Vena cava filter placement in a duplicated infrarenal inferior cava venous system with azygous continuation

Gustavo Lagrotta, 1,2 Mauricio Danckers, 3 Roberto Fourzali 1

DESCRIPTION
A 50-year-old man with atrial fibrillation without anticoagulation presented to the hospital after tonic–clonic seizures, followed by pulseless cardiopulmonary arrest with return of spontaneous circulation after 2 min. Imaging demonstrated a left superior cerebellar thromboembolic ischaemic stroke associated with trace subarachnoid haemorrhage. Further studies revealed bilateral basilic and left cephalic superficial vein thrombosis, and right brachial and right popliteal deep vein thrombosis. Non-contrast chest and abdomen CT revealed a duplicated infrarenal inferior vena cava (IVC) with azygous continuation and absence of suprarenal IVC (figure 1A,B). Due to the inability to start systemic anticoagulation and anatomical variance, a retrievable vena cava filter (Cordis OPTEASE) was placed in the right infrarenal IVC via femoral access site under fluoroscopy (video 1).

Several IVC congenital anomalies and their associations with findings such as thromboembolic events have been documented. 1, 2 The development of the IVC begins between the sixth and eight gestational weeks and involves anastomoses between the paired embryonic cardinal veins. These form the hepatic, suprarenal, renal and infrarenal segments. 3 It is theorised that duplication of the IVC results from persistence of the supracardinal veins, with a prevalence of 0.2%–3.0% in the general population. 4 A classification of duplicated IVC has been proposed: type I (major duplication, where both IVCs have symmetrical trunks and similar size as the preaortic trunk) as seen in our patient, type II (minor type, where both IVCs have symmetrical trunks but are smaller than the preaortic trunk) and type III (asymmetrical type, where the left IVC has a smaller trunk than the right IVC, and with variable sizes of the preaortic trunk). 5 A novel type IV (left IVC with a larger trunk than the right IVC) has also been proposed. 5

In addition, the absence of the suprarenal IVC with azygous continuation is theorised to be failure to form the right subcardinal–hepatic anastomosis, with resulting atrophy of the right subcardinal vein. The prevalence of azygous continuation has been noted to 0.6%. 4 However, these two IVC abnormalities presenting simultaneously have yet to be thoroughly documented and pose a particular challenge in our patient.
Images in... site retrievable IVC filter in a patient with a rare venous drainage anatomical variant.

Patient's perspective

I feel really well, surprisingly well. Everyone I know, all of my family, is in shock of the quick recovery I’ve made. I have lingering discomfort in my flank, but otherwise I’m feeling good. The findings honestly haven’t changed how I go on about my day, I’ll still continue to be as healthy as I can in my life.

Learning points

► Venous anomalies are commonly discovered as an incidental finding and likely occur at higher rates than what has been published.
► Proper anatomical evaluation, equipment selection and procedural planning are key when considering placement of an inferior vena cava filter in a patient with venous drainage system anatomical variants.

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