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Fetal tachycardia may indicate asymptomatic COVID-19 at term pregnancies: A case series

Fetal taşikardi term gebeliklerde asemptomatik COVID-19'a işaret edebilir: Olgu serisi

ESİN MERVE EROL KOC [1] Orcid ID:0000-0001-7686-9149
HATİCE AKKAYA [1] Orcid ID:0000-0002-9613-1712

[1] Department of Obstetrics and Gynecology, Ankara City Hospital, Ankara, Turkey

ÖZ

Coronavirus Hastalığı 2019(COVID-19)viral kaynaklı bir pandemidir.Hastalığın olumsuz gebelik sonuçlarıyla doğrudan ilişkili olmadığı savunulmakla birlikte,çalışmalarda COVID-19'lu gebeliklerde fetal distres oranının arttığı gösterilmiştir.Bu vaka serisinde,asemptomatik COVID-19'un eşlik ettiği fetal taşikardi vakalarını sunmayı amaçladık.Bu çalışmada,rutin gebelik takibi için başvuran ve term gebeliği olan 3 hastada,-fetal taşikardi temelinde fetal distres geliştiği tespit edildi ve acil sezaryen ile doğum gerçekleştirildi.Gebelerden hiçbirinin kronik hastalığı veya COVID-19'lu bir vaka ile yakın temas öyküsü yoktu.Tam kan sayımı ve kan serumu analizleri normaldi.Tüm hastalara asemptomatik COVID-19 teşhisi konuldu ve yenidoğanlardan 1 tanesinde de COVID-19 pozitif çıktı.Bu doğrultuda,fetal taşikardi tespit edilen gebeliklerde,hastalık semptomları olmasa bile COVID-19 ihtimali akılda tutulmalıdır. Fetal distres,obstetrik bir acildir.Bu nedenle olası olumsuz maternal ve neonatal sonuçlarla başa çıkabilmek için,COVID-19'un potansiyel tehditleri göz önünde bulundurulmalıdır.

Anahtar kelimeler: COVID-19; fetal distres; fetal taşikardi; güven vermeyen fetal status; gebelik sonuçları.

ABSTRACT

Coronavirus Disease 2019(COVID-19) pandemic is caused by a novel viral infection. The disease was not found to be directly related with adverse pregnancy outcomes; however, the incidence of fetal distress was shown to be increased in pregnancies with COVID-19.This case series aimed to present fetal tachycardia cases with accompanying asymptomatic COVID-19. This study reported three women with term pregnancies who presented for routine pregnancy follow-up and were detected with fetal distress at the basis of fetal tachycardia and delivered through emergency C-section. None of them had any chronic disease or the history of close contact. The complete blood count and blood serum analyses were normal. All patients were diagnosed to have asymptomatic COVID-19,of which one neonate was positive for COVID-19. COVID-19 should be considered in fetal tachycardia cases, even in the absence of disease symptoms. Fetal distress is an obstetric emergency; therefore, the potential threats of COVID-19 should be kept in mind to be able to cope with possible adverse maternal and neonatal outcomes.

Keywords: COVID-19; fetal distress; fetal heart rate; nonreassuring fetal status; pregnancy outcomes.

Sorumlu Yazar/ Corresponding Author:Esin Merve Erol Koc
Adres: MD, Obstetrician - Gynecologist, Department of Obstetrics and Gynecology, Anakara City Hospital, Ankara, Turkey
Address: Universiteler District, Bilkent Street, No:1, 06800, Çankaya, Ankara.
E-mail: esinmerve87@gmail.com

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INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a novel RNA virus that belongs to coronaviridae family (1). It is the cause of Coronavirus Disease 2019 (COVID-19) pandemic, which was first clearly identified in Wuhan, China in December 2019. The number of cases is increasing steadily, and the studies gain acceleration to evaluate the mechanism and clinical course of the disease as well as to develop the treatment modalities.

Fetal heart rate significantly changes as a response to the prolonged oxygen deprivation. Therefore, fetal heart rate monitorization is a commonly used tool in clinical practice to evaluate the fetal oxygenation. Fetal distress may be diagnosed according to the changes in fetal heart-beat patterns, poor fetal biophysics profile, and detection of meconium in amniotic fluid. Abnormal findings at Electronic Fetal Monitorization (EFM), which should be interpreted as non-reassuring fetal status are the presence of fetal tachycardia or bradycardia, and prolonged or recurrent decelerations (2).

Even though the SARS-CoV-2 infection has not been shown to be significantly related to adverse pregnancy outcomes (1, 3), the incidence of fetal distress was found to be significantly increased in COVID-19 (1, 4). The fetal distress cases reported in previous studies presented with fetal bradycardia, loss of beat-to-beat variability or persistent decelerations (1, 4-6). In this case series, we aimed to present 3 pregnancies, with asymptomatic COVID-19 and absence of close contact history, who developed fetal distress with fetal tachycardia through the course of delivery.

CASE REPORTS

Case 1

A 24-year-old primigravid pregnant woman at 39 +4 weeks of gestation presented to our obstetrics outpatient clinic for routine pregnancy follow-up. During the obstetric examination, fetal tachycardia was observed in EFM with the baseline of 160 beats/minute and the patient was hospitalized with the diagnosis of non-reassuring fetal status. The patient's body temperature was 36.7 0C, Arterial Pulse (AP) rate was 78/min, arterial systolic/diastolic Blood Pressure (BP) was 110/70. Routine blood biochemistry analyses including aspartate aminotransferase, alanine aminotransferase, blood urea nitrogen, and creatinine levels and Thyroid Function Tests (TFT) including thyroid-stimulating hormone, and thyroxine levels were at normal range. In terms of the Complete Blood Count (CBC) parameters; white blood cell count was 13 x109/L, lymphocyte count was 2.49 x109/L, platelet count was 253 x109/L, hemoglobin level was 12.8 g/dL. The C-Reactive Protein (CRP) level was 0.006 g/dL. Urine analysis was normal. The continuous EFM revealed loss of beat-to-beat variability and persistent fetal tachycardia with the baseline of 160 beats/minute and the findings were evaluated as fetal distress. Due to the continuing COVID-19 pandemic, to predict any possible undesired clinical outcome for the fetus and the mother, Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) analysis was performed for SARS-CoV-2 through nasopharyngeal swab sampling and the result was reported as positive for SARS-CoV-2. Emergency C-section was applied. A 3415 g weighted, female gendered baby was born with APGAR scores of 7 at 1st minute and 9 at 5th minute. On the neonatal 1st day, the RT-PCR performed through the nasopharyngeal swab sampling of the newborn was negative for SARS-CoV-2. The patient and the newborn were discharged from the hospital on the postpartum 2nd day.

Case 2

A 28-year-old multiparous pregnant woman at 39 weeks of gestation applied to our obstetrics emergency clinic with the complaint of labor pain. In obstetric evaluation, patient was in the active phase of the labor with 5 cm cervical dilatation, 70% cervical effacement. Considering the rapid course of the labor in a multiparous pregnancy, patient was hospitalized. The patient's body temperature was 36.5 0C, AP was 81/min, BP was 110/65. Routine blood biochemistry analyses including and TFT were at normal range. The CBC and urine analysis were normal. The patient had no symptoms or complaints of COVID-19. During the close follow-up at the delivery room, persistent fetal tachycardia was observed with the baseline of 180 beats/minute with persistent late decelerations with regular contractions in EFM. Emergency C-section was performed with the indication of fetal distress. RT-PCR test was performed and resulted as positive for SARS-CoV-2. The patient delivered a 3140 g weighted, male gendered baby with APGAR scores of 6 at 1st minute and 8 at 5th minute. SARS-CoV-2 was not detected in the two consecutive RT-PCR tests which were performed for the neonate, at the postpartum 1st and 3rd days. The patient and the newborn were discharged from the hospital on the postpartum 3rd day.

Case 3

A 30-year-old multiparous pregnant woman at 37 weeks of

gestation applied to our obstetrics emergency clinic with the complaint of groin pain. The patient had not any complaint compatible with COVID-19. Obstetric evaluation revealed that the patient was in the latent phase of the labor. NST showed beat-to-beat variability loss in fetal heart rate monitorization and minimal uterine contractions in tocography. The patient's body temperature was 36.8 0C, AP was 84/min, BP was 105/60. The blood biochemistry analyses, CBC, TSH, T4, ferritin, CRP and urine analysis were at normal range. The CRP was slightly increased to 0.009 g/dL. Patient was hospitalized and during the follow-up for labor, persistent fetal tachycardia was observed in EFM with the baseline of 170 beats/min. Emergency C-section was performed with the diagnosis of fetal distress. RT-PCR test was performed and resulted positive for SARS-CoV-2. The patient delivered a 3050 g weighted, female gendered baby with APGAR scores of 5 at 1st minute and 6 at 5th minute. The newborn was positive for SARS-CoV-2 in RT-PCR test, both on the postpartum 1st and the 3rd days. The newborn was followed-up in Neonatal Intensive Care Unit (NICU) through the first 3 neonatal days due to respiratory problems and in the neonatology clinic for 1 day. The patient and the newborn were discharged from the hospital on the postpartum 5th day.

The clinical features of the cases are summarized in table 1.

Table 1. A summary presenting the clinical characteristics of the cases.

	Case 1	**Case 2**	**Case 3**
Gestational weeks	39 +4	39	37
Complaint for hospital apply	Control visit for routine pregnancy follow-up	Labor pain	Labor pain
COVID-19 symptoms +/-	-	-	-
Fetal heart rate on EFM			
baseline	160	180	170
characteristics	Loss of variability	Persistent late decelerations	Loss of variability
Maternal SARS-CoV-2 RT-PCR	Positive	Positive	Positive
Delivery route	Emergency C-section	Emergency C-section	Emergency C-section
Birthweight *grams*	3415	3140	3050
APGAR scores *1st - 5th minute*	7-9	6-8	5-6
Neonatal SARS-CoV-2 RT-PCR	Negative	Negative	Positive
Need for NICU	-	-	+ NICU admission for respiratory problems. Discharged at postpartum 5th day.

COVID-19: Coronavirus disease-2019; EFM: Electronic fetal monitorization; SARS-CoV-2 RT-PCR: The severe acute respiratory syndrome coronavirus-2 reverse transcriptase polymerase chain reaction; NICU: Neonatal intensive care unit.

DISCUSSION

The pregnant women who had been reported in our case series had no symptoms of COVID-19 despite the positive RT-PCR results for SARS-CoV-2. The patients were admitted to the hospital through the usual course of the pregnancy. The current case series is important because it is the first report to present the fetal distress cases developed at the basis of fetal tachycardia in pregnant women who had no symptoms of COVID-19 or close contact history with people diagnosed with COVID-19.

Fetal distress is an indicator of the progressive fetal hypoxia and/or acidemia that results from the temporary or permanent inadequate fetal oxygenation (2). The underlying mechanisms of fetal distress in SARS-CoV-2 infection may be considered as the direct effect of the viral infection per se, or the physiologically decreased tolerance to hypoxia during late pregnancy that become more profound due to the respiratory involvement of the infection (5, 7). Any disturbance in maternal vascular perfusion consequently decreases the fetoplacental oxygen supply, which may result in fetal hypoxia. Decreased maternal vascular perfusion was shown to result in persistent muscularization of basal plate arterioles, villous infarction, and distal villous hypoplasia due to the deterioration of intervillous oxygen tension and increased oxidative stress (7, 8). Placental pathology was not examined in our case series, however, previous studies concluded that avascular villi, intervillous or subchorionic fibrin deposition, and thrombotic fetal vessels are found as the prevalent placental pathological findings in SARS-CoV-2 (9, 10).

Fetal distress is considered as a clinical determinant of non-reassuring fetal status. There are systematic reviews that reported fetal distress as one of the most prevailing adverse outcomes of the COVID-19 in pregnancy (1, 6). According to the previous reports, the fetal distress was defined in pregnancies complicated by symptomatic SARS-CoV-2 infection for all cases (1, 4-6). In a study conducted by Chen. et al., fetal distress was present in 2 of the 9 term pregnancies positive for SARS-CoV-2 infection. Both the pregnant women had the fever between 37.8-39.9 0C. Emergency C-section was performed. The newborns had APGAR scores of 8-10 in 1st and 5th minute and were negative for SARS-CoV-2 infection. There had been no need for NICU (6). In another study, Zhu et al. reported 6 fetal distress cases in their clinical analysis including 9 pregnancies with COVID-19 that delivered at term. All the pregnant women had complaints associated with SARS-CoV-2 infection such as fever, fatigue, and cough within the last 1-6 days until delivery. Emergency

C-section was performed. None of the neonates had positive PCR results for SARS-CoV-2 infection, however, 5 of the neonates with fetal distress had pulmonary complications including respiratory distress syndrome and need NICU (5). There is only one case that presented with an asymptomatic COVID-19 pregnancy that resulted in fetal distress. However, the patient had the history of myalgia and fever continuing for a few days up to the date of admission and the fetal distress was defined as persistent fetal bradycardia. The patient also had the complaint of decreased fetal movements for the last two days. Emergency C-section was performed. Even though the neonate was negative for SARS-CoV-2 infection, NICU was needed due to respiratory distress syndrome (9).

In previous publications, SARS-CoV-2 positivity in neonates of the pregnant women with COVID-19 has been shown in a number of cases. Angiotensin converting enzyme 2 receptors seem as essential in transmission, and infection processes of SARS-CoV-2 and are highly expressed on the placental maternal-fetal interface cells (11). However, there has not been any direct evidence or clearly defined mechanism, which may explain the vertical transmission or the transmission during the delivery. Although there was a tendency to prefer C-section as a delivery method for pregnant women with COVID-19, there has been also no sufficient data which could be accepted as evidence to determine whether the vaginal delivery or the C-section should be considered as superior to the other one (4, 12). The mode of the delivery was C-section for all three patients in our case series. Besides, one of the neonates was detected as positive for SARS-CoV-2 in the repeated PCR results at the 1st and 3rd neonatal days. It is not possible to clearly define whether this newborn was infected with SARS-CoV-2 through the vertical transmission or during the delivery.

CONCLUSION

Fetal distress is an emergent obstetric condition and should be meticulously managed. The potential threats of the SARS-CoV-2 infection on fetal well-being should be kept in mind. In this respect, SARS-CoV-2 infection should be considered in case of fetal tachycardia even in pregnancies asymptomatic for COVID-19 to be able to cope with adverse maternal and neonatal outcomes.

Ethical Status

The study was designed to present the reports of three cases; therefore, Institutional Review Board approval was not required due to the nature of the study. Written informed consent was obtained from all individual participants and the cases were reported according to the rules of Helsinki Declaration developed by The World Medical Association.

State Financial Disclaimer/Conflict of Interest

There is no person or organization that supported the study financially. The authors declared no conflict of interests.

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