Case 12098

A rare vascular anomaly - Type III asymmetric duplicated inferior vena cava

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Section: Cardiovascular
Area of Interest: Abdomen
Procedure: Computer Applications-General
Imaging Technique: CT
Special Focus: Congenital Case Type: Anatomy and Functional Imaging
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Patient: 51 years, female

Clinical History:

A 51-year-old lady presented with complaints of pedal oedema for 2 weeks. A USG of bilateral superficial and deep venous systems ruled out any deep vein thrombosis. Axial CT of the abdomen and pelvis was then performed to rule out a pelvic mass.

Imaging Findings:

Axial and coronal images shows the left-sided IVC as a continuation of left common iliac vein (Fig. 2a, e), crossing anterior to aorta (Fig. 2b) at the level of renal vein (Fig. 2c) to join the right-sided IVC (Fig. 2e). The left-sided IVC is smaller in calibre compared to the right IVC, suggestive of Type III asymmetric duplication of the IVC. No associated renal anomalies like crossed fused ectopia or circumaortic renal collar were noted. The ureters on both sides show a normal course.

Discussion:

Duplication of the inferior vena cava is a rare vascular anomaly with an incidence of 0.2-3% [2]. This caval abnormality needs to be recognized, especially in association with renal anomalies like crossed fused ectopia or circumaortic renal collar [2, 3].

Three variants have been described; Type I or major duplication: comprises two bilaterally symmetrical trunks and a preaortic trunk of the same calibre. Type II or minor duplication: comprises two bilaterally symmetrical trunks, but smaller than the preaortic trunk. Type III or asymmetric duplication: comprises small left IVC, larger right IVC and even larger preaortic trunk.

Other rarer associations which need to be sought for are horse-shoe kidney, retroaortic left renal vein and cloacal extrophy [2]. None of them were present in this patient. Inferior vena cava is complex developing during 7-10th weeks of gestation [3, 4]. IVC duplication results from persistent left supracardinal vein [4].

On CT, a duplicated left-sided IVC is usually seen as a continuation of left common iliac vein, crossing anterior to aorta at the level of renal vein to join the right-sided IVC as in this case.

Differential diagnosis are transposition of IVC (due to persistent left supracardinal vein) [4], where it continues on the
left side of the aorta only and retrocaval ureter (due to persistent right posterior cardinal vein) [4], where the proximal ureter courses posterior to the IVC [5].

The radiologist must be well aware of these variants and should be able to differentiate between an anomalous IVC and other pathologies. All these variants have to be documented in the report, as this information is vital to surgeons performing portosystemic shunts, abdominal aortic aneurysm repair, ligation of IVC in thromboembolic disease, placement of IVC filter, nephrectomy and renal transplantation [1].

**Differential Diagnosis List:** Type III asymmetric duplicated left inferior vena cava, Transposition of IVC, Retrocaval or circumcaval ureter

**Final Diagnosis:** Type III asymmetric duplicated left inferior vena cava

**References:**


Figure 1

a

Description: Axial image shows the duplicated left-sided IVC. A mirror image is seen of the IVC on both sides of the aorta. Origin: BHRUT NHS Trust, Rom Valley Way, UK

b

Description: Axial image shows the duplicated left-sided IVC crossing over to the right, anterior to the aorta and joining the right-sided IVC. Origin: BHRUT NHS Trust, Rom Valley Way, UK
Description: Axial image shows the duplicated left-sided IVC. A mirror image is seen of the IVC on both sides of the aorta. Left renal vein drains into the left-sided IVC. Origin: BHRUT NHS Trust, Rom Valley Way, UK
**Description:** Sagittal image shows the left-sided IVC. **Origin:** BHRUT NHS Trust, Rom Valley Way, UK
Description: Coronal image shows the duplicated asymmetric left-sided IVC. The left is smaller in calibre, suggestive of the Type III variant. Origin: BHRUT NHS Trust, Rom Valley Way, UK