Portal vein thrombosis associated with ChAdOx1 nCov-19 vaccination

Osman Öcal, Stephanie-Susanne Stecher, Moritz Wildgruber

Lancet Gastroenterol Hepatol 2021; 6: 676

Published Online June 8, 2021 https://doi.org/10.1016/S2468-1253(21)00197-7

Department of Radiology (O Öcal MD, Prof M Wildgruber MD) **and Department of Medicine II, Liver Center Munich** (S-S Stecher MD), **University Hospital, LMU Munich, Munich, Germany**

Correspondence to: Dr Osman Öcal, Department of Radiology, University Hospital, LMU, 81377 Munich, Germany **osman.oecal@med.uni-muenchen.de**

A 41-year-old man with an unremarkable medical history presented to the emergency department with a headache that woke him and persisted despite painkillers. He had no neurological symptoms. The initial evaluation revealed severe thrombocytopenia (64 000 per µL) and increased D-dimer (42 028 µg/L). Cranial CT identified no findings of haematoma or ischaemia, and there was no sign of dural venous thrombosis on CT angiography. Thorax CT showed peripheral pulmonary emboli in the right lower lobe. There were no clinical signs of COVID-19, and upper abdominal organs were normal. The patient had received the first dose of ChAdOx1 nCov-19 vaccination (AstraZeneca) 11 days previously. Due to suspicion of COVID-19 vaccine-induced immune thrombotic thrombocytopenia (VITT), a modified heparin-induced platelet activation (HIPA) test was sent, and low-dose anticoagulation with apixaban was initiated. The headaches stopped, and no neurological symptoms developed.

4 days later, abdomen CT was obtained due to sudden severe abdominal pain, which revealed massive thrombosis of the entire portal venous system with no residual enhancement in the portal vein, splenic vein, and superior mesenteric vein (figure A, B). Extensive intraabdominal free fluid was noted with higher density in the perisplenic area; the patient also had splenomegaly and decreased spleen enhancement. High-dose intravenous immune globulin was given to inhibit the suspected Fc gamma receptor-mediated platelet activation. The patient developed hypovolaemic shock, and emergent laparotomy was undertaken. The splenic capsule ruptured due to venous congestion, and splenectomy was done. During postoperative follow-up, intravenous immune globulin was continued, and platelet count increased slightly (98 000 per µL). Anticoagulation was changed to argatroban with a target activated partial thromboplastin time of 50–70 s. Follow-up CT imaging revealed mild dilatation of the ascending colon without signs of necrosis. As no recanalisation occurred during 3 days of systemic anticoagulation, recanalisation via a transjugular intrahepatic portosystemic shunt was done. Mechanical aspiration revealed massive acute thrombus from the extrahepatic portal vein and the superior and inferior mesenteric veins (figure, C). Control venograms showed recanalisation of the portal venous system with minimal residual thrombi in the superior mesenteric vein (figure D). Results of the modified HIPA test confirmed the diagnosis of VITT. ELISA against platelet factor 4 (PF4)-polyanion was strongly positive (optical density units >1·0 [normal range ≤0·399]). The patient remained critically ill at the time of writing.

VITT, with various clinical sequelae, is an extremely rare complication following vaccination against SARS-CoV-2, especially with vector-based vaccines. The reported frequency of VITT following ChAdOx1 nCov-19 vaccination is approximately ten per million. Pulmonary thromboembolism is a more frequent clinical manifestation of VITT than is visceral thrombosis, but the latter is nonetheless a potentially life-threatening complication. Early diagnosis of VITT is essential to initiate early treatment, as porto-splenic-mesenteric thrombosis can lead to venous congestion of the gut, splenic rupture, and even liver failure.

Declaration of interests

We declare no competing interests.

Contributors

All authors wrote and reviewed the manuscript. OÖ and MW prepared the figures. MW did the interventional procedure and S-SS provided medical intensive care. All authors were involved in the diagnostic process. All authors approved the final version of the manuscript. Written consent has been obtained from the patient's relatives.

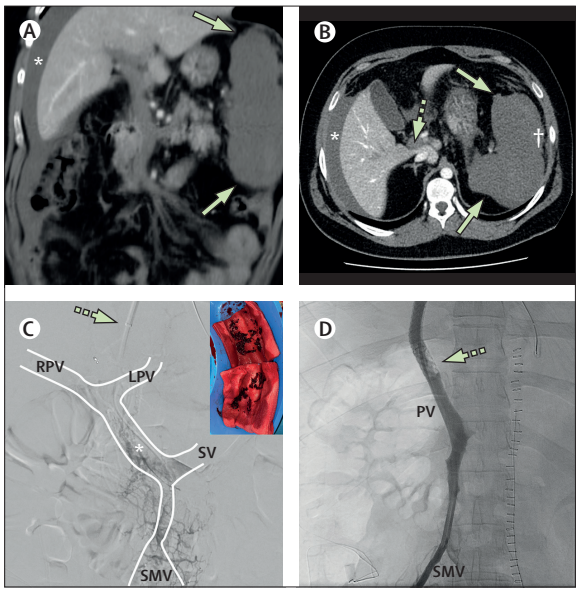

Figure: **Portomesenteric thrombosis following COVID-19 vaccination**
(A) Paracoronal and (B) transverse CT view of extensive acute thrombosis of the portal and superior mesenteric veins, splenic rupture due to venous outflow obstruction (solid arrows), intra-abdominal free fluid (*), and perisplenic haematoma (†). Dotted arrow indicates portal vein thrombosis. (C) An angiogram of the portomesenteric vasculature revealing no contrast filling, consistent with complete thrombosis and early collateral vessel formation. The upper right panel shows fresh thrombus mass after aspiration from the portal vein. Asterisk indicates portal vein thrombosis, dotted arrow indicates transjugular access for placement of transjugular intrahepatic portosystemic shunt. (D) An angiogram after shunt-assisted near-complete recanalisation of the extrahepatic portal and superior mesenteric vein shows regained contrast filling in the portal venous system. PV=portal vein. RPV=right portal vein. LVP=left portal vein. SV=splenic vein. SMV=superior mesenteric vein.