How to Cite:
Alavi, S. M. A., Bahrami, S., & Hoori, M. (2022). COVID-19 in pregnancy: A case report of cardiomyopathy. *International Journal of Health Sciences*, *6*(S7), 5944-5949.
https://doi.org/10.53730/ijhs.v6nS7.13404

COVID-19 in pregnancy: A case report of cardiomyopathy

Seyed Mohammad Amin Alavi
Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Samaneh Bahrami*
Department of Obstetrics and Gynecology, Division of Perinatology, Imam Khomeini Hospital, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
Corresponding author email: samanehbahrami115@gmail.com

Mina Hoori
Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

***Abstract*---**Objective: The coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus (SARS-CoV 2), has expanded rapidly all over the world and is a pandemic now. Pregnant women experience immunological and physiologic changes that make them more susceptible to viral infections. Case Report: We described a case report of a term singleton pregnant woman with the manifestation of acute myocardial injury. In echocardiography, reduced left and right ventricular ejection fraction was seen in the absence of obstructive coronary artery disease. This phenomenon was highly suggestive of cardiomyopathy. Conclusion: Due to the fact of the immunological and physiological changes during pregnancy, women should be aware of viral infections, especially COVID-19, which is prevalent all over the world. Cardiomyopathy might be classified as one of the manifestations of COVID-19 in pregnant women. Further investigations should be considered for the absolute relationship between COVID-19 and cardiomyopathy to improve pregnant women's health.

Keywords*---COVID-19; SARS-CoV 2; Pandemic; Cardiomyopathy; Pregnancy.***

Introduction

On December 31, 2019, Wuhan Municipal Health Commission firstly identified cluster cases of pneumonia in Wuhan, Hubei province, China. On January 30, 2020, the World Health Organization (WHO) declared COVID-19 to be the sixth public health emergency of international concern. SARS-CoV-2 is a new coronavirus that causes respiratory disease (1). The most frequent symptoms of covid-19 are coughs, shortness of breath, difficulty in breathing, fever or chills, muscle and body aches, vomiting or diarrhea, and new less of taste or smell (2). Pregnancy is a physiological state that exposes women to respiratory complications of viral infection. The maternal physiological changes in their immune and cardiopulmonary systems can be associated with a high-risk position to develop severe illness after infection with respiratory viruses and worse outcomes (3). COVID-19 can manifest with acute cardiovascular syndrome (4). There is limited information on SARS CoV-2 infection among pregnant women and the severity of illness (3). This study described a case report of a term singleton pregnant woman with a severe feature of COVID-19 infection presented with acute myocardial injury. (5-7)

Case report

On August 28, 2020, a 33-year-old Iranian female, 37 weeks and three days pregnant, presented to the labor department with three days history of fever, confusion, weakness, and shortness of breathing that added labor pain from the morning.

The patient had a history of three full-term cesarean deliveries. Her medication was only a daily prenatal vitamin. She did not have any medical history during pregnancy. She received prenatal care at another medical center. Her body mass index (BMI) was 21 kg/m2. On arrival to Labor Department, vital signs were Temperature 38.4 ºC, Heart rate (HR) 100 a beat/min, blood pressure (BP) 110/70 mmHg, respiratory rate (RR) of 22 breath/min, Oxygen Saturation (SPo2) of 98% in room air.

A fetal non-stress test (NST) showed moderate heart rate variability with tachycardia and fetal baseline heart rate of 180 beats/min. She had three force full contractions with a 25-second duration in 10 minutes. Admission laboratory tests were abnormal that reported a rise of transaminase, creatinine, coagulation disorder, hypoglycemia, and thrombocytopenia (Table 1). After consultation with the perinatologist, the patient underwent emergency cesarean delivery under general anesthesia on the same day (1 hour after admission). The result of the cesarean section was a boy impregnated with thick meconium and with an Apgar score of 7/10- 8/10 (one and five minutes after delivery). His birth weight was 2950 gr. He was admitted to the neonatal ICU for observation. Forty-eight hours after birth, the neonate expired due to sepsis. Unfortunately, a COVID-19 test was not done for him. The patient was transferred to the intensive care unit with an impression of HELLP syndrome and thrombotic thrombocytopenic purpura (TTP) disorder.

Magnesium Sulfate IV, Ceftriaxone IV, and Metronidazole Iv were administered for the patient. Admission laboratory tests were abnormal, which was reported with rising of transaminases, creatinine and hypoglycemia, thrombocytopenia, and coagulation disorder (Table 1). After surgery, immediate vital signs were BP: 90/60 mmHg, RR: 20 breath/min, PR: 100 a beat/min, temperature: 37 °C, SPO2: 95%. Several multidisciplinary consultations were performed.

Nasopharyngeal swab for COVID-19 real-time reverse transcriptase-polymerase chain reaction (real-time RT-PCR) assay was obtained. Her test was reported as negative after 28 hours. Spiral chest computed tomography (CT) without contrast was requested. Bilateral patchy ground-glass opacity and bilateral pleural effusion were reported in chest CT (Figure 1). It was difficult to recognize COVID-19 pneumonia from other viral pneumonia on chest CT findings. On post-operative day 3 (POD 3), the COVID-19 test was ordered again due to abnormal imaging findings. TTP was initially diagnosed in consultation with a hematologist, and plasmapheresis with volume restriction was done for her (POD 1,2,3) and transfused fresh frozen plasma (FFP).

Bacterial culture of the specimen from the blood and nasopharynx were obtained, and the result was negative. Both Brain CT scan and Electrocardiogram (ECG) were normal. On POD2, the patient complained about chest pain and developed generalized tonic colonic seizure, and then immediately cardiac arrest happened. Cardiopulmonary resuscitation (CPR) was initiated; the return of spontaneous circulation was obtained after 7 minutes of CPR. The patient was intubated, and a norepinephrine drip (10 mcg/min) was started until blood pressure raised 100/60 mmHg.

Post successfully CPR vital signs were BP:70 with norepinephrine drip, SPO2: 95%. The patient was extubated, but she was reintubated after 10 hours due to decreased SPO2. An electrocardiogram (ECG) was performed with sinus rhythm and ST-depression in V3_V6 leads.

The bedside transthoracic echocardiography was ordered, and results showed left Ventricle (LV) size enlargement and severe LV systolic dysfunction, mild right ventricle (RV) enlargement and mild RV systolic dysfunction, left atrium (LA) size enlargement, severe mitral regurgitation (MR), moderate to severe tricuspid regurgitation (TR), mild to moderate pulmonary insufficiency (PI), LV Ejection fraction was 25%, pulmonary artery pressure: 50 mmHg. With the diagnosis of cardiomyopathy, Magnesium Sulfate was discontinued as soon as possible angiography was performed with nonspecific findings. A full laboratory test was requested after CPR (Table 1). A peripheral blood smear was unremarkable, and troponin was positive. Levetiracetam IV, Aldactone (25 mg tab daily), Metoprolol tab (12.5 mg BD), Furosemide (40 mg tab BD), Milrinone (0.1 mic/kg/min), Methylprednisolone (500 mg×3 days) were started. On POD4 COVID-19, real-time RT-PCR testing was confirmed to be positive, so antiviral medication (Remdesivir) was started, and methylprednisolone (100 mg IV daily) was continued. The patient's condition was deteriorating, and hemodynamic instability has occurred. On POD5, O2 saturation was decreased (70-75%), and cardiac arrest happened. Unfortunately, cardiopulmonary resuscitation was not successful, and the patient expired.

Discussion

Pregnant women experience immunological and physiologic changes that make them more susceptible to viral infections (8). In this case, COVID-19 infection manifested with the acute myocardial injury with reduced left and right ventricular ejection fraction in the absence of obstructive coronary artery disease. Initial symptoms of Peripartum Cardiomyopathy (PPCM) are cough, orthopnea, dyspnea, fatigue, chest, and abdominal pain. These symptoms are also the clinical presentations of heart failure. (9) moreover, the same symptoms were seen in our patient.

Transthoracic Echocardiography is the essential technique for confirming or ruling out PPCM, and it should always be done in peripartum women with heart failure symptoms. During Echocardiography, the deterioration of left ventricular systolic function is the most significant result. LVEF is almost usually less than 45 percent. Furthermore, Echocardiography frequently reveals heart dilation, which generally affects all four chambers. (10) As the same findings were seen in this case, PPCM is a diagnosis of exclusion following evaluation for peripartum heart failure.

PPCM differential diagnoses are severe preeclampsia or eclampsia, cardiac dysfunction due to arrhythmia, cardiac dysfunction due to ischemia, pulmonary embolism, sepsis, and amniotic fluid embolism syndrome (11). These diagnoses were ruled out by laboratory findings, ultrasound, CT scan, and Echocardiography.

The mechanism of acute myocardial injury in COVID-19 is unresolved (8). It is unknown that cardiomyopathy due to COVID-19 is the direct effect of infection or part of multisystem organ dysfunction (12). It is also unclear to what extent acute systolic heart failure is mediated by myocarditis, cytogenetics storm, microvascular dysfunction, small vessel thrombotic complications, or a variant of stress-induced cardiomyopathy (13). Some studies from Wuhan China indicate a significant proportion of no surviving patients with COVID-19 and acute cardiovascular syndrome also had elevated transaminases, lactate dehydrogenase, creatine kinase, D_dimer, prothrombin time, which overall suggest markedly elevated pro-inflammatory mediators and a cytogenetics profile similar to the cytokine release syndrome (13). Those findings were similar to this case. The patient had only one risk factor for cardiomyopathy, including multiparity, and had no known contact with COVID-19 cases. Breslin et al. reported that the most common symptoms of COVID-19 infection were dry coughs, followed by fever and weakness (14). Although the patient came to the hospital to get midwifery care due to obstetric complaints, the initial chief complaints were similar to the common symptoms of COVID-19.

Conclusion

Symptoms of COVID-19 and PPCM are very similar, so that we should take in to consideration for further investigation to rule out cardiac dysfunction. This could be life-saving for the patient.

Unfortunately, due to a lack of the patient's family consent, an autopsy was not carried out. The autopsy would give us further information about COVID-19 and its precise relation with cardiovascular injury and should be considered in future. It should be mentioned that, because of limited publications explaining cardiovascular complications of COVID-19 in pregnant women, and also restricted information on how to deal with SARS CoV-2 infection morbidities in pregnancy, we hope so many studies will be done about acute cardiovascular injury with COVID-19 and methods that prevent the occurrence of the cytokine storm.

Author's declarations

Conflict of Interest Statement

The authors have no conflict of interest to declare.

Ethics Approval

In the institution that the research was carried out there was no necessity for ethics committee for case studies

Authors' contribution

All authors designed, performed the study, and wrote the manuscript together for publication.

Consent to participate, and publication

A written informed consent for publication of case report has been signed by the patient next of kin and is available upon request from the Editors.

References

1. *Listings of WHO's response to COVID-19 [Internet]. Available from: https://www.who.int/news/item/29-06-2020-covidtimeline*
2. *Symptoms of Coronavirus (COVID-19) [Internet]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/downloads/COVID19-symptoms.pdf*
3. *Koutis, Athena P., Read, Jennifer S. , Jamieson DJ. Pregnancy and infection. N Engl J Med. 2014;370(23):2211-.*
4. *Dotters-Katz SK, Hughes BL. Considerations for Obstetric Care during the COVID-19 Pandemic. Am J Perinatol. 2020;37(8):773–9.*
5. *Alghamdi A, Ibrahim A, Alraey M, Alkazemi A, Alghamdi I, Alwarafi G. Side effects following COVID-19 vaccination: A cross-sectional survey with age-related outcomes in Saudi Arabia. Journal of Advanced Pharmacy Education & Research| Jul-Sep. 2021;11(3):119-25*
6. *Siyal FJ, Shaikh ZA, Ahmed SZ, Shahid MA, Agha F, Khoso M, Unar AA, Unar K, Saleem R, Shahani MP. Anxiety among COVID-19 physicians during the pandemic in the health care center of the rural region. Arch Pharm Pract. 2020 Oct 1;11(4):91-3.*

7. *Magomedova UG, Khadartseva ZA, Grechko VV, Polivanova MN, Mishvelov AE, Povetkin SN, Demchenkov EL, Shevchenko YS. The role of Covid-19 in the acute respiratory pathology formation in children. Pharmacophore. 2020 Sep 1;11(5):61-5.*
8. *Hendren NS, Drazner MH, Bozkurt B, Cooper LT. Description and Proposed Management of the Acute COVID-19 Cardiovascular Syndrome. Circulation. 2020;141(23):1903–14.*
9. *Elkayam U. Clinical characteristics of peripartum cardiomyopathy in the United States: Diagnosis, prognosis, and management. J Am Coll Cardiol. 2011;58(7):659–70.*
10. *Ersbøll AS, Damm P, Gustafsson F, Vejlstrup NG, Johansen M. Peripartum cardiomyopathy: a systematic literature review. Acta Obstet Gynecol Scand. 2016;95(11):1205–19.*
11. *Honigberg MC, Givertz MM. Peripartum cardiomyopathy. BMJ. 2019;364:1–14.*
12. *Juusela A, Nazir M, Gimovsky M. Two cases of coronavirus 2019-related cardiomyopathy in pregnancy. Am J Obstet Gynecol MFM. 2020 May;2(2):100113.*
13. *Shi S, Qin M, Shen B, Cai Y, Liu T, Yang F, et al. Association of Cardiac Injury with Mortality in Hospitalized Patients with COVID-19 in Wuhan, China. JAMA Cardiol. 2020;5(7):802–10.*
14. *Breslin N, Baptiste C, Cynthia Gyamfi-Bannerman, Miller R, Martinez R, Bernstein K, et al. Coronavirus disease 2019 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals. Am J Obstet Gynecol [Internet]. 2020;2(2):1–7. Available from: https://doi.org/10.1016/j.ajogmf.2020.100118*