

Original Article

A case series of duplicated inferior vena cava: mind the side, or fail to trap!

Zhu Tong, Yongquan Gu

Department of Vascular Surgery, Xuanwu Hospital, Capital Medical University, Beijing 100053, China

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Abstract: Purpose: The incidence of duplicated inferior vena cava (IVC) ranges between 0.2-3%. Methods: The objective of this report is to showcase malformation of inferior vena cava in a series of authors' own case studies. We also discuss the abnormal embryogenesis that results in this and the clinical management aspects of duplicated IVC. Results: Our findings suggest that it is important to recognize congenital anomaly such as duplicated IVC, especially prior to an invasive procedure.

Keywords: Inferior vena cava, case, embryogenesis

Introduction

The inferior vena cava is an important venous drainage system, and vascular access is required. Though sporadic reports exist, no clear cut morphological parameters are available of where the left and right segments of the inferior vena cava join, and their relations to major vascular drainage, including testicular/ovarian, renal and suprarenal venous drainages [1].

The incidence of duplicated inferior vena cava (IVC) ranges between 0.2% to 3.0% [1, 2]. IVC results due to well-regulated embryonic development whereby multiple formation and subsequent regression of anastomoses are a common occurrence, the later also precluding the same to different embryonic development defects including duplicated IVC [2]. The current manuscript is a brief authors' own case series on duplicated IVC. Our findings suggest that it is important to recognize congenital anomaly such as duplicated IVC, especially prior to an invasive procedure.

Case presentations

An 82-year-old male patient was brought to our attention with sudden-onset right lower extrem-

ity swelling since the last five days. The patient had undergone right knee replacement a week before symptoms appeared and was confined to bed during this entire time. Venous ultrasound revealed right sided DVT and a decision to place an inferior vena cava (IVC) filter was made. Venous angiography via left femoral puncture traced IVC coursing to the left of spine and turning right after receiving drainage of a vein draining the superior pole of the left kidney. Faint trace of contrast was seen to regurgitate in a conduit that drained inferiorly on the right side (*arrowhead*, **Figure 1A**). A filter introduced through the left femoral vein was left *in situ* in the IVC (*arrow*, **Figure 1B**). Postoperative USG confirmed the location of this filter, but confirmed our intraoperative differential of existence of duplication of the caval venous drainage. Due to this anomaly, our therapeutic intervention failed to trap clot fragments from the right side. Due to this alertness, we were able to identify double IVC in another 51-year-old female patient who presented with bilateral lower limb swelling, palpitation and chest tightness for the last three days, in whom duplex ultrasound identified thrombosis in bilateral femoral veins and CE-CT confirmed pulmonary embolism. During the filter implantation, we ensured the placement of the filter into the common IVC (*black arrow*, **Figure 1C**).

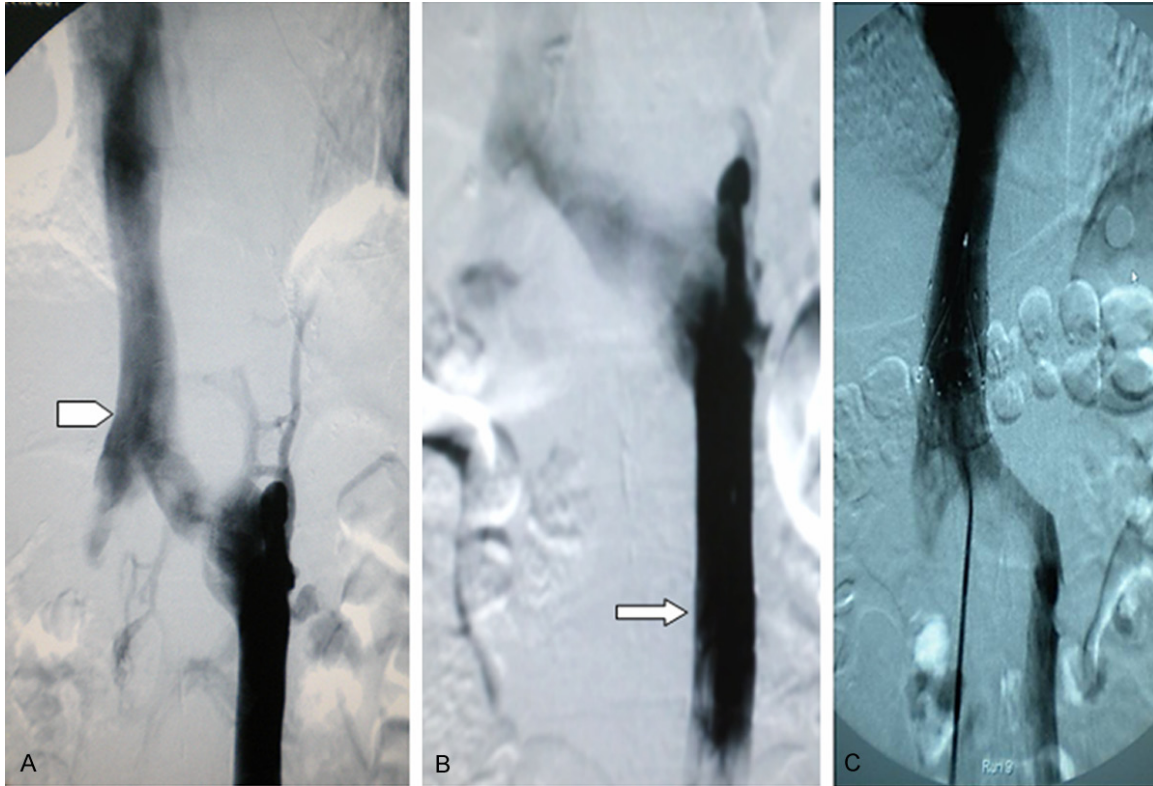


Figure 1. Case presentations of duplicated inferior vena cava. (A and B) Refers to the same patient (82-year-old) and shows faint trace of contrast regurgitating in a conduit that drained inferiorly on the right side and the filter introduced through the left femoral vein and left in the IVC, respectively. (C) Represents the placement into the common inferior vena cava of the implanted filter in yet another patient (51-year-old) with duplicated inferior vena cava.

Discussion

Duplication of the inferior vena cava is a relatively rare vascular anomaly, but this caval abnormality needs to be recognized, especially in association with renal anomalies like [3, 4]. Embryonic development of inferior vena cava goes through sea changes during weeks 7-10 of gestation [5]. Briefly, posterior cardinal vein appears first, but forms only the distal IVC i.e. iliac bifurcation. This is followed by the appearance of the two subcardinal veins. Whereas the right subcardinal vein forms suprarenal IVC, the left one regresses. Finally, the two supracardinal veins arise, out of which the right one form infrarenal IVC and the left one regresses. Of note, duplicated IVC results from failure of the left supracardinal vein to regress.

Our findings suggest that even though duplicated IVC is largely an incidental finding, eagle-eyed visualization during interventional approaches will help to achieve therapeutic success of an IVC filter.

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Disclosure of conflict of interest

None.

Address correspondence to: Dr. Yongquan Gu, Department of Vascular Surgery, Xuanwu Hospital, Capital Medical University, 45 Changchun Street, Beijing 100053, China. Fax: +86-10-83125113; Tel: +86-10-83198605; E-mail: guyq2010@126.com

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A case series of duplicated inferior vena cava

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