The Relationship between the COVID-19 Pandemic and Early Pregnancy Abortions

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ABSTRACT

Aims: The present study aims to find the relationship between the COVID-19 pandemic and early pregnancy abortions.

Methods: The abortion materials observed in the endometrial curettage cases between March 11 and November 30 during the 2020 pandemic period were compared with those observed at the same time in 2019. The placetas of COVID-19 positive patients and those of early abortion in the previous year were compared. Furthermore, the relationship between the blood type and COVID-19 related abortions were examined. This retrospective study applies various statistical tests to analyze the relationship between COVID-19 and abortions.

Findings: The data collected from the samples in 2019 and 2020 were analyzed statistically. Significant differences were found between the causes of miscarriages in 2019 and 2020.

Conclusion: The results indicated that there were significant vascular changes in the placenta of pregnant women among the cases of early abortions due to COVID-19 during the pandemic period. In addition, a significant relation was found between ARH+ blood type and COVID-19 on miscarriages. The results suggest that COVID-19 is one of the main causes of early pregnancy abortions.

Keywords: Blood groups, COVID-19, pregnancy loss.

I. INTRODUCTION

The causes of miscarriage during the first trimester of pregnancy can be due to genetic disorders, hereditary or chronic diseases, placental anomalies, Rh incompatibility, maternal uterine anomalies, and infections [1]. Although the mortality rate of COVID-19 is lower than the mortality rates of the previous SARS and Middle East Respiratory Syndrome (MERS) outbreaks, SARS-COV-2 is more contagious and the risk of transmission to pregnant women is higher, which increases the risk of miscarriage [2]-[5]. Previous studies showed that the majority of cases of miscarriage during the first trimester, known as the early pregnancy period, occur as a result of chromosomal anomalies, anatomical disorders of the uterus, cervical insufficiency, infections, bleeding disorders, and hormonal disorders [6]. In addition, the use of alcohol, cigarettes, and caffeine during pregnancy increases the risk of miscarriage [6], [7]. The present study aims to examine the effects of the COVID-19 virus on early pregnancy by comparing the cases of early pregnancy abortions before and during the COVID-19 pandemic and share the relevant findings.

II. METHODS

The tissues samples of endometrial curettage were collected between March 11 and November 30 in 2019 and during the COVID-19 pandemic period between March 11 and November 30 in 2020. The samples were evaluated with histopathological examination and a tissue follow-up process was carried out on the tissue tracking device. The blocks embedded in the paraffin blocks were investigated. The sections of these paraffin blocks were stained with histological hematoxylin and eosin stains and re-evaluated under a light microscope. Demographic information, such as previous pregnancy status, blood group, and the presence/absence of chronic diseases were recorded in the study. The results were investigated using Statistics Package for Social Sciences for Windows®22.0 (IBM Corporation, Chicago, Illinois) software.

III. RESULTS

The data collected from 91 patients aged between 20–46 years in 2019, and 187 patients aged between 20–49 years in 2020. Frequency analysis and Mann–Whitney U test were used for comparative analyses. A p value of 0.05 was considered statistically significant. Significant differences were found between the causes of miscarriages in 2019 and 2020.

A. The causes of Miscarriages in 2019

The data were collected from 91 patients in 2019. The main causes of miscarriage were due to the absence of fetal
heartbeat + anembryonic pregnancy (N=48, 52.7%), bleeding associated with various factors (N= 27, 29.7%), Rh incompatibility and other blood group incompatibilities (N=11, 12.1%), the absence of fetal heartbeat (FHB) (N=2, 2%), partial hydatidiform mole (PHM) (N=2, 2.2%), and 1 due to maternal chronic diseases (MCD) (N=1, 1.1%) (Fig. 1). There were three main causes of the miscarriages in 2019; the absence of fetal heartbeat + anembryonic pregnancy, bleeding associated with various factors and Rh incompatibility and other blood group incompatibilities.

Fig. 1. The main causes of miscarriages in 2019.

B. The Causes of Miscarriages during the COVID-19 Pandemic in 2020

The data were collected from 187 patients in 2020 in total (Fig. 2). The results showed that the miscarriages were due to the absence of fetal heartbeat + bleeding (N=70, 37.4%), COVID-19 (+) bleeding + absence of fetal heartbeat (N=26, 13.9%), RH incompatibility and other blood group incompatibilities (N=23, 12.3%), anembryonic pregnancy (N=11, 5.9%), hypothyroidism (N=5, 2.7%), bleeding + maternal diabetes mellitus (N=1, 0.5%), maternal chronic disease + nephrotic syndrome (N=1, 0.5%), and heart disease (N=1, 0.5%).

The results indicated that three main causes of miscarriages in 2020 were absence of fetal heartbeat + bleeding, COVID-19 (+) bleeding + absence of fetal heartbeat, and RH incompatibility and other blood group incompatibilities. Reverse transcription polymerase chain reaction (RT-PCR) test results did not differ significantly based on the age distribution of the patients. The lowest age was 22 years, and the highest age was 47 years.

Fig. 2. The main causes of miscarriages in 2020.

C. Blood Groups, Age, and COVID-19 Relationship on Miscarriages

The relationship between the blood type and RT-PCR test scores of 187 cases were also examined in this study. There were 31 abortion cases out of 187 who had RT-PCT. Out of these 31 patients 13 were A Rh (+), 3 O Rh (-), 7 O Rh (+), 3 A Rh (-), 2 AB Rh (+), and 3 B Rh (+). In other words, the patients who had miscarriages due to Covid 19 were with A RH (+) (Fig. 3).

Most of the patients with Covid-19 were with A RH (+). Endometrial curettage of patients who had a miscarriage in 2019, the changes in the chorionic villi were consistent with the gestational week. Further, there were findings of bleeding in the decidualized tissues and inflammatory cell infiltration, suggesting infection. The revealed that the patients with COVID-19 in 2020 had an increase in vascularization in the chorionic villi and more intense fibrin deposition in the perivillous and intervillous spaces. In addition, there were changes in the chorionic villi that were consistent with the gestational week. An inflammatory cell infiltration due to an infection was observed in the decidualized tissues.

Finally, the results suggested that young patients were more vulnerable for having a miscarriage than older ones. This is important to provide insights on the effects of taking more strict protective measures against COVID-19 for women of reproductive age in reducing the risk of miscarriage in possible pregnancy situations.

Fig. 3. Blood groups and RT-PCR test results of the patients in 2020.

IV. DISCUSSION

In the light of the results, the causes of miscarriage were related to causes such as chromosomal anomalies resulting in anembryonic pregnancy, blood group and Rh incompatibilities, and chronic diseases in the mother or the fetus (Fig. 3). In addition to these causes, COVID-19 was the second most common cause of miscarriage during the pandemic period (Fig. 3). When the clinical histories of the patients in this period were examined, it was observed that they did not present to the hospital immediately when they experienced fever, headache, or nausea and tried to relieve their symptoms with alternative treatment methods such as cold compress and paracetamol. These patients later presented to the emergency department of the hospital with vaginal bleeding and had a PCR test performed in the hospital.
The signs of miscarriage mostly associated with bleeding in patients with COVID-19 in the early period of pregnancy during the pandemic period. Vascular changes, villitis, chorioamnionitis findings, and fibrin deposits in the intervillus and peri villous spaces were observed to be more exaggerated in the placentas of such patients. It is possible that such changes may impair the nutrition of the fetus or lead to a blood supply disorder. Previous studies suggest that SARS-COV-19-2 may cause fetal vascular malperfusion by causing vascular endothelial damage through the ACE2 receptor on endothelial cells, making them susceptible to microthrombus formation as because of complement-induced coagulopathy [8], [9]. Reference [10] stated that vascular perfusion decreased in the placentas of pregnant women during the third trimester, and villith and chorioamnionitis are the most common findings. The histo-morphological findings of this study were similar. In a large-scale study, [11] observed that COVID-19 was among the causes of miscarriage during pregnancy, wherein the miscarriages occurred due to placental inflammation. Reference [12] reported that abortion rates due to COVID-19 were not higher than those due to other causes of miscarriage. In another study by [13] the changes observed in the placenta in patients with COVID-19 during the early period of pregnancy corroborate the findings of our study.

The increased viral load after SARS-COV-2 infection is associated with disease severity. Reference [14] reported that immune mechanisms become more effective as viral load increases in pregnant women and that the risk of miscarriage increases due to proinflammatory maternal immune response, vascular thromboembolic events, or changes in trophoblastic cells caused by the virus. Similarly, the present study shows the placental changes in the patients with the early pregnancy abortions.

Regarding the blood type, COVID-19 and early pregnancy abortions. O blood group have a lower risk of contracting COVID-19, but individuals with A blood group are more likely to contract the disease and develop a more severe form of the disease [15]-[18]. In this study, no statistically significant difference was observed in terms of the blood groups of pregnant women with COVID-19 who had a miscarriage in the early pregnancy period. However, although the number of patients examined in this study was limited, it is noteworthy that most of pregnant women with COVID-19 who had a miscarriage had A Rh (+) blood group. In addition, what is particularly noteworthy in this study is that the microscopic examinations of the tissues of patients with COVID-19 who had different blood groups revealed that the histopathological symptoms were more severe in patients with A blood group and were less common in patients with O blood group and other blood groups. Reference [19] examined the effects of the disease in pregnant women with COVID-19 who had different blood groups from various countries in their large-scale study and reported that pregnant patients with O blood group had a milder disease and those with A blood group had a more severe disease. In the same study, they reported that the disease was riskier in Rh-negative patients, although they could not obtain a statistically significant result. It was important to state that the findings were more severe, and the rate of miscarriage was slightly higher among Rh (+) patients, albeit not statistically significant.

V. CONCLUSION

The results of the study showed that COVID-19 is involved early pregnancy abortions during the pandemic period. Patients with COVID-19 and A Rh+ blood group have higher risks of pregnancy abortions than other blood types. It is necessary to undertake more preventive measures and frequent checks during the early pregnancy period. Further research on pregnant women infected with SARS-Cov-2 would be valuable for achieving insightful results in terms of reproductive health.

REFERENCES