CARDIOVASCULAR FLASHLIGHT

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Microvascular thrombi in recurrent myocardial injury after coronavirus disease 2019 infection

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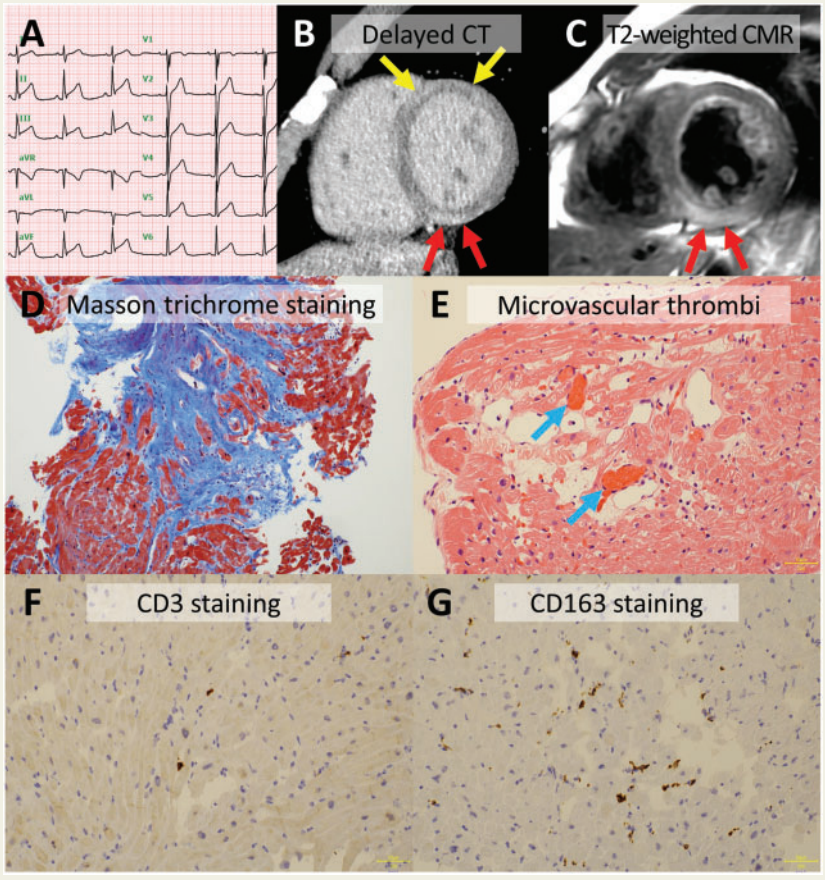

We recently reported on an 18-year-old man who suffered coronavirus disease 2019 (COVID-19)-related myocardial injury occurring 3 months after the initial infection in *European Heart Journal*. Five months after the episode of myocardial injury, he presented to our hospital with sudden dyspnoea at the age of 19 years. He was afebrile and his reverse transcriptase polymerase chain reaction for SARS-CoV-2 returned negative. His cardiac troponin T was raised at 123 ng/L; electrocardiography showed new inferior ST-segment elevation (*Panel A*). Urgent coronary computed tomography (CT) angiography revealed no coronary abnormalities. Ten minutes after the contrast injection, CT demonstrated pre-existing subepicardial hyperenhancement in the left ventricular anterior wall (*Panel B, yellow arrows*) and new hyperenhancement in the inferior wall (*Panel B, red arrows*). These finding were consistent with cardiovascular magnetic resonance imaging (*Panel C* and Supplementary material online, *Video S1*), indicating acute myocarditis. Biopsy specimens of the interventricular septum obtained from the right ventricle revealed focal interstitial fibrosis and cardiomyocyte hypertrophy without inflammatory cell infiltration in the myocardium (*Panel D*). Surprisingly, microthrombi were observed in the myocardial microvessels (*Panel E, arrows*). Immunoshistochemical staining demonstrated few CD3-positive T cells (*Panel F*) and a scattered distribution of CD163-positive macrophages (*Panel G*), both of which were not markedly increased similarly to recent autopsy studies. His symptoms gradually improved within a week after the admission without any treatment.

The pathological findings in this case support the recent autopsy-based hypothesis that microvascular thrombi play a pivotal role in myocardial injury after COVID-19 infection. Our case highlights the importance of long-term follow-up and histological evaluation in patients with COVID-19-related myocardial injury.

Supplementary material is available at *European Heart Journal* online.

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