

CASE REPORT

Friend or foe—The Pfizer-BioNTech (BNT162b2) vaccination: A case report of reversible acute acalculous cholecystitis

Bianca Maria Wahlen¹  | Ruben Peralta^{2,3} | Hassan Al-Thani⁴ |
Ayman El-Menyar^{5,6} 

¹Department of Anesthesiology, Hamad Medical Corporation (HMC), Doha, Qatar

²Department of Surgery, Trauma Surgery, Hamad Medical Corporation (HMC), Doha, Qatar

³Department of Surgery, School of Medicine, Universidad Nacional Pedro Henríquez Ureña, Santo Domingo, Dominican Republic

⁴Department of Surgery, Trauma and Vascular Surgery, Hamad Medical Corporation (HMC), Doha, Qatar

⁵Department of Surgery, Trauma and Vascular Surgery Clinical Research, Hamad Medical Corporation (HMC), Doha, Qatar

⁶Clinical Medicine, Weill Cornell Medical College, Doha, Qatar

Correspondence

Ayman El-Menyar, Clinical Research, Hamad General Hospital & Weill Cornell Medical School, P.O Box 3050, Doha, Qatar.
Email: aymanco65@yahoo.com

Abstract

We described a rare case of vaccine-induced acalculous cholecystitis (ACC). A 52-year-old female developed ACC after 8 h of receiving a 3rd dose of the Pfizer-BioNTech COVID-19 vaccination. The symptoms subsided completely with conservative treatment for 12 days, and the ultrasound and laboratory findings went back to normal.

KEYWORDS

acalculous cholecystitis, adverse event, booster, COVID-19 vaccination

1 | INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread over the world at an unprecedented rate, claiming the lives of millions.¹ International pharmaceutical companies are in a race to develop COVID-19 vaccines.² Meanwhile, there are

recommendations for a booster dose for Pfizer-BioNTech. Various countries have already mandated booster vaccination programs. Even though the vaccination in general is well tolerated, some people were hit by rare adverse events.³ Acalculous cholecystitis (ACC) is an inflammatory affection of the gallbladder with no evidence of stones or cystic duct obstruction that has not been described

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2022 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

after vaccination yet. However, the present case report describes reversible septic constellation including ACC 8 h post the third dose of COVID-19 vaccination.

2 | CASE PRESENTATION

A 52-year-old female healthcare provider received the first dose of Pfizer-BioNTech (BNT162b2) vaccine on 06.01.2021 and the second on 27.01.2021. Following the first dose, she reported pain on the injection site, and on the second day, she developed generalized severe arthralgia. The second vaccination was accompanied with inflammation of biceps tendon and a bursitis for 6 months. The patient came back from a vacation in Europe with a complete normal checkup just before departure. She had no prior history of gall bladder disorders. The RT-PCR test for COVID-19 was never positive. On 24.10.2021, the third dose was taken around 9 AM. After 4–5 h, severe tiredness has been started. At 7:00 PM, she developed severe shivering and whole-body muscle cramps in addition to massive swelling of the injection site, accompanied by nausea and vomiting for 5 h. On 25.10.2021 at 02:03 AM, the patient called the ambulance because of ongoing vomiting and sweating. The blood pressure was normal, with heart rate of 100 beats per minute (bpm) and temperature of 38°C. She was complaining of massive thirst and received 1 L of fluid and 1 g paracetamol until 4:00 AM.

In between, shivering and non-watery diarrhea started around 3:30 AM. In addition, upper right abdominal quadrant pain started. On the afternoon of 24.10.2021, she reported anuria. So, another 4-L fluid was given. However, fluid was stopped because of breathing difficulties and chest pain. The laboratory tests showed a white blood cell count of $15.8 \times 10^9/L$, absolute neutrophil count of $14.6 \times 10^9/L$, low bicarbonate with 21 mmol/L, low protein with 59 g/L, and low albumin with 29 g/L. The alanine aminotransferase was high with 89 Unit per liter, and CRP was elevated to 10.8 mg/L. The patient took oral ondansetron, however, neither nausea nor vomiting subsided until the evening of 26.11.2021. Diarrhea, alternating sweating, and feeling light freezing continued. The patients weight scale showed an increase 5 kg. After the initiation of antibiotic the urine production started again on 26.10.2021 and the patient's weight reduced to normal on 31.10.2021. The massive swelling and pain on the injections site got less and was almost gone 1 week later. Nausea, weakness, and diarrhea went on. Diarrhea stopped on 31.10.2021. The pain in the right upper quadrant of the abdomen persisted and got worse. Abdomen was tense and painful on palpation. The ACC has been confirmed by ultrasound examination (Figure 1). Figure 1 shows evidence of dilated hepatic veins and inferior vena cava with patent portal vein. The liver was of normal size with passive hepatic congestion. Common

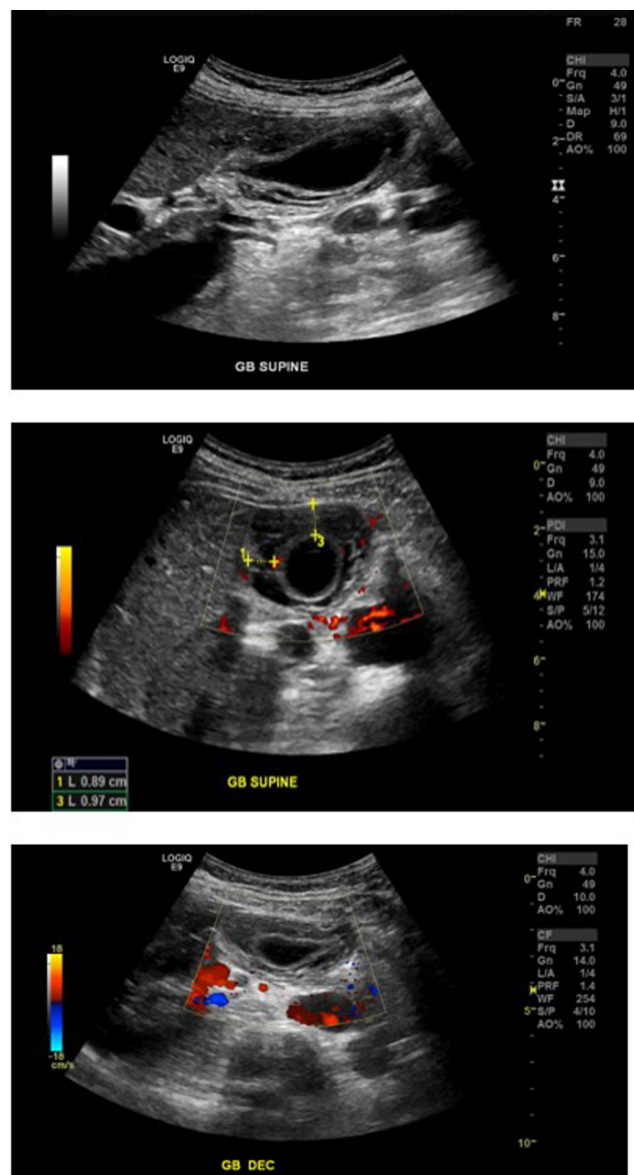


FIGURE 1 Abdominal ultrasound images showed signs of acalculous cholecystitis.

bile duct was of normal caliber with no intrahepatic biliary dilatation. The gall bladder was distended with thickened and edematous wall measuring 8.9 mm with pericholecystic fluid with no evidence of gall bladder stones. These manifestations had changed and improved after starting antibiotic course and conservative treatment. Twelve days after the incident, the symptoms subsided completely and the repeated ultrasound (Figure 2), as well as the clinical and laboratory findings, went back to normal.

3 | DISCUSSION

To our knowledge, this is the second reported case of ACC following the booster dose of Pfizer-BioNTech



FIGURE 2 Follow-up abdominal ultrasound showed a normal gall bladder.

(BNT162b2) vaccination. There is no possibility to prove the route cause/relationship between the vaccination and symptoms but the patient's medical history, the increase in severity of symptoms which each dose and the timely correlation should consider this case as a rare potential side effect.

Pfizer-BioNTech (BNT162b2) vaccine has shown excellent safety in phase 3 trials. A study from the United Kingdom showed that less than 30% of users complained of local side effects and less than 25% of fatigue and headache after the first dose. More side effects were prevalent in women compared with men. A recently published study reported that adverse effects have occurred at frequencies lower than what were demonstrated in phase 3 clinical trials.⁴ However, analysis clearly displayed that after a second dose of the Pfizer vaccine up to 84.2% of subjects have the same or more adverse effects than after the first dose.⁵ The amount and severity of side effects increased from dose to dose, accumulating in the third dose.⁶

Acaculous cholecystitis may occur in patients suffering from COVID-19 infection.⁷⁻⁹ However, a possible association between COVID-19 vaccination and

cholecystitis has been reported in 0.02% of cases.¹⁰ The absence of symptoms before the vaccination, and the absence of stones or sludge in the gallbladder may suggest a correlation with the booster dose of the vaccination. The ACC was diagnosed clinically and confirmed by ultrasound. The patient was non-operatively treated and had improved within 2 weeks. The mechanism of vaccine-induced ACC is not known. However, autoimmune cholecystitis has been described with autoimmune hepatitis and autoimmune pancreatitis.¹¹ Recently Cieřlewicz et al.¹² published one case of COVID-19 vaccine-induced pancreatitis. The author postulated that amino acid sequences similarities between viral and self-antigens can result in autoimmune reaction and induction of such an autoimmune response can result in the production of cytotoxic antibodies.¹² However, we do not have solid evidence to support such post-vaccine immune reaction in our case as this needs further studies with large sample size. Kyungu et al.¹³ reported one case like ours but they did not assume the mechanism that could explain the occurrence of ACC post-vaccination.

4 | CONCLUSION

The possibility of getting septic constellation with ACC after a 3rd dose of Pfizer-BioNTech (BNT162b2) vaccination for protection against COVID-19 is very rare and needs high index of suspicion and more investigation.

AUTHOR CONTRIBUTIONS

All authors (BW, RP, HA, and AE) have made substantial contribution in case report design, data collection and interpretation, and manuscript drafting, editing, and approval.

ACKNOWLEDGEMENTS

We thank the Clinical Research Team of the Trauma and Vascular Surgery Department at Hamad General Hospital, Doha, Qatar.

CONFLICT OF INTEREST

All authors have nothing to declare.

DATA AVAILABILITY STATEMENT

Not applicable.

ETHICAL APPROVAL

This case report has been approved by the Medical Research Center at Hamad Medical Corporation (IRB: MRC-04-21-1068). Data were de-identifiable and collected retrospectively, and no photograph for the patients was used.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy. It is available upon editor request.

ORCID

Bianca Maria Wahlen  <https://orcid.org/0000-0002-8218-2375>

Ayman El-Menyar  <https://orcid.org/0000-0003-2584-953X>

REFERENCES

- World Health Organization (WHO). WHO status report: weekly epidemiological update on COVID-19 - 14 December 2021. 2021. Accessed December 20, 2021. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
- Staista. Leading companies by number of COVID-19 drugs and vaccines in development as of December 16, 2021. 2021. Accessed December 20, 2021. <https://www.statista.com/statistics/1119090/coronavirus-drugs-in-development-by-leading-companies/>
- Centers for Disease Control and Prevention (CDC). Pfizer-BioNTech COVID-19 vaccine reactions & adverse events. 2021. Accessed December 20, 2021. <https://www.cdc.gov/vaccines/covid-19/info-by-product/pfizer/reactogenicity.html>
- Menni C, Klaser K, May A, et al. Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID symptom study app in the UK: a prospective observational study. *Lancet Infect Dis*. 2021;21:939-949.
- Andrzejczak-Grazadko S, Czudy Z, Donderska M. Side effects after COVID-19 vaccinations among residents of Poland. *Eur Rev Med Pharmacol Sci*. 2021;25:4418-4421.
- Centers for Disease Control and Prevention (CDC). Safety monitoring of an additional dose of COVID-19 vaccine — United States, August 12–September 19, 2021. 2021. Accessed December 20, 2021. https://www.cdc.gov/mmwr/volumes/70/wr/mm7039e4.htm?s_cid=mm7039e4_w
- Singh R, Domenico C, Rao SD, et al. Novel Coronavirus Disease 2019 in a patient on durable left ventricular assist device support. *J Card Fail*. 2020;26:438-439. doi:10.1016/j.cardfail.2020.04.007
- Bruni A, Garofalo E, Zuccalà V, et al. Histopathological findings in a COVID-19 patient affected by ischemic gangrenous cholecystitis. *World J Emerg Surg*. 2020;15:43. doi:10.1186/s13017-020-00320-5
- Ying M, Lu B, Pan J, et al. COVID-19 with acute cholecystitis: a case report. *BMC Infect Dis*. 2020;20:437. doi:10.1186/s12879-020-05164-7
- Dutta S, Kaur RJ, Bhardwaj P, et al. Adverse events reported from the COVID-19 vaccines: a descriptive study based on the WHO database (VigiBase®). *J Appl Pharm Sci*. 2021;11(8):001-009.
- Memon Z, Moya DA, Baker R, Kozielski R, Baker S. Autoimmune cholecystitis. *J Pediatr Gastroenterol Nutr*. 2012;54(4):441.
- Cieśliewicz A, Dudek M, Krela-Kaźmierczak I, Jabłeczka A, Lesiak M, Korzeniowska K. Pancreatic injury after COVID-19 vaccine—a case report. *Vaccine*. 2021;9(6):576. doi:10.3390/vaccines9060576
- Kyungu FM, Katumba AM, Kamwira HL, et al. Acute acalculous cholecystitis following COVID-19 vaccination: a case report. *Pan Afr Med J*. 2022;41:291. <https://www.panafrican-med-journal.com/content/article/41/291/full>

How to cite this article: Wahlen BM, Peralta R, Al-Thani H, El-Menyar A. Friend or foe—The Pfizer-BioNTech (BNT162b2) vaccination: A case report of reversible acute acalculous cholecystitis. *Clin Case Rep*. 2022;10:e06078. doi: [10.1002/ccr3.6078](https://doi.org/10.1002/ccr3.6078)