CLINICAL IMAGE

Acute portal vein thrombosis secondary to COVID-19

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A 33-year-old man with an unremarkable medical history was admitted to the gastroenterology department due to severe abdominal pain and vomiting. Initially, a few days before the admission, the pain was mild and localized to the epigastrium, then it became worse and diffuse with concomitant vomiting (the specific reason for admission). Two weeks before the admission, the patient had recovered from a mild clinical course of COVID-19, with complaints of fever, headache, and anosmia. The time interval between the onset of COVID-19 symptoms and the abdominal pain was 21 days. Biochemical tests on admission revealed a mild increase in C-reactive protein, aminotransferases, and D-dimer (>10 × the upper limit of normal).

Abdominal ultrasound and computed tomography performed on admission showed a dilated portal vein and the absence of blood flow (FIGURE 1A), consistent with the portal vein thrombosis (PVT) (FIGURE 1B). The thrombus spread through the confluence to the superior mesenteric and splenic veins (FIGURE 1C). Esophagogastroduodenoscopy, abdominal ultrasound, and chest X-ray indicated no significant abnormalities. Common causes of thrombophilia, including myeloproliferative diseases, antiphospholipid syndrome, factor V Leiden, prothrombin gene mutation, and a deficiency of antithrombin, protein C, or protein S were excluded. The patient's body mass index was 22 kg/m^2.

Following a treatment with subcutaneously administered low-molecular-weight heparin initiated on admission, the pain ceased within a few days, and oral anticoagulation therapy with warfarin was started. The patient remained free of symptoms during a 6 month follow-up. On follow-up, abdominal ultrasound revealed a cavernous transformation of the portal vein (FIGURE 1D). Due to a lack of any other diagnosis or known predisposing causative factors, we concluded that the past COVID-19 infection was the probable cause of the PVT in this patient.

PVT is a venous, thromboembolic disease that mostly occurs in patients with underlying liver disease or disorders that lead to thrombophilia.[1] However, recent studies showed that patients with SARS-CoV-2 infections frequently experienced thromboembolic episodes, and most commonly, venous thrombosis.[2] Consequently, most guidelines for patients hospitalized for COVID-19 recommend administration of antithrombotic prophylaxis with heparin.[3]

Hypercoagulability is a complication of COVID-19. In fact, the infection affects all 3 components of Virchow's triad. To the best of our knowledge, about a dozen cases of PVT related to SARS-CoV-2 infections have been described.[2] Moreover, thromboembolism (including PVT) can occur weeks after the symptoms of COVID-19 disappeared and can be related to COVID-19 vaccination.[2,4] Early treatment (as soon as a diagnosis of thrombosis is established) with therapeutic doses of heparin, followed by oral vitamin K antagonists is typically sufficient to prevent thrombi from extending into mesenteric veins and causing an intestinal infarction.[1]

The review of COVID-19–related portal vein thrombosis cases, apart from a few with a fatal outcome, or gastrointestinal bleeding, or bowel ischemia,[2] shows that usually anticoagulation treatment resolves the abdominal pain and patients can be discharged home. However, data from follow-up imaging studies are scarce. Due to the development of the portal vein cavernous transformation, our patient will undergo imaging and endoscopic follow-up to evaluate the risk of the collateral circulation development.

This case study demonstrated that abdominal pain could indicate a serious complication of mild COVID-19. Considering the scale of SARS-CoV-2 infections (>230 million confirmed cases

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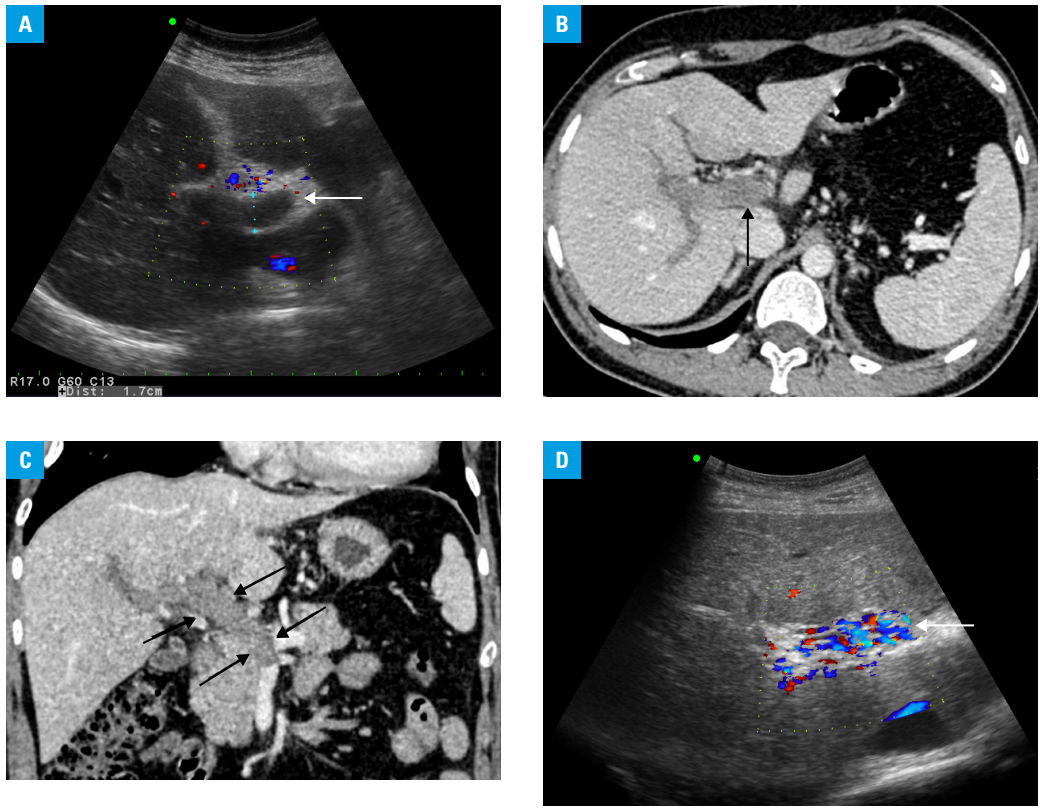

FIGURE 1 Portal vein thromboembolism development post COVID-19. **A** – abdominal ultrasound confirming the absence of blood flow in a dilated portal vein; **B** – computed tomography (CT) scan showing a thrombus in the main trunk of the dilated portal vein; **C** – CT scan showing an extension of the thrombus into the portomesenteric confluence; **D** – abdominal ultrasound showing the liver hilum with periportal collaterals, consistent with a cavernous transformation of the portal vein

worldwide) and the fact that thromboembolic complications are common (21% of patients hospitalized for COVID-19),[5] it is important to be aware that thromboembolic events can occur as a complication of even a mild course of COVID-19, and they may develop weeks after the symptoms of the infection subsided. Our findings support frontline physicians in their crucial role in saving lives by emphasizing the importance of early identification of thromboembolism.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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