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Case Report

Pseudothrombosis due to blood-contrast level in the infrarenal vena cava ☆,☆☆

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ABSTRACT

Filling defects within the inferior vena cava (IVC) are common findings on computed tomography (CT); nevertheless, a majority of these defects are attributed to artifacts. The documentation pertaining to pseudothrombosis specifically affecting the infrarenal vena cava is notably insufficient in current literature. The aim of this study is to present a case demonstrating a blood-contrast level in the infrarenal vena cava, resembling an intraluminal filling defect.

Introduction

Frequently identified on computed tomography (CT), filling defects within the inferior vena cava (IVC) are primarily attributed to laminar flow artifacts. While the investigation of artifactual filling defects in the suprarenal vena cava have been widely addressed in many published researches, the insufficient documentation of pseudothrombosis specifically affecting the IVC distal to the renal veins persists within the current literature [1–3]. The objective of this study is to present a case involving a blood-contrast level observed in the infrarenal vena cava, exhibiting characteristics akin to an intraluminal filling defect, with an emphasis on the distinction of false from true filling defects.

Case report

A 60-year-old male was admitted to our institution reporting a 2-month history of swelling affecting both lower extremities. There was no prior history of any systemic disease. Upon presentation, his vital signs were within normal limits. Physical examination revealed bilateral lower extremity edema and a palpable mass located in the right hypochondrium, displaying mild tenderness to deep palpation.

The patient underwent abdominal contrast-enhanced CT utilizing a 4-phase liver protocol. A large hepatic cyst was found in the right lobe, which directly compressed the hepatic, suprarenal, and renal segments of IVC (Fig. 1). Notably, the infrarenal segment appeared dilated with anterior-posterior

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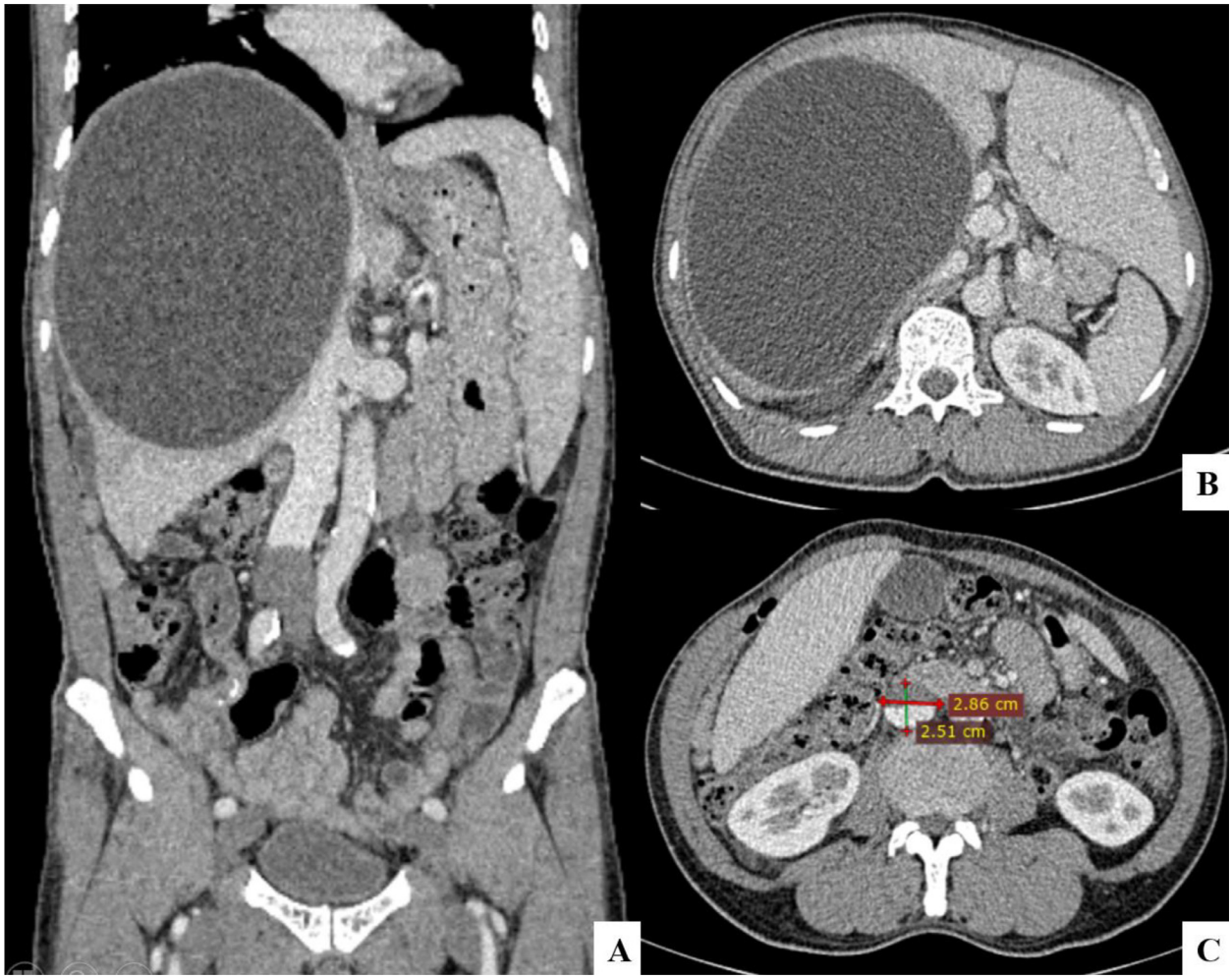

Fig. 1 – Coronal reconstruction CT scan in the portal venous phase (A) in the portal venous phase. Axial CT scan through the suprarenal (B) and infrarenal (C) segment of IVC in the portal venous phase. The hepatic cyst in the right lobe compressed the hepatic, suprarenal, and renal segments of IVC. The infrarenal segment appeared dilated.

and transverse dimensions of 24 mm and 27 mm respectively (Fig. 1). In the non-contrast phase, there was no hyperdense material within the IVC (Fig. 2). The portal venous phase showed dependent layering of contrast material with a blood-contrast level inside the infrarenal segment, replicating a well-defined intraluminal filling defect (Fig. 3). However, the IVC enhanced homogenously in the delayed phase, indicating the previously detected filling defect was indeed an artifact (Fig. 4).

Discussion

Inferior vena cava filling defects are frequently encountered on CT examinations. Most of these defects are attributed to artifacts and require accurate differentiation from genuine thrombi, as the latter are of critical importance to clinical management. Familiarity with anatomy and the impact of flow dynamics is imperative in discerning between false and true thrombus in the IVC [1–3].

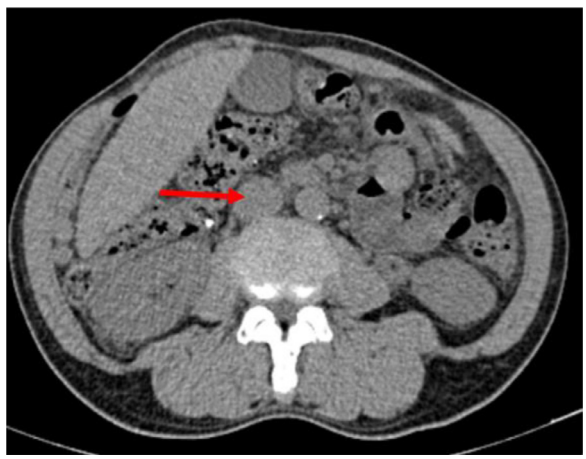

Fig. 2 – Axial CT scan through the infrarenal vena cava in the non-contrast phase. There was no hyperdense material within the infrarenal vena cava (arrow).

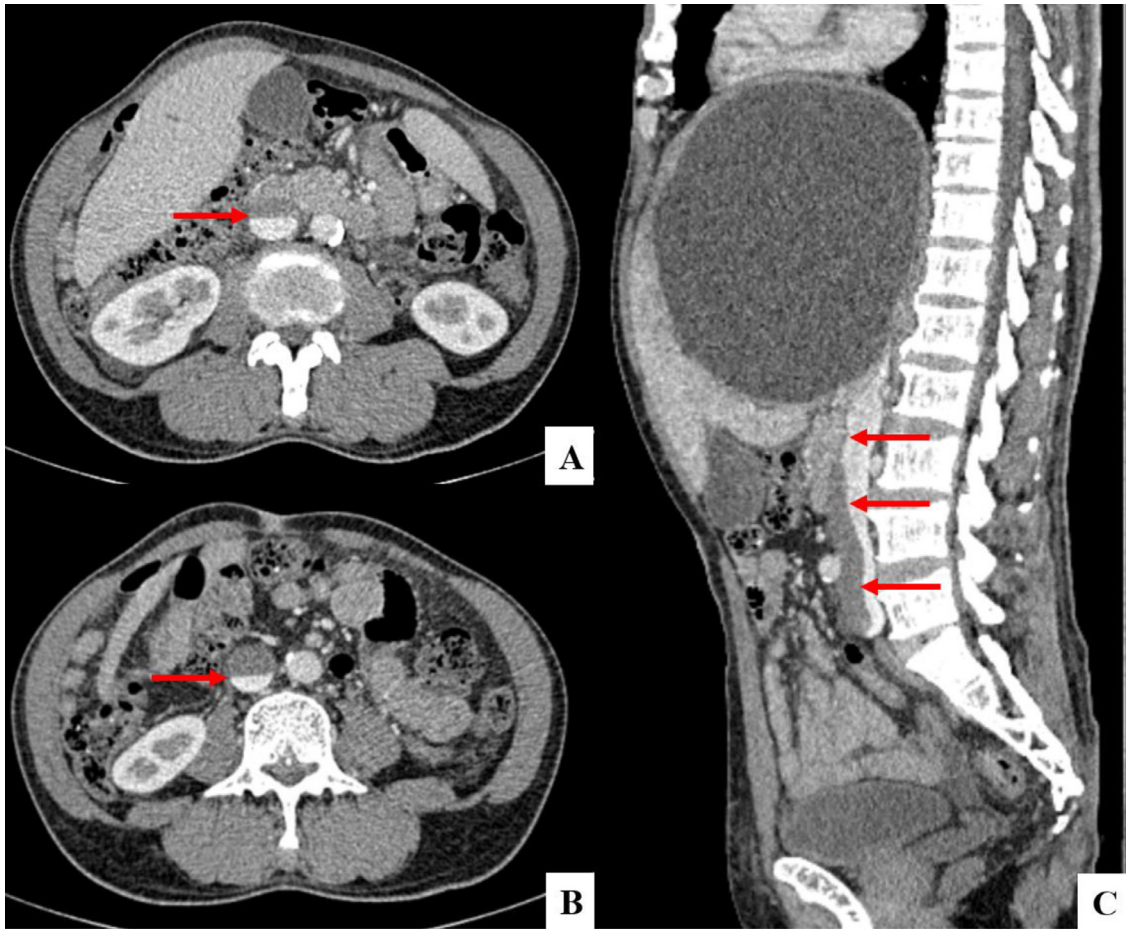

Fig. 3 – Axial CT scan through the infrarenal vena cava in the portal venous phase (A, B). Sagittal reconstruction CT scan through the IVC in the portal venous phase (C). Dependent layering of contrast material with a blood-contrast level inside the infrarenal segment (arrow) replicated a well-defined intraluminal filling defect.

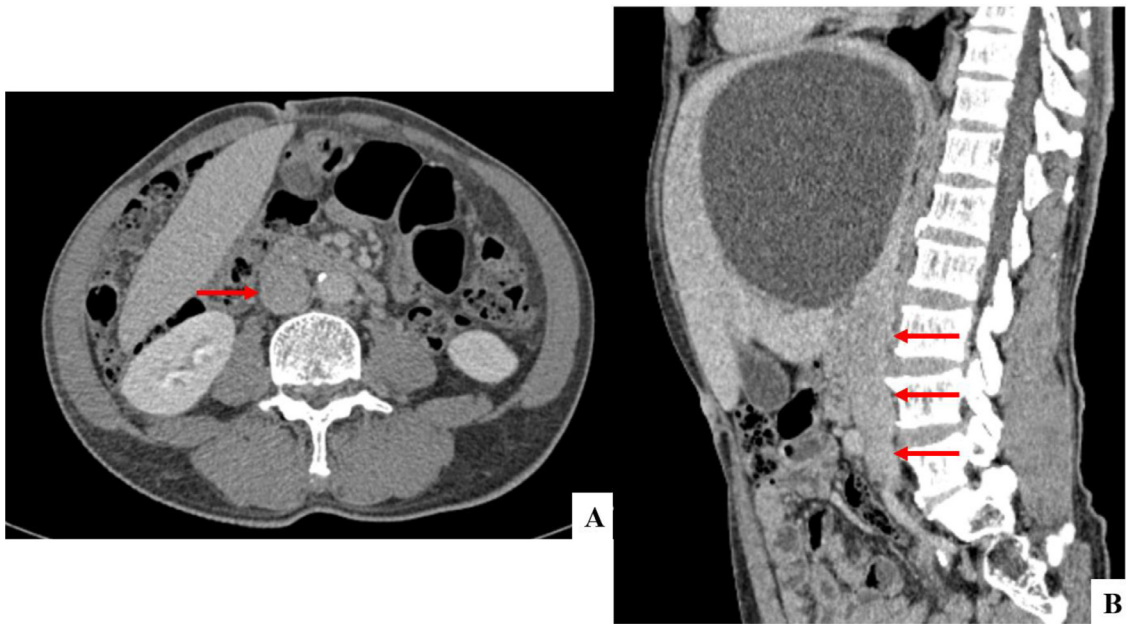

Fig. 4 – Axial CT scan through the infrarenal vena cava in the delayed phase (A). Sagittal reconstruction CT scan through the IVC in the delayed phase (B). The IVC enhanced homogenously (arrow).

In this case report, we delineate a large hepatic cyst exerting pressure on the hepatic, suprarenal, and renal segments of IVC, causing upstream dilatation. A well-defined filling defect is visualized within the distended infrarenal segment of IVC in the portal venous phase. This sharp-bordered artifactual filling defect, coupled with bilateral lower extremity edema, may erroneously suggest a diagnosis of IVC thrombosis. Although pseudothrombosis typically presents with indistinct borders, there are instances where it exhibits relatively well-defined margins. Differentiation from genuine thrombus can be achieved by conducting delayed scans through the area in question. In our case, the delayed images display the resolution of the previously observed filling defect, thereby confirming the artifactual nature of such pseudolesions [2–4].

A meticulous assessment of the IVC near the origins of the renal veins elucidates the underlying cause behind the pseudothrombus. Downstream compression causes enhanced blood from the renal veins to reflux into the infrarenal IVC. This retrograde flow of opacified blood from the renal veins runs parallel to the column of unopacified blood returning from the lower body, creating a laminar flow phenomenon that mimics the appearance of thrombus formation.

In continuation, the aforementioned laminar flow also results in a blood-contrast level within the infrarenal segment of IVC. The specific gravity of whole blood at body temperature typically measures around 1.062 [5], whereas commonly used contrast agents have specific gravity values ranging from 1.280 to 1.406. Under normal physiological conditions, specific gravity has no effect on the dynamics of contrast material. However, in our case, decreased venous blood flow, attributed to downstream compression, leads to a hypostatic state. Consequently, iodinated contrast agents, being heavier than blood, tend to accumulate in dependent parts of the venous system relative to unenhanced whole blood [6–8].

Conclusion

This case report outlines an unusual blood-contrast level identified in the infrarenal vena cava, simulating the appearance of an intraluminal filling defect. Such dependent venous pooling occurs in enlarged veins with slow flow. Confirmation of normal patency can be obtained by delayed scans through the concerned area. A thorough comprehension of anatomy and the influence of flow dynamics is crucial for accurate identification and discernment of artifactual filling defects in the IVC.

Patient consent

Written informed consent for the publication of this case report was obtained from the patient.

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