



# An Incidental Finding of Double Inferior Vena Cava A Rare Vascular Anomaly

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## Clinical history

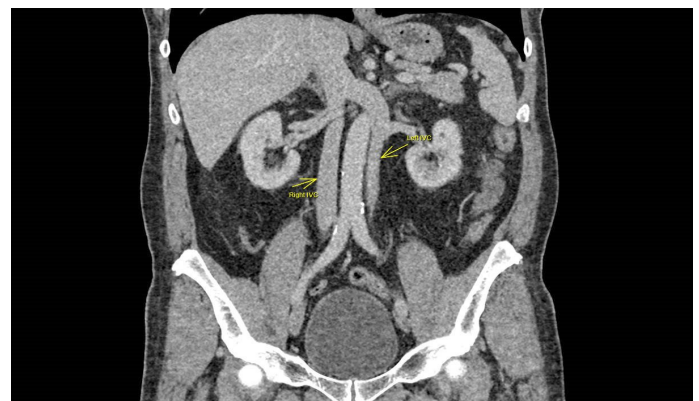
59 yrs old male, fit and healthy after contracting COVID, had several scans, which led to an incidental finding of a left renal exophytic mass and double Inferior Vena Cava (IVC). Apart from COVID-related symptoms, there were no other complaints. After recovering, he underwent an uneventful robotic left partial nephrectomy.

## Imaging findings

CT abdomen and pelvis with contrast showed a double IVC, a smaller left IVC than the right Figure [1]. Left renal vein draining into the left IVC Figure [2A,2B]. The left IVC continues upwards to cross in front of the aorta at the level of L1 to join the right IVC infraheptic Figure [3,5]. The left ureter ran laterally to the left IVC Figure [4]. Apart from the left kidney exophytic mass, the kidneys were normal and no other abnormality.

## Abstract

Inferior Vena Cava Carries (IVC) venous return from the pelvis, abdominal viscera and lower extremities. Unidentified IVC anomalies can lead to severe bleeding during retroperitoneal surgeries if the abnormal IVC is injured. Fortunately, the widespread use of Computed Tomography (CT) during preoperative planning enables identification of the abnormal anatomy before surgery and reduces the risk of damage to the anomalous venous structure.



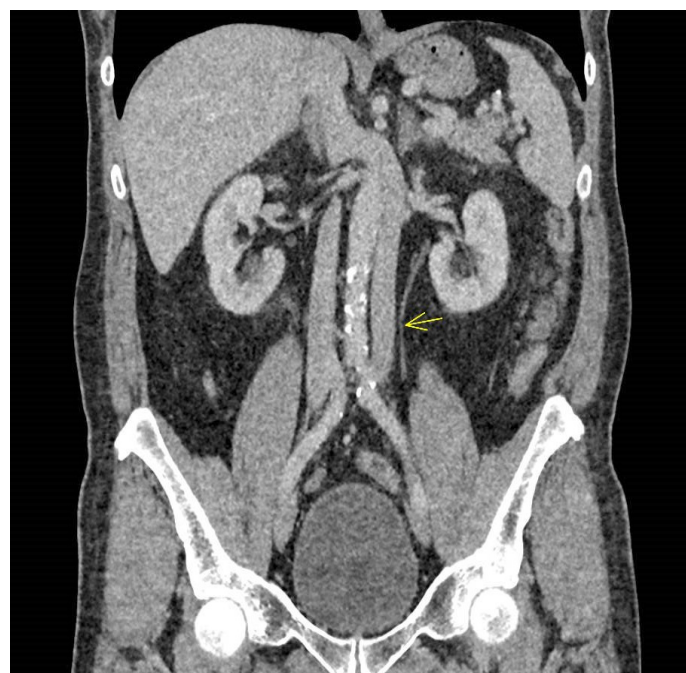
**Figure 1:** Double inferior vena cava, smaller left IVC compared to the right



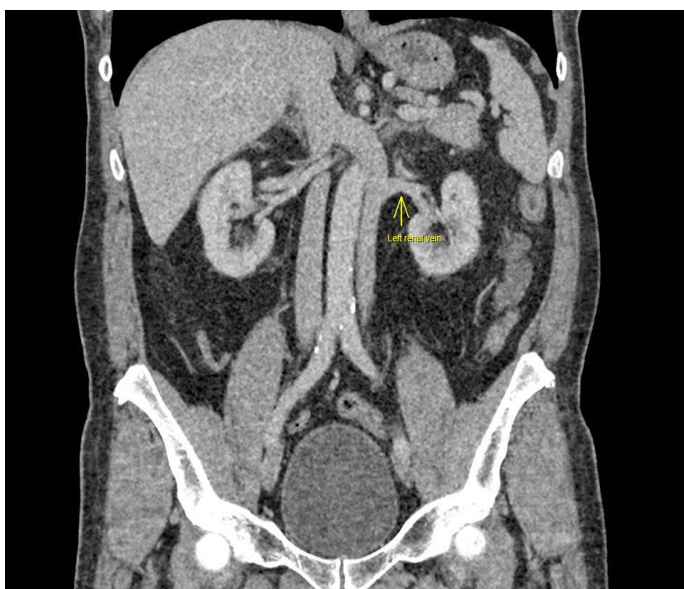
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**Figure 2a:** Left renal vein draining into the left IVC



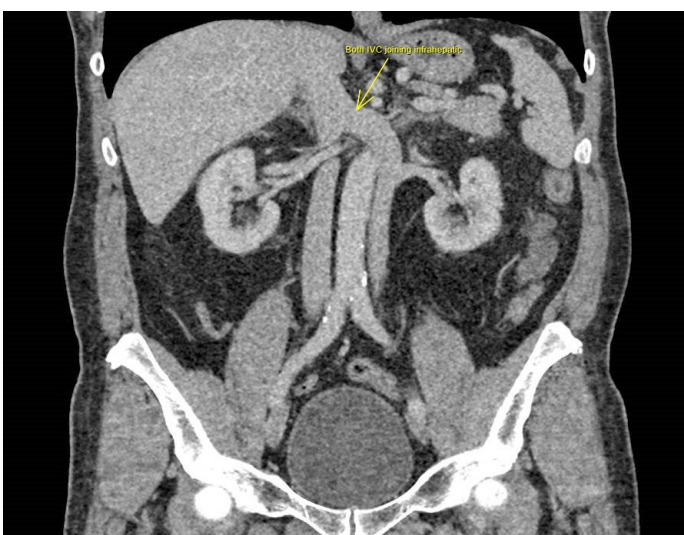
**Figure 4:** Left ureter lateral to the left IVC.



**Figure 2b:** Left renal vein draining into the left IVC.



**Figure 5:** Volume rendering reconstruction showing duplicated IVC.



**Figure 3:** Left IVC crosses in front of the aorta to join the right IVC infrahepatic.

**Discussion**

IVC development is a complex embryogenic process; The infrahepatic vena cava derives from 3 pairs of primitive veins, namely posterior cardinal, subcardinal and supra cardinal veins [1]. Double IVC is present in 0.2%–3% of the general population and arises from the persistence of both supracardinal veins [2].

Three different variants of duplication of inferior vena cava are known, i.e. Type I or Major duplication: Two bilaterally symmetrical trunks with a pre-aortic trunk of the same calibre. Type II or minor duplication with two bilaterally symmetrical trunks, but it is smaller than the pre-aortic trunk. In Type III or asymmetric duplication, there is a small left IVC, larger right IVC and even larger pre-aortic trunk [3].

Double IVC is usually asymptomatic; however, recurrent DVT was reported in patients with double IVC [4]

In the evaluation of IVC variations, The most useful diagnostic tests include Doppler ultrasound, CT and MRI. Doppler ultrasound is operator-dependent and often of limited value in obese patients. MRI might not be a preferred method because of the cost, availability, movement artefacts, and contraindications for patients with cardiac pacemakers and claustrophobia [5].

### Summary

IVC variations should be kept in mind by radiologists and surgeons who are to manipulate in this anatomic area. Although most of them do not cause functional damage, these venous variations should be taken into account during the application of imaging techniques and various retroperitoneal surgeries. Preoperative recognition of anatomic variations provides better surgical planning and outcome.

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