



## Short communication

# A case series of acute pericarditis following COVID-19 vaccination in the context of recent reports from Europe and the United States



George Lazaros<sup>a,\*</sup>, Cleo Anastassopoulou<sup>b,1</sup>, Sophia Hatziantoniou<sup>c</sup>, Theodoros Kalos<sup>a</sup>, Stergios Soulaïdopoulos<sup>a</sup>, Emilia Lazarou<sup>a</sup>, Charalambos Vlachopoulos<sup>a</sup>, Dimitrios Vassilopoulos<sup>d</sup>, Athanasios Tsakris<sup>b</sup>, Costas Tsioufis<sup>a</sup>

<sup>a</sup> First Cardiology Department, School of Medicine, Hippokration General Hospital, National and Kapodistrian University of Athens, Athens, Greece

<sup>b</sup> Department of Microbiology, Medical School, National and Kapodistrian University of Athens, Athens, Greece

<sup>c</sup> Laboratory of Pharmaceutical Technology, Department of Pharmacy, School of Health Sciences, University of Patras, Patras, Greece

<sup>d</sup> Second Department of Medicine and Laboratory, Clinical Immunology-Rheumatology Unit, School of Medicine, Hippokration General Hospital, National and Kapodistrian University of Athens, Athens, Greece

## ARTICLE INFO

## Article history:

Received 9 July 2021

Received in revised form 29 September 2021

Accepted 30 September 2021

Available online 5 October 2021

## Keywords:

COVID-19 vaccination

Pericarditis

mRNA vaccines

Adenovirus vector-based vaccines

SARS-CoV-2, outcome

## ABSTRACT

**Background:** COVID-19 vaccines were efficacious and safe in clinical trials. We report nine events of acute pericarditis (AP) in eight patients following COVID-19 vaccination with BNT162b2 (6/9), AZD1222 (2/9) and mRNA-1273 (1/9).

**Methods:** All patients were referred for AP temporally linked with COVID-19 vaccination. Chest pain was the most common clinical manifestation. Alternative etiologies were excluded upon thorough diagnostic work up. AP diagnosis was established according to ESC guidelines.

**Findings:** Five events occurred after the first vaccine dose and four after the second. The mean age in this cohort was  $65.8 \pm 10.2$  years and the men/women ratio 3/5. All events resolved without sequelae; two events were complicated by cardiac tamponade requiring emergent pericardial decompression. Hospitalization was required in four cases.

**Interpretation:** Although causality cannot be firmly established, AP has emerged as a possible complication following COVID-19 vaccination. Further investigation is indispensable to fully characterize this new entity.

© 2021 Elsevier Ltd. All rights reserved.

## 1. Introduction

### 1.1. Background

Acute pericarditis (AP) is the most common form of inflammatory heart disease with an estimated annual incidence of approximately 28 cases/100,000 subjects in the Western world [1]. The most common underlying etiology is a definite or presumed viral infection. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged as a novel etiologic agent of a variety of pericardial syndromes, including AP.

In the absence of an efficacious therapeutic against SARS-CoV-2, mass vaccination currently represents the exclusive means to control the outbreak. Several highly effective vaccines at preventing

coronavirus disease 2019 (COVID-19) hospitalizations and deaths and potentially reducing SARS-CoV-2 transmission, became available and were granted emergency use authorization in record time. A number of rare vaccine-related complications have been reported. In this case series, we describe AP as a possible complication of COVID-19 vaccination, focusing on the time interval between vaccination and symptoms onset, clinical manifestations, peculiar features and short-term outcomes.

### 1.2. National COVID-19 vaccination scheme

The mass vaccination program started in Greece on the 27th of December 2020. By June 21, 2021, over 7.1 million subjects had received at least one vaccine dose, with ~3.1 million (30.5% of the population) having completed the recommended scheme [2,3]. Available vaccines during the observation period (December 27, 2020 to June 21, 2021) included Pfizer-BioNTech's BNT162b2 (Tozinameran, Comirnaty, 5,145,028 administered doses) and

\* Corresponding author.

E-mail address: [glaz35@hotmail.com](mailto:glaz35@hotmail.com) (G. Lazaros).

<sup>1</sup> The first two authors contributed equally to this work.