ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 10| October 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

FEATURES OF THE COURSE OF GESTATION IN PREGNANT WOMEN WITH COVID-19 ASSOCIATED MYOCARDITIS

Karimov A.Kh.[1], Tukhtabaev A.A.[2], Tukhtabaeva G.M.[2]

[1]Department of Obstetrics and Gynecology №2, Tashkent Medical Academy, Uzbekistan, Tashkent.
[2]Republican Specialized Scientific and Practical Medical Center for Obstetrics and Gynecology of the Ministry of Health of the Republic of Uzbekistan, Tashkent

Article DOI: https://doi.org/10.36713/epra14579
DOI No: 10.36713/epra14579

SUMMARY

Our analysis of the course of pregnancy revealed that myocarditis against the background of COVID-19 is a fairly common pathology that is missed due to the difficulty in diagnosing this disease, and it occurs in the morbidity structure in 27% of cases at the convalescence stage. The significance of this pathology increases due to the latent course up to a certain point, as well as circulatory failure that develops sharply during pregnancy, and the associated placental dysfunction, leading to undesirable complications for the fetus and mother. Developed prenatal hypoxia negatively affects the prenatal state of the fetus and newborns, possibly leading to the development of cardiac pathologies. We put forward the opinion that pregnant women with COVID-19 associated myocarditis are at increased risk for the development of perinatal complications, aggravation of the course of pregnancy, the occurrence of cardiac pathologies of the mother and fetus, which undoubtedly requires improved management of pregnancy and childbirth in women with COVID-19 associated myocarditis. The results, which should be aimed at early detection of maternal and fetal cardiac pathology, thereby preventing obstetric and perinatal complications.

KEY WORDS: ***gestation against the background of COVID-19, myocarditis during pregnancy, COVID-19 associated myocarditis, fetoplacental dysfunction.***

INTRODUCTION

Currently, in the field of maternal and child health, numerous discoveries have been made, with the main directions being the reduction of maternal and neonatal morbidity and mortality. However, unfortunately, there is a constant trend towards an increase in intrauterine fetal pathologies, which are caused by morphofunctional disorders in the fetoplacental complex, mostly in women with concomitant somatic pathologies, a complicated obstetric-gynecological history, and a pathological course of pregnancy [4].

In turn, the prevalence of COVID-19 during pregnancy leads to a range of complications that result in irreversible consequences, including myocarditis and circulatory insufficiency, and heart rhythm disturbances. There is currently no established approach for managing pregnancy in this group, which necessitates the refinement of pregnancy management strategies and the early identification of potential complications. Scientific progress in modern medicine has led to the need to address new challenges associated with new circumstances, including the COVID-19 pandemic, for the rational management of pregnancy and antenatal care for fetal health. In the modern world, due to the widespread identification of myocarditis and placental dysfunction during pregnancy, special attention is given to research aimed at early detection, treatment, and prevention of pathology. One of the most common and important pathologies in pregnant women is placental dysfunction (PD), which is a frequent complication of pregnancy, leading to fetal hypoxia, intrauterine growth restriction, and, as a result of the aforementioned pathological changes, contributing to perinatal morbidity and mortality. Therefore, a leading direction in scientific work in this area is the development of a management algorithm. Among the current tasks for specialists in this field is the identification of risk factors for the development of pathological childbirth and the determination of preventive measures for women with placental dysfunction in the context of COVID-19-associated myocarditis.

Measures are being taken in our country to improve the provision of medical care to the population, including early diagnosis and reduction of complications, especially in women of reproductive age. In connection with this, the healthcare system is undergoing comprehensive reform, with the "Expansion of high-tech and specialized medical care for mothers and children to reduce infant and child mortality" identified as a top priority [Decree No. 5590 dated December 7, 2018].

In light of the above, an important aspect in improving the quality of healthcare provided to the population of the country is the development of a new approach to pregnancy and childbirth management in women with COVID-19-associated myocarditis. In practical medicine, determining the true prevalence of myocarditis among pregnant women is impossible because clinical diagnosis of myocarditis is variable

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 10| October 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

and presents a number of difficulties. One of the reasons is terminological (nosological) inconsistency and the inability to define clear clinicomorphological criteria due to unjustified drug treatment, making the clinical course of the disease obscure and often masked by other, often primary, diseases. Very often, a misdiagnosis of rheumatism (latent or mild) or other heart diseases (of ischemic origin) is made, although in reality, COVID-19-associated myocarditis (non-rheumatic myocarditis) is present. As a result of the complicated course of myocarditis, areas of sclerosis develop at the site of affected myocytes, leading to symptoms of post-myocarditic cardiomyopathy [1,4,6].

The relevance of studying the course of gestation in the context of COVID-19-associated myocarditis is associated with a high level of maternal and infant morbidity and mortality in this path7ology, difficulties in assessing its early diagnosis, and the absence of pathognomonic signs specific to this condition. According to the literature, the prevalence of COVID-19-associated myocarditis does not decrease from year to year and reaches 16-27% in the structure of morbidity. Myocarditis is the dominant pathology among all forms of cardiovascular diseases during pregnancy in the context of COVID-19, and it is one of the main causes of maternal and perinatal mortality, following hemorrhage and hypertensive syndromes [2,5]. In foreign literature, myocarditis during pregnancy in the context of COVID-19 is seen as the cause of maternal mortality in an average of 17% of cases (second only to other causes), which can only be verified by pathological examination, and it ranks first in the structure of perinatal morbidity and mortality [4,7]. The relevance of the problem we are studying is due to the severe consequences of myocarditis for pregnant women and the developing placental dysfunction, which leads to fetal intrauterine distress and affects the health of the newborn. In women with cardiac pathologies, the course of pregnancy is often complicated by exacerbations of chronic diseases such as chronic hypertension, myocardial ischemia, and nephropathies [2,5]. Newborns may exhibit signs of central nervous system damage, cardiac system pathologies, low birth weight for gestational age, neonatal diabetes, and others [5,8]. When reviewing the literature and the experience of conducted research, numerous questions arise that require further investigation. Etiologically and pathogenetically, there are unconfirmed aspects related to the pathogenesis of myocarditis during pregnancy in the context of COVID-19. Special features of central and intracardiac hemodynamics in the mother are noted as a result of morphofunctional changes in the myocardium of women [3,6].

The aim of the study was to investigate the features of pregnancy course in pregnant women with COVID-19-associated myocarditis.

MATERIALS AND METHODS

We conducted a study of pregnancy progression in the first to third trimesters (gestational age ranging from 8 to 36 weeks). A total of 138 pregnant women participated in the study, among whom 86 women had contracted COVID-19 during pregnancy. They were divided into three groups. Group I (n=42) consisted of pregnant women who had contracted COVID-19 and had no complications related to the cardiovascular system. Group II (n=52) included pregnant women who had contracted respiratory infections during pregnancy, which subsequently led to myocarditis. Group III (n=44) comprised pregnant women who had contracted COVID-19, and subsequently developed myocarditis. The diagnosis of myocarditis was established by a cardiologist based on a combination of clinical manifestations.

We utilized the following methods: general clinical, clinical-anamnestic, clinical-laboratory, ultrasound examination of the mother and fetus, Doppler measurements, assessment of hemodynamic parameters in the mother, placenta, and fetus, fetal Doppler-echocardiographic studies, and cardiotocography.

RESULTS

When assessing subjective sensations, pregnant women reported complaints related to comorbidities, including elevated heart rate - in 85% and 69% in the III and II groups, respectively, and resting shortness of breath - in 45% and 13% in the III and II groups, respectively (Figure 1).

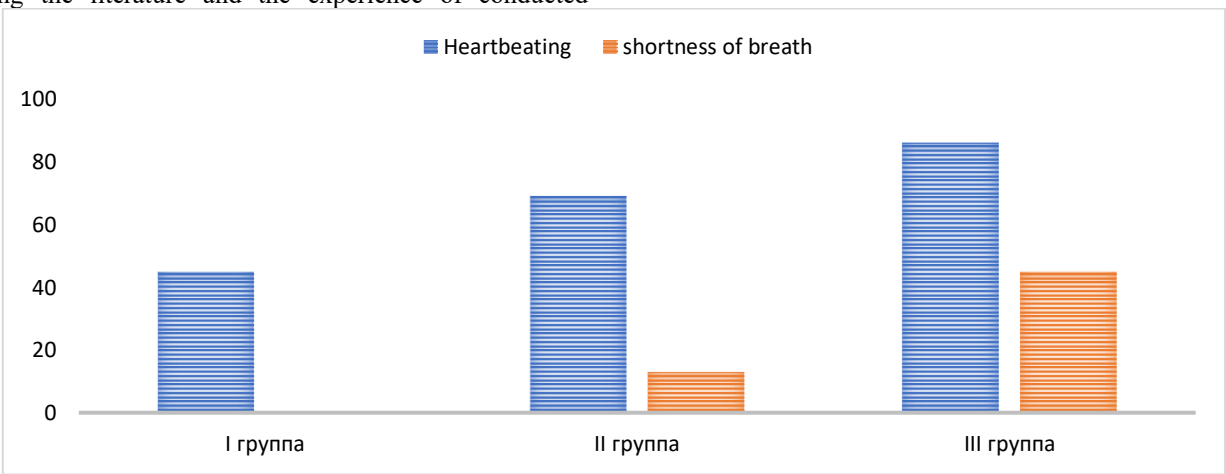

Figure 1. Complains of patients.

Analysis of the duration of myocarditis existence showed that in all pregnant women from Group II, cardiac pathology existed for no more than 2 months at the time of referral to the cardiologist, while in Group III, except for 11 cases (15%),

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 10| October 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

myocarditis lasted no more than 6 months. In more than half (60%) of the women in Group II with clinically established placental dysfunction, myocarditis had been present for more than 2 months but not more than 6 months. In Group III, myocarditis had been present for more than 6 months in 48% of women (Figure 2).

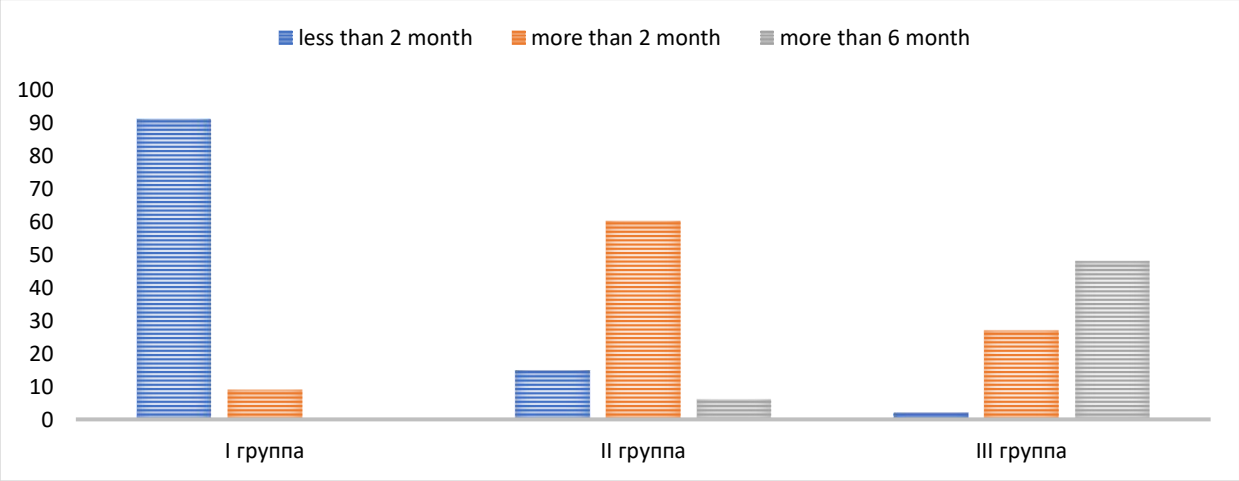

Figure 2. Duration of myocarditis in pregnant women.

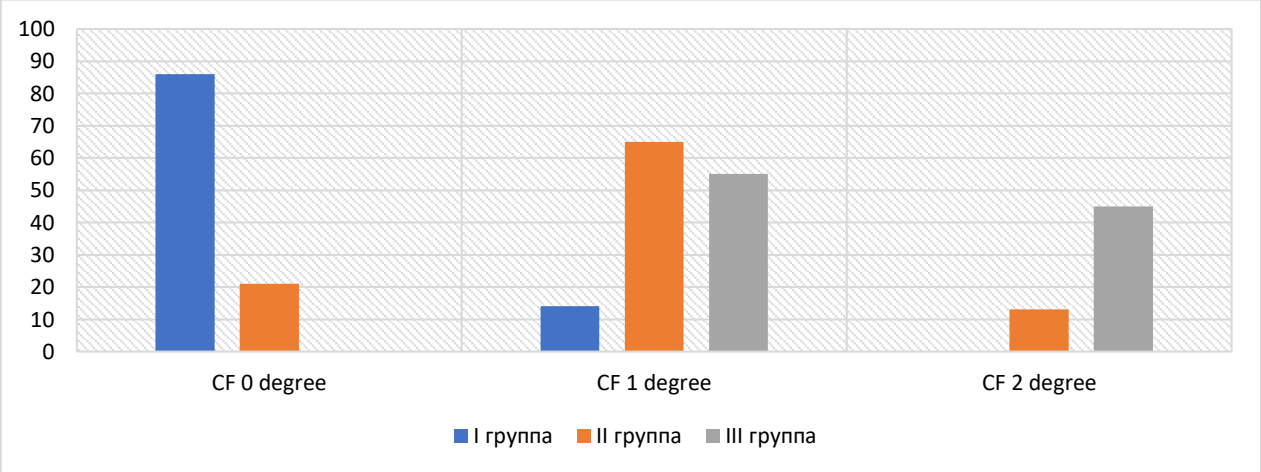

Figure 3. Distribution depending on the degree of circulatory failure.

The identified data demonstrate that myocarditis was complicated by NYHA class I in more than half of the cases, in both Group II (65%) and Group III (55%) of women. NYHA class II was observed in 12% and 45% in Group II and Group III, respectively (Figure 3). In addition to assessing the duration and severity of myocarditis, a detailed examination of the course of the first and second halves of gestation in pregnant women with clinically established and not established placental dysfunction, which developed against the backdrop of myocarditis, was of great importance. The analysis of the obtained results and the study of clinical and anamnestic data confirmed our hypothesis that the severity of PD and the degree of impairment of the mother's compensatory capabilities are dependent on predisposing factors. These factors include complicated pregravid background, an unfavorable course of the first half of gestation, and previous respiratory infections.

The main share of somatic pathologies during the first half of gestation consisted of various degrees of anemia and respiratory infections (ARI), which were found in almost more than half of the women in Groups II and III (53.8% and 65.9% respectively). Following them in frequency were respiratory tract diseases (15.4% and 18.2% respectively), tonsillitis (9.6% and 18.2% respectively), obesity (19.2% and 47.7% respectively), and arterial hypertension (3.8% and 18.2% respectively). It is interesting to note that these pathologies were observed in most cases in women from both Group II and Group III.

The dominant role in the structure of accompanying somatic pathologies identified during the second and third trimesters was anemia of varying severity, which was present in 80% of pregnant women in Group III and 60% of women in Group II. The most common accompanying somatic diseases were found in women in Group III and included chronic pyelonephritis (50%), diseases of the cardiovascular system (6.1%), thyroid gland disorders (11.1%), and chronic tonsillitis (11%). Diseases such as obesity and varicose veins were almost equally prevalent in all pregnant women with myocarditis complicated by PD.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 10| October 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

Most somatic pathologies were present in similar frequencies in the main group and the comparison group. However, when analyzing the data in detail, the simultaneous presence and exacerbation of multiple somatic diseases in pregnant women from the main Group III was of particular interest. Combinations of more than 2 somatic diseases were found in 35%, and more than 3 in 15% of women in Group II. Therefore, it can be concluded that the severity of PD and the depletion of compensatory reserves of the mother-placenta-fetus system depend not only on concomitant somatic diseases but also on their simultaneous occurrence and exacerbation.

Consequently, we classified these diseases as predisposing factors for the development of placental dysfunction and the worsening of compensatory reserves of the mother-placenta-fetus system up to decompensation in the fetoplacental circulation. Similar results were obtained when studying the characteristics of complications in the first half of gestation in the examined pregnant women. The most common obstetric complications in Group III women were early (34.1%) and late spontaneous abortion (13.6%), which were observed 7.5 and 3 times more frequently than in Group II pregnant women, respectively. We determined that nausea and vomiting of pregnancy (NVP) of varying degrees were present in every fifth woman (18.2%) in Group III, with 59.1% experiencing mild NVP. In contrast, in Group II, almost every ninth woman (15.4%) experienced severe intractable NVP during the first half of gestation, which was not observed in Group III women. It is known that threatened miscarriage, especially in the early stages of gestation, is accompanied by an increase in uterine muscle tone, leading to vascular spasm. Prolonged occurrence of this process leads to a hypoxic condition and the development of metabolic changes in the fetoplacental complex. Similar metabolic changes occur in pregnant women with NVP, especially in its severe forms. These circumstances create an unfavorable background during placentation when cytotrophoblast invasion occurs, and placental vessel formation.

Therefore, the prolonged threat of miscarriage and excessive vomiting in pregnant women of mild and severe degrees can be considered factors that deplete the compensatory-adaptive capabilities of the placenta, disrupting trophoblastic processes. Among obstetric complications, the threat of preterm birth (in 31.8% of cases) was frequently observed in Group III women, which was noted 2.3 times more often compared to pregnant women in Group II. Perinatal complications in the form of fetal growth restriction (FGR) occurred almost 4.8 times more frequently in Group III women (18.2%) compared to those in Group II, and antenatal fetal death (AFD) was found in the history of 3 women (6.8%) in Group III, leading to an increased frequency of perinatal morbidity and mortality in this group. Umbilical placental syndromes (UPS) occurred in 1.9% and 6.8% of cases, respectively, in Group II and Group III, and fetal cardiac pathologies (FCP) were mainly detected by Doppler echocardiography among pregnant women in both groups (7.7% and 13.6%, respectively). Among these women, concomitant FGR (in 10 cases), oligohydramnios (in 2 cases), polyhydramnios (in 2 cases), and 2 cases of AFD were identified. The timing of childbirth significantly differed between the studied groups. In Group I, except for one woman, all other deliveries occurred at a gestational age of 37-40 weeks. In contrast, in 77% and 61% of cases in Group II and Group III, respectively, deliveries occurred at a gestational age of 37-40 weeks. In 15% and 18% of women, respectively, deliveries occurred at a gestational age of 35-36 weeks, and deliveries at a gestational age of 31-32 weeks were observed in 8% of Group II and 21% of Group III women. Induction of labor was performed in 8% of cases in Group II and 16% in Group III due to the sudden exacerbation of chronic somatic pathologies.

CONCLUSION

It is worth noting that in pregnant women with COVID-19-associated myocarditis, pregnancy is complicated by NYHA Class I heart failure in 59% of cases, and Class II heart failure in 35% of cases. In the structure of placental insufficiency and prenatal hypoxia, COVID-19-associated myocarditis was found to be dominant among all forms of cardiovascular pathologies. In 5% of cases, Fetal Growth Restriction (FGR) developed on the background of myocarditis, and in 0.8% of cases, antenatal fetal death (AFD) was observed due to rapidly progressing placental dysfunction. In terms of the frequency of complications in the obstetric history, pregnant women in Group III predominated. It should be noted that the majority of women in Groups II and III had a history of somatic, obstetric, and gynecological complications. When studying the history of diseases in the first half of pregnancy in the examined women, it was found that the vast majority had experienced acute respiratory infections (ARIs) and COVID-19 without proper treatment, which unfortunately led to complications. Complications in the first half of pregnancy were most often observed in Group III women. Patients in both groups most frequently complained of palpitations, with 85% in Group III and 69% in Group II, as well as resting dyspnea (45% and 13%) in pregnant women in Groups III and II, respectively. In all pregnant women in Group II, myocarditis existed for no more than 6 months, whereas in Group III, myocarditis persisted for more than 6 months in more than half of the cases (68%) - indicating that compensatory capabilities of the body were already exhausted, resulting in a higher number of complications in this group. The majority of pregnant women in Group I did not have heart failure, and NYHA Class I heart failure was diagnosed in 65% and 55% of the cases in Groups II and III, respectively. NYHA Class II heart failure was only observed in Groups II (13%) and III (45%) women. Funding sources: No sponsors were involved in this scientific research. In the event of a conflict of interest, the authors take full responsibility.

REFERENCES

1. *E. A. Kogan, Ju. S. Berezovskij, O. V. Blagova. // Myocarditis in COVID-19 Patients Confirmed by Immunohistochemical Analysis // Kardiologija zhurnal// Tom 60, № 7 (2020).*
2. *R.I. Strjuk.//Cardiovascular diseases and pregnancy.// - M.: GJeOTAR& Media, 2020. - 277 s*
3. *Bansal M. Cardiovascular Disease and COVID-19 // Diabetes & Metabolic Syndrome: Clinical Research & Reviews. — 2020. — Vol. 14. — P. 247-2504.*

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 10| October 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

4. *Chan J.F., Kok K.H., Zhu Z. et al. Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan // Emergency Microbes Infect. — 2020.*
5. *Hayward R.M., Foster E., Tseng Z.H.// Maternal and fetal outcomes of admission for delivery in women with congenital heart disease. // JAMA Cardol. – 2017. - №2. – P. 664–671.*
6. *Hulot J.S. COVID-19 in patients with cardiovascular diseases // Arch Cardiovascular Dis. — 2020. — S1875-2136(20)30080-2. 3. Zheng Y.Y., Ma Y.T., Zhang J.Y., Xie X. COVID-19 and the cardiovascular system // Nat Rev Cardiol. — 2020.*
7. *Lippi G., Lavie C.J., Sanchis-Gomar F. // Cardiac troponin I in patients with coronavirus disease 2019 (COVID-19): Evidence from a meta-analysis [published online] // Program Cardiovascular Dis [published online]. — 2020.*
8. *Lippi G., M Henry M.B. and Sanchis-Gomar F. // Physical inactivity and cardiovascular disease at the time of coronavirus disease 2019 (COVID-19) // European Journal of Preventive Cardiology. The European Society of Cardiology. — 2020 — 0(0). — P. 1-3*