Bilateral Inferior Vena Cava (IVC) Filter Insertion in Duplicated IVC: Case Report and Literature Review

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Objectives

Duplicated IVC is a rare but well-known anatomical variant. This case report aims to illustrate the imaging features of duplicated IVC, importance of recognition of such variant and its implication in IVC filter insertion. The need for thorough pre-procedural planning in IVC filter insertion is highlighted.

Materials and Methods

Retrospective review of a case of bilateral IVC filter insertion in duplicated IVC. Representative pre-procedural and procedural images are chosen for demonstration.

Case Presentation

A 51-year old woman newly diagnosed with colorectal cancer presented with bilateral lower limb deep vein thrombosis (DVT). She was contraindicated for systemic anticoagulation in view of profound anaemia, and was referred for IVC filter placement. Review of prior CT showed duplicated IVC with the left IVC joining the left renal vein, and two infra-renal bridging veins between the two IVCs (Figure 1a), also confirmed on digital subtraction venogram (Figure 1b) prior to IVC filter placement. The right renal vein joins the right-sided IVC at the same level of left renal vein (not shown).

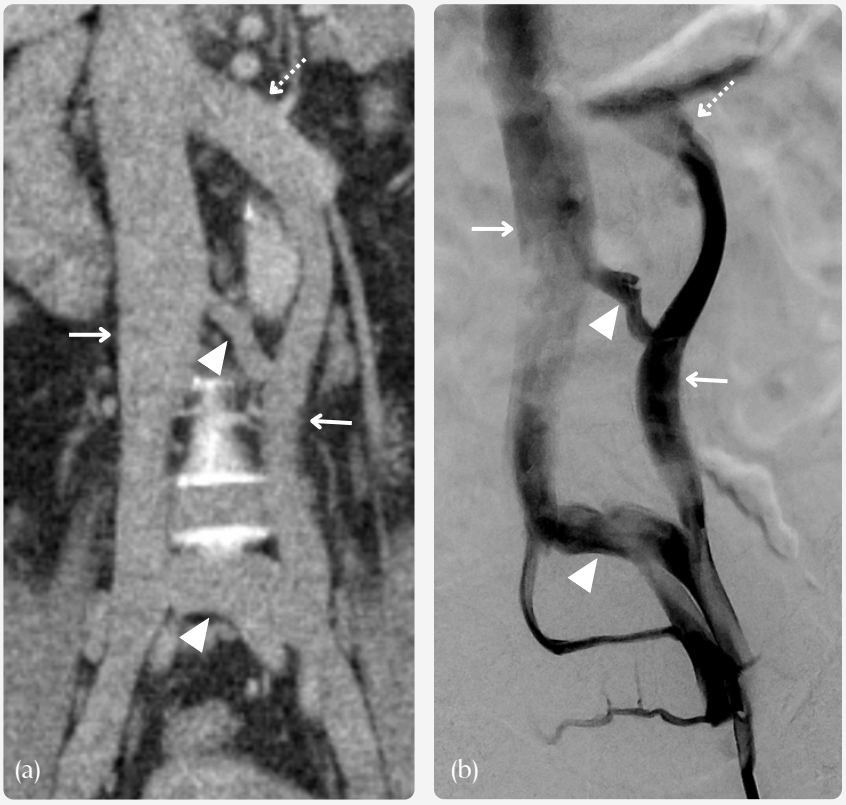

Figure 1 (a) Contrast-enhanced CT (coronal image) showing duplicated IVC (arrows), with the left-sided IVC joining the left renal vein (dotted arrow) and presence of two infra-renal bridging veins (arrowheads). (b) Venogram with catheter tip in left common iliac vein showing corresponding findings and additional collateral vessels.

Case Presentation (cont'd)

Paired IVC filters were inserted via right internal jugular approach in bilateral IVCs, one on each side, at an infrarenal location between two bridging veins (Figure 2). No procedure-related complications were reported.

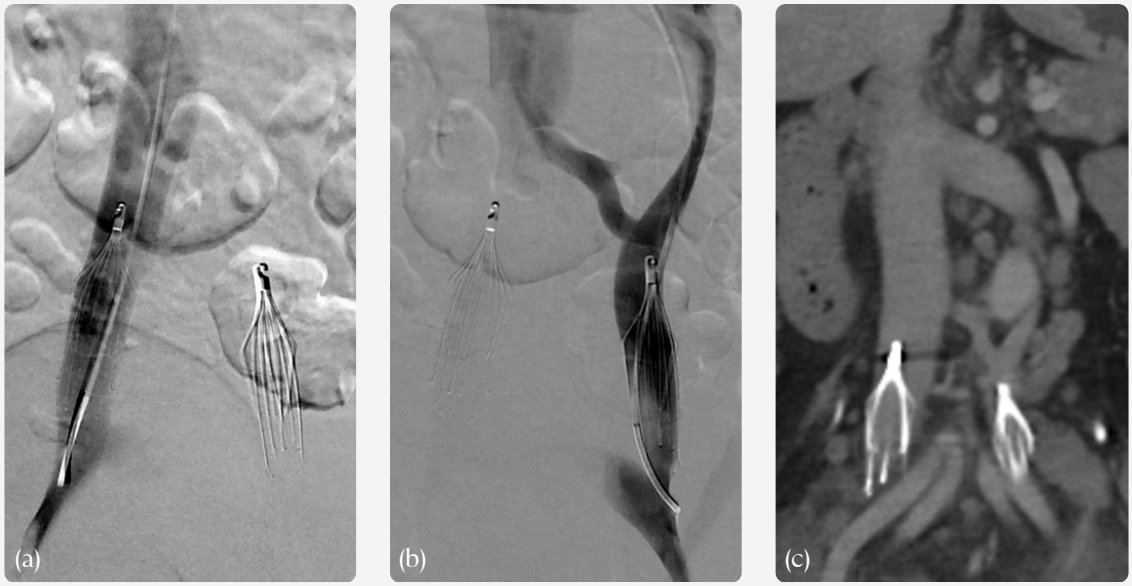

Figure 2 (a, b) Venograms showing satisfactory positioning of both IVC filters with no significant tilting observed. (c) Positions of IVC filters confirmed on coronal CT scan.

Discussion

Duplicated IVC is a rare vascular anatomical variant with a reported prevalence of 0.2%-3.0%. It occurs when the left supracardinal vein fails to regress during the 4-8th weeks of fetal development and both left and right supracardinal veins are persistent, instead of the usual development where only the right supracardinal vein persists to form the IVC. The duplicated IVC most commonly appears as a communication between the left common iliac vein and the left renal vein, which then typically crosses anterior to the aorta to join the right-sided IVC. It is usually asymptomatic and seen as an incidental finding on imaging such as CT or ultrasound studies. Duplicated IVC predisposes to DVT, especially in young patients, presumably by favouring venous stasis.

In normal situations, IVC filters are placed at an infrarenal location. Different treatment options for IVC filter insertion in duplicated IVC have been reported, including bilateral infrarenal IVC filter insertion, single suprarenal IVC filter insertion, and unilateral infrarenal IVC filter insertion with coil embolisation of smaller duplicated IVC or communicating segments of the duplicated IVC system. If duplicated IVC is not recognised, pulmonary embolism may result following routine placement of an infrarenal IVC filter as collateral pathways for emboli to bypass the filter still exist. It is essential to review prior images and perform venograms to delineate venous anatomy before IVC filter insertion.

Conclusion

Radiologists should be aware of vascular anatomical variants such as duplicated IVC, which has significant clinical implications in IVC filter insertion and prevention of thromboembolism.

References

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