



Contents lists available at ScienceDirect

# Cardiovascular Revascularization Medicine



## Review

# Temporal Association Between the COVID-19 Ad26.COV2.S Vaccine and Acute Myocarditis: A Case Report and Literature Review

Imran Sulemankhil<sup>a</sup>, Mohammad Abdelrahman<sup>b</sup>, Smita I. Negi<sup>b,\*</sup>

<sup>a</sup> Department of Internal Medicine, The Jewish Hospital, 4777 East Galbraith Rd, Cincinnati, OH 45236, United States of America

<sup>b</sup> Department of Cardiology, Summa Health, 141 N. Forge St., Akron, OH 44304, United States of America

## ARTICLE INFO

### Article history:

Received 12 July 2021

Received in revised form 5 August 2021

Accepted 9 August 2021

### Keywords:

COVID-19

Myocarditis

Vaccine

## ABSTRACT

With the recent approval and widespread administration of the Pfizer-BioNTech, Moderna, and Janssen vaccines worldwide, incidence of severe Coronavirus Disease 2019 (COVID-19) infection has significantly decreased. In spite of their undisputed role in reducing the severity of the disease and reduction of the disease burden in the community, there have been case reports of serious side effects with these vaccines. We aim to describe a case report of myocarditis following administration of the Janssen vaccine in a healthy, young male and review the available literature on COVID-19 vaccine related myocarditis and its possible pathogenesis. This case and literature review notes a temporal association between COVID-19 vaccination and myocarditis. Despite these observations, the benefits of the vaccines far outweigh the risks of possible myocarditis.

© 2021 Elsevier Inc. All rights reserved.

## Contents

1. Introduction . . . . .	117
2. Methods . . . . .	120
3. Results . . . . .	120
4. Discussion . . . . .	120
5. Conclusion . . . . .	122
Declaration of competing interest . . . . .	122
Acknowledgments . . . . .	122
Sources of funding . . . . .	122
References . . . . .	122

## 1. Introduction

Severe acute respiratory syndrome coronavirus (SARS-COV)-2 infection and the consequent disease, Coronavirus Disease 2019 (COVID-19) have led to a global pandemic resulting in over 3.97 million deaths at the time of publication [1]. To mitigate transmissibility, three novel vaccines have been granted emergency use authorization (EUA) in the United States. Widespread use of these vaccines has resulted in a precipitous decline in COVID-19-associated hospitalizations and mortality. The two-dose mRNA based COVID-19 vaccines, BNT162b2 mRNA

(Pfizer-BioNTech, New York NY) and the mRNA-1273 (Moderna, Cambridge MA), have been widely used globally and granted provisional FDA approval in the United States on December 2020 resulting in 180 million and 134 million vaccinations to date, respectively. The single-dose Janssen Ad26.COV2.S (Johnson and Johnson, New Brunswick NJ) COVID-19 vaccine, a recombinant, replication-incompetent human adenovirus type 26 vector, was authorized for use in the United States on February 27, 2021 and has been administered to more than eight million patients to date [2]. Through either mRNA or a viral vector, these vaccines lead to expression of the SARS-CoV-2 spike (S) antigen without virus propagation. An immune response elicited to the S antigen protects against COVID-19 [3]. Although adverse effects due to these vaccines are commonly limited to mild and transient symptoms, there have been reports of myocarditis associated with the BNT162b2 mRNA and the mRNA-1273 vaccines (Table 1). In

\* Corresponding author at: 95 Arch Street, Suite 300, Akron, OH 44304, United States of America.

E-mail address: [smitanegi2007@gmail.com](mailto:smitanegi2007@gmail.com) (S.I. Negi).