ANTIOXIDANT SYSTEM ACTIVITY IN THE PATEGENESIS OF POSTPARTUM ENDOMETRITIS

Umarov Aziz Rustamovich [2, b], Kamilova Iroda Abdurasulovna [1, a]
[1] Independent Researcher, Tashkent State Medical University
[2] DSc., Associate Professor, Tashkent State Medical University
Tashkent, Uzbekistan
[a] umazrus@mail.ru [b] irodakamilova@mail.ru

Abstract: The developed method for predicting the development of postpartum endometritis allows for the preclinical identification of women at high risk for endometritis in an obstetric hospital setting, preventing the development of severe purulent-septic complications after childbirth, and serves as a measure to reduce maternal mortality.

Keywords: endometritis, postpartum period, antioxidant system, systemic inflammation, postpartum sepsis, malondialdehyde.

Introduction. Several factors increase the risk of intrauterine infection after childbirth. These include young maternal age, obesity, diabetes, immunosuppressive disorders, corticosteroid therapy, decreased frequency of antenatal care, chorioamnionitis, a history of repeat cesarean section, emergency cesarean section, stapled wound closure, and excessive blood loss [1,3,5]. The severity of the inflammatory condition is assessed using immunological, biochemical, and physiological changes, markers of which include proinflammatory chemical mediators of inflammation, such as chemokines, cytokines, vasoactive amines, eicosanoids, and proteolytic cascade products, the levels of which are important prognostic markers for the development of PE.

The aim of the study was to investigate the prognostic significance of blood antioxidant system (AOS) activity in the early postpartum period in the development of postpartum endometritis.

Materials and Methods: The study included 66 women in labor with postpartum endometritis of varying severity: 23 with mild endometritis, 22 with moderate endometritis, and 21 with severe endometritis. The control (comparison) group consisted of 23 women with a normal postpartum period.

All parturient women had their AOS enzyme activity assessed on day 3 postpartum. Using standard aseptic precautions, 5 ml of venous blood from the

antecubital vein was collected in a polyethylene Stoppard tube containing 60 µl of the anticoagulant k3 EDTA (tricotassium ethylenediaminetetraacetic acid). After centrifugation at 3000 rpm for 10 min, the plasma was separated and stored at -40°C until analysis in the research laboratory. Data were collected using a pre-developed, validated data collection sheet. Total antioxidant activity of blood plasma - in the oxidation reaction with paraphenylenediamine [2,4].

Statistical analysis was performed using SPSS (IBM, version 21). Results are presented as mean (M), variance (õ), and standard deviation (±m); median (25% lower quartile – 75% upper quartile). The assumption of normal distribution was verified using the Shapiro-Wilk test (α=0.05). Results were considered statistically significant at an error level of $p<0.05$.

An assessment of antioxidant activity (AOA) demonstrated the opposite trend: with increasing PE severity, total AOA activity significantly decreased. The difference between the critical mean and group mean AOA activity (in %) in the comparison groups demonstrates a decrease in AOA with increasing PE severity.

The critical average AOA value in % was adopted in group 4 – severe PE, while the difference between the critical average and average group AOA activity in women in labor without PE and with a severe course (X1 – X4) is -26.13 AOA units; with a moderate and severe course (X2 – X4) - 22.74 AOA units; the corresponding difference between a moderate and severe course is 13.46 AOA units.

Total antioxidant capacity (activity) (AOA) is a biological parameter that represents the sum of the antioxidant effects of enzymatic antioxidants and molecules with antioxidant properties in a living organism and reflects the ability to neutralize the negative impact of free radicals at the cellular level [7]. Determining total antioxidant activity as the integrated activity of several antioxidants in plasma is important in the analysis of biological systems. A decrease in AOA with increasing severity of PE reflects the role of pathogenetic mechanisms of oxidative stress in the severity of PE.

It was found that with the increase in MDA concentration, the blood AOA progressively decreased. Thus, if the AOA value in % in group 4 (severe PE) is taken as the critical average, then the difference between the critical average and the average group AOA activity in women in labor without PE and with a severe course is -26.13 AOA units ($p\leq0.001$); with a moderate and severe course 22.74 AOA units ($p\leq0.001$); the corresponding difference between a moderate and severe course is 13.46 ($p\leq0.001$) AOA units, etc. AOA activity in women in labor was lower than in the control group ($p\leq0.001$).

The obtained results are consistent with the literature data. It is recognized that oxidative stress plays a central role in the pathophysiology of many disorders of pregnancy and the postpartum period, including pregnancy complications such as placental pathology, preeclampsia, intrauterine growth restriction, gestational diabetes and miscarriage. In the pathophysiology of oxidative stress in obstetric complications, the role of harmful habits, including alcohol abuse, is high [6,7].

Our results show a significant increase in lipid peroxidation and a significant decrease in antioxidant status in women with postpartum endometritis compared to the control group. This imbalance leads to a significant increase in the oxidative stress index in women with postpartum endometritis.

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