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Absent infrarenal inferior vena cava

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Absence of an infrarenal inferior vena cava is an infrequent finding on computed tomography scans and is usually an unexpected, incidental finding. This report concerns a young patient with an absent infrarenal inferior vena cava who presented with abdominal and back pain.

Case report

A 23-year-old with a history of acute myelogenous leukemia (AML) was traveling from North Carolina to New Jersey when he experienced intense abdominal pain and came to our hospital's emergency department (ED). He was diagnosed with acute myeloid leukemia (AML) one year earlier and had received four cycles of chemotherapy. The patient had experienced abdominal pain for a few days, which had recently worsened. In addition, he complained of nausea and vomiting. The patient denied fever, dizziness, chills, diarrhea, or constipation. Family history was significant for a history of nonspecified cancer in his maternal lineage.

On physical examination, the patient was alert but in significant distress. He had anicteric sclera without pallor. There was no axillary or cervical lymphadenopathy. His abdomen was tender with some guarding due to pain. Heart and lung exams were within normal limits. No lower extremity edema was noted. The patient's pain was controlled with intravenous Dilaudid and Morphine. A CT scan of the abdomen/pelvis with contrast was performed. The CT scan showed absence of the IVC in the infrarenal region (Figure 1A). In addition, several enhancing structures were noted in the paraspinal and pelvic areas (Figure 1B, C, and D) consistent with collateral vessels. Mild splenomegaly and small bilateral pleural effusions were also seen.

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The patient was made aware of this anatomical variation and referred back to his oncologist. On discharge, the patient reported that his pain had resolved, rating it 0/10. This patient had an extensive history of AML, with a poor response to chemotherapy. A peripheral smear revealed 70% myeloblasts and a white count of 16.1/uL. The patient has been referred to another institution for a possible bone-marrow transplant. His presentation to our ED with abdominal and back pain was most likely not related to the absence of the infrarenal inferior vena cava, and the associated mass effect of dilated collateral vessels. Given the relatively short onset of abdominal pain, his recent pain could be related to an ongoing blast crisis.

Discussion

The spectrum of congenital anomalies of the IVC has been well described (1-3). Congenital variants of the infrarenal IVC are believed to have a prevalence of less than 2% in the normal population, with complete absence of the IVC occurring in 0.3% of healthy patients (2, 4). CT has been recommended as the method of choice for diagnosis of, and the presence of well-developed hemi-azygous and azygous system as key clues to, certain variants of IVC anatomy (5). The IVC is formed via an intricate embryologic series of events involving three paired venous channels: postcardinal, subcardinal, and supracardinal. There is disagreement in the literature on the cause of absent infrarenal IVCs (1, 3). Alicioglu et al. (1), support a theory that perinatal thrombosis is most likely to blame and that the preferred nomenclature should replace the word absence with "hypoplasia." This IVC thrombosis theory was further defended by their finding of bilateral adrenal calcification and renal parenchymal atrophy. However, these findings were absent in our patient. Case reports discussed an absent infrarenal IVC in patients who had a history of treatment for IVC and renal vein thrombi (6). To our knowledge, our patient did not have a history of anticoagulation treatment. Furthermore, his malignancy was detected only within a year of his most recent presentation.

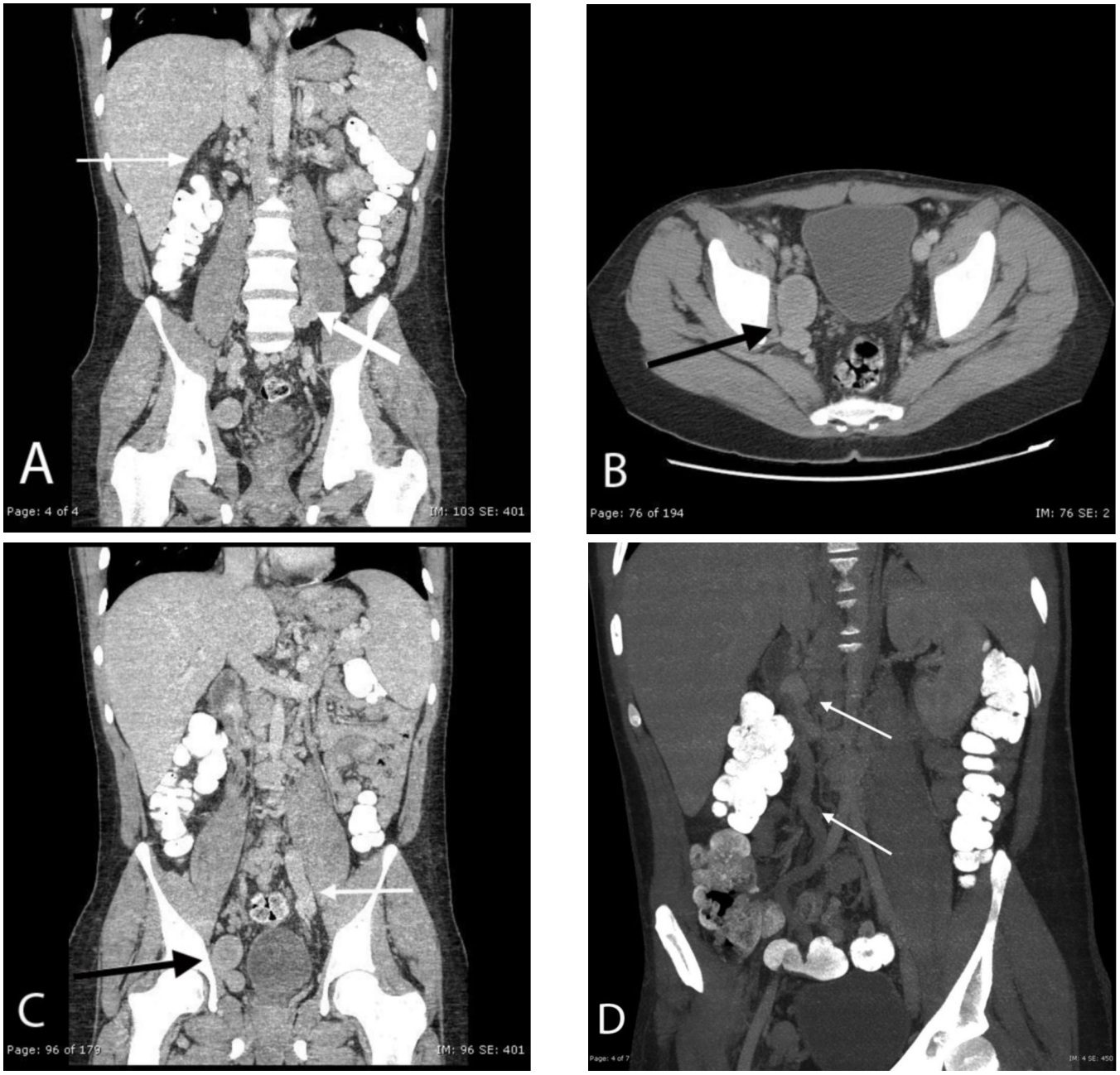

Figure 1. 23-year-old male with absent infrarenal inferior vena cava. A contrast-enhanced CT of the abdomen showed on a coronal image the absence of the infrarenal IVC (**A**, thin arrow) with posteriorly located paravertebral collaterals (**A**, thick arrow). It also showed more dilated right-sided pelvic/iliac collaterals on axial (**B**, black arrow) and coronal (**C**, black arrow) reconstructions as well as more anteriorly located pelvic collaterals to renal veins, both on the left side (**C**, white arrow) as well as on the right on an obliqued coronal view (**D**, arrows), both leading to the renal veins.

The finding of an absent infrarenal IVC was probably an incidental finding in our patient because of the lack of physical findings reported in the literature. For example, he lacked significant pedal edema, venous stasis ulcers, and the superficial venous engorgement. It could be argued that, given the history of malignancy and absent infrarenal IVC, this patient is at significant risk of deep venous thrombosis (DVT). Two studies (6, 7) reported that IVC abnormalities explained up to 5% of idiopathic DVT cases in people under 40 years old. Emboli from the femoral circulation could reach the pulmonary circulation via the hemi-azygous and azygous system (5).

Surgical indications in patients with absent infrarenal IVC may include recurring DVT, stasis ulcers, and collat-

eral engorgement. Zhou et al. report a case in which a surgical bypass was performed to relieve disabling pelvic congestion (4). A polytetrafluoroethylene graft was used to connect the femoral vessels to the suprarenal IVC, with symptom resolution and patency six months later. After complete recovery from AML and if abdominal and back pain do not resolve, our patient might possibly benefit from an evaluation by a vascular surgeon.

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