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# Myopericarditis and Pulmonary Thrombosis after Administration of the BNT162b2 Vaccine against COVID-19 in a Carrier of Familial Mediterranean fever

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## Abstract

Based on the current interest in the complications associated with vaccination against COVID-19, we present this case report of great interest that shows a carrier of familial Mediterranean fever who suffered myopericarditis and pulmonary thrombosis after administration of the BNT162b2 vaccine against COVID-19.

Certain autoimmune disorders may be triggered by COVID-19 vaccination in genetically susceptible persons. A 40-year-old woman had a history of deep vein thrombosis in 2006 coinciding with taking oral contraceptives, and a daughter with familial Mediterranean fever. In January 2021, as part of the COVID-19 vaccination program, she received her first dose of the BNT162b2 vaccination. Thirteen hours after the second dose she presented at the hospital with oppressive chest pain and fever and after several tests, including a cardiac MRI, she was diagnosed of myopericarditis and pulmonary thrombosis. The patient was heterozygous for the c.1772T>CM variant of gene MEFV.

Steroids and immunoglobulins were started, plus rivaroxaban, ivabradine and colchicine, resulting in slow improvement of the symptoms.

Cases have been reported of myocarditis and pericarditis after vaccination with live virus, like smallpox or flu, and more recently with SARS Cov-2 vaccination. Thrombotic events associated with COVID-19 vaccines are currently being carefully studied by the pharmacovigilance systems. The temporal association with vaccination, the serological pattern of immunization, plus the exclusion of other causes must be thoroughly evaluated.

The greater frequency of cases of myocarditis and pericarditis after RNA vaccination in Israel compared to other geographical areas may be related with ethnic and genetic differences. Indeed, the incidence of familial Mediterranean fever is greater in Israel, Armenia, Turkey and other Mediterranean countries. Further study of this would be interesting.

**Keywords:** Myopericarditis • COVID-19 • Familial Mediterranean Fever • Pulmonary thrombosis • Vaccination

## Case Report

Certain autoimmune disorders may be triggered by COVID-19 vaccination in genetically susceptible persons [1,2].

A 40-year-old woman had a history of deep vein thrombosis in 2006 coinciding with taking oral contraceptives, and a daughter with familial Mediterranean fever. In September 2020 her husband had COVID-19, but all PCR and serological tests in the patient were negative. In January 2021, as part of the COVID-19 vaccination program, she received her first dose of the BNT162b2 vaccination. Thirteen hours after the second dose she presented oppressive chest pain, tachycardia 160 bpm, fever 38.7º C, headache, vomiting and myalgia. On arrival at the emergency department her blood pressure was 162/89, with 126 bpm, baseline $O_2$ sat: 99, 90% on walking. An electrocardiogram showed sinus tachycardia 120 bpm, generalized decrease in the PR, ST segment depression in v4-v6, and right axis deviation. Notable in the laboratory tests were CRP 63.9, K 3.33, leukopenia 3190, lymphopenia 750, D-dimer 834. Troponin 3.6, SARS-Cov 2 PCR negative. The echocardiogram showed a hyperechoic pericardium with no pericardial effusion.

Cardiac magnetic resonance (Figure 1) showed delayed mesocardial enhancement at the midapex septum, with an ejection fraction of 54%, compatible with myocarditis.

ANA, antiPF4 and antiphospholipid antibodies were all negative, troponins and proBNP within normal ranges, parvovirus IgG+, EBV IgG+. SARS-Cov-2 S protein (Spike) IgM+ and IgG+. SARS-Cov-2 N protein (Nucleocapside) IgM-, IgG-, serological pattern of immunization. Infection was discarded.

Ventilation/perfusion scintigraphy showed irregular uptake in both parenchymas, with an area of lower perfusion intensity affecting the apical segment of the upper right lobe. Doppler ultrasound of the legs showed no interesting findings and cardiac SPECT no perfusion defects.

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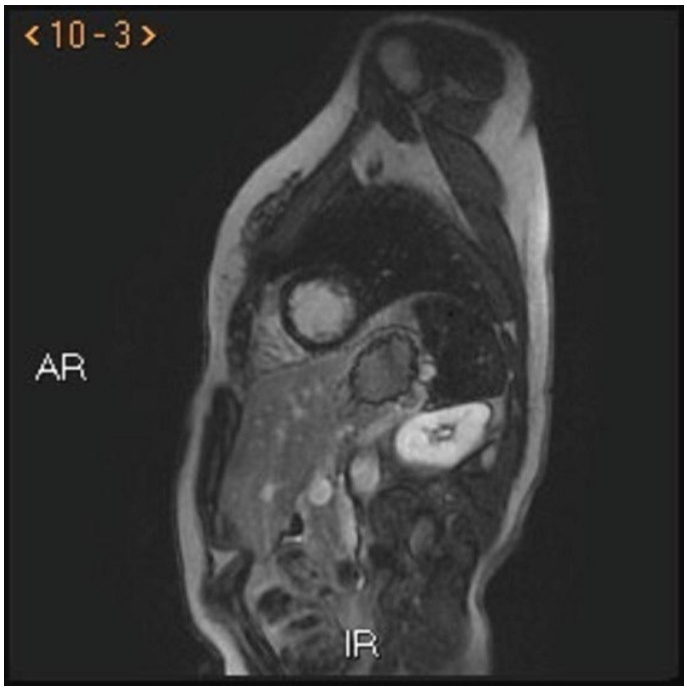


**Figure 1.** Cardiac magnetic resonance.

Steroids and immunoglobulins were started, plus rivaroxaban, ivabradine and colchicine, resulting in slow improvement of the symptoms.

The patient was heterozygous for the c.1772T>CM variant of gene MEFV.

## Discussion

Cases have been reported of myocarditis and pericarditis after vaccination with live virus, like smallpox or flu, and more recently with SARS Cov-2 vaccination [1-5]. Thrombotic events associated with COVID-19 vaccines are currently being carefully studied by the pharmacovigilance systems [6,7]. The temporal association with vaccination, the serological pattern of immunization, plus the exclusion of other causes must be thoroughly evaluated.

The greater frequency of cases of myocarditis and pericarditis after RNA vaccination in Israel compared to other geographical areas may be related with ethnic and genetic differences. Indeed, the incidence of familial Mediterranean fever is greater in Israel, Armenia, Turkey and other Mediterranean countries. Further study of this would be interesting.

Immune thrombosis, direct interaction between platelet-activated leukocytes and plasma coagulation factors in the innate immune response may contribute to the thrombotic events seen in COVID-19 patients [8]. The neutrophil extracellular traps that trigger immune thrombosis could be therapeutic targets. The histological and pathological findings in COVID 19 suggest a complement-mediated endotheliopathy where the deposition of C3 and C5 fragments in the target cells is the common denominator between endothelial dysfunction and microvascular thrombosis [9]. Complement activation accompanied by the production of C5a anaphylatoxin acts as an inducer of chemotaxis. Additionally, deficiency of the C5a inhibitor is associated with familiar Mediterranean fever.

Colchicine is an alkaloid lipophilic drug with anti-inflammatory and anti-fibrotic properties. Its mechanism of action centers on disruption of the microtubular system, inhibition of adhesion and recruitment of neutrophils, and inhibition of complement activity and the inflammasome. Various clinical trials have shown that colchicine in patients with COVID-19 reduces the D-dimer and CRP figures, improves symptoms and reduces mortality [10].

The use of aspirin as an anti-platelet aggregator and colchicine as an inhibitor of neutrophil chemotaxis and complement could explain the reperfusion of the pulmonary thrombosis in our patient in the absence anticoagulation therapy.

## Conclusion

In conclusion, the interaction of platelet-activated leukocytes in immune thrombosis suggests a possible therapeutic target deserving study.

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