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Case Report

Case report of unusual presentation of COVID-19 in a patient with pulmonary hypertension

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Abstract

Objective: COVID-19 has now become a worldwide health problem with many new cases diagnosed every day. people with underlying heart diseases are more likely to get infected and have poor prognosis. Of them, adult patients with congenital heart disease need special attention due to their different symptoms and course of the disease.

Case Presentation: Here, we report the unusual presentation and course of COVID-19 disease with rapid progression of right ventricle failure and pulmonary hypertension in patient who was infected with new SARS-CoV-2 virus. She is a 39-year-old woman, known case of ventricular septal defect and pulmonary hypertension with a history of open-heart surgery at the age of seven that arrived to our clinic due to exacerbation of dyspnea; progressive lower extremity edema and mild ascites from 10-days ago.

Conclusion: Any changes in the condition of adult patients with congenital heart disease in this epidemic should be considered as a potential infection by this virus and the necessary and accurate evaluation should be done.

Keywords: Congenital heart disease, Ventricular septal defect, Heart failure

Introduction

COVID-9 disease caused by new SARS-CoV- 2 is a large size beta corona-virus, first started in Wuhan, China in December 2019 and has now become a pandemic with 1 000 000 deaths till October 1, 2020. (1,2). This disease primarily affects the respiratory system and manifests itself in a range of common symptoms such as fever, cough and shortness of breath but can also affect other organs (1).

Cardiovascular system is one of the systems that can be affected by various mechanisms with SARS-CoV- 2, which worsens the prognosis and mortality of the disease (3).

Once the cardiovascular system is involved by the virus, due to unknown nature of the disease and the pathogenic mechanisms of the virus, the course of the disease and its symptoms would be different in patients. Therefore, it is important to pay attention to the underlying disease such as congenital heart disease of the patients (4,5). These patients can be infected by corona virus and their condition to be exacerbated. So, they need special attention during present pandemic (2).

Here, we report the unusual presentation and course of COVID-19 disease with rapid progression of right ventricle failure and pulmonary hypertension in patient with history of ventricular septal defect and pulmonary hypertension.

Case Presentation

Our patient was a 39-year-old woman, known case of ventricular septal defect and pulmonary hypertension (VSD/PH) with a history of open-heart surgery at the age of seven that arrived to our clinic due to exacerbation of dyspnea as a function of class III; progressive lower extremity edema and mild ascites from 10-days ago. At the beginning of the visit, blood oxygen saturation (SO_2) was 67% and vital signs showed: BP:100/60, PR:130, RR:24 and oral temperature: 36.5°C. Physical examination showed tachycardia with harsh systolic murmur at left sternal border and fine crackle in base of both lungs. Moderately severe (3+) pitting edema was evident in lower extremities. Electrocardiography (EKG) was taken and showed wide complex tachycardia with superior axis and rate of approximately 130 beat/minute that suggestive of atrial tachycardia (AT). Echocardiography showed mild left ventricular (LV) enlargement with moderate dysfunction; D-shaped septum; severe right ventricular (RV) enlargement (6.2 cm) with severe systolic dysfunction; severe tricuspid regurgitation (TR) with peak gradient (PG): 107; dilated main pulmonary artery and its branches with severe pulmonary regurgitation (PI) (Figure 1).

Based on medical records, patient had been periodically

visited and due to delayed surgery and relatively high pulmonary pressure, she had to take medicines since diagnosis of VSD/PH and her symptoms were controlled by medical treatment with Lisinopril (2.5 mg daily); Furosemide (20 mg twice a day); Spironolactone (25 mg daily); Carvedilol (6.25 mg twice a day) and Bosentan, endothelin receptor antagonist, (125 mg twice a day). Her previous echocardiography (Performed six months prior to her last visit) showed mild enlargement and dysfunction of LV; moderate enlargement and dysfunction of RV with severe hypertrophy; Severe TR with PG: 90 mm Hg and severe PI. The patient's SO2 was 88% at that time and she had no edema; ECG was sinus rhythm with right axis deviation and right ventricular hypertrophy (Figure 2).

Due to patient's condition and the instability of her symptoms, we decided to hospitalize her with a diagnosis of decompensated heart failure. The patient was monitored and treated with intra-venous amiodarone 150 mg stat and then infusion drip; 0.1 μg/kg/min infusion drip of Milrinone; phosphodiesterase type-3 inhibitor; and low dose of Inotrope (norepinephrine 0.01 μg/kg/min). Furthermore, based on her condition and laboratory tests, we decided to discontinue Spironolactone; Lisinopril and Carvedilol. The patient's initial laboratory tests indicated: creatinine (Cr): 2.9; blood urea nitrogen (BUN):161; sodium (Na):131; potassium (K): 5.8; white blood cell (WBC): 11 000; hemoglobin (Hg):18.9; platelet (PLT): 105 000 and urine analysis (U/A): normal. BUN, Cr and K level decreased on the second day. The edema of the limbs and ascites decreased, but her shortness of breath did not respond significantly to medical treatment. Due to the epidemics of COVID-19 disease and the fact that no reason was found for the deterioration of the heart condition, she was evaluated for this infection by polymerase chain reaction (PCR) test which result was positive.

After it, routine treatment for COVID-19 was started

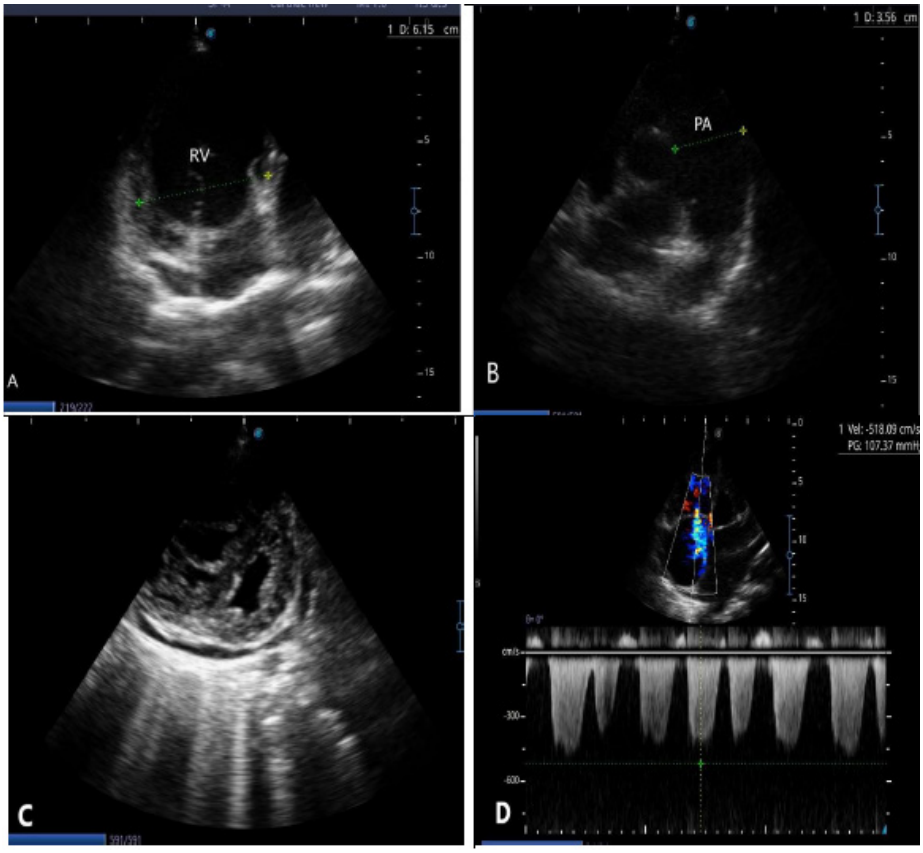

Figure 1. Doppler echocardiography in 4-chamber short axis view shows: A) Severe right ventricular enlargement; B) Dilated main pulmonary artery and its branches; C) D-shaped septum; D) Severe tricuspid regurgitation with PG:107 mm Hg.

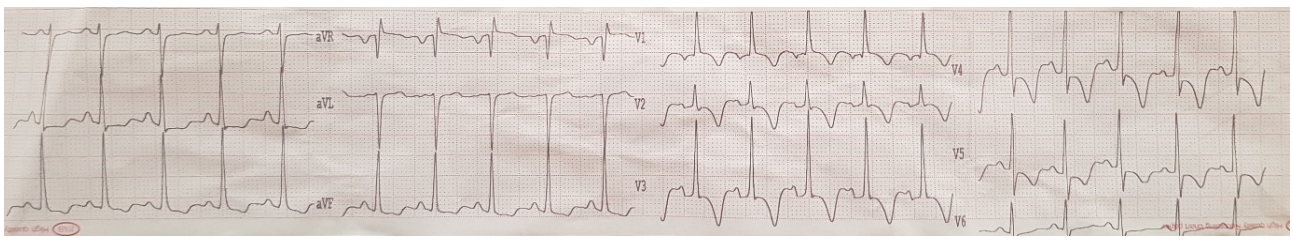

Figure 2. EKG shows sinus rhythm with right axis deviation and sign of right ventricular hypertrophy.

for the patient, but unfortunately the patient did not respond well to treatment. After decrease of SO_2 and tachycardia, the patient condition deteriorated and turned to respiratory distress, hypotension, and immediately cardiopulmonary arrest. Cardiac pulmonary resuscitation was started, but unfortunately was unsuccessful after twenty minutes and the patient became asystole and died after 48 hours of hospitalization.

Discussion

Today, due to advances in surgery and treatment methods, it is expected that the survival rate of infants with congenital heart disease will increase and the population of adults with this problem is increasing (6).

Due to the chronic nature of congenital heart disease, there is an expectation of a chronic inflammatory process during the life of these patients. On the other hand, the presence of residual defects of surgery puts these patients at risk (3) and they are considered a special group that who need more attention (7).

Cardiac dysfunction and pulmonary hypertension are two of the most common complications in these patients. Both have been shown to cause instability in patients during respiratory infections such as influenza or COVID-19 infection. Following infection with the virus and respiratory infection, we see an acute increase in the resistance of the pulmonary arteries, which worsens the severity of pulmonary hypertension and increases the capillary wedge pressure. This process increases the cardiorespiratory work load, especially on the right side of the heart, and can cause the right chamber collapse (8).

In the patient discussed in this article, both cardiac dysfunction and pulmonary hypertension were seen as underlying diseases which predisposed her to infection with the SARS-CoV-2. In addition, according to the above, under these conditions, the patient's prognosis is expected to be worse than normal people.

Another considerable issue is the manifestations of COVID-19 disease in adult patients with congenital heart disease. According to previous studies, the most common manifestations of this disease are fever, dyspnea and dry cough (9). However, our case experienced symptoms of heart failure and she was not febrile during the course of the disease, which may be due to the different mechanism of pathogenesis of the virus in these patients (8).

Similarly, Moazenzadeh et al reported the initial manifestation of the COVID-19 disease in an adult patient with unrepaired Tetralogy of Fallot as aggravation of dyspnea without fever at the beginning of the disease (10). Likewise, Simpson et al showed that in spite of new heart failure, cardiac inflammation and arrhythmia was seen in patients with congenital heart disease (11). Another study by Sabatino et al on 76 known patients with congenital heart disease and confirmed COVID-19, also showed that 9% patients exhibited heart failure symptoms and 3% showed palpitations/arrhythmias (2).

In general, COVID-19 disease in adult patients with congenital heart disease can be considered in two ways. Firstly, we are facing a disease whose nature; courses and mechanism of virus pathogenicity are not yet known. Additionally, we are faced with a heterogeneous population of patients with multiple and different heart and lung complications who need regular periodic visits. In addition, it seems that the course of the disease in these people is atypical and insidious. As can be seen, our patient's symptoms were controlled by medical treatment over the years and she acutely developed cardiac dysfunction and disease progression. In these circumstances, complete physical examinations and necessary para-clinical evaluation should be performed in each visit. Comparing patient's symptoms, ECG and laboratory information with previous ones can also be very helpful. Any changes in the patient's underlying disease course as well as para-clinical examinations such as exacerbation of dyspnea, decrease of SO_2, and unexplained aggravation of cardiac dysfunction may require special attention to rule out SARS-CoV-2 infection. To minimize the risk of infections, arrangements should be made to visit these patients in such a way not to be exposed to contaminated environments. They could also benefit from telemedicine.

Conclusion

In the current situation and according to the epidemic of COVID-19, any changes in the condition of adult patients with congenital heart disease should be considered as a potential infection by this virus and the necessary and accurate evaluation should be done. Moreover, improving patient awareness could be beneficial in preventing the disease and timely diagnosis.

In addition, increasing patient awareness and effective communication between physician and patient in these conditions can be of great help in preventing the disease and timely diagnosis.

Authors' contributions

MM and MA managed the patient. MA drafted the paper and MM revised the draft. Both authors read and approved final version of the paper.

Ethical issues

Informed consent was obtained from the patient relatives to publish this report.

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