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CASE REPORT

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Left ventricular thrombosis and endogenous endophthalmitis in the setting of COVID-19: A case report

Mohammad Javad Zibaeenezhad[1] | **Alireza Moaref**[1] | **Firoozeh Abtahi**[1,2] | **Mohsen Moghadami**[3] | **Mohammad Karim Johari**[4] | **Ali Ardekani**[5] | **Mohammad Keshavarz**[2]

[1]Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[2]Department of Cardiovascular Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

[3]Non-communicable Disease Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[4]Department of Ophthalmology, Poostchi Ophthalmology Research Center, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

[5]Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence
Ali Ardekani, Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: aliardekanimed@gmail.com

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Abstract

Aside from typical pneumonia, the coronavirus disease 2019 (COVID-19) has shown several extra-pulmonary manifestations. This study was done on a 66-year-old male patient who concomitantly had endogenous endophthalmitis and left ventricular thrombosis one month after being hospitalized due to COVID-19.

KEYWORDS

COVID-19, SARS-CoV-2, embolism and thrombosis, anticoagulants, endophthalmitis

1 | BACKGROUND

At the beginning of the coronavirus disease 2019 (COVID-19) pandemic, it was described as a highly contagious respiratory disease,[1] with fever, cough, malaise, and dyspnea being the most common symptoms among infected individuals.[2] Nevertheless, as time went by, more and more unusual and rare presentations of this disease were discovered.[3] To date, a wide range of extra-pulmonary manifestations including cardiovascular, thromboembolic, and ocular presentations have been reported following COVID-19.[4–7] Given the high prevalence of COVID-19,[8] these rare complications have occurred among many people worldwide. Therefore, it is vitally important for physicians to know how to diagnose and treat these complications.

The present study aims to report the first case of concomitant left ventricular (LV) thrombosis and endogenous endophthalmitis (EE) without a previous predisposing history, as a rare complication of COVID-19.

2 | CASE PRESENTATION

The case was a 66-year-old non-diabetic male patient with a previous history of controlled hypertension who had referred to a rural hospital with fever, cough, dyspnea, and malaise (blood pressure: 112/75 mmHg, pulse rate: 89

per minute, temperature: 38.5°C, and oxygen saturation: 92%). Routine laboratory tests including complete blood count, sodium level, potassium level, blood urea nitrogen, and creatinine level were sent for the patient, which were within the normal ranges. Given the high susceptibility of the patient for COVID-19, a nasopharyngeal polymerase chain reaction (PCR) test was also done, which turned out to be positive for COVID-19. In addition, the computed tomography (CT) scan showed 30% lung involvement. Thus, the patient was admitted. The treatment protocol included the administration of remdesivir 200 mg IV stat and 100 mg IV per day for five days, methylprednisolone 2 mg/kg IV, every 5 days tapered to half dosage until the discharge day, and tocilizumab 8 mg/kg IV stat. During the course of admission, due to progressive dyspnea and low oxygen saturation, the patient was transferred to the intensive care unit (ICU) for 4 days. Fortunately, the patient could survive this critical condition and was discharged after one week with prednisolone 50 mg daily, tapering in two weeks, and the previous anti-hypertensive drugs (losartan 25 mg twice a day and metoprolol tartrate 100 mg daily).

The patient was relatively well until ten days after discharge when he referred to the ophthalmology clinic with blurred vision mainly in the left eye. At presentation, the best corrected visual acuity (BCVA) of the right and left eyes were 8/10 and light perception (LP), respectively. All the examinations of the right eye were normal, except for mild macular pigmentary changes. However, examination of the left eye revealed conjunctival chemosis and redness, anterior chamber hypopyon (3 mm), and absence of red reflex due to severe vitreous opacity. No evidence of systemic presentations or COVID-19 signs and symptoms was observed. Aside from hypertension, past medical, surgical, and psychosocial history of the patient was unremarkable. However, due to being suspected for infectious EE, 23 gauge-parsplana vitrectomy was performed, and finally, silicone oil with intraviteral vancomycin (0.5 mg in 0.05 ml) and ceftazidime (1.125 mg/0.05 ml) was injected. The samples were sent for laboratory evaluations. According to the results of PCR, the tissue was positive for cytomegalovirus (CMV). Candida hyphae growth was also detected in the culture. The optical coherence tomography of both eyes has been shown in Figure 1. Accordingly, very small pockets of central sub-retinal fluid were observed in the right eye that were in favor of chronic central serous chorioretinopathy (CSC), while retinal layers' necrosis with a hyper-reflective line of silicon oil was found in the left eye.

Due to the diagnosis of EE, a complete workup panel was requested to determine the possible source of this infection. Erythrocyte sedimentation rate (ESR) was 46 mm/hr, and C-reactive protein (CRP) was 6 mg/dL. According to the enzyme-linked immunoassay (ELISA) test, the human immunodeficiency virus (HIV) antibody was negative. Blood cultures were performed three times every 12 h via an aseptic protocol, which turned out to be negative. Otherwise, the laboratory data were normal. Furthermore, transthoracic echocardiography (TTE) showed a mobile mass in the left ventricle. For a more precise evaluation, a transesophageal echocardiography (TEE) was performed, which revealed a large echogenic hypermobile mass sized 1.9 × 1.1 cm in the left ventricle attached to anterolateral papillary muscles, which was suggestive of thrombosis (Figure 2). Otherwise, TEE was normal with an ejection fraction of 55%–60%, without regional wall motion abnormality. Due to being suspected for concomitant CMV-associated retinitis and candida EE together with LV thrombosis, the patient received intravenous ganciclovir 5 mg/kg/BID and oral voriconazole 200 mg BID. Additionally, 400 μg/0.1mL intravitreal ganciclovir twice/week for two weeks and voriconazole 50 μg/0.1 mL single dose were injected. Subcutaneous enoxaparin 60 mg was also started every 12 h to treat the thrombosis. The plan was to follow the patient up via echocardiography in order to determine any change

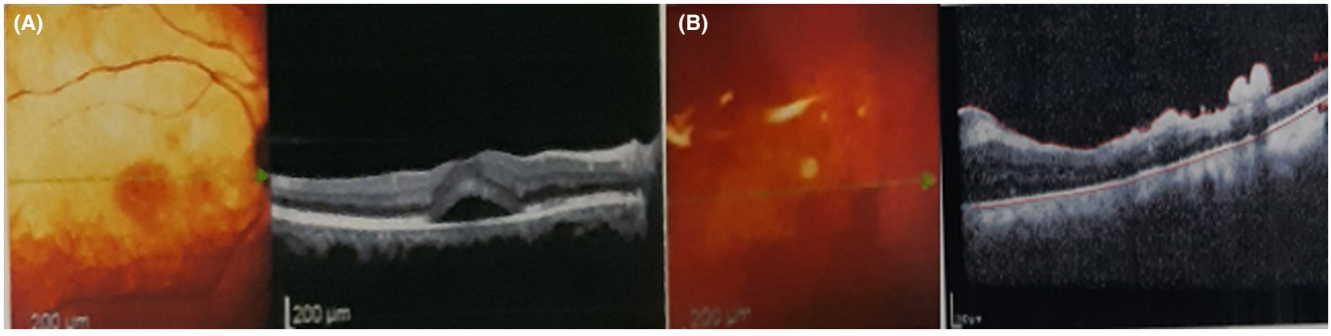

FIGURE 1 Optical coherence tomography (OCT) imaging of both eyes. In the right eye (A), very small pockets of central sub-retinal fluid (SRF) were detected, which were in favor of chronic central serous chorioretinopathy (CSC). In the left eye (B), retinal layers' necrosis was found with a hyper-reflective line of silicon oil

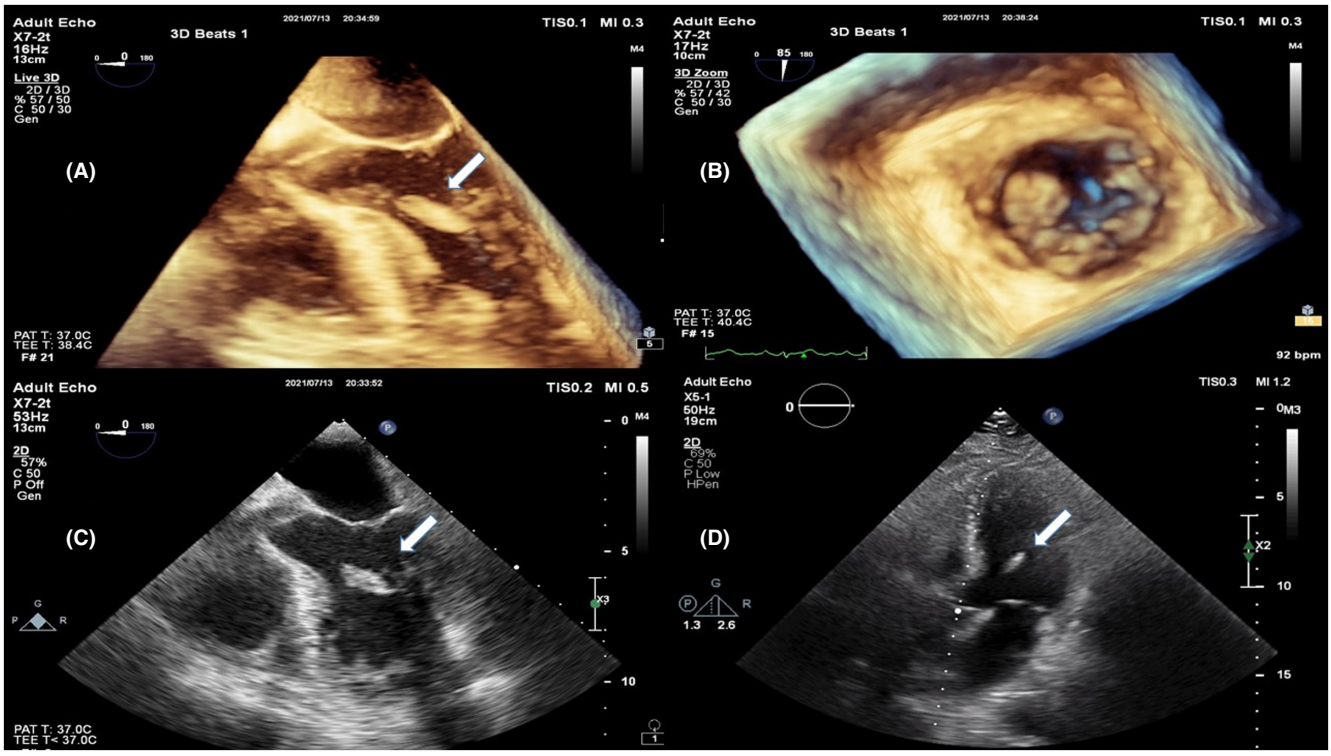

FIGURE 2 3D view of thrombus in TEE before treatment (A and B), 2D view of thrombus in TEE before treatment (C), and 2D view of thrombus in TTE after treatment (D)

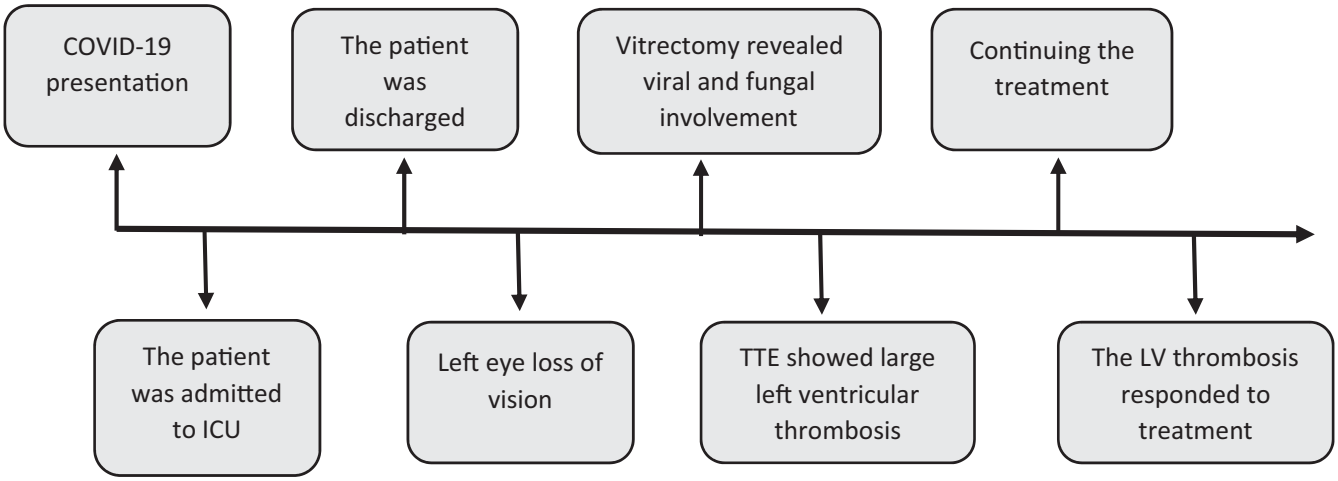

FIGURE 3 Patient's presentation timeline

in the size of LV thrombosis and response to treatment. The follow-up TEE showed no change in the size of the thrombus. However, given the patient's stable condition, it was decided to continue the anticoagulant therapy. A follow-up TTE was performed to determine the treatment outcomes, which revealed a regress in the ventricular mass size after ten days that was indicative of response to anticoagulant treatment (Figure 2). Hence, the patient was discharged and was under treatment with Apixaban 5 mg twice a day, valganciclovir 900 mg twice a day, and oral voriconazole 200 mg BID. The patient was followed up in terms of any size change in LV thrombosis and visual acuity. The timeline of the manifestations has been shown in Figure 3.

3 | DISCUSSION

This study described a 66-year-old male patient with concomitant LV thrombosis and EE after a short period of

admission in ICU due to COVID-19. Given the patient's unremarkable past history, it was hypothesized that infection with COVID-19, hyper-inflammatory state, and their consequences might have played a role in the incidence of complications. During the treatment of COVID-19, especially for critically ill patients, various immunomodulatory and immunosuppressive drugs are used to control the cytokine storm.[9] These treatments and the subsequent suppression of the immune system expose patients to other infectious diseases or the reoccurrence of latent ones.

The case under the current investigation presented with the classic signs and symptoms of EE and did not have any predisposing factors, except for COVID-19 and receiving immunomodulatory drugs. Long hospital stay and intravenous cannulas have been reported as the predisposing factors of EE among COIVD-19 patients.[10–12] Previous studies on EE following COVID-19 also indicated the role of immunosuppression in developing EE after receiving corticosteroids.[12–14] Generally, clinical manifestations are the basis of EE diagnosis, and empirical treatments are acceptable before knowing the culture results.[15] A systematic evaluation of patients is also necessary to find any possible source of infection. However, ocular fluid culture is only conclusive in 14%–43% of specimens,[10] and response to empirical therapy guides physicians for treatment.

Up to now, there have been reports of intracardiac thrombosis following COVID-19.[16–19] In these cases, the diagnosis of thrombus was confirmed by a pathology sample either after surgical and interventional removal or by response to anticoagulant treatment. Higher age, male gender, higher D-dimer level, lactate dehydrogenase, white blood cells, and lower lymphocytes were considered risk factors for thrombotic events in patients with COVID-19.[20] In a previous meta-analysis, the rates of venous and arterial thromboembolism were, respectively, 21% and 2% among COVID-19 patients and 31% and 5% among those admitted to ICUs.[4] Hence, thrombosis prophylaxis regimen has been recommended in moderate and severe cases.[21] In outpatient settings, thrombosis prophylaxis has been even suggested for high-risk individuals.[22] Overall, several mechanisms have been speculated for thrombus formation in COVID-19 patients including endothelial dysfunction, intercellular junction abnormalities, formation of microthrombi, coagulopathies, immune-induced thrombosis, cytokine storm, and inflammation.[21,23]

4 | CONCLUSION

Herein, a case of concomitant EE and LV thrombosis was presented. Given that immunomodulatory and immunosuppressant drugs are used to treat the inflammatory phase of COVID-19, patients are more prone to infections. Considering the higher chance of thromboembolism development in patients with COVID-19, appropriate workups must be done in case of relevant presentations. These repercussions have to be kept in mind while treating COVID-19 patients.

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AUTHOR CONTRIBUTIONS

MJZ, AM, FA, MM, MKJ, AA, and MK participated in drafting the manuscript and literature search. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

All data are included in this published article.

ETHICAL APPROVAL

A case report does not require ethical approval.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

ORCID

Mohammad Karim Johari https://orcid.org/0000-0002-5442-0073
Ali Ardekani https://orcid.org/0000-0001-7154-8864

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