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## RESEARCH ARTICLE

# UNCOMMON LINK OF ACUTE MYOCARDITIS POST-COVID 19 VACCINE (BNT162b2 mRNA)

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**ABSTRACT**

This case report describes a case of acute myocarditis post-vaccination. Patient who received the Covid 19 vaccine. There is evidence in the literature linking vaccines to different auto-immune manifestations. Of late, autoimmune manifestations that appear to be caused by an external adjuvant have been grouped into a complex syndrome referred to as autoimmune/inflammatory syndrome induced by adjuvants (ASIA). He presented to hospital with chest pain, fever and weakness after 4 days from vaccination. Laboratory investigations showed elevated creatine kinase and troponin-I, and extensive cardiac investigations yielded a diagnosis of myocarditis. Adjuvants are elements that induce an inflammatory response. In the case of vaccines, adjuvants increase the antigen-specific immune response, to ultimately improve vaccine immunogenicity. The incidence of myocarditis post vaccination is rare Given the benefits of the vaccine and the rarity of this complication, we do not discourage its routine usage when clinically indicated. However, ongoing surveillance is required to evaluate the occurrence of rare adverse events.



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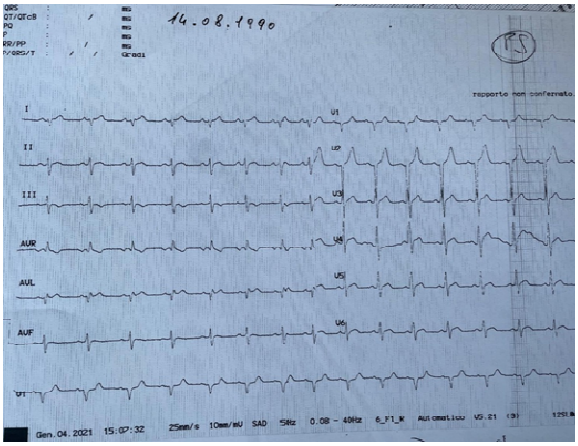
# INTRODUCTION

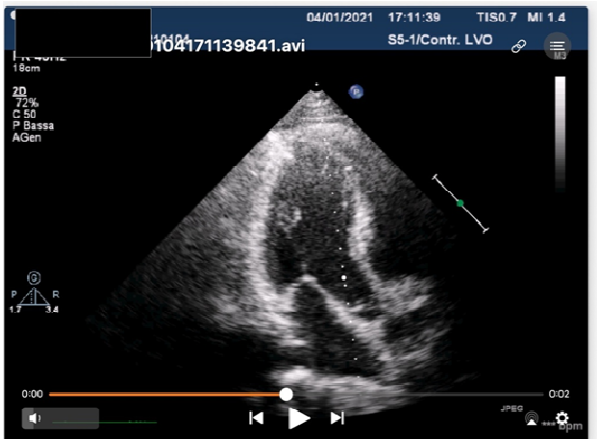
Myocarditis is an inflammation of the heart muscle. Myocarditis can affect your heart muscle and your heart's electrical system, reducing your heart's ability to pump and causing rapid or abnormal heart rhythms. A viral infection usually causes myocarditis, but it can result from a reaction to a drug or be part of a more general inflammatory condition. Signs and symptoms include chest pain, fatigue, shortness of breath, and arrhythmias. Treatment for myocarditis depends on the cause. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and the resulting coronavirus disease 2019 (Covid-19) have afflicted tens of millions of people in a worldwide pandemic. Safe and effective vaccines are needed urgently. A two-dose regimen of BNT162b2 conferred 95% protection against Covid-19 in persons 16 years of age or older. Safety over a median of 2 months was similar to that of other viral vaccines.

**Case Report**

We present a case of acute myocarditis post-vaccination. A 31 year old man, by profession an nurse, presented to hospital with chest pain, fever and chills of cold. 4 days before admission, he had received the vaccine BNT162b2 a lipid nanoparticle– formulated, nucleoside-modified RNA (modRNA) encoding the SARS-CoV-2 full-length spike, modified by two proline mutations. 30-µg doses of BNT162b2 elicited high SARS-CoV-2 neutralizing antibody titers and robust antigen- specific CD8+ and Th1-type CD4+ T-cell responses. The patient, was hemodynamicallystable, normotensive (130/90 mmHg) with shortness of breath and fever (TC 38,3°C). On physical exam his vitals were: P 110, RR 21 and O2 saturation was 92 % on oxygen (2l/ min). The rest of the examination was unremarkable. His blood counts were WBC 1,330 ×99/L, hemoglobin 17g/L (MCV 86 fL) and platelets 216×109/L. Electrolytes included sodium 140 mmol/L, potassium 4,8 mmol/L.



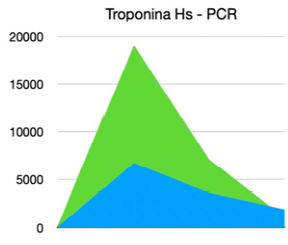
**EKG normal sinus rhythm with ischemic features [Fig.1]**




**Echocardiogram [Fig.2] systolic dysfunction with regional wall motion abnormalities**

**Tissue characterization at resonance: nuanced and irregular edema with hyperemia and delay enhancement [Fig.3,4]**

| Descrizione | 4 gen. 2021 - PS | 4 gen.2021 - UTIC | 5 gen. 2021 - UTIC | 6 gen. 2021 -Cardio |
|---|---|---|---|---|
| PCR mg/dL | 70 | 6680 | 3600 | 1900 |
| TROPONINA HS | 200 | 19047 | 7041 | 1054 |




**Troponin and RCP levels [Fig.5]**

Other investigations showed creatinine 0,96 mM/L and troponin I (Hs) 12602 g/L (normal <0.2g/L). Nasopharyngeal swab was negative for COVID-19 with anti Sars CoV2 IgG 2239 UA/mL His EKG was normal sinus rhythm with ischemic features [Fig.1]. Our therapeutic decision was the treatment withoxygen and beta-blocker, ace-inhibitor and indometacine to which he responded well. An echocardiogram [Fig.2] performed immediately at entry to the CCU revealed systolic dysfunction with regional wall motion abnormalities. He underwent MR on the second day, which showed myocarditis and not myocardial infarction as a cause for his elevated troponin. Tissue characterization at resonance: at the basal, middle and apical level of the inferior and anterior lateral walls, we can appreciate nuanced and irregular edema with hyperemia and delay enhancement [Fig.3,4]. His troponin and RCP levels [Fig.5] began to trend downwards after four days, and almost completely normalized within ten days. Despite the atypical nature of our patient's presentation, including cardiac involvement, we believe that his intense inflammatory response may be attributed to his recent vaccine in the absence of other causes, especially given the timing of adjuvant exposure. Based on the patient's clinical and laboratory findings, a presumptive diagnosis of ASIA was made. The fact that the symptoms started immediately after the vaccination raises the suspicion that an immunological reaction may have caused the inflammation. The patient recovered fully, and was safely discharged home on day fifteen. The consent of the publication of scientific work has been signed by the patient.

# DISCUSSION

In general, most people who are vaccinated have mild if any side effects. Cardiac side effects associated with vaccination have been reported rarely. There is evidence in the literature linking vaccines to different autoimmune manifestations. Relating to the current knowledge we would like to suggest to include these comparable conditions under a common syndrome entitled ASIA, "Autoimmune (Auto-inflammatory) Syndrome induced by Adjuvants". (6) Of late, autoimmune manifestations that appear to be caused by an external adjuvant have been grouped into a complex syndrome referred to as autoimmune/ inflammatory syndrome induced by adjuvants (ASIA). Based on the patient's clinical and laboratory findings, a presumptive diagnosis of a post vaccination inflammatory syndrome was made. The patient recovered promptly in hospital without the usage of immunomodulatory agents. For the diagnosis of ASIA, the presence of at least 2 major (exposure to an external stimuli prior to clinical manifestations; the appearance of 'typical' clinical manifestations: myalgia, myositis or muscle weakness) or 1 major and 2 minor criteria (the appearance of auto antibodies or antibodies directed at the suspected adjuvant; other clinical manifestations: irritable bowel syndrome) must be apparent. At this time, the incidence of myocarditis post vaccination Covid-19 is rare. However, a number of COVID-19-related myocarditis cases have been reported, according to the US National Institutes of Health. ASIA is an emerging clinical entity, with its share of case reports hypothesizing a causal link with vaccines. Ongoing surveillance to establish the existence of this posited entity and to evaluate its risks should be pursued.

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**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published, and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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**Conflicts of interest:** There are no conflicts of interest.

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