Royal Australasian College of Surgeons

Double inferior vena cava-an important anatomical variant in retroperitoneal surgery

A 62-year-old female patient with no personal history of interest. In 2015, the patient began to experience abdominal pain and iron deficiency anaemia and an upper gastrointestinal endoscopy (EDA) was performed, in which a gastric mass was detected and diagnosed as a gastric GIST tumour by pathological anatomy. In the CT scan corresponding to the extension study, an anatomical variant was observed by chance (Fig. 1) consisting of the infrarenal existence of a double IVC on both sides of the aorta artery. Each of the right and left portions of these infrarenal VC would correspond to an iliac vein. The connection between the two VC constituting an IVC would be via the left renal vein (Fig. 2). The GIST tumour was resected by wedge lumpectomy. Left nephrectomy was also performed for renal oncocytoma. After the clinical and anatomopathological study, the GIST tumour was classified as elevated risk and the patient underwent adjuvant treatment with Imatinib 400 mg every 24 h for 3 years. The patient is currently in good general condition and shows no signs of tumour relapse.

Anatomical variants in IVC are common in the population. Thus, from a randomized group of 1000 patients, it was observed that 1.8% had anomalies in the IVC.[1] When a duplicated IVC is present, the left moiety drains into left renal vein, which in turn usually joins with the right IVC, leading to the normal suprarenal anatomy. Iliac venous inflows into the duplicated system may be isolated to each respective side or may join at the inferior origin of the duplicated IVC.[2,3] On the one hand, according to Chen *et al*., our case is a type two duplication that represents the 20.2% of double inferior vena cava.[4] On the other hand, Natsis *et al*. describe our case as a type two in terms of thickness in both duplicated infrarenal vena cava.[5] Although this malformation represents a low incidence, other authors such as Raza *et al*., published a similar duplication of

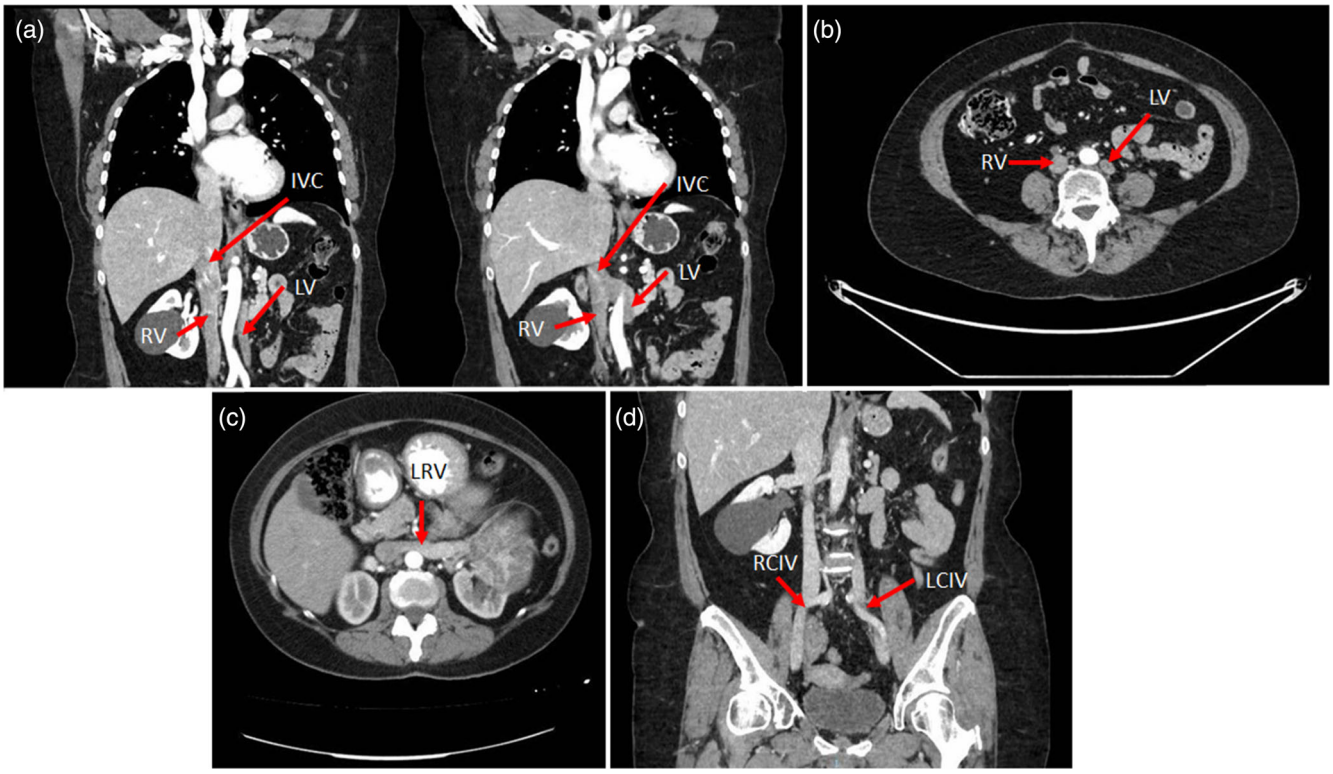

Fig. 1. Computed tomography image of a patient with a GIST tumour detecting the anatomical variant of double IVC unexpectedly in coronal view (a, d) and axial view (b, c), marked with red arrows. IVC, Inferior vena cava; LCIV, left common iliac vein; LRV, left renal vein; LV, left vein; RCIV, right common iliac vein; RV, right vein.

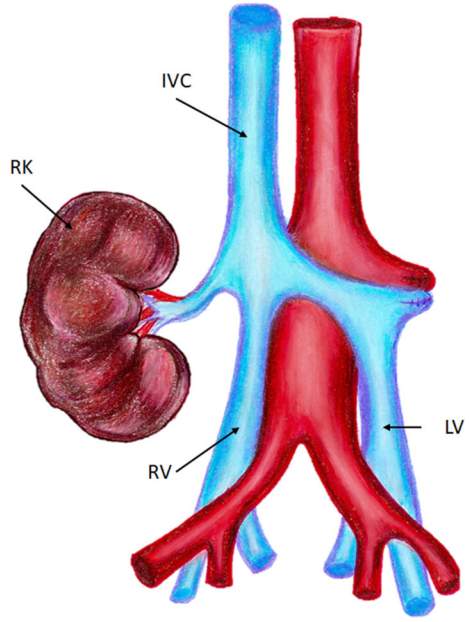

Fig. 2. Schematic picture of double inferior vena cava. IVC, Inferior vena cava; LV, left vein; RK, right kidney; RV, right vein.

inferior vena cava that was incidentally found in a donor for multi-organ transplantation.[6] Most patients do not have clinical symptoms, being this variant diagnosed accidentally by imaging or in autopsies.[7–9] In this clinical case, the patient underwent a CT scan for the detection of a GIST tumour. The test results confirmed the diagnosis and the existence of a double infrarenal VC. Despite this, there are cases in which this variant generates a recognizable pathology. Thus, there are patients diagnosed with IVC duplication diagnosed with pulmonary embolism (PE) and deep vein thrombosis. In these cases, the PE affected the main pulmonary artery and was treated with catheter-directed thrombolysis from the right subclavian vein to the main pulmonary artery.[8] Moreover, Oulare *et al.* described a case that was detected in the context of a unilateral iliofemoral vein thrombosis.[10] Although the patient did not have any type of symptomatology, it is important to be able to identify this type of alteration, since it is very relevant for the planning of retroperitoneal surgeries. Thus, the surgical plan in a patient with aldosteronism had to be modified to approach the operation safely and successfully. In conclusion, this article shows a clinical case of a patient with an anatomical variant (duplication of the IVC) diagnosed from another pathology, a common phenomenon. As shown, most of these variants do not generate symptomatology, which means that they are only detected when imaging tests are performed for other purposes. Therefore, it is essential to know the anatomy of the retroperitoneum to allow the planning of surgeries affecting this area to be adequate, adapting to the patient's own anatomy.

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Author contributions

Kevin Doello: Conceptualization; data curation; investigation; methodology; writing – original draft. **Cristina Mesas:** Conceptualization; data curation; investigation; methodology; writing – original draft. **Francisco Quiñonero:** Investigation; supervision; visualization. **Gloria Perazzoli:** Software; supervision; validation; visualization. **Jose Prados:** Conceptualization; resources; writing – review and editing.

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Kevin Doello,*†‡ PhD, MD
Cristina Mesas,†‡§ PhD
Francisco Quiñonero,*†‡ PhD
Gloria Perazzoli,*†‡ PhD
Jose Prados,†‡§ PhD, MD

**Medical Oncology Service, Virgen de las Nieves Hospital, Granada, Spain, †Biomedical Research Center (CIBM), Institute of Biopathology and Regenerative Medicine (IBIMER), Granada, Spain, ‡Instituto Biosanitario de Granada, (ibs.GRANADA), SAS-Universidad de Granada, Granada, Spain and §Department of Anatomy and Embryology, University of Granada, Granada, Spain*

Kevin Doello and Cristina Mesas contributed equally to this study.

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