

DIAGNOSTIC VALUE OF CYTOKINE DYNAMICS IN PHYSIOLOGICAL GESTATION

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Abstract

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Introduction

Pregnancy represents a unique immunological state characterized by complex, finely tuned changes in the maternal immune system, aimed at maintaining tolerance to the semi-allogeneic fetus while preserving adequate immune defense. This dynamic balance involves coordinated shifts in pro- and anti-inflammatory responses that are essential for successful implantation, placentation, vascular remodeling, and fetal development. Traditional assessment of cytokine levels by trimesters provides only a broad overview of immune status and is insufficiently informative for detecting short-term yet clinically significant fluctuations. Such critical peaks and declines often correspond to key transitional stages of pregnancy — including placental development, remodeling of the maternal-fetal vascular network, and pivotal phases of immunological adaptation. Failure to identify these changes in a timely manner may result in missed opportunities for early detection of potential complications, such as preeclampsia, intrauterine growth restriction, or threatened miscarriage. In the Bukhara region, normative reference values of cytokine status by weeks of gestation have not been established. This lack of region-specific benchmarks reduces the precision of clinical diagnostics, limits prognostic accuracy, and hampers the development of individualized monitoring and management strategies. Generating weekly cytokine profiles for this population would fill a significant gap in perinatal medicine, enabling earlier identification of deviations from physiological norms and facilitating targeted interventions to improve maternal and fetal outcomes.

Aim:

To determine the dynamics of IL-1 β , IL-6, and IL-8 by weeks of gestation in physiological pregnancy and establish normative values for women in the Bukhara region.

Materials and Methods:

The study included 245 women: 180 pregnant, 28 in labor (38–40 weeks), and 37 controls. Cytokines were measured using ELISA. Gestational age groups: 5–7, 8–11, 12–15, 16–19, 20–23, 24–27, 28–31, 32–35, and 36–40 weeks.



Results and Discussion:

IL-1 β : control — 22.7 ± 1.2 pg/ml; peak at 28–31 weeks — 212.7 ± 6.1 pg/ml; increase before labor — 273.6 ± 7.5 pg/ml. IL-6: control — 27.3 ± 1.3 pg/ml; maximum at 12–15 weeks — 113.6 ± 4.5 pg/ml; decrease to 34.9 ± 3.0 pg/ml by 36–40 weeks. IL-8: control — 17.5 ± 0.9 pg/ml; peak at 12–15 weeks — 98.5 ± 3.5 pg/ml; minimum at 36–40 weeks — 19.8 ± 1.5 pg/ml.

Conclusions:

1. Weekly cytokine analysis reflects immune changes in pregnancy more precisely than trimester-based assessment.
2. Normative cytokine values by gestational week have been established for women in the Bukhara region.
3. Data may be used for early detection and prevention of pregnancy complications.