

Every rose has its thorns — acute myocarditis following COVID-19 vaccination

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A 21-year-old man was admitted to the hospital with severe chest pain. Apart from atopic asthma in childhood, pollen and pet allergy, and appendectomy a few years ago, his past medical history was unremarkable, and he did not have a symptomatic COVID-19 infection in the past. He worked physically as a warehouse worker and trained regularly Brazilian Jiu-Jitsu without any health problems. The family history was negative for cardiovascular disease.

Three days before hospitalization, the patient received the first dose of mRNA COVID-19 vaccination (Comirnaty, Pfizer). Apart from mild muscle pain at the site of vaccine administration, he did not experience any other symptoms during the first two days. On admission day, he woke up at night due to a tight and squeezing sensation in his chest, which he rated as 8 points in the 0–10 Numeric Rating Scale used to estimate the intensity of pain. The chest discomfort lasted about 3 hours despite taking a painkiller; it resolved spontaneously and did not return later.

On admission to the hospital, the patient was hemodynamically stable. Electrocardiography showed sinus rhythm at a heart rate of 50 beats per minute, an incomplete right bundle branch block, Q wave and ST-segment elevation less than 1 mm in leads II, III and aVF, negative T-wave in lead V1 and patterns of precordial early repolarization (Figure 1A). Blood tests demonstrated elevated levels of high-sensitive cardiac troponin I (6490–6559 pg/ml; reference range <34 pg/ml), N-terminal fragment of the prohormone brain natriuretic peptide (337 pg/ml; reference range <125 pg/ml), and C-reactive protein (82 mg/l; reference range <5 mg/l).

Echocardiography demonstrated a normal-sized, non-hypertrophic left ventricle with normal ejection fraction (biplane, 58%) and

borderline global longitudinal deformation (–16.3%) with a regional heterogeneity (Figure 1B). Coronary computed tomography angiography demonstrated normal coronary arteries (Figure 1C). Cardiac magnetic resonance revealed imaging findings typical of active myocarditis [1], including increased signal intensity on T2-weighted images, increased values on both T1 and T2 mapping (Figure 1D), and the presence of diffuse subepicardial late gadolinium enhancement (Figure 1E–F). During further laboratory workup, viral causes of myocarditis were excluded, i.e. COVID-19, influenza type A and B, hepatitis type B and C, Epstein–Barr-, human immunodeficiency- and cytomegalovirus infections. The vaccine-associated acute myocarditis was diagnosed.

Acute myocarditis following vaccination is a rare but serious complication, which has until now been recognized as associated almost exclusively with smallpox and influenza immunization [2]. Myocarditis in the course of COVID-19 infection was previously described [3, 4]; however, only recently have the first cases of acute myocarditis following administration of the mRNA-based anti-COVID-19 vaccines (Pfizer-BioNTech and Moderna) been reported [2, 5]. This complication typically occurs in young adult males within 4 days after administration of the second dose of the COVID-19 vaccine [2, 5]. Acute myocarditis diagnosed shortly after the first dose of mRNA vaccine, as in our case, is unusual and appears mainly in COVID-19 convalescents [5]. Longer follow-up is needed to assess the further course of the disease. Comprehensive imaging is helpful in establishing the diagnosis of myocarditis and should be included in the diagnostic workup in patients suspected of having myocardial complications of COVID-19 infection or COVID-19 vaccination.

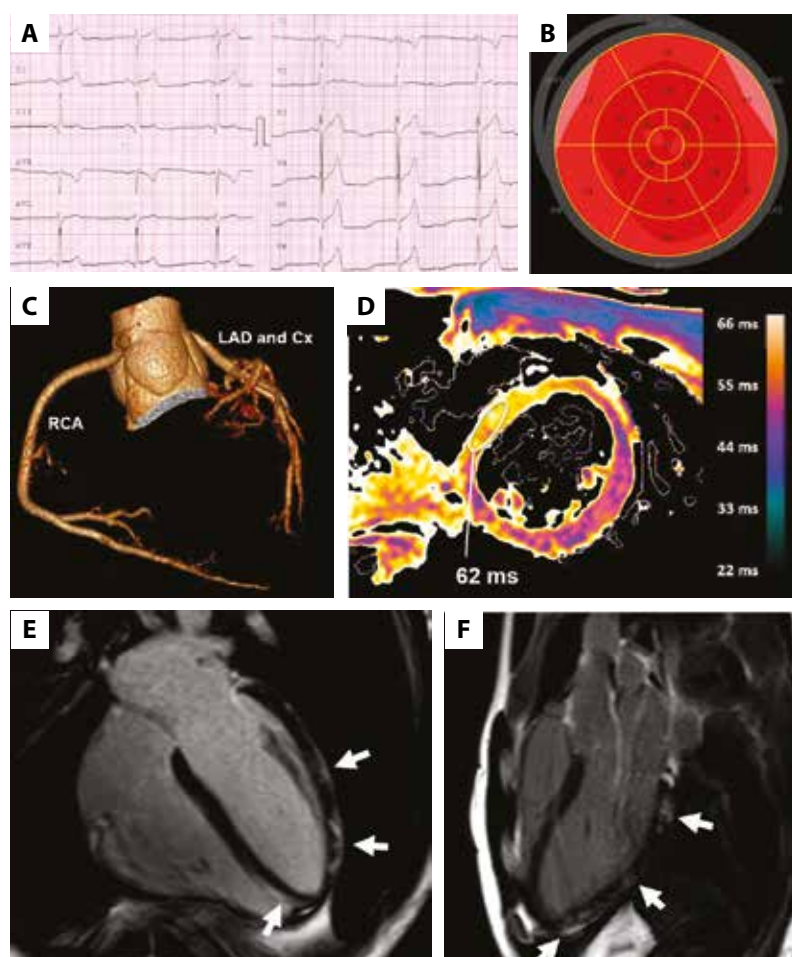


Figure 1. **A.** 12-lead electrocardiogram on admission showing sinus rhythm, normal axis, an incomplete right bundle branch block, Q wave and ST-segment elevation less than 1 mm in leads II, III and aVF, negative T-wave in lead V1 and patterns of precordial early repolarization. **B.** Speckle tracking echocardiography demonstrated a borderline global longitudinal strain (-16.3 %) with a regional heterogeneity (abnormal values in the basal inferior, anterior and septal segments). **C.** Coronary computed tomography angiography visualized normal coronary arteries with the strongly dominant right coronary artery. **D–F.** Cardiac magnetic resonance imaging demonstrating typical findings of active myocarditis. **D.** T2 mapping confirming global myocardial edema, short-axis view. **E–F.** Diffuse subepicardial late gadolinium enhancement (arrows), 4- and 3-chamber view

Abbreviations: Cx, circumflex artery; LAD, left anterior descending artery; RCA, right coronary artery

Article information

Conflict of interest: None declared.

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