



## Research Article

# THE CONTENT OF LIPIDS IN THE BLOOD OF PREGNANT WOMEN WITH PREECLAMPSIA

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### ABSTRACT

**Background:** Today a little information is known on the lipid spectrum of blood in preeclampsia in pregnant women, at the same time, coverage of this issue could deepen our understanding about changes in the body be-belt with preeclampsia that will justify a more rational therapy of the disease and prevention of complications of gestation.

**Purpose:** To study some parameters of lipid and protein spectrum of blood in pregnant women with preeclampsia.

**Materials and Methods:** We observed and studied blood lipid spectrum in 70 women in II-III trimester of pregnancy; main group consisted of 50 pregnant women with PE light and heavy degree. Preeclampsia was established in 17 (34%) at 28-31 weeks' gestation, in 32 (64%) at 32-36 weeks. The studies were conducted a number of biochemical studies in serum of blood was determined the content of total lipids, cholesterol, triglycerides,  $\beta$ -lipoproteins, phospholipids and albumin. The concentration of substances were determined by standardized methods using commercial test – systems of firm "Human" on the automatic analyzer "Autohumolyzer F-1". To study the content of lipid components and albumin blood was drawn from the cubital vein in the morning on an empty stomach.

**Results:** The level of total lipids reached to  $6.9 \pm 0.3$  g/l and  $8.9 \pm 0.4$  g/l ( $p < 0.05$ ), that is, 1.4 and 1.8 times higher, the content  $\beta$ -lipoprotein –  $4.13 \pm 0.1$  g/l and  $4.83 \pm 0.4$  g/l ( $p < 0.05$ ), 1.5 and 1.7 times higher than the control group. The concentration of cholesterol amounted to  $6.62 \pm 0.2$  g/l and  $8.13 \pm 0.3$  mmol/l ( $p < 0.05$ ) or 1.2 and 1.5 times higher than control, the content of triglycerides were  $2.6 \pm 0.27$  and  $3.81 \pm 0.3$  mmol/l ( $p < 0.05$ ), that is, 2.4 times and 3.5 times higher than the same values in the physiological pregnancy. The level of phospholipids in our patients was evaluated at  $1.81 \pm 0.1$  g/l and  $1.41 \pm 0.2$  g/l ( $p < 0.05$ ), i.e., 1.5 times and 1.9 times lower than the control values. Albumin was equal to  $35.2 \pm 0.9$  g/l and  $33.1 \pm 1.4$  g/l ( $p < 0.05$ ), 1.2 times and 1.3 times lower than similar values when physiologically flowing pregnancy.

**Conclusion:** Clinical data showed a correlation between changes of lipids in the pregnant women with the severity of PE. With the progression of PE, there was a significant increase of the main indicators of lipogram and reducing the level of phospholipids and albumin. The revealed changes in lipid metabolism in pregnant women with preeclampsia may be used as a diagnostic criterion.

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## INTRODUCTION

With the onset of pregnancy, significant changes occur in the metabolism. These changes are adaptive in nature and referred us to ensure the proper development of the embryo and fetus. The basal metabolic rate and oxygen consumption are significantly increased, especially in the second half of pregnancy. From a modern scientific point of view, the exchange is one of the basic processes of life; this is due to the universal role of lipids in homeostatic functions, the mobile ability of their metabolism, adaptation to different conditions of the body.

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In importance not inferior to lipids proteins and nucleic acids: they are the source material and precursors to the synthesis of hormones, prostaglandins, and leukotriene, are part of the plasma and intracellular membranes [Moroz et al., 2001; Rasulzade et al., 2003; Severov, 2002; Fesenko and Aripov, 2001]. Changes of lipid spectrum of blood in pregnancy is due to the need to ensure uninterrupted synthesis of steroids, fatty acids, cholesterol, phospholipids and other lipids go to formation of the tissues of the fetus. In addition, the accumulation of lipids occurs in the placenta, adrenal glands, and mammary glands. On the background of enhanced fatty acid utilization in the liver and developing hyperinsulinemia total the substance environmentally of lipids in the blood plasma of a pregnant woman increases by 1.5 times or more with a significant increase in the content of triglycerides and

low-density lipoprotein. Total cholesterol of plasma in the first trimester of pregnancy constant or decreases towards the end of pregnancy increases linearly. The content of free fatty acids in the early stages of pregnancy is also reduced, in the later stages grows approximately twice that necessary to maintain the gain of body weight of the fetus. Severity: environmentally content of plasma lipids increases from 600 to 1000 mg%, triglycerides – 80 to 160 mg%, the level of low density lipoproteins from 250 to 350 mg%, total cholesterol 250 mg%. The level of free fatty acids reaches 1250 mmol/l [Aylamazyan et al., 2007]. Believe that the increased content in the blood of pregnant total lipids and  $\beta$ -lipoprotein occurs to ensure the migration of essential and nonessential fatty acids through the placenta to the fetus. High cholesterol necessary for synthesis of progesterone in the placenta.

The liver of the fetus in utero is not capable of synthesizing phospholipids of the plasma and the fetus receives from the placenta. Obviously, diffuse, cleaving and synthetic functions of placenta during different periods of pregnancy expressed differently depending both on the needs of fetus in different components of lipids or their precursors, and from his ability to synthesize them. It is established that the most intensive exchange of phospholipids occurs in the last weeks of the gestational period characterized by rapid growth, marked by processes of myelination, intertriginous morphological and functional maturity of the nervous system of the fetus and newborn [Skorokhodova and Dovicin, 2001].

Preeclampsia (PE) remains one of the topical problems of modern medicine. This is a serious complication of pregnancy is a major cause of maternal and perinatal morbidity and mortality. In Uzbekistan, the frequency of preeclampsia increased from 3-5% to 4-7% and study the issues associated with this disease, has been recognized as one of the priority directions of scientific researches [Nazhmudinova, 2003; Nazirov, 1999] and remains up to date. In the literature there is also little information on the lipid spectrum of blood in preeclampsia in pregnant women, at the same time, coverage of this issue could deepen our understanding about changes in the body be-belt with preeclampsia that will justify a more rational therapy of the disease and prevention of complications of gestation.

respectively and after childbirth. The degree of severity was assessed according to the unified classification proposed by the who and recommended for implementation in the Republic. The control group consisted of 20 pregnant women with physiological course of gestation. Preeclampsia was established in 17 (34%) at 28-31 weeks' gestation, in 32(64%) at 32-36 weeks. Women in the study and control groups were in same age range mostly in age from 20 to 29 years. Analysis of data on frequency of illnesses in pregnant women with PE showed that there was a high frequency of previously deferred childhood infections 30 (60.0%) and chronic tonsillitis - 27 (54.0%), which indicate sensitization and reduction of adaptive reactions of the organism. The disease could create toxic and allergic background and cause the failure of system of adaptation that caused the development of PE. There was a high frequency of iron deficiency anemia in 31 (62.0 %) and chronic pyelonephritis in 12 women (24.0 %). Provo was born therapy in the PE, based on the principles of preventive and curative care for pregnant women with hypertensive conditions set out in the relevant "Clinical guidance" [Tashkent, 2007]. Along with general clinical methods the studies were conducted a number of biochemical studies in serum of blood was determined the content of total lipids, cholesterol, triglycerides,  $\beta$ -lipoproteins, phospholipids and albumin according to standardized methods using commercial test – systems of firm "Human" on the automatic analyzer "Autohumolyser F-1". To study the content of lipid components and albumin blood was drawn from the cubital vein in the morning on an empty stomach.

## RESULTS AND DISCUSSION

In the study settings lipogram serum of mothers with preeclampsia found that, they differed significantly from those of pregnant women with physiological pregnancy (table). Lipogram pregnant women with preeclampsia mild and severe severity was characterized by increased concentrations of total lipids, cholesterol, triglycerides,  $\beta$ -lipoproteins, together with the decreased levels of albumin and phospholipids. Moreover, the severity of changes in the values of lipogram depended on the severity of a pathological condition. Thus, the level of total lipids reached to  $6.9 \pm 0.3$  g/l and  $8.9 \pm 0.4$  g/l ( $p < 0.05$ ), that is, 1.4 and 1.8 times the control values, the content  $\beta$ -lipoprotein –  $4.13 \pm 0.1$  g/l and  $4.83 \pm 0.4$  g/l ( $p < 0.05$ ), 1.5 and 1.7 times higher than control group.

**Table. Lipid metabolism in the serum of pregnant women with preeclampsia**

Indicators	Women with physiological pregnancy, n=20	Pregnant women with mild PE, n=30	Pregnant women with severe PE, n=20
Total lipids, g/l	5,0 $\pm$ 0,2	6,9 + 0,3*	8,9 + 0,4*
$\beta$ - lipoproteins, g/l	2,79 $\pm$ 0,2	4,13 + 0,1*	4,83 + 0,4*
Phospholipids, g/l	2,64 $\pm$ 0,1	1,81 + 0,1*	1,41 + 0,2*
Cholesterol, mmol/l	5,56 $\pm$ 0,3	6,62 + 0,2*	8,13 + 0,3*
Triglycerides, mmol/l	1,1 $\pm$ 0,1	2,6 + 0,27*	3,8 + 0,3*
Albumin, g/l	42,3 $\pm$ 0,6	35,2 + 0,9*	33,1 + 1,4*

**The purpose of the study:** To study some parameters of lipid and protein spectrum of blood in pregnant women with preeclampsia.

## MATERIALS AND METHODS

To determine the peculiarities of lipid spectrum of blood were examined 70 women in II-III trimester of pregnancy, of which the main group consisted of 50 pregnant women with PE light and heavy degree of 30 and 20 women in each subgroup

The concentration of cholesterol amounted to  $6.62 \pm 0.2$  g/l and  $8.13 \pm 0.3$  mmol/l ( $p < 0.05$ ) or 1.2 times and 1.5 times higher than control, the content of triglycerides and  $2.6 \pm 0.27$  and  $3.81 \pm 0.3$  mmol/l ( $p < 0.05$ ), that is, 2.4 times and 3.5 times higher than the same values in the physiological pregnancy. The level of phospholipids in our patients was estimated at  $1.81 \pm 0.1$  g/l and  $1.41 \pm 0.2$  g/l ( $p < 0.05$ ), i.e., 1.5 times and 1.9 times below the control values. Albumin was equal to  $35.2 \pm 0.9$  g/l and  $33.1 \pm 1.4$  g/l ( $p < 0.05$ ), 1.2 times and 1.3 times lower than similar values when physiologically flowing pregnancy.

## Conclusion

Thus, our data showed a correlation between changes of lipids in the body pregnant with the severity of PE. With the progression of PE, there was a significant increase of the main indicators of lipogram and reducing the level of phospholipids and albumin. The revealed changes in lipid metabolism in pregnant women with preeclampsia may be used as a diagnostic criterion.

## Consent

It is not applicable.

## Ethical Approval

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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## Competing Interests

Authors have declared that no competing interests exist.

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