

## CARDIOVASCULAR FLASHLIGHT

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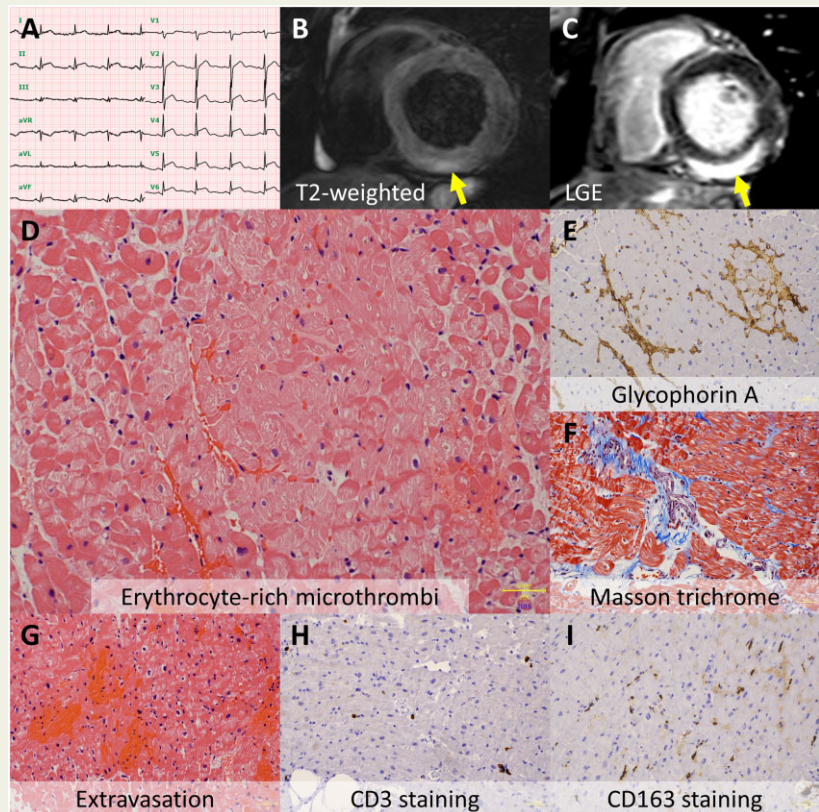
## Myocardial microthrombi after COVID-19 mRNA vaccination

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A 37-year-old man was admitted to the emergency room with acute chest pain 19 days after his first dose of mRNA-1273 SARS-CoV-2 vaccination (Moderna). He was afebrile and his Abbott ID NOW COVID-19 point-of-care test returned negative. Electrocardiography showed diffuse ST-segment elevation (Panel A); echocardiography showed subtle wall motion abnormality in the left ventricle; and his troponin T, creatinine kinase, and C-reactive protein levels were raised at 1660 ng/L, 1200 U/L, and 5.76 mg/dL, respectively. Urgent coronary angiography revealed no coronary abnormalities. Cardiovascular magnetic resonance demonstrated T2-weighted hyperintense (Panel B, arrow) and gadolinium-delayed hyperenhancement (Panel C, arrow; [Supplementary material online, Videos S1 and S2](#)) in the subepicardial myocardium of the left ventricle, indicating acute myocarditis. Right ventricular endomyocardial biopsy revealed that erythrocyte-rich microthrombi occluded capillary vessels (Panels D and E) accompanied by extravasation of erythrocytes without inflammatory cell infiltration in the myocardium (Panels F–I), thereby precluding the pathological diagnosis of myocarditis. The levels of D-dimer and haptoglobin were within the normal range. Serological testing ruled out systemic virus infections. He was discharged without any complications on Day 7 and had no symptoms after discharge. Although myocardial injury has been described as a rare adverse reaction of SARS-CoV-2 vaccination, caution should be exercised in individuals presenting with chest pain after the vaccination. The underlying mechanisms of COVID-19 vaccine-related myocardial injury remain to be elucidated; myocardial microthrombi without inflammatory cell infiltration may be proposed as a possible explanation. Our case highlights that histological examination is important to clarify the mechanism of COVID-19 vaccine-related myocardial injury.



[Supplementary material](#) is available at *European Heart Journal* online.

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**Conflict of interest:** The authors have submitted their declaration which can be found in the article [Supplementary Material online](#).

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