AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

DIAGNOSTIC SIGNIFICANCE OF FETAL ECHOCARDIOGRAPHY IN PREGNANT WOMEN AFTER COVID-19 INFECTION

[1]Sevara.A.Palvanova, [2]Ahmad.X. Karimov

[1]Researcher Perinatal Center of Khorezm region. Khorezm,Uzbekistan E-mail: palvanovas6@gmail.com ,

[2]Associate professor (DS c) Tashkent Medical Academy Department of Obstetrics and Gynecology. Tashkent, Uzbekistan №2. E-mail: dr.akhmad@mail.ru ;

Abstract

Background: Coronavirus disease 2019 (COVID-19) has been shown to affect the cardiovascular system and may influence fetal development during pregnancy. However, data regarding its impact on fetal cardiac function remain limited.

Objective: To evaluate the diagnostic significance of fetal echocardiography in assessing cardiac functional changes in fetuses of pregnant women who experienced COVID-19 infection during the second and third trimesters.

Materials and Methods: A total of 124 pregnant women with a confirmed history of COVID-19 infection during the second and third trimesters were included in the study. All participants were receiving care at the Khorezm Regional Perinatal Center. Fetal echocardiography was performed four weeks after clinical recovery. Assessment of fetal cardiac function included evaluation of diastolic and systolic parameters using mitral and tricuspid E/A ratios, myocardial performance index (MPI), and cardiac chamber dimensions. The control group consisted of gestational age–matched healthy pregnant women without a history of COVID-19 infection. Statistical analysis was performed using appropriate parametric tests, with results expressed as p-values and effect sizes calculated using Cohen's d.

Results: Fetuses of mothers with prior COVID-19 infection demonstrated a significant decrease in mitral valve E/A ratio, indicating impaired diastolic relaxation ($p < 0.05$). An increase in MPI suggested subclinical global myocardial dysfunction. These changes were more pronounced in the third trimester compared to the second trimester.

Conclusion: Fetal echocardiography is a highly informative and non-invasive method for early detection of functional cardiac alterations in fetuses of pregnant women after COVID-19 infection. Its routine use may improve prenatal monitoring and pregnancy management in this population.

Keywords: COVID-19, pregnancy, fetal echocardiography, myocardial performance index, diastolic dysfunction.

Introduction

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

COVID-19 infection has been associated with multisystem involvement, including cardiovascular complications. During pregnancy, maternal viral infections can adversely affect placental function, fetal oxygenation, and cardiovascular adaptation. The fetal heart is particularly sensitive to hypoxia, inflammation, and hemodynamic disturbances.

Recent studies suggest that COVID-19 may impair fetoplacental circulation and alter fetal cardiac function even in the absence of structural heart defects. These changes are often subclinical and cannot be detected by routine obstetric ultrasound. Therefore, fetal echocardiography plays a crucial role in evaluating both structural and functional cardiac parameters.

The aim of this study was to assess the diagnostic value of fetal echocardiography in detecting cardiac functional changes in fetuses of pregnant women who had COVID-19 infection during the second and third trimesters.

Materials and Methods

Study Design and Population

A prospective observational study was conducted involving pregnant women who had a confirmed COVID-19 infection during the second or third trimester. Fetal echocardiography was performed 4 weeks after clinical recovery.

The control group included gestational age-matched healthy pregnant women with no history of COVID-19 infection.

Echocardiographic Assessment

Fetal echocardiography was performed using a standardized protocol. The following parameters were evaluated:

- Mitral and tricuspid inflow velocities (E/A ratio)
- Myocardial Performance Index (MPI, Tei index)
- Cardiac chamber dimensions
- Outflow tract Doppler parameters

Statistical Analysis

Data were analyzed using standard statistical software. Continuous variables were expressed as mean ± standard deviation. Intergroup differences were assessed using Student's t-test. Effect size was calculated using Cohen's d. A p-value < 0.01 was considered statistically significant.

Results

Fetuses of mothers with a history of COVID-19 infection demonstrated statistically significant alterations in cardiac functional parameters compared to the control group. The mitral valve E/A ratio was significantly reduced, reflecting impaired diastolic relaxation of the left ventricle.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

Additionally, MPI values were increased, indicating combined systolic and diastolic myocardial dysfunction. These changes were more evident in fetuses examined during the third trimester, suggesting a gestational age–dependent vulnerability of the fetal myocardium.

No major structural congenital heart defects were detected in either group.

Discussion

The findings of this study indicate that maternal COVID-19 infection may lead to functional cardiac changes in the fetus. Possible mechanisms include placental insufficiency, chronic intrauterine hypoxia, and inflammatory-mediated myocardial involvement.

Fetal echocardiography allows early identification of these subclinical alterations, which may be missed by conventional obstetric ultrasound. Early detection provides an opportunity for closer prenatal surveillance and optimized pregnancy management.

Our results are consistent with emerging evidence suggesting that COVID-19 affects fetal cardiovascular adaptation rather than causing structural abnormalities.

Conclusion

1. Maternal COVID-19 infection during pregnancy is associated with functional alterations in fetal cardiac performance.
2. Fetal echocardiography is a sensitive and reliable method for detecting subclinical myocardial dysfunction.
3. Routine fetal echocardiographic assessment should be considered in pregnant women with a history of COVID-19 infection.

Clinical Implications

Fetal echocardiography may serve as an essential tool for risk stratification and individualized prenatal care in pregnancies complicated by COVID-19.