and regression of the ventral limb.

The presence of a retroaortic left renal vein carries important clinical implications. During surgical procedures involving the abdominal aorta or retroperitoneal space, failure to recognize this variant may result in inadvertent vascular injury and significant hemorrhage. In renal transplantation and donor nephrectomy, accurate knowledge of venous anatomy is essential for safe dissection and vascular anastomosis.

From a radiological perspective, retroaortic renal veins may mimic pathological structures such as lymphadenopathy or retroperitoneal masses. Furthermore, Retroaortic left renal vein variants have been described in association with posterior nutcracker syndrome, in which the vein may be compressed between the abdominal aorta and vertebral column, potentially resulting in hematuria or flank pain [3].

Cadaveric reports remain valuable for reinforcing awareness of anatomical variability and complementing imaging-based observations.

Conclusion

This cadaveric observation emphasizes the anatomical and clinical importance of recognizing retroaortic left renal vein variants.

Declarations

Funding Declaration

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References

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Figures



Figure 1

Overview of the retroperitoneal dissection demonstrating exposure of the abdominal great vessels and surrounding structures prior to focused examination of the renal vasculature.



Figure 2

Retroaortic course of the left renal vein as it passes posterior to the abdominal aorta before draining into the inferior vena cava.



Figure 3

Close-up view demonstrating the junction of the retroaortic left renal vein with the inferior vena cava.



Figure 4

Venous tributaries associated with the left renal vein, including the left gonadal vein and suprarenal vein.

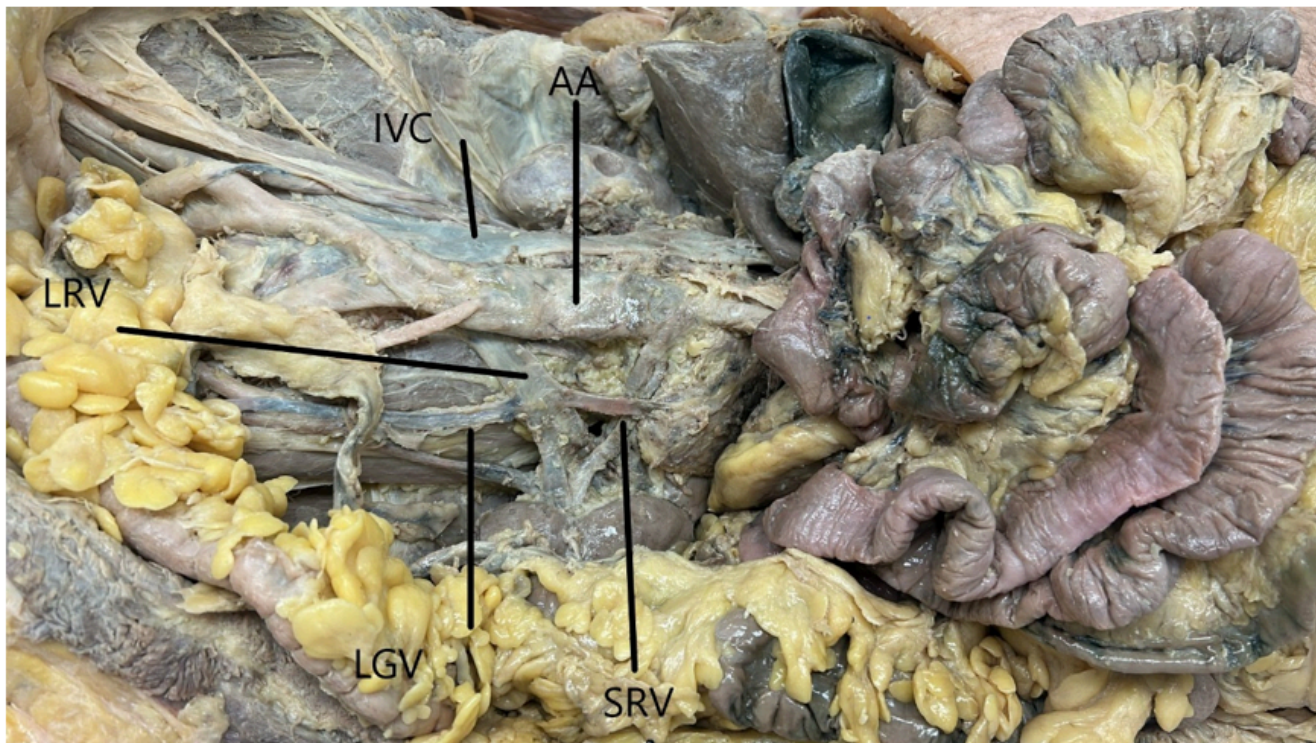


Figure 5

Labeled specimen identifying the abdominal aorta, inferior vena cava, left renal vein, left gonadal vein, and suprarenal vein.