Case of adult large vessel vasculitis after SARS-CoV-2 infection

We read with great interest the article 'Characteristics associated with hospitalisation for COVID-19 in people with rheumatic disease: data from the COVID-19 Global Rheumatology Alliance physician-reported registry' by Gianfrancesco *et al*.[1] This study showed that glucocorticoid exposure of ≥10 mg/day was associated with higher odds of hospitalisation and anti-TNF with a decreased odds of hospitalisation in patients with COVID-19 with rheumatic disease. Like this report, studies on the relationship between COVID-19 and rheumatic diseases are needed. Although several cases of vasculitis, such as large vessel vasculitis (LVV) and Kawasaki disease, have been reported among patients with COVID-19,[2 3] there are no recorded cases of adult LVV developing after severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. We report a case of this development.

A 71-year-old Japanese man was admitted to our hospital with complaints of fever and productive cough for 12 days. He was referred to our hospital after a chest X-ray at a private clinic revealed ground glass opacity (GGO) in bilateral lung fields. He had no history of vasculitis or arteriosclerosis. Two days after admission, PCR was positive for SARS-CoV-2 RNA. He was afebrile, with 95% oxygen saturation in room air. Chest CT revealed multiple bilateral patchy GGO. Blood test results showed white blood cell and C reactive protein (CRP) of 5460/μL and 17.7 mg/dL, respectively. Although respiratory symptoms improved after administering hydroxychloroquine and azithromycin, he had persistent spiking fever and high CRP levels. Contrast-enhanced CT on day 8 showed increased contrast enhancement of the vessel wall, ranging from the abdominal aorta to the bilateral common iliac arteries. Fat stranding and mild lymph node enlargement were visible, representing inflammatory changes (figure 1A). On day 10, CRP and erythrocyte sedimentation rate (ESR) were 10.6 mg/dL and 61 mm/h, respectively. Blood culture results were negative. We suspected LVV, which developed after infection with SARS-CoV-2. Nasal swabs were negative for SARS-CoV-2 RNA on days 10 and 11. On day 16, 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET)CT showed elevated 18F-FDG uptake in the arterial wall where increased contrast enhancement had been observed (figure 1B). An investigation of the cause of inflammation revealed an IgG4 level of 112 mg/dL, negative results for antineutrophil cytoplasmic antibodies and a negative serological result for syphilis. He exhibited no jaw claudication or visual impairment. Based on the findings, we diagnosed LVV associated with COVID-19.[4] Considering the reactivation of SARS-CoV-2 infection, we followed the clinical course without immunosuppressive drugs. By day 24, fever gradually improved with only non-steroidal anti-inflammatory drugs (NSAIDs), and CRP and ESR decreased (0.20 mg/dL and 45 mm/hour, respectively). On day 26, he was discharged with NSAIDs. At outpatient follow-up 46 days after admission, he did not complain of recurrent symptoms, and CRP and ESR were decreased (0.10 mg/dL and 17 mm/hour, respectively). Contrast-enhanced CT revealed no contrast enhancement of the arterial wall, and 18F-FDG PET/CT showed no 18F-FDG uptake in the arterial wall (figure 1C,D). Human leucocyte antigen (HLA) showed HLA-DR4, correlating with giant cell arteritis (GCA).[5] No specific HLA alleles for Takayasu arteritis were detected.

To the best of our knowledge, we report the first case of adult LVV associated with COVID-19. This patient had HLA-DR4, which correlates with GCA.[5] The inflammatory changes seen on CT and 18F-FDG PET/CT improved after 1 month with only NSAIDs. This was not a typical clinical course of GCA. These findings suggest that patients with a predisposition to develop vasculitis may develop LVV due to SARS-CoV-2 infection. Although the pathogenesis of COVID-19 has not yet been elucidated, a previous report described endothelial cell infection and endotheliitis in patients with COVID-19.[6] We theorise that this infection and endotheliitis may have led to vasculitis.[2 3]

In conclusion, our report may lead to an improved understanding of inflammation that can occur due to COVID-19, especially in cases of vasculitis. The association between COVID-19 and LVV requires further investigation.

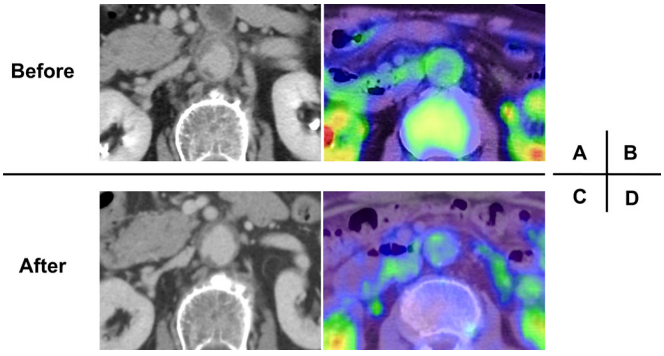

Figure 1 Radiological findings of contrast-enhanced CT and 18F-FDG PET/CT. (A) CT scan with increased contrast enhancement of the aortic wall (day 8). (B) 18F-FDG uptake at the same aortic wall with increased contrast enhancement area (day 16). Mild enlargement of the para-aortic lymph nodes and fat stranding surrounding the aorta are noted, indicating inflammation of the para-aortic region. (C) CT scan with decrease in contrast enhancement of the aortic wall (46 days after admission). (D) Lower 18F-FDG uptake at the same place as that in (B) (46 days after admission). FDG, fuorodeoxyglucose; PET, positron emission tomography.

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