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Case Report

Takotsubo syndrome after receiving the COVID-19 vaccine

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ABSTRACT

The coronavirus disease (COVID)-19 pandemic has affected millions worldwide with prevention efforts culminating in the development of a vaccine. An mRNA vaccine, developed by Moderna (Cambridge, MA, USA), mounts an immunologic response leading to antibody neutralization. Commonly reported vaccine side effects include myalgia, fever, and chills, with low reported rates of cardiovascular events. This case demonstrates the development of takotsubo syndrome (TTS) after administration of the COVID-19 vaccine. A 73-year-old woman with recently diagnosed myocardial infarction with no obstructive coronary atherosclerosis (MINOCA) presented with typical chest pain starting less than a day after receiving the Moderna vaccine. She had troponin elevations and new ST-segment abnormalities. Transthoracic echocardiogram (TTE) findings were consistent with mid-ventricular TTS. Treatment included diuretics, beta-blockers, and angiotensin receptor blockers. Prior to discharge, repeat imaging showed improvement in systolic function. This case presents a post-menopausal woman with a recent diagnosis of MINOCA who developed TTS shortly after receiving the COVID-19 vaccine. Risk factors including sex, age, MINOCA, anxiety about the vaccine, and possibly the vaccine itself may have all contributed to the TTS presentation. TTS may occur after COVID-19 vaccination, and appreciation of this potential rare association is important for evaluating vaccine safety and optimizing patient outcomes.

<Learning objective: Takotsubo syndrome (TTS) has been associated with multiple predisposing factors. We present a case of TTS which developed shortly after receipt of an mRNA COVID-19 vaccine. We discuss contributing factors, diagnosis, and treatment of TTS.>

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Introduction

The coronavirus (COVID)-19 pandemic caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has negatively affected millions worldwide. To combat the COVID-19 impact, an mRNA vaccine developed by Moderna (Cambridge, MA, USA) mounts an immunologic response which significantly reduces clinical infection rates. Moderna's commonly reported vaccine side effects include muscle pain, fatigue, and headache, with low reported rates of cardiovascular side effects [1]. This case describes the occurrence of takotsubo syndrome (TTS) shortly after receiving the Moderna vaccine in a patient with a prior diagnosis of myocardial infarction with no obstructive coronary atherosclerosis (MINOCA).

Case Report

A 73-year-old woman with history of hypertension and chronic kidney disease presented to our hospital with non-radiating, pressure-like dull chest pain with activity and at rest. Initial eval-

uation included mild troponin T elevation at 0.1 ng/mL (normal ≤ 0.03 ng/mL) and sinus rhythm without abnormalities on electrocardiogram. Transthoracic echocardiogram (TTE) demonstrated normal left ventricle (LV) wall motion and ejection fraction (EF) of 65%. Coronary angiogram revealed normal coronary arteries, leading to a diagnosis of MINOCA (Fig. 1). She was discharged home on isosorbide mononitrate and atorvastatin with plan for medical management of suspected coronary vasospasm or microvascular dysfunction. Coronary functional testing or provocative testing to evaluate coronary vasospasm was not performed.

Additional relevant past medical history included rheumatoid arthritis controlled on hydroxychloroquine, acid reflux, asthma, presumed viral pericarditis in 2018 without residual symptoms, and hepatocellular carcinoma with resection in 2017. Other home medications included furosemide, losartan, aspirin, and diltiazem.

She did well until about two months later. At that time, she received the Moderna COVID-19 vaccine and noted acute onset of chest pressure with radiation to the back associated with shortness of breath about 17 h after vaccination. She also had progressive dyspnea on exertion, orthopnea, nausea, vomiting, and fatigue over the next two days. She reported anxiety prior to getting the vaccine. On presentation to the emergency room, vital signs demon-

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