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Clinical analysis of the effect of preeclampsia on the course of pregnancy and childbirth in multiparous women with iron deficiency anemia

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According to the World Health Organization, iron deficiency in the human organism is the most widespread anemia in the world. There is no country today that has studied and solved the problem of anemia completely. To analyze the impact of preeclampsia on pregnancy and childbirth in multiparous women with iron deficiency anemia. The study was conducted on 80 pregnant women aged 18-44 years. The objects of the study were multiparous women with iron deficiency anemia without preeclampsia 61 (76.3%) and with preeclampsia 19 (23.8%). Clinical-anamnestic information was obtained. A general analysis of blood and urine and a biochemical analysis of the pregnant women were performed. Methods of mathematical and statistical analysis- discriminant and variance analysis methods. Complicated obstetric anamnesis in pregnant women with iron deficiency anemia was observed in 73.7% of the women with preeclampsia and in 41.0% of the women without preeclampsia ($P_{\chi 2}$=0.013). Complicated gynecological anamnesis was in 3.3% of the women without preeclampsia and in 15.8% of the women with preeclampsia ($P_{\chi 2}$=0.049). IUGR was observed in 3.3% of the women without preeclampsia and 21.1% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.010). According to the comparative analysis, mild, moderate, and severe anemia occurred in 17 (27.9%), 43 (70.5%), and 1 (1.6) pregnant women without preeclampsia, and in 6 (31.6%), 11 (57.9%), and 2 (10.5%) pregnant women with preeclampsia, respectively ($P_{\chi 2}$=0.177). With the increasing severity of anemia, preeclampsia and cesarean delivery cases increased. The study of the effect of preeclampsia on the course of pregnancy and childbirth in pregnant multiparous women with iron deficiency anemia revealed that a complicated obstetric and gynecological history of pregnancy is predominant in this group of women. Surgical delivery is very common. It can be concluded that complicated obstetric and gynecological anamnesis is a premorbid background for the disease.

Keywords: *Multiparous women, preeclampsia, iron deficiency anemia*

INTRODUCTION

According to the WHO, iron deficiency is very common in the world population. Research is being conducted around the world to study this problem.

Iron deficiency anemia is a hematologic syndrome characterized by impaired hemoglobin synthesis as a result of iron deficiency, manifestations of sideropenia and anemia, as well as the development of trophic disorders in organs and tissues (Dobrokhotova et al., 2016).

Preeclampsia is a disease occurring during pregnancy with a lethal outcome in 5-8% of cases. Although effective diagnostic and treatment methods were improved to prevent the disease, the relationship between the capacity of pathological mechanisms and the variety of factors affecting pregnancy needs to be studied (Guillermina, 2017).

Preeclampsia is a multifactorial disorder characterized by hypertension and increased

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urinary protein excretion in pregnant women. It is the main complication that causes maternal and fetal deaths worldwide. Despite the controversial opinions on the pathogenesis of preeclampsia, the issue of predicting the initial symptoms of the disease has not yet been solved (Fatemeh al., 2018).

Preeclampsia is a disorder characterized by hypertension and proteinuria. According to the collected evidence, it is an endothelial disease. Angiogenic factors regulate the development of placental vessels. There is no evidence of the preeclampsia onset prediction in the clinic. Biomarkers are ideal choices for predicting preeclampsia during pregnancy. Attempts were made to study serum tumor necrosis factor α (TNF-α), C-reactive protein (CRP), vascular endothelial growth factor (VEGF) expression gene, endothelial nitric oxide synthase (eNOS), and p53 level in serum in the first trimester of pregnancy and biomarkers in the prediction of preeclampsia (Mervat et al., 2019).

As mentioned, one of the risk factors for the development of obstetric complications in women is a history of 3 or more births (multiparous women). The high incidence of anemia in multiparous women and the increase in the development of preeclampsia in the context of anemia, according to the literature, make us think about this and conduct research on these pregnant women.

To analyze the incidence rate of preeclampsia in multiparous women with iron deficiency anemia and its impact on the course of pregnancy and childbirth.

The study was conducted on 80 multiparous women with anemia, aged 18-44 years. In 19 (23,8%) of these women, preeclampsia was observed, 61 (76,3%) pregnant women did not have preeclampsia.

MATERIALS AND METHODS

The study was conducted on pregnant and postpartum women admitted to the maternity hospital No.5 (2014-2022) under the II Department of Obstetrics and Gynecology of AMU. The study is prospective in nature and consent was obtained from all patients. General blood analysis, biochemical analysis of blood were performed, coalograms were made, and anamnesis was recorded for each case carefully. Rates of HIV, RW, HCW, the classification, given by WHO experts, is based on the concentration of hemoglobin. Thus, mild, moderate, and severe anemia correspond to Hb concentrations, less than 100-110 g/l, 70-99 g/l, and 70 g/l, respectively.

Preeclampsia is classified as moderate or severe. HbsAg were determined and all pregnant women underwent the Ultrasound examination, Dopplerography, Cardiotocography of the fetus in the first and third trimesters.

Hypertension was diagnosed when the systolic blood pressure was ≥ 140 mm of mercury and the diastolic pressure was ≥ 90 mm of mercury. The result of + ≥1 (+ ≥0.3 g/l in daily urine) when protein was determined in the urine by the test-strip method confirmed proteinuria. Edema was observed in preeclampsia [Clinical protocol, 2012].

Regarding the age group of pregnant women, 34.4% of the women without preeclampsia and 15.8% of pregnant women with preeclampsia were 18-29 years old, while 65.6% of the women without preeclampsia and 84.2% of pregnant women with preeclampsia were 30-40 years old, $P_{\chi 2}$ =0.122.

When examining the social status of this group of women, it was detected that 75.4% of pregnant women without preeclampsia were housewives, 24.6% were working women, and 78.9% of pregnant women with preeclampsia were housewives and 21.1% were working women $P_{\chi 2}$=0.752.

Statistical analysis: The statistical integrity of the difference between the indicators of the groups was calculated in the SPSS-26 program with the Pt (Student-Bonferon), $P_{\chi 2}$ (Pearson), PU (Mann-Whitney) criteria (Gafarov 2022).

RESULTS AND DISCUSSION

The clinical characteristics of pregnancy and childbirth in women with preeclampsia were analyzed. First of all, special attention was paid to anamnestic data. Thus, in the anamnesis of the women without preeclampsia, abortion was not

registered in 32.8%, whereas 67.2% of the women had a history of abortion in preeclampsia cases, 26.3% of the women did not have an abortion, and 73.7% had an abortion ($P_{\chi 2}$=0.595). Abortion refers to spontaneous and artificial abortions. Gynecological diseases (infertility, genital inflammation, menstrual disorders, etc.) occurred in 3.3% of the non-preeclampsia pregnant women, and 15.8% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.049).

Extragenital diseases (cardiovascular pathology, obesity, varicose veins, etc.) were found in 18.0% of the pregnant women without preeclampsia and 31.6% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.208).

COA (complicated obstetric anamnesis) was present in 41.0% of the pregnant women without preeclampsia and in 73.7% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.013).

When analyzing the degree of anemia, the I, II, and III degrees were found in 17 (27.9%), 43 (70.5%), and 1 (1.6%) of the pregnant women without preeclampsia and 6 (31.6%), 11 (57.9 %), and 2(10.5%) in the pregnant women with preeclampsia, respectively ($P_{\chi 2}$=0.177) (Fig.).

MR (miscarriage risk) was 42.6% in pregnant women without preeclampsia and 52.6% in pregnant women with preeclampsia ($P_{\chi 2}$=0.444).

CFH (chronic fetal hypoxia) associated with the development of anemia was observed in 42.6% of the women without preeclampsia and in 68.4% of the women with preeclampsia ($P_{\chi 2}$=0.049).

FPI (Feto placental insufficiency) of the I, II, and III degrees was detected in 1.6%, 0.0%, and 1.6% of the pregnant women with preeclampsia and 21.1%, 0.0%, and 0.0% of the pregnant women without preeclampsia ($P_{\chi 2}$=0.008).

IUGR (Intrauterine growth retardation) occurred in 3.3% of the pregnant women without preeclampsia and in 21.1% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.008).

In cases without preeclampsia, the I degree birth weakness occurred in 24.6%, the II degree birth weakness in 6.6% of the women giving birth naturally, whereas in the pregnant women with preeclampsia, the I degree birth weakness occurred in 21.1%, and the II degree birth weakness in 5.3% of the women ($P_{\chi 2}$=0.922).

PROM (pre-labor rupture of membranes) was observed in 59.0% of the women without preeclampsia and in 26.1% of the women with preeclampsia ($P_{\chi 2}$=0.013).

PB (Premature birth) occurred in 9.8% of the pregnant women without preeclampsia and in 36.8% of the pregnant women with preeclampsia ($P_{\chi 2}$=0.005).

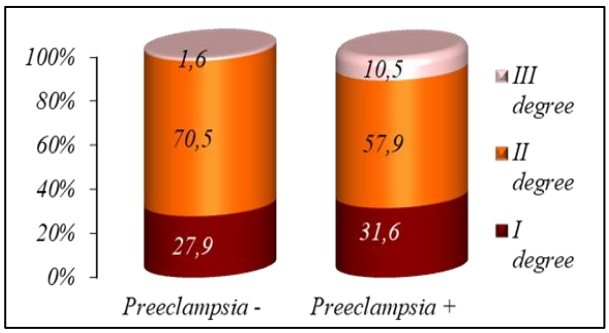

Fig. Frequency of anemia incidences

In cases without preeclampsia, 77.0 % of the women attended the hospital in the I period and 23.0% in the II period of pregnancy. Whereas, 89.5% of the patients with preeclampsia attended the hospital in the I and 10.5% in the II period of pregnancy ($P_{\chi 2}$=0.237).

Hysiological births and abdominal births occurred in 72.1% and 27.9% of women without preeclampsia, while in women with preeclampsia, this indicator amounted to 42.1% and 57.9%, respectively ($P_{\chi 2}$=0.017).

Regarding the fetus position during labor, in pregnant women without preeclampsia, 93.4% of the baby positions were head-down and 5.3% of them were breech. In patients with preeclampsia, 94.7% of the babies were in head-down and 5.3% breech positions ($P_{\chi 2}$=0.839).

Newborn babies were tested using the Apgar scale. At 1 min after birth for the babies delivered by the women without preeclampsia, Me=7.0 (7.0-7.0), and in the case of preeclampsia, Me=7.0 (7.0-7.0), (P_U=0.393) were obtained. At 5 minutes after birth, Me=8.0 (8.0-8.0) was obtained for the babies delivered by the women without preeclampsia.

The weight of newborns delivered by the women without preeclampsia was Me=3300.0 (3000.0-3600.0) and in the case of preeclampsia,

it was Me=2800.0 (2400.0-3200.0), (P_U=0.001).

In terms of height, it was Me=51.0 (50.0-52.0) in cases without preeclampsia and 48.3 ± 0.9 in cases with preeclampsia P_F = 0.001, (P_U = 0.001).

As for the gestation period, it was Me=40.0 (38.0-40.0) in the pregnant women without preeclampsia, and Me=38.0 (36.0-39.0) P_U= 0.004 in the pregnant women with preeclampsia.

We observed a high incidence of iron deficiency anemia in multiparous women. According to the literature data, chronic iron deficiency anemia (80-95% of all anemias) is frequent in real practice in therapy [Turkhan D.I. et al., 2019].

Iron deficiency anemia adversely affects the course of pregnancy, childbirth, the postpartum period, the condition of the fetus and newborn. The main complications caused by iron deficiency anemia in pregnancy are the risk of miscarriage (20-42%); preeclampsia (40%); premature abruption of the placenta (25-35%); intrauterine growth retardation of the fetus (25%); premature births (11-42%) [Vavina O.V. et al., 2018]. Thus, in our study, the risk of miscarriage has increased significantly, and there has been intrauterine growth retardation of the fetus.

Severe preeclampsia is most common among pregnant women and results in an increased number of cesarean sections (Surina et al., 2019). In our study, cesarean sections have also been preferred.

In women with a history of spontaneous abortion, subsequent pregnancies may also lead to the development of preeclampsia (Sepidarkish et al., 2017). It should also be noted that the incidence rate of artificial or spontaneous abortions (COA) among multiparous women was also high in the current study.

Traffic, noise, and air pollution increase the risk of developing hypertension and preeclampsia during pregnancy (Pedersen et al., 2017). In this regard, we have studied the social status of pregnant women, and housewives were found to predominate among these women.

Early hospitalization and treatment of acute arterial hypertension with magnesium sulfate result in reduced mortality among pregnant women (Ramas et al., 2017). It is important to pay more attention to women with proteinuria during the prenatal period. Because it is important to study its development in preeclampsia, analysis and study of proteinuria should be performed to predict the development of preeclampsia (Chung et al., 2018).

Preeclampsia is a multifactorial and multisystem disease specific to pregnancy. It is the classic diagnosis of arterial hypertension and associated proteinuria after 20 weeks of pregnancy in women with normal prepregnancy blood pressure. Preeclampsia can also be considered in the absence of proteinuria with damage to target organs (Peracali et al., 2019). The long-term prevention of non-contagious diseases leads to a sharp reduction in the maternal and fetal risk of hypertension and preeclampsia.

Hypertension and preeclampsia are global health priorities and important issues for maternal and newborn health after non-infectious diseases, which are a global epidemic (Shakhbazova, 2018).

The presence of extragenital pathologies in pregnant women was found to be a risk factor for preeclampsia and eclampsia (Hannah et al., 2020). Based on our research, we suggested that anemia is a risk factor, as well as extragenital pathology for pregnant women with preeclampsia.

CONCLUSION

It has been established that preeclampsia is more common during pregnancy in multiparous women with iron deficiency anemia. Moderate and severe preeclampsia is more common in the II and III degrees of anemia. A study of the clinical and anamnestic data of these women showed that this condition was more common in women with complicated obstetric and gynecological anamnesis. Due to preeclampsia, cesarean delivery was predominant. Regarding the condition of the fetus, intrauterine chronic hypoxia and growth retardation became more common as the severity of preeclampsia and anemia increased.

Thus, it can be concluded that COA and CGA prophylaxis before pregnancy and effective contraceptive methods are needed. Preventing complications caused by anemia, performing timely diagnosis and quality antianemic treatment

will ensure the health of the mother and fetus.

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