



**ANTIOXIDANT SYSTEM ACTIVITY IN BLOOD AS AN EARLY
PREDICTOR OF POSTPARTUM ENDOMETRITIS (CLINICAL AND
LABORATORY STUDY)**

Kamilova Iroda Abdurasulovna ^{1a}, Umarov Aziz Rustamovich ^{2b}

¹ DSc., Associate Professor, Tashkent State Medical University

² Independent Researcher, Tashkent State Medical University
Tashkent, Uzbekistan

^a irodakamilova@mail.ru ^b umazrus@mail.ru

Keywords: postpartum endometritis; postpartum period; antioxidant system; oxidative stress; malondialdehyde; prognosis.

Background. Postpartum endometritis (PE) remains one of the leading causes of maternal infectious morbidity in the postpartum period and often determines the duration of hospitalization, the need for repeat visits, and the risk of developing postpartum sepsis. Surgical delivery makes a significant contribution to the structure of postpartum infections: PE occurs after 1–3% of vaginal deliveries and up to 27% of cesarean sections, and the problem is particularly relevant against the backdrop of an increase in the frequency of cesarean sections in Uzbekistan.

Caesarean section is associated with a 5- to 10-fold increase in the incidence of postpartum infections and endometritis compared with vaginal delivery. The WHO benchmark for the acceptable proportion of cesarean sections (15-30%) is also noted as a measure to prevent complications.

Current approaches to reducing the incidence and severity of PE include standardized diagnostic/reporting criteria and optimization of antibacterial therapy. However, even with the existence of protocols, there remains a need for early risk stratification and identification of preclinical markers of complications (Rouse et al., 2019; Mackeen et al., 2015). Population-based studies demonstrate an association between postpartum infections and maternal characteristics, obstetric interventions, and complications, further highlighting the need to find objective prognostic indicators (Axelsson et al., 2018).

Systematic reviews confirm that peripartum infections remain a significant global health problem (Woodd et al., 2019).

In recent years, increasing attention has been paid to the role of oxidative stress in inflammatory and infectious conditions of the reproductive system, as an imbalance of



prooxidants and antioxidants can reflect the severity of inflammation and its potential for progression. The integrated indicator—total antioxidant capacity—is considered a clinically significant biochemical marker characterizing the overall antioxidant potential of biological environments (Silvestrini et al., 2023).

Therefore, assessing plasma AOA in the early postpartum period may be promising for predicting PE and preventing severe purulent-septic complications.

Objective. To evaluate the prognostic significance of blood antioxidant system activity in the early postpartum period in the development of postpartum endometritis.

Materials and Methods. Sixty-six women with varying degrees of PE severity (mild – 23, moderate – 22, severe – 21) and 23 women with a normal postpartum period (control) were examined. On day 3 postpartum, 5 ml of venous blood was collected with the anticoagulant K3-EDTA. The plasma was separated by centrifugation (3000 rpm, 10 min) and stored at -40°C. Total antioxidant activity (AOA) of plasma was determined using the paraphenylenediamine oxidation reaction. Statistical analysis was performed in SPSS (IBM, v21) using the Shapiro–Wilk test, ANOVA with post-hoc Tukey/Tukey–Kramer, Kruskal–Wallis test, and Spearman correlation ($p<0.05$).

Results. A consistent association was found between decreased plasma antioxidant capacity and increased clinical severity of PE. The average antioxidant capacity values were 57.8% in mild cases, 48.0% in moderate cases, and 34.5% in severe cases, compared to 60.6% in the control group. Thus, a decrease in the integral antioxidant capacity of the blood reflects increased oxidative stress and can be considered a biochemical marker of an unfavorable postpartum period in women with PE.

To assess the predictive value of this indicator, a ROC analysis was performed: an antioxidant capacity level of $<40\%$ was suggested to indicate a high risk of developing postpartum endometritis; diagnostic sensitivity was 80.30%, and specificity was 17.39%. This indicates the suitability of the AOA threshold $<40\%$ primarily as a sensitive screening criterion, which should be used in combination with clinical and laboratory markers of inflammation to reduce the proportion of false-positive conclusions.

Conclusions. The development of postpartum endometritis is accompanied by a significant decrease in total antioxidant activity (TAA) in blood plasma, with the degree of decrease correlating with the severity of the clinical course.

An AOA threshold of $<40\%$ can be used for the early identification of high-risk women (high sensitivity), but requires combination with other methods.



The introduction of biochemical assessment of TAA (along with markers of oxidative stress and inflammation) potentially allows for the optimization of preclinical monitoring and prevention of severe purulent-septic complications in obstetric hospitals.

References.

1. Mackeen A.D., Packard R.E., Ota E., Speer L. Antibiotic regimens for postpartum endometritis // Cochrane Database of Systematic Reviews. 2015. DOI:10.1002/14651858.cd001067.pub.
2. Axelsson D., Brynhildsen J., Blomberg M. Postpartum infection in relation to maternal characteristics, obstetric interventions and complications // J Perinat Med. 2018;46(3):271–278. DOI:10.1515/jpm-2016-0389.
3. Woodd S.L., Montoya A., Barreix M., et al. Incidence of maternal peripartum infection: A systematic review and meta-analysis // PLoS Med. 2019;16(12). DOI:10.1371/journal.pmed.1002984.
4. Rouse C.E., Eckert L.O., Muñoz F.M., et al. Postpartum endometritis and infection following incomplete or complete abortion: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data // Vaccine. 2019;37(52):7585–7595.
5. Silvestrini A., Meucci E., Ricerca B.M., Mancini A. Total Antioxidant Capacity: Biochemical Aspects and Clinical Significance // Int. J. Mol. Sci. 2023;24:10978. DOI:10.3390/ijms241310978.