

Possibilities of Interleukin-10 (IL-10) for Predicting the Development of Preeclampsia

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ABSTRACT

Hypertensive disorders during pregnancy are associated with high maternal and perinatal mortality, so it is very important for obstetricians to recognize severe cases with a poor prognosis in time.

The purpose of the study: To study the potential of interleukin-10 (IL-10) to predict the development of preeclampsia.

Materials and Methods: The study population consisted of 200 pregnant women. Of these, 100 had a risk of preeclampsia in the 1st and 2nd trimesters of pregnancy and 50 had a risk of preeclampsia in the 3rd trimester, and the control group consisted of 50 women with uncomplicated pregnancies. IL-10 was studied in pregnant women included in our study.

Results: In our study, the plasma level of IL-10 in women with preeclampsia was 23.3 pg/ml (specificity 89.7%, sensitivity 76.4%, accuracy 80.5%).

Conclusions: Thus, in preeclampsia, in contrast to normal pregnancy, the cytokine profile changes - there are lower concentrations of IL-10. Although the final pathogenesis of this pathology remains to be elucidated, on the basis of this it will be possible to develop an adequate therapy algorithm to save the life of the mother and child.

Preeclampsia (PE) is a pathological condition characterized by hypertension and proteinuria in the 20th week of pregnancy, often ending with severe complications, and occurs in 5-10% of pregnant women. This problem is especially relevant in developing countries, where complications of preeclampsia in pregnancy and maternal mortality are 20 times higher, and developed countries are no exception. In different regions of our republic, the incidence of hypertension in pregnant women is 15-25%. According to the analyzes of the national committee of the Republic of Uzbekistan, the death rate from preeclampsia in our country is 22.8 percent [1,3,6].

Preeclampsia, the leading cause of perinatal death, accounts for 8 percent of all pregnancies in Western countries [2,10]. It is one of the leading causes of maternal mortality and morbidity worldwide, accounting for 10–15% of maternal deaths [8,11].

Cytokines are signaling proteins that control biological processes during pregnancy, from implantation to birth. The first trimester is a vulnerable stage of pregnancy, as complications may be associated with improper development of placentation. In the first trimester, some evidence has shown that IL-10 concentrations are slightly lower in pregnant women at risk of preeclampsia than in healthy pregnant women [4,8].

Interleukin-10 (IL-10), encoded on chromosome 1, is an anti-inflammatory cytokine that acts through a receptor complex composed of IL-10R1 and IL-10R2 [5,9]. The multifunctional

cytokine is produced by macrophages, mast cells, Th2 cells, and regulatory T cells (Treg) and can inhibit pro-inflammatory cytokines, including IFN- γ . IL-10 and TGF- β are secreted by T cells (Treg) and their immunomodulatory properties control inflammation, which is important for successful pregnancy.

The purpose of the study: to study the possibilities of interleukin-10 (IL-10) predicting the development of preeclampsia

Research materials and methods:

In accordance with the goals and objectives, this scientific research work was carried out at the Department of Obstetrics and Gynecology No. 2 of the Bukhara State Medical Institute. There were 200 women involved in the study. 100 of them were at risk of preeclampsia in the 1st and 2nd trimesters of pregnancy and 50 were complicated by preeclampsia in the 3rd trimester, the control group was made up of 50 women whose pregnancy was uncomplicated. A research program was developed in accordance with the set goals and objectives: Interleukin 10 (IL-10) cytokine was examined in pregnant women involved in our study.

Research results:

The results obtained from our research showed that the concentration of interleukin-10 (IL-10) in the blood was 14.42 ± 0.54 pg/ml in the first trimester and 14.6 ± 0.64 pg/ml in the second trimester in pregnant women at risk of preeclampsia. did, no statistically significant changes were observed between the indicators of groups 1A and 1B. Among pregnant women complicated by preeclampsia, this indicator is 12.3 ± 0.81 pg/ml, and among pregnant women of the control group, this indicator is 15.53 ± 0.44 pg/ml ($P < 0.01$).

Compared to the indicators of groups 1A and 1B and the control group, the indicators of group 2 showed statistically significant changes.

Table 1. IL-10 cytokine levels in pregnant women with preeclampsia and risk of preeclampsia (n=200)

Indicators	control group, n=50	1 ^A -group, n=50	1 ^B -group, n=50	2-group, n=50
IL-10 pg/ml	$15,53 \pm 0,44$	$14,42 \pm 0,54^*$	$14,6 \pm 0,64^*$	$12,3 \pm 0,81^{***\wedge\wedge}$
Max-min	15,02-12,56	20,25-2,6	23,8-4,2	32,2-10,4
Median	13,5	14,25	13,9	13,7
P-value	0,01	0,006	0,02	0,06

Note: * - differences are significant compared to the data of the control group (* - $P < 0.05$), ^ - differences are significant compared to the data of group 1 (- $P < 0.01$)

If IL-10, 1A and 1B in pregnant women complicated by preeclampsia were 14.7 and 15.7% ($R < 0.05$), respectively, compared to the pregnant women of the group, compared to the control group, these indicators were 20.7%, respectively. ($R < 0.001$) was equal.

In studies conducted by many researchers, pregnant women complicated by preeclampsia can be seen to have low levels of IL-10 in the placenta and in the peripheral blood, which may be a compensatory response to the excess of pro-inflammatory cytokines.

The presented data showed that there were no significant changes in the concentration of IL-10 in the blood of healthy pregnant women with a normal pregnancy, pregnant women at risk of preeclampsia.

An important feature of this anti-inflammatory cytokine is its slight decrease under the risk of developing preeclampsia (up to 14.6 ± 0.64 pg/ml) and up to 12.3 ± 0.81 pg/ml in pregnant

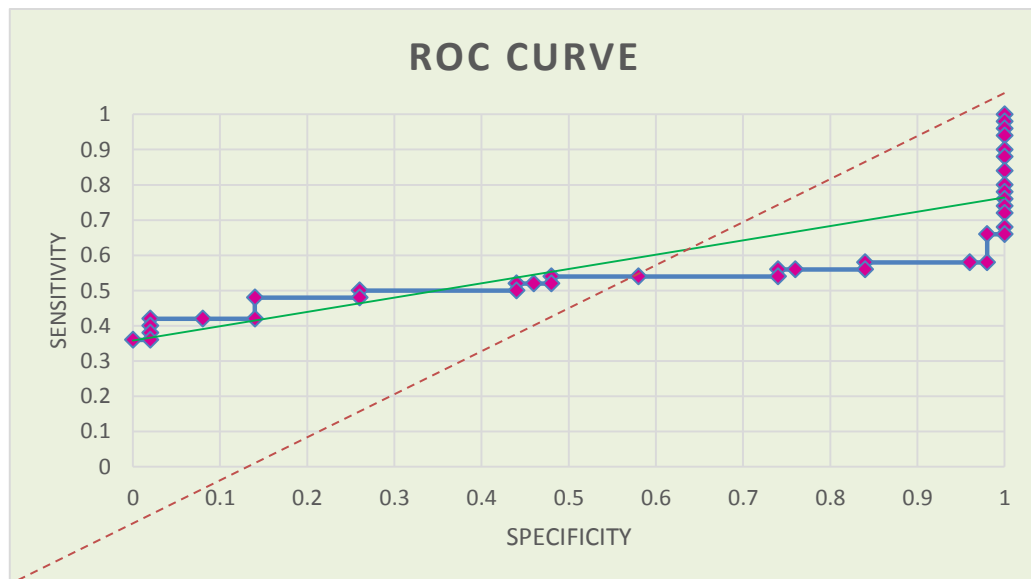
women complicated by preeclampsia, i.e. in conditions of advanced inflammatory process is a decrease.

Taking into account the above, it was shown that there is almost no difference in the concentration of IL-10 in the mother's serum between pregnant women at risk of preeclampsia and healthy pregnant women.

According to the literature, there is some evidence that IL-10 may be an early predictor of the onset of preeclampsia, but more studies are needed to confirm this evidence.

ROC analysis using ROC curves was performed to investigate the possibility of using interleukin-10 (IL-10) as a predictor of preeclampsia development.

Figure 2 shows the ROC curve for the indicator "Interleukin-10 (IL-10) pg/ml". The area under the curve was 1.03 ± 0.100 (95% IO (confidence interval) 0.360... 0.980), $r=0.01$, indicating the possibility of using IL-10 as a predictor of preeclampsia. In our study, IL-10 plasma level in women complicated by preeclampsia was 23.3 pg/ml (specificity 89.7%, sensitivity 76.4%, accuracy 80.5%).



Picture 1. ROC curve for "Interleukin-10 (IL-10) pg/ml" in predicting severe preeclampsia

Based on these, Munro S.K., et al. (2021) agree that interleukin-10 (IL-10) is not only a risk factor for preeclampsia but also a predictor of complicated pregnancy.

The results obtained from our research showed that the indicators recorded according to our results can be a predictor and indicator of the development of PE and its severity.

Thus, concluding our studies in this chapter of the work, monitoring the indicators of pro-inflammatory and inflammatory cytokines in the mother, evaluating them, identifying possible complications of endothelial dysfunction and inflammatory system, monitoring the effectiveness of treatment without waiting for the exacerbation of clinical manifestations, timely diagnosis of preeclampsia we made sure once again that it allows to assess the level of severity.

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