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Circumaortic Left Renal Vein with Focal Dilatation of the Retroaortic Limb: An Incidental CT Finding

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ABSTRACT

Circumaortic left renal vein (CLRV) is a rare congenital venous variant characterized by duplication of the left renal vein forming a vascular ring around the aorta. It is most often asymptomatic and incidentally detected on imaging. We report a case identified on contrast-enhanced abdominal CT performed for oncologic evaluation. Recognition of this anatomical variant is essential to avoid diagnostic pitfalls and prevent potential complications during retroperitoneal surgical or interventional procedures.

KEYWORDS :

Circumaortic left renal vein; Renal vein anomaly ; Venous variant; Incidental finding

MAIN ARTICLE

CASE PRESENTATION

A 56-year-old patient underwent contrast-enhanced abdominal CT for oncologic evaluation following the detection of a hepatic lesion on ultrasound.

Imaging demonstrated a circumaortic left renal vein with duplication into anterior (pre-aortic) and posterior (retro-aortic) branches forming a venous ring around the aorta. The anterior limb coursed between the abdominal aorta and the superior mesenteric artery before draining into the inferior vena cava (Figure 1). The posterior limb passed obliquely behind the aorta and joined the inferior vena cava at a lower level (Figure 2).

A mild focal dilatation of the posteroinferior segment of the retroaortic branch was noted, without evidence of thrombosis or significant compression.

DISCUSSION

Circumaortic left renal vein (CLRV) is an uncommon congenital venous variant resulting from the persistence of both ventral and dorsal embryologic venous channels. Its prevalence ranges from approximately 0.3% to 3.7% in imaging studies [2,3].

The embryogenesis of the renal venous system involves a complex interplay between posterior cardinal, subcardinal, and supracardinal veins. Normally, regression of the dorsal component leads to a single pre-aortic renal vein. Persistence of both channels results in duplication, forming a venous ring encircling the aorta [1,3].

Although typically asymptomatic, this variant may have clinical implications. The retroaortic limb can be compressed between the aorta and the vertebral column, leading to a posterior nutcracker phenomenon, which has been associated with hematuria or flank pain in rare cases [4–6].

From a surgical perspective, accurate identification of CLRV is crucial. Failure to recognize this variant may result in unexpected hemorrhage during retroperitoneal procedures such as nephrectomy, renal transplantation, or aortic surgery [1,3]. It may also impact interventional procedures, including renal vein sampling and adrenal venography.

Multidetector CT is the imaging modality of choice for detecting and characterizing these venous variants, allowing precise anatomical assessment and avoiding misinterpretation as retroperitoneal pathology [3].

CONCLUSION

Circumaortic left renal vein is a rare but clinically important anatomical variant. Its recognition on imaging is essential for accurate diagnosis and safe surgical planning. Radiologists should be familiar with this entity to prevent diagnostic errors and procedural complications.

FIGURES

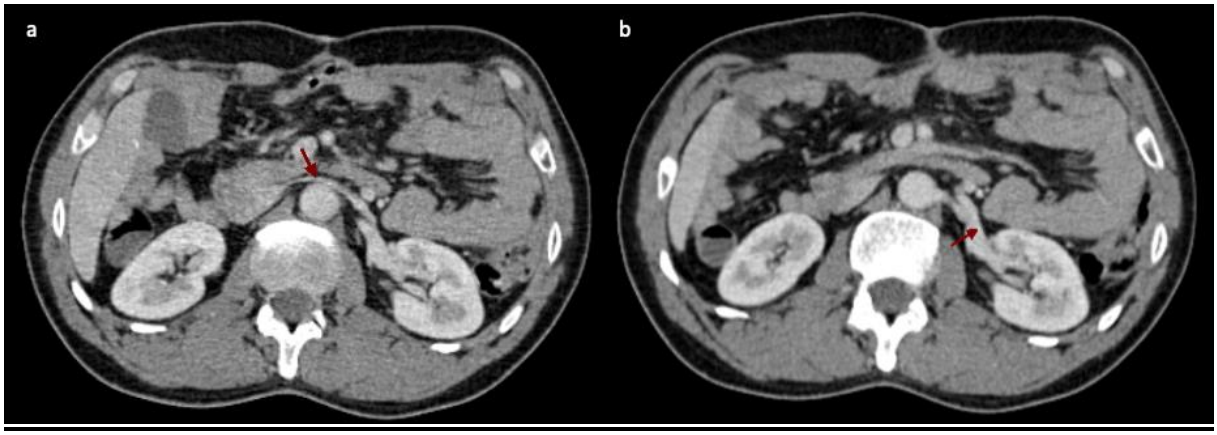

Figure 1: *Contrast-enhanced axial CT images showing the anterior branch of the left renal vein (red arrow) coursing between the aorta and the superior mesenteric artery before draining into the inferior vena cava.*

Figure 2: *Axial CT images demonstrating the posterior branch of the left renal vein (blue arrow) passing behind the aorta toward the inferior vena cava, with mild focal dilatation of its inferior segment.*

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The authors declare that they have no conflicts of interest.

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