Case 9560

Circumaortic left renal vein
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Section: Uroradiology & genital male imaging
Area of Interest: Abdomen
Procedure: Diagnostic procedure
Imaging Technique: CT
Special Focus: Congenital Case Type: Anatomy and Functional Imaging
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Patient: 42 years, male

Clinical History:
A 42-year-old male underwent CECT abdomen for longstanding non-alcoholic-steatohepatitis (NASH).

Imaging Findings:
An incidental note on CECT abdomen was made of duplicated left renal vein, with both an anterior and posterior component, forming a collar around the abdominal aorta. The inferior component ran behind the aorta while the superior component was pre-aortic running just beneath the SMA origin. CT findings were consistent with circumaortic left renal vein.

Discussion:
Circumaortic left renal vein is an uncommon congenital variant/ anomaly where in the left renal vein is duplicated with both an anterior (pre-aortic) and posterior (retro-aortic) component, forming a collar around the abdominal aorta. It has an approximate prevalence of approximately 0.3 to 3.7%. The superior limb of the duplicated left renal vein traverses anterior to the aorta and drains into the IVC in the expected ‘normal’ anatomic location, while the inferior limb courses obliquely behind the aorta thus forming a ‘vascular ring’ that encircles the aorta [1-6].

The development of normal IVC and renal veins is a complex process, involving development, regression, anastomosis and replacement of three pairs of embryonic veins namely posterior cardinal, subcardinal and supracardinal veins. The normal renal veins are formed by the anastomoses of the supracardinal and subcardinal veins [1-3, 5, 6]. Two renal veins form as ventral and dorsal; the dorsal vein usually degenerates, the ventral vein forms the renal vein. Both circumaortic and retroaortic left renal veins are the result of persistence of the dorsal limb of the embryonic left renal vein and of the dorsal arch of the renal collar (intersupracardinal anastomosis). However, in retroaortic left renal vein the ventral arch regresses so that a single renal vein passes posterior to the aorta [6].

The importance of identifying circumaortic left renal vein is to prevent potentially life-threatening venous haemorrhages during retroperitoneal surgeries, such as nephrectomy or aneurysmectomy [1-6]. Identification of left renal vein anomalies and associated IVC anomalies can decisively influence the planning of procedures such as shunt placement for portal hypertension, choosing prospective renal transplant donors, choosing the site for inferior vena cava ligation for thromboembolic disease, and performing retroperitoneal surgery [2]. Angiographically, awareness of this anomaly is important in performing adrenal venography, renal vein sampling, and in avoiding the
false interpretation that a mass lesion is causing the inferior displacement of the retroaortic left renal vein [2].

**Differential Diagnosis List:** Circumaortic left renal vein, Retro-aortic left renal vein, Left renal vein duplication

**Final Diagnosis:** Circumaortic left renal vein

**References:**


Royal SA, Callen PW (1979) CT evaluation of anomalies of the inferior vena cava and left renal vein. AJR Am J Roentgenol 132:759-63 (PMID: 107741)


Description: The superior limb of the duplicated left renal vein is seen traversing anterior to the aorta and draining into IVC in the expected ‘normal’ anatomic location. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Description: Another retro-aortic left renal vein is seen at a relatively caudal level. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Figure 2

Description: Coronal CECT reveals a bifid left renal vein with a superior and inferior limb. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Description: Coronal CECT reveals a bifid left renal vein with a superior and inferior limb. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Description: The two limbs of the renal vein are forming a collar around the aorta. The superior limb is traversing anterior to the aorta (pre-aortic) and draining into the IVC at a cranial level. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Description: The two limbs of the renal vein are forming a collar around the aorta. The superior limb is traversing anterior to the aorta (pre-aortic) and draining into the IVC at a cranial level. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
**Description:** The inferior (retro-aortic) limb drains obliquely downward to enter the inferior vena cava at a caudal level. **Origin:** Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.
Description: The inferior (retro-aortic) limb drains obliquely downward to enter the inferior vena cava at a caudal level. Origin: Ankur Arora, Dept of Radiodiagnosis, ILBS Hospital, New Delhi, India.