

Single Case – General Neurology

Rhabdomyolysis after COVID-19 Comirnaty Vaccination: A Case Report

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Keywords

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Abstract

Rhabdomyolysis is an acute disruption in skeletal muscle integrity, leading to the rapid release of 4 muscle contents into the bloodstream, such as creatine kinase (CK). It can have various causes, including infections. Throughout the pandemic, multiple cases of rhabdomyolysis following COVID-19 infections have been reported. However, rhabdomyolysis subsequent to COVID-19 vaccinations appears to be relatively rare. Here, we report such a case after a second COVID-19 Comirnaty (BioNTech/Pfizer) vaccination. Our patient developed rhabdomyolysis 1 day after the second Comirnaty vaccination with high creatine kinase (CK) levels, generalized weakness, and kidney failure. CK levels and muscle weakness resolved after treatment with intravenous fluids, but unfortunately, he remained hemodialysis dependent after discharge. To our knowledge, this is one of the first case reports describing a patient with rhabdomyolysis after a Comirnaty vaccination. However, as millions of people have received the Comirnaty vaccine, it is unclear whether the rhabdomyolysis in our patient is a rare side effect or an unrelated, coincidental event. Large observational studies are needed to elucidate the causality between the Comirnaty vaccination and rhabdomyolysis. Awareness is warranted in patients with myalgia and muscle weakness shortly after COVID-19 vaccination, in order to initiate treatment early and prevent life-threatening complications.

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Introduction

Rhabdomyolysis is an acute disruption in skeletal muscle integrity, which leads to the rapid release of intracellular muscle components into the bloodstream, such as CK, myoglobin, electrolytes, and lactate dehydrogenase. Clinical features of rhabdomyolysis can vary from asymptomatic elevated CK levels to life-threatening conditions such as electrolyte disturbances or acute renal failure. Causes include acute traumatic injury, drugs such as statins, muscle ischemia, electrolyte disturbances, genetic or metabolic diseases, and infections [1].

Many cases of rhabdomyolysis following COVID-19 infections have been reported [2]. However, rhabdomyolysis subsequent to COVID-19 vaccinations is relatively rare. Here we describe a Dutch patient who developed rhabdomyolysis shortly after a COVID-19 Comirnaty (BioNTech/Pfizer) vaccination, complicated by acute kidney failure and hemodialysis dependency.

Case Report

An 80-year-old man, known with COPD, asthma, hypertension, and myocardial infarction, presented to our emergency room with malaise, severe myalgia, muscle weakness, fatigue, nausea, and diarrhea, which developed 1 day after his second Comirnaty vaccination. Physical examination showed a drowsy patient with tender muscles during palpation and generalized proximal muscle weakness (MRC 2-3). No other clinical abnormalities were found. Laboratory examinations showed: serum CK 280.600 u/L, C-reactive protein 14 mg/L, leucocytes $15.4 \times 10^9/L$, estimated glomerular filtration rate 3 mL/min/1.73 m², sodium 126 mmol/L, and potassium 7.6 mmol/L. Rhabdomyolysis was diagnosed and suspected to be triggered by the recent Comirnaty vaccination. As myositis could not be ruled out, a myositis autoantibody panel was obtained and the patient was pragmatically treated with intravenous immunoglobulin for 5 days, additionally to intravenous fluids. The complaints and CK values improved within 2 weeks. Due to anuria caused by acute renal failure, intermittent hemodialysis was started. Subsequently, the patient turned out to be positive for anti-PL7 autoantibodies but with a negative immunoblot assay for antinuclear antibodies. There were no clinical or radiological signs of interstitial lung disease, arthritis or dermatomyositis. At discharge, 3 weeks after admission, the muscle weakness was almost fully recovered and the CK was 207 u/L. Intermittent hemodialysis was continued in an outpatient setting. Four weeks after discharge, the patient was followed-up and did not have any muscle-related complaints and normal muscle strength.

Serum CK was 78 u/L. However, kidney function did not improve and the patient remained hemodialysis dependent.

Discussion

To our knowledge, this is one of the first case reports describing a patient who developed rhabdomyolysis after a COVID-19 vaccination. In the absence of trauma, dehydration, excessive exercise, alcohol or drug usage, infection, diabetic ketoacidosis, or seizures, we could not find an alternative explanation for rhabdomyolysis in our patient. Moreover, the short time period between the Comirnaty vaccination and the development of complaints supports the hypothesis of vaccine-induced rhabdomyolysis. Although the vaccination is the most likely trigger of rhabdomyolysis in our patient, the patient was on rosuvastatin for at least 6 months without any complaints, which may have been a contributing factor. Although the patient was

anti-PL7 positive, the fast normalization of both strength and CK values argues against myositis. Also, there were no clinical signs of an anti-synthetase syndrome. In the literature, 6 cases of isolated rhabdomyolysis secondary to vaccination with various non-COVID vaccines have been described (see online suppl. Table S1, S2; online suppl. Fig. S1; for all online suppl. material, see www.karger.com/doi/10.1159/000527599). However, no relation has been established in larger studies and after large vaccination campaigns, possibly due to the low incidence of rhabdomyolysis [3]. In the literature, 10 cases of rhabdomyolysis after COVID-19 vaccination have been reported. In these cases, the patients were vaccinated with Moderna, Comirnaty, AstraZeneca, Johnson & Johnson, and a non-specified COVID-19 vaccine [4–13].

Rhabdomyolysis occurred after the first dose or second dose, between 5 h and 10 days after administration of the vaccine. All patients were treated with IV fluids. In 4/10 cases, complaints and CK levels resolved partly after discharge but with limited follow-up [4–6, 11]. In 4/10 cases, complaints and CK levels resolved completely [7–9, 12]. In one case, the rhabdomyolysis was fatal [10]. One case did not describe the treatment and outcome [13]. In addition, ten cases have been reported at the Netherlands Pharmacovigilance Centre Lareb and 536 cases at VigiBase, the World Health Organization's (WHO) global individual case safety report (ICSR) database (see online suppl. Table S3, S4, respectively).

However, millions of people have received Comirnaty vaccinations and rhabdomyolysis has only been reported a few times in the literature and clinical practice. This raises the question if the rhabdomyolysis in our patient is a potential, rare side effect or an unrelated, coincidental event.

Our case and the previous reports warrant awareness in patients with myalgia and muscle weakness shortly after COVID-19 vaccination, in order to initiate treatment early and thereby prevent life-threatening complications such as acute kidney failure. However, large observational studies are needed to elucidate whether there is causality between COVID-19 vaccination and rhabdomyolysis. This case report has been drafted according to the CARE checklist for case reports.

Statement of Ethics

Written informed consent was obtained from the patient for publication of the details of his medical case and any accompanying images. This study is exempt from ethics committee approval as no ethical issues arose from reporting this case. This study has been approved according to the governance code of Pharmacovigilance Centre Lareb on October 21, 2021. The Global ICSR database, VigiBase, was used as a data source for this article. The information in VigiBase comes from a variety of sources, and the probability that the suspected adverse effect is drug-related is not the same in all cases. The information in this article does not represent the opinion of the UMC or the World Health Organization.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Veerle J. Ruijters was involved in acquisition of data and drafting the manuscript for intellectual content. Marjon F.G. van der Meulen, Tessa Smit, and Jessica E. Hoogendijk were involved in acquisition of data and revised the manuscript for intellectual content. Michael A. van Es interpreted the data and revised the manuscript for intellectual content.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplemental files. Further inquiries can be directed to the corresponding author.

References

- 1 Torres PA, Helmstetter JA, Kaye AM, Kaye AD. Rhabdomyolysis: pathogenesis, diagnosis, and treatment. *Ochsner J.* 2015;15(1):58–69.
- 2 Haroun MW, Dieiev V, Kang J, Barbi M, Marashi Nia SF, Gabr M, et al. Rhabdomyolysis in COVID-19 patients: a retrospective observational study. *Cureus.* 2021;13(1):e12552.
- 3 Stübing JP. A review on the association between inflammatory myopathies and vaccination. *Autoimmun Rev.* 2014;13(1):31–9.
- 4 Mack M, Nichols L, Guerrero DM. Rhabdomyolysis secondary to COVID-19 vaccination. *Cureus.* 2021;13(5):e15004.
- 5 Nassar M, Chung H, Dhayaparan Y, Nyein A, Acevedo BJ, Chicos C, et al. COVID-19 vaccine induced rhabdomyolysis: case report with literature review. *Diabetes Metab Syndr.* 2021;15(4):102170.
- 6 Tan A, Stepien KM, Narayana STK. Carnitine palmitoyltransferase II deficiency and post-COVID vaccination rhabdomyolysis. *QJM.* 2021 Apr;114(8):596–7.
- 7 Faissner S, Richter D, Ceylan U, Schneider-Gold C, Gold R. COVID-19 mRNA vaccine induced rhabdomyolysis and fasciitis. *J Neurol.* 2022;269(4):1774–5.
- 8 Gelbenegger G, Cacioppo F, Firbas C, Jilma B. Rhabdomyolysis following Ad26.COV2.S COVID-19 vaccination. *Vaccines.* 2021;9(9):956.
- 9 Elias C, Cardoso P, Gonçalves D, Vaz I, Cardoso L. Rhabdomyolysis following administration of Comirnaty(®). *Eur J Case Rep Intern Med.* 2021;8(8):002796.
- 10 Ajmera KM. Fatal case of rhabdomyolysis post-COVID-19 vaccine. *Infect Drug Resist.* 2021;14:3929–35.
- 11 Unger K, Ponte CD, Anderson D. A possible case of COVID-19 booster vaccine-associated rhabdomyolysis and acute kidney injury. *J Pharm Technol.* 2022;38(4):247–50.
- 12 Sutcu M, Gul D, Atik F, Kara M. Rhabdomyolysis after BNT162b2 mRNA Covid-19 vaccine in an adolescent male. *Malawi Med J.* 2022;34(2):154–6.
- 13 Kalekar TM, Jaipuria RK, Navani RS. MRI findings in case of post-COVID-19 vaccination rhabdomyolysis: a rare postvaccination adverse effect. *Indian J Radiol Imaging.* 2022;32(2):256–9.