Case Report

Symptomatic Acute Myopericarditis after Pfizer Vaccine against COVID-19

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Introduction

Cases of myocarditis and pericarditis have been reported in diverse parts of the world since vaccination against the new coronavirus began with messenger RNA (mRNA) vaccines, mainly those produced by Pfizer-BioNTech.[1] The pathophysiology of this vaccine-induced pathology is not yet fully understood, but it may be related to the active component of the vaccine (the mRNA sequence that encodes the SARS-CoV-2 spike protein) or to the immune system response that is triggered after vaccination[2]. What is known so far is that it is a rare adverse event in view of the number of people who have already been immunized with these components, and the vast majority of cases reported in the literature have a benign course, with good evolution.[1-10] We report a case of myopericarditis in a young adult who presented symptoms 2 days after receiving the second dose of the Pfizer vaccine against COVID-19.

Case Report

JASD, a male, 18-year-old patient, with a history of leukemia treated in childhood, developed intense chest pain, radiating to the left upper limb, as well as back pain, 2 days after receiving the second dose of the Pfizer vaccine against COVID-19. Upon hospitalization for investigation in his hometown, his electrocardiogram showed ST-segment elevation in the inferolateral wall, and there were changes in troponin I levels (6.33; reference value: 0 to 0.5) and CK-MB mass (98.4; reference value: 0 to 7.0). Cardiac magnetic resonance imaging was performed, demonstrating the presence of late enhancement (edema/necrosis), with non-coronary and mesoepicardial enhancement in the entire lateral wall, as well as in the apical portion of the inferior, septal, and apex walls of the left ventricle, suggestive of myocarditis. Additionally, areas of edema and delayed enhancement were observed over the posterior pericardium, although there was no pericardial thickening. After 48 hours of hospitalization, the patient presented a new worsening of chest pain, tachycardia, and an increase in myocardial necrosis markers, leading to the decision to perform resonance imaging again for therapeutic definition. The second examination demonstrated the appearance of new areas of late enhancement, in the middle and basal portions of the inferior and inferoseptal walls, as well as an increase in the segments with hypersignal with myocardial edema, indicating extension of the areas of myocardial necrosis resulting from clearly active myocarditis (Figures 1 and 2). The decision was made to initiate pulse therapy with 1 g of methylprednisolone daily and to transfer the patient to the cardiological intensive care unit of a tertiary hospital, due to the risk of progression to fulminant myocarditis. In this unit, the previously initiated therapeutic regimen (enalapril, bisoprolol, colchicine, and methylprednisolone) was maintained. Troponin I measured on admission to this hospital was significantly altered (416.5; reference value in this hospital: less than 19.8), and there was a slight change in the inflammatory marker (C-reactive protein: 7.9; reference value: less than 5.0). Electrocardiogram showed changes in ventricular repolarization in the inferior wall and slow progression of the R wave, as well as ST-segment elevation in the anterior wall. The transthoracic echocardiogram was normal. The patient had transient episodes of pulmonary congestion, bradycardia, and elevated lactate levels, but all of these were easy to manage and resolve. He did not have any new episodes of chest pain after admission to this hospital, and he evolved with a drop in C-reactive protein and troponin I. After completing pulse therapy with corticosteroids for a 3-day period, resonance imaging was repeated to reassess the extent of injury, which showed improvement in relation to the last exam that had been performed in his hometown. The patient evolved with clinical stability and significant improvement. He was discharged after 6 days, with a prescription for bisoprolol, enalapril, spironolactone, and colchicine. He was further instructed to avoid physical exertion for a minimum period of 6 months, to undergo outpatient Holter, and to return early to the assistant cardiologist in his hometown.

Keywords

Myocarditis; Pericarditis; COVID-19 Vaccines

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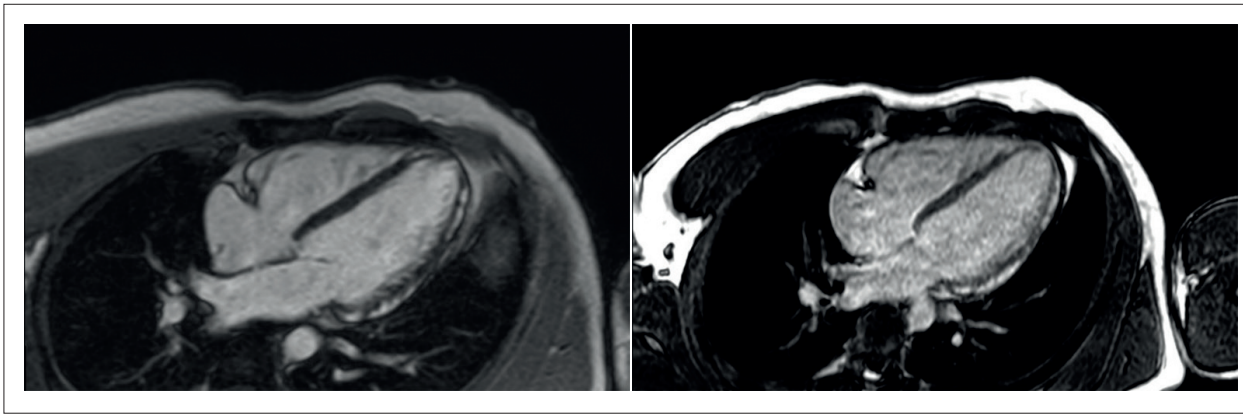

Figure 1 – *Cardiac magnetic resonance imaging showing late enhancement. Image 1: first exam; image 2: exam performed 48 hours later.*

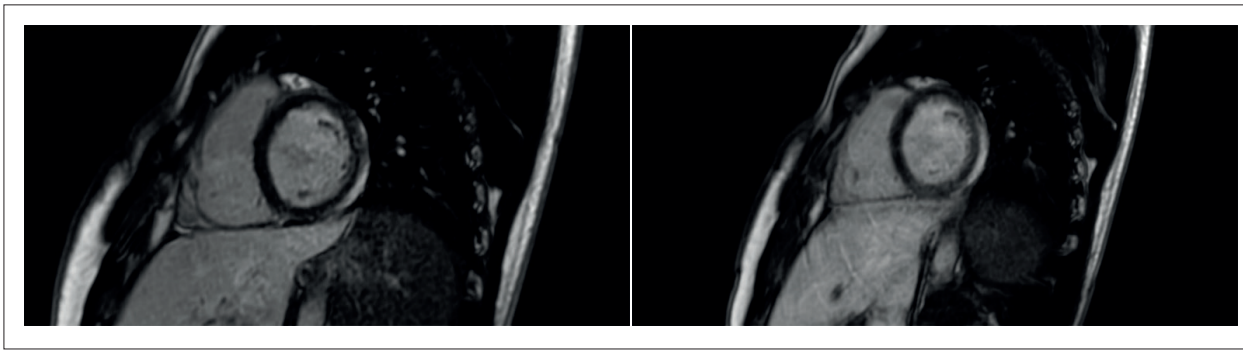

Figure 2 – *Cardiac magnetic resonance imaging showing late enhancement. Image 1: first exam; image 2: exam performed 48 hours later.*

Discussion

Repeated case descriptions seem to suggest a new adverse event associated with mRNA vaccines, namely, post-vaccination myocarditis and pericarditis, which had not been observed in the initial studies published by the pharmaceutical company in December 2020.11 The occurrence seems to be more common in young male adults. In the initial clinical trials of mRNA vaccines, systemic adverse reactions were also observed more frequently in this population, probably due to increased immunogenicity.[9,11] A systematic review that evaluated cardiac complications in this scenario, including 43 case reports and 26 series, identified that myocarditis/myopericarditis and pericarditis were the most common adverse events among the 243 complications reported, and they were observed more after the Pfizer mRNA vaccine.[1] The majority of patients are previously healthy, and the symptoms are typical of myocarditis and pericarditis due to other causes, with chest pain being the most reported symptom, followed by fever. They generally start within a week of the second dose of the vaccine. Electrocardiographic changes (such as ST-segment changes) are present in the vast majority of cases, as are increased troponin and increased inflammatory markers (such as C-reactive protein and erythrocyte sedimentation rate). The type of troponin used has been heterogeneous among the studies. A transthoracic echocardiogram with a normal result was common in several reports, but there were always changes on cardiac resonance imaging (in most cases, late enhancement with gadolinium, indicating myocardial necrosis/fibrosis). Before concluding diagnosis of post-vaccination myocarditis, the vast majority of patients underwent other exams to rule out other etiologies, including infection caused by the novel coronavirus. The most common situation is that patients present a mild condition with rapid recovery and short length of hospital stay.[1-10] As pharmacological treatment, they receive doses of non-steroidal anti-inflammatory drugs, colchicine, and corticosteroids. Some patients require intravenous immunoglobulin, acetylsalicylic acid, beta-blockers, and angiotensin-converting enzyme inhibitors due to left ventricular systolic dysfunction.[1,8] Most of the clinical information available on myocarditis after mRNA vaccination has been published in the form of case reports and series, making further studies necessary in order to establish these patients' long-term prognosis.

Conclusion

Although reports of myocarditis and pericarditis related to mRNA vaccines are becoming increasingly frequent in the literature, they are still considered rare in view of the number of individuals who are receiving these vaccines. Furthermore, the majority of cases have had a quick recovery, with good clinical evolution. Therefore, in spite of the real possibility of post-vaccination myocarditis, it is

still recommended to maintain the immunization schedule as a strategy to face the pandemic, seeing that the benefits of vaccination continue to outweigh the risks.

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Author Contributions

Conception and design of the study, data acquisition, manuscript drafting: Giublin IT; critical revision for important intellectual content: Hartmann C, Moura LAZ; supervision as principal investigator: Mangili OC, Shiozaki AA, Moura LAZ.

Potential Conflicts of Interest

The authors declare no relevant conflicts of interest.

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Academic Affiliation

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Ethical Approval and Informed Consent

This article does not contain human or animal studies conducted by any of the authors.

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