

Fulminant Hepatitis following COVID-19 Vaccination: A case report

Mohammad Barary¹, Athena Sharifi-Razavi², Nasser Rakhshani³, Terence Sio⁴, Soheil Ebrahimpour¹, and Mana Baziboroun¹

¹Babol University of Medical Science

²Mazandaran University of Medical Sciences

³Iran University of Medical Sciences

⁴Mayo Clinic Arizona

February 24, 2022

Abstract

The side effects of COVID-19 vaccination were mostly self-restricted local reactions that quickly resolved. Nevertheless, rare autoimmune hepatitis cases have been reported in some vaccinated individuals. This article presents a young man who developed fulminant hepatitis a few days after vaccination with the first dose of the AstraZeneca COVID-19 vaccine.

Fulminant Hepatitis following COVID-19 Vaccination: A case report

Running title: Fulminant hepatitis after COVID-19 vaccination

Mohammad Barary^{1, 2}, Athena Sharifi-Razavi³, Nasser Rakhshani⁴, Terence T. Sio⁵, Soheil Ebrahimpour⁶, Mana Baziboroun^{6, *}

¹ Student Research Committee, Babol University of Medical Sciences, Babol, Iran

² Students' Scientific Research Center (SSRC), Tehran University of Medical Sciences, Tehran, Iran

³ Clinical Research Development Unit of Bou-Ali Sina Hospital, Mazandaran University of Medical Sciences, Sari, Iran

⁴ Department of Pathology, Gastrointestinal and Liver Diseases Research Centre, Firoozgar Hospital, Iran University of Medical Sciences, Tehran, Iran

⁵ Department of Radiation Oncology, Mayo Clinic, Phoenix, Arizona, USA

⁶ Infectious Diseases and Tropical Medicine Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran

Correspondence: Mana Baziboroun, Infectious Diseases and Tropical Medicine Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran. Tel: +989111153051, Fax: +98-1132207918, Email: manabaziboron@gmail.com

Abstract

The common side effects of COVID-19 vaccination were mostly self-restricted local reactions that quickly resolved. Nevertheless, rare autoimmune hepatitis cases have been reported in some vaccinated with mRNA COVID-19 vaccines. This article presents a young man who developed fulminant hepatitis a few days after vaccination with the first dose of the AstraZeneca COVID-19 vaccine.

Keywords: COVID-19; SARS-CoV-2; AstraZeneca; Vaccine, Fulminant; Hepatitis

Introduction

The common side effects of COVID-19 vaccination were mostly self-restricted local reactions that quickly resolved (1). Nevertheless, rare autoimmune hepatitis cases have been reported in some vaccinated with mRNA COVID-19 vaccines (2,3). This article presents a young man who developed fulminant hepatitis a few days after vaccination with the first dose of the AstraZeneca COVID-19 vaccine.

Case presentation

A 35-year-old man was admitted to our hospital with generalized weakness, abdominal pain, and jaundice. He received the first dose of the AstraZeneca COVID-19 vaccine 8 days earlier. Five days after vaccination, the patient experienced fever and headache. Despite the improvement of fever, his abdominal pain was exacerbated, and loss of appetite, jaundice, and vomiting was also manifested. Thus, he was admitted to our center. He had a history of psychological problems under control with paroxetine and sodium valproate. His laboratory results on admission are summarized in Table 1. According to the high D-dimers, low platelet count, and low Fibrinogen level, vaccine-induced immune thrombosis thrombocytopenia (VITT) was suspected. Therefore, high-dose dexamethasone 40 daily, IVIG 1 mg/kg for 2 days, and rivaroxaban 15 mg daily, was started for the patient. Abdominal ultrasonography showed a grade I fatty liver disease, normal gall bladder, and pancreas with mild effusion in subdiaphragmatic space. Also, no intra- or extra-hepatic biliary dilatation was observed. Color Doppler ultrasonography revealed normal portal and hepatic vein and inferior vena cava. The laboratory results of his second hospitalization day were indicative of a surge in his hepatic enzymes, decreasing platelet, prolonged PTT, and increased INR (Table 1) (Fig. 1A).

Furthermore, laboratory results were negative for hepatitis A, B, C, and E viruses, HIV, EBV, HSV-1, and HSV-2. Anti-nuclear antibody (ANA), anti-smooth muscle antibody (ASMA), and SARS-CoV-2 reverse transcriptase-polymerase chain reaction (RT-PCR) were also negative. Hence, fulminant hepatitis was suspected for the patient. Due to a lack of clinical improvement, he became a liver transplant candidate. Unfortunately, after 3 days of hospitalization, he was expired as of disseminated intravascular coagulation (DIC), after which a liver necropsy was performed, indicating drug/toxin-induced hepatitis (Fig. 1B-D).

Discussion

Vaccines have been shown to trigger an immune response leading to a broad spectrum of autoimmune diseases (4). The spike glycoprotein of SARS-CoV-2 or adenoviral vector spike protein vaccines share genetic similarities with a large heptapeptide human protein, so this is an additional factor that can trigger autoimmune disease after vaccination due to molecular mimicry (5). In our patient viral markers were negative, and there was no history of drug or toxin exposure. Unfortunately, our patient died quickly after hospitalization, making our laboratory tests incomplete to determine the etiology of his fulminant hepatitis. On the other hand, the patient was being treated with paroxetine and sodium valproate for his psychological illnesses that might have increased the chance of fulminant hepatitis following vaccination. Since these side effects are infrequent, such cases should not discourage people from being vaccinated against COVID-19, yet physicians must be vigilant for such potential adverse events.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgments

The authors thank the Department of Infectious Diseases and Tropical Medicine of Babol University of Medical Sciences.

Author contributions

The case was diagnosed and followed up by NR and MB. SE and MB conceived and planned the case report, MB, ASR, and TTS wrote the manuscript, and MB and TTS edited the first draft and provided substantial revision. The final version was read, corrected, and approved by all authors. All co-authors take full responsibility for the integrity of the case study and literature review.

Conflicts of Interest

TTS reports that he provides strategic and scientific recommendations as a member of the Advisory Board and speaker for Novocure, Inc. and also as a member of the Advisory Board to Galera Therapeutics, which are not in any way associated with the content or disease site as presented in this manuscript. All other authors have no relevant financial interests to be declared.

Informed consent

Written informed consent was obtained from the patient for publication of the current case report.

References

1. Finsterer J. Exacerbating Guillain–Barré Syndrome Eight Days after Vector-Based COVID-19 Vaccination. Cui D, editor. Case Rep Infect Dis [Internet]. 2021 May 8;2021:1–3. Available from: <https://www.hindawi.com/journals/criid/2021/3619131/>
2. Bril F, Al Diffalha S, Dean M, Fettig DM. Autoimmune hepatitis developing after coronavirus disease 2019 (COVID-19) vaccine: Causality or casualty? J Hepatol [Internet]. 2021 Jul;75(1):222–4. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0168827821002373>
3. Londoño M-C, Gratacós-Ginès J, Sáez-Peñataro J. Another case of autoimmune hepatitis after SARS-CoV-2 vaccination. Still casualty? J Hepatol [Internet]. 2021 Jun; Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0168827821004177>
4. Vera-Lastra O, Ordinola Navarro A, Cruz Domiguez MP, Medina G, Sánchez Valadez TI, Jara LJ. Two Cases of Graves' Disease Following SARS-CoV-2 Vaccination: An Autoimmune/Inflammatory Syndrome Induced by Adjuvants. Thyroid [Internet]. 2021 May 3;thy.2021.0142. Available from: <https://www.liebertpub.com/doi/10.1089/thy.2021.0142>
5. McGonagle D, De Marco G, Bridgewood C. Differences in venous immunothrombosis in severe COVID-19 pneumonia and Vaccine-Induced Thrombotic Thrombocytopenia (VITT) – It's in the viral DNA. J Autoimmun [Internet]. 2021 Jul;121:102662. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0896841121000706>

Figure legends

Fig 1. ALT trend and histological findings. **A)** Trends of plasma ALT. **B)** Low-magnification (40x), **C)** Medium-magnification (100x), **D)** High-magnification (400x) of liver necropsy demonstrating multifocal confluent necrosis in liver lobule, mild lymphocytic infiltration in sinusoids, and between hepatocytes.

