Case Report

Journal of Emergency Medicine Case Reports

Arterial and Venous Embolism Due to COVID-19 Vaccine (Biontech): Case Series

Oya Güven[1], Lale Tuna[2], İbrahim Atakan Geçici[3], Zeynep Sümeyye Durgun[4], Ömer Işık[5]

[1] Kırklareli University Medicine School, Emergency Department, Kırklareli, Turkey.
[2] Kırklareli Training and Research Hospital,bRadiology Department, Kırklareli, Turkey.
[3] Kırklareli Training and Research Hospital, Cardiac Surgery Department, Kırklareli, Turkey.
[4] Kırklareli Training and Research Hospital, Emergency Department, Kırklareli, Turkey.
[5] Kırklareli University Medicine School, Cardiac Surgery Department, Kırklareli, Turkey.

Abstract

Although the most prominent effect of Corona disease, respiratory disease it disrupts the vascular structure and causes vascular occlusion. Intravascular coagulation, has also begun to be observed in people who have been vaccinated. Therefore, clinicians had to add anti-coagulants or antiaggregants to the treatment. In this article; We will try to present the patient who developed arterial and venous embolism after BioNTech vaccine. These patients without known vascular disease responded well to treatment. The rate of sickness dropped after the vaccine was discovered to be the most effective strategy to protect against Covid-19. It was discovered that vaccinated patients exhibited symptoms similar to corona disease but had a moderate course.

Keywords: Covid-19, arterial embolism, venous embolism, BioNTech, vaccine

Introduction

A Corona disease is caused by the SARS-COV2 (Severe Acute Respiratory Syndrome causing Coronavirus-2); Initially, it was thought to develop respiratory tract diseases, but over time it was observed that it also led to vascular pathology. Among these, large artery occlusion (1) such as pulmonary artery embolism can be seen, as well as small artery occlusion (2) such as radial artery. Consequently, anticoagulant therapy was added to the Department of Health's guideline on treatment (3).

Although the Covid-19 (Coronavirus Disease Infection-2019) pandemic slowed somewhat with the discovery of the vaccine, the adverse effects of the vaccine were observed to be similar.

A BNT162b2 mRNA vaccine against Covid-19 (Pfizer-BioNTech), one of the most used vaccines in the world in the Covid-19 pandemic, has been in use in Turkey since April 2021 (4). Unlike traditional vaccines, in this type of mRNA vaccine, when the synthetic part of the RNA of the virus is injected into the person, the body forms antibodies faster than other vaccines. Therefore, its effectiveness is very high, but its side effects are less.

In this article, We will try to present two cases with arteria digitalis propria embolism at the middle and distal phalanx level on the 2nd finger of the left hand and femoral vein embolism at left leg that developed after BioNTech vaccine.

The case series has written in an anonymous characteristic, thus secret and detailed data about the patients have removed. Editor and reviewers can know and see these detailed data. These data may back up by editor and by reviewers.

Case Reports

Case-1

A 76-year-old male patient presented to the emergency department with complaints of pain in his left hand and bruising on his second finger. He did not have a history of trauma or COVID-19. He had covid vaccine (Pfizer-BioNTech) 1 day ago, that he developed pain in his left arm at the place where the vaccine was given, and that he noticed numbness and bruising in the 2nd finger of his left hand for 1-2 hours. He had no known chronic disease or history of drug use. He was smoking (25 packs/year). Hypertension (TA: 150/80) was detected in his vital signs. No pathology was detected in the blood tests (including D-Dimer and coagulation tests). EKG was in sinus rhythm. Arterial Doppler ultrasound was requested for cyanosis in his finger (Figure-1).

Corresponding Author: Oya Güven **e-mail:** ersinoya@yahoo.com
Received: 18.03.2022 • **Accepted:** 18.05.2022
DOI: 10.33706/jemcr.1089785

Cite this article as: Guven O, Tuna L, Gecici IA, Durgun ZS, Isık O. Arterial and venous embolism due to COVID-19 vaccine (biontech): case series. Journal of Emergency Medicine Case Reports. 2022;13(3): 88-91

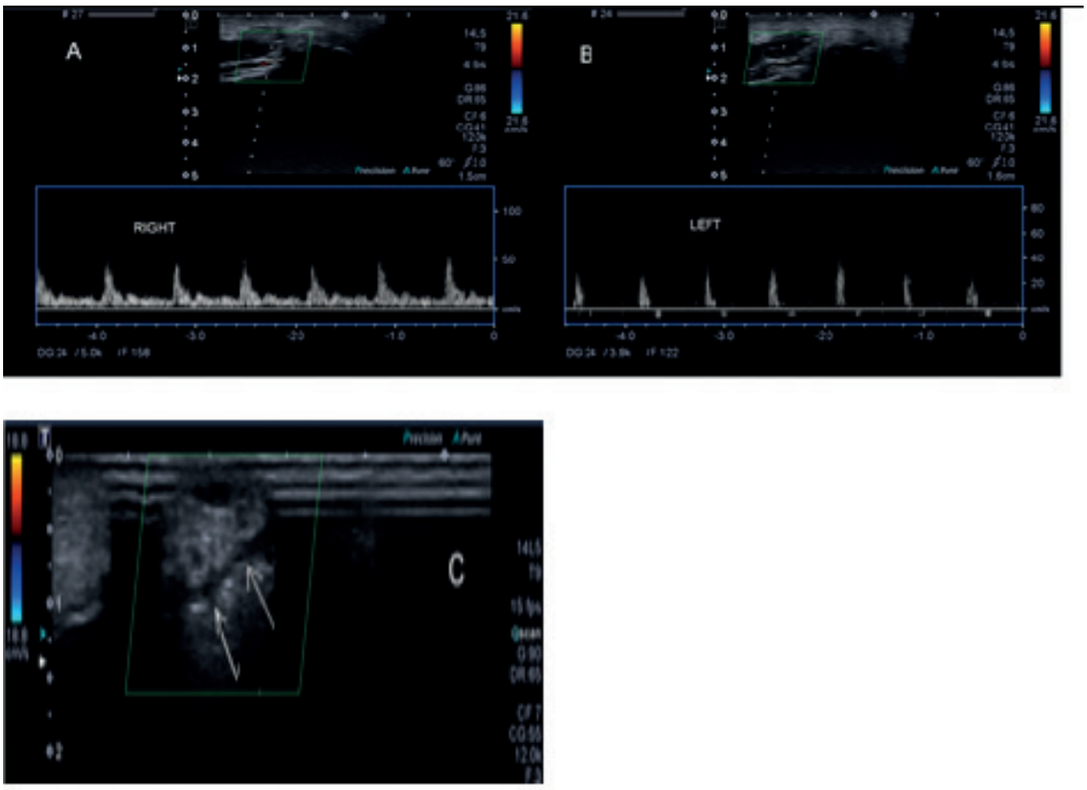

Figure 1. Arterial doppler ultrasound

A. Spectral Doppler waveform in the arteria radialis indicis of the right hand: normal flow pattern
B. Spectral Doppler waveform in the arteria radialis indicis of the left hand: biphasic flow pattern due to resistance
C. No flow was detected in the digitalis propria artery of the left second finger (white arrows).

Contrast-enhanced computed tomography (CT) was requested as an advanced examination (Figure-2).

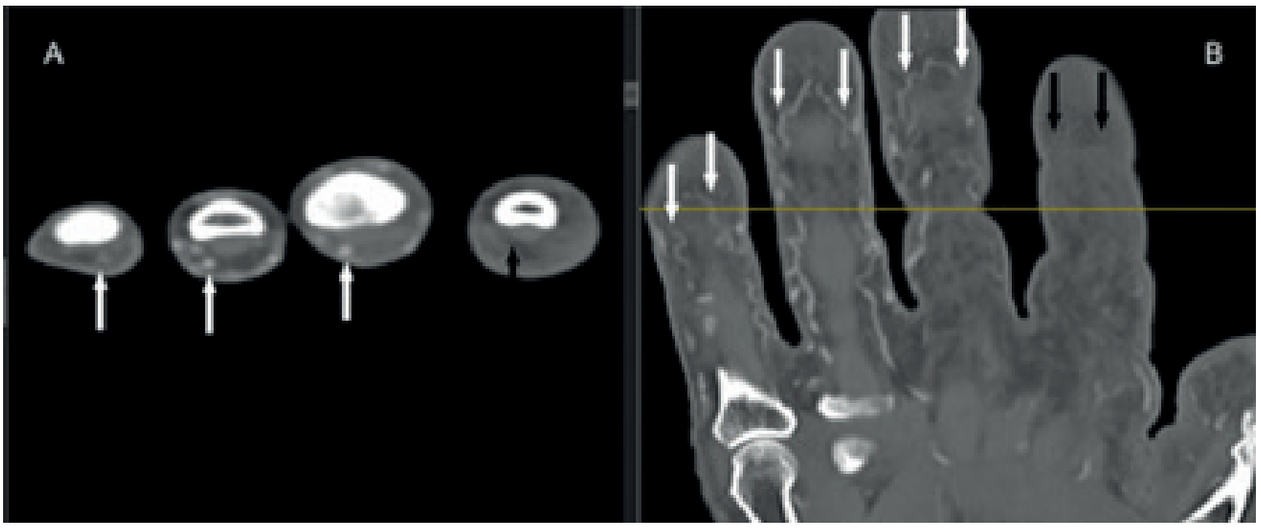

Figure 2. Computed tomography angiography (CTA) of the left hand

A. Contrast uptake was not observed in the second finger in the image obtained in the axial plane (black arrow). No vascular pathology was observed in other fingers (white arrows).
B. In the same case, contrast enhancement was not observed in the second finger in the coronal plane image (black arrow). No vascular pathology was observed in other fingers (white arrows).

DOI: 10.33706/jemcr.1089785
Journal of Emergency Medicine Case Reports. 2022;13(3): 88-91

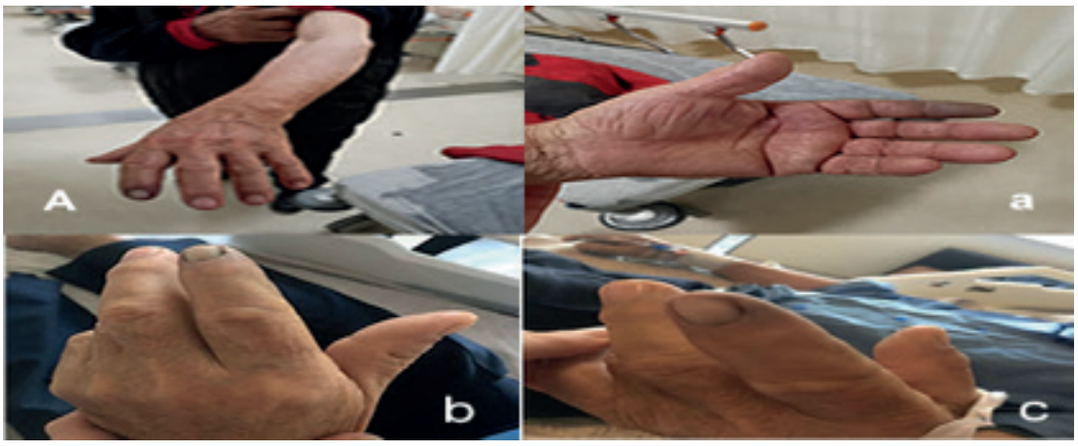

Figure 3. On the 1st day, it was observed that the bruise on the finger was on the mid-distal phalanx (A-a). It was observed that it regressed to the distal phalanx on the 2nd day of the treatment (b) and remained only at the base of the nail on the 5th day (c).

The patient was hospitalized by cardiovascular surgery. Low molecular weight heparin (LMWH) (enoxaparin sodium 12000 IU/dayx2), Ilioprost 1.58 ng/kg/min, Pentoxifylline 200 mg/day, N-acetylcysteine 1200 mg/day, Acetylsalicylic acid 100 mg and analgesic treatment were given. It was observed that the cyanosis, which spread to the middle phalanx at the first application, regressed to the base of the nail on the 5th day (Figure-3). After 5 days of treatment, LMWH and Pentoxifylline, Acetylsalicylic acid, Clopidogrel were prescribed, and he was discharged. He was called follow-up examination 10 days later.

Case-2

A 65-year-old male patient presented with complaints of pain and edema in his left leg. He had hypertension and not smoked for 5 years. He did not have a history of trauma or Covid-19. He had covid vaccine (Pfizer-BioNTech) 5-day ago, that he developed pain in his left leg. In his examination, the left leg was painful on palpation, there was no temperature difference or color change (Figure-4a-b). When compared to the right leg, the edema increased somewhat, but there was no phlegmasia. Hypertension (TA: 170/90) was detected in his vital signs. No pathology was detected in the blood tests (including D-Dimer and coagulation tests). First of all, x-ray was requested, no osseous pathology was detected. The pulses are clean on arterial examination, but a venous doppler test showed subacute DVT (deep vein thrombosis) in the left superficial femoral vein and its distal segment. LMWH 6000 IU/dayx2 and Acetylsalicylic acid 100 mg 1x1 prescribed for 10 days. The pain had subsided and the difference in diameter had reduced 15 days later, according to the follow-up assessment.

Discussion

Corona disease can be asymptomatic or complaints of fever, cough, shortness of breath, headache, joint pain can be seen. Similar symptoms are also observed after vaccination. Cause of hypercoagulability that develops during the disease is presumed to be hyperviscosity secondary to hypoxia. Infection of cells, localized inflammation, endothelial activation, tissue injury, and dysregulated cytokine release are all symptoms of this condition. Coagulation problem and diffuse intravascular coagulation are caused by the septic state, which develops with an increase in leukocytes and

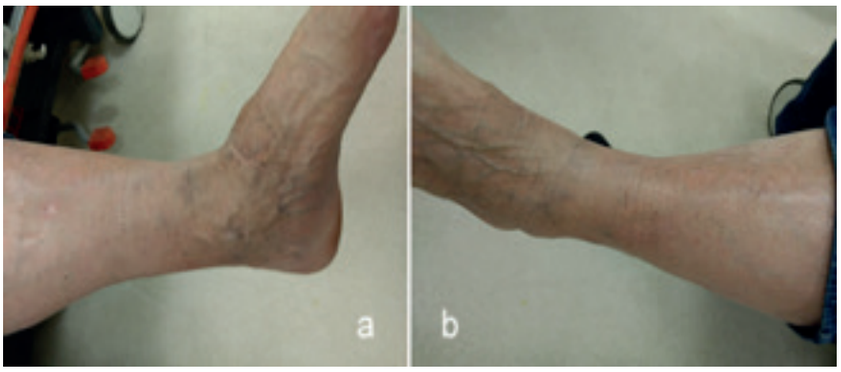

Figure 4. DVT was detected in the patient without edema or color change.

platelets. As a result, multiple organ failures are possible (5). There have been descriptions of the most common cases of pulmonary embolism and cardiac thrombosis.

In the 5-case study of Schultz et al.; After the ChAdOx1 nCoV-19 (AstraZeneca) vaccine, in the histories of the patients who were found to have embolism in the major arteries, it was seen that an average of 1 week passed after the vaccination, and all patients had significant thrombocytopenia. This embolism: they named it as immune thrombotic-thrombocytopenia caused by the antibody response developing due to the platelet factor 4 (PF4)-polyanion complex after vaccination (6). The side effect in our patients; that is a rare finding because the vaccine type is different. It developed within 24 hours after vaccination, all blood tests were normal, and minor arterial embolism was present in first case. In the other patient, Embolism was detected 5 days after vaccination. In comparison to other vaccines, the adverse effects that may arise after the BioNTech vaccine are at a manageable level, according to this study.

In a study by Smadja et al. with data from WHO; The data of 3 vaccines (BioNtech, Moderna, Astra Zeneca) were examined, and it was found that arterial embolism cases were more common (67.9%) in patients who received BioNTech. However, it was emphasized that this result may have occurred because this vaccine was administered to more people and in an older population compared to the other group (7). Since our cases presented with the same post-vaccine arterial and venous embolism, it is compatible with the literature.

In a study conducted; It has been found that people who have had Corona before, experience more side effects after a single dose of BioNTech vaccine (8). In this study, emphasized that it provides a rapid immune response in who with high antibody titers after vaccination. The first patient reported an adverse effect 7 months after receiving two doses of Sinovac vaccination and one dose of BioNTech vaccine. In the second patient, 4 months after receiving the BioNTech vaccination and two doses of Sinovac, findings improved. The reason for this is the high antibody level after previous vaccinations may have been the cause.

During Corona disease and at discharge, if the patient has other conditions, anticoagulant therapy should be added to the treatment (9). If, as in our cases, thrombosis findings are detected in a short time, as in the during the disease, in people who have been vaccinated, or if there is a tendency to thrombosis in the history; maybe after vaccination, prophylactic anticoagulant treatment can be started and followed. We think that this may be possible with a clear identification of the cases. In our cases, we found smoking (or his history) and unmanaged hypertension as factors that may predispose to vascular pathology. With LMWH, we saw a significant improvement in a short period of time. In our cases, even if there is a predisposition to hypercoagulation, we may have received a rapid response to treatment. Because treatment began quickly after the symptoms appeared and peripheral minor embolism was detected, we may have had a speedy response.

The development of the vaccine provided optimism for the end of the pandemic; the epidemic slowed, but identical adverse effects, albeit slightly, were reported following the vaccine (10).

Since BioNTech vaccine is in the new generation m-RNA vaccine group, its side effects are not predictable. However, its side effects should be ignored due to its high effectiveness in the fight against Corona. These side effects should not discourage of getting vaccinated. Our theory is reinforced by the fact that we have found that developing side effects improve with effective treatment.

References

1. Çelik H, Saadoon AQ. COVID-19 with pulmonary embolism: Case report. Cumhuriyet Medical Journal 2020; 42(2), 213-215.
2. Makhoul K, Shukha Y, Hanna LA, Nitecki S, Leiderman M, Hayek T, et. al. A case of rapidly progressive upper limb ischemic necrosis in a patient with COVID-19. International Journal of Infectious Diseases 2021; 106, 401-404.
3. T.C. Sağlık Bakanlığı-COVID-19-Bilgilendirme Platformu. https://covid19.saglik.gov.tr/TR-66341/antisitokin-antiinflamatuar-tedaviler-koagulopati-yonetimi. Access:1.2.22
4. Wikipedia the free encyclopedia. https://tr.wikipedia.org/ COVID-19 vaccination in Turkey. Access: 30.1.22
5. Tang N, Li D, Wang X, Sun Z. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. Journal of thrombosis and haemostasis 2020; 18(4), 844-847.
6. Schultz NH, Sørvoll IH, Michelsen AE, Munthe LA, Lund-Johansen F, Ahlen MT, et. al. Thrombosis and thrombocytopenia after ChAdOx1 nCoV-19 vaccination. New England journal of medicine 2021; 384(22), 2124-2130.
7. Smadja DM, Yue QY, Chocron R, Sanchez O, Lillo-Le Louet A. Vaccination against COVID-19: Insight from arterial and venous thrombosis occurrence using data from VigiBase. European Respiratory Journal 2021
8. Tissot N, Brunel AS, Bozon F, Rosolen B, Chirouze C, Bouiller K. Patients with history of covid-19 had more side effects after the first dose of covid-19 vaccine. Vaccine 2021; 39(36), 5087-5090.
9. Spyropoulos AC, Levy JH, Ageno W, Connors JM, Hunt BJ, Iba T, et. al. Scientific and standardization committee communication: Clinical guidance on the diagnosis, prevention and treatment of venous thromboembolism in hospitalized patients with COVID-19. J ThrombHaemost 2020
10. Elnaem MH, MohdTaufek NH, Ab Rahman NS, MohdNazar NI, Zin CS, Nuffer W, et. al. COVID-19 Vaccination Attitudes, Perceptions, and Side Effect Experiences in Malaysia: Do Age, Gender, and Vaccine Type Matter? Vaccines 2021; 9(10), 1156.