

Alpha₂ macroglobulin in healthy pregnant women and those with EPH gestosis

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Summary: The Authors determined alpha₂ macroglobulin in 50 healthy pregnant women and in 50 pregnant women with EPH gestosis, using the technique of nephelometry on the Immunochemistry Analyzer. The assays were done in blood serum of the mother and umbilical cord, urine and in the amniotic fluid of the affected patients. Serum values were expressed in gr/L, and amniotic fluid and urine values in mg/L.

Significant reduction was found in the pregnant women with EPH gestosis in serum values of the mothers (healthy pregnant women $2.871 \text{ g/L} \pm 1.015$, with EPH gestosis $2.239 \text{ g/L} \pm 1.323$, $p < 0.05$), and in the umbilical cord serum (healthy pregnant women $3.351 \text{ g/L} \pm 0.859$, affected ones $2.032 \text{ g/L} \pm 0.693 \text{ g/L}$, $p < 0.01$). The reduction was also noted in the urine values but was significant one.

The importance of these determinations is presented in the discussion.

Key words: Alpha₂ macroglobulin; pregnancy; EPH gestosis.

INTRODUCTION

Burger *et al.* (1) are of the opinion that alpha₂ macroglobulin has the highest percentage of all of the serum proteins, and its main characteristic is to bind different biologically important molecules to metallic ions.

It has been proved that hepatocytes synthesize this protein even in the early fetus. Due to the large molecule form, Daniels (2) considers that the greater part occupied intervacular space, and the smaller was found in other fluids: cerebrospinal, synovial, urine and other ones. It has the inhibitory activity against trypsin, chymotrypsin, plasma callicrein, thrombin and

elastase. Beside these functions, it participates as the transport protein of certain hormones (3, 4). It is in close relation with cellular proliferation. Cultivated transformed fibroblasts are capable of synthesizing it, while the untransformed ones are not. It has been found that lymphocytes and monocytes are capable of synthesizing and releasing it (5). It is rather labile, can be seen by immunoelectrophoresis as one of the purest precipitin arches in the alpha₂ area. It has been observed that its concentration changed when kept at room temperature.

MATERIALS AND METHODS

Our investigation comprised a group of 50 healthy pregnant women and 50 with EPH gestoses treated at our Clinic of Gynecology and Obstetrics. The material was assayed immedia-

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Table 1. - *Alpha₂ macroglobulin values from maternal and umbilical cord sera.*

Pregnant women		Serum g/L					
		Maternal			Umbilical cord		
		\bar{x}	SD	Kv	\bar{x}	SD	Kv
Healthy	N/50	2.871	1.015	35,4	3.351	0.859	25,6
With EPH gestosis	N/50	2.239	1.323	59,1	2.032	0.693	34,1

tely after delivery (blood from the umbilical cord).

We used nephelometry by Immunochemistry Analyzer for alpha₂ macroglobulin determination with the use of special ICS Reagent test kit. Serum samples from the mother and the umbilical cord were diluted and expressed in gr/L, those, from the amniotic fluid and urine were not diluted due to their low concentrations and were expressed in mg/L.

RESULTS

Table 1 shows alpha₂ macroglobulin values obtained from maternal and umbilical cord sera.

Table 1 indicates that significant reduction of alpha₂ macroglobulin from maternal sera was obtained in pregnant women with EPH gestoses (healthy pregnant women 2.871 g/L ± 1.015, affected ones 2.239 g/L ± 1.823, p < 0.05).

This reduction was more significant in the umbilical cord serum (healthy pregnant

women 3.351 g/L ± 0.859, with EPH gestoses 2.032 g/L ± 0.693, p < 0.01).

Table 2 presents amniotic fluid and urine values. We performed no determinations in the amniotic fluid of healthy subjects.

Table 2 shows rather low alpha₂ macroglobulin concentrations in the amniotic fluid in pregnant women with EPH gestoses of 3.729 mg/L. We also obtained reduced urine values, but this reduction was not significant (healthy pregnant women 2.129 mg/L ± 0.683, affected ones 1.920 mg/L ± 0.880, p < 0.05).

Table 3 presents the correlation coefficient of the certain media.

Table 3 indicates significant correlation between maternal serum and umbilical cord-serum in pregnant women with EPH gestoses and satisfactory correlation between maternal sera and urine.

Table 2. - *Alpha₂ macroglobulin values in the amniotic fluid and urine.*

Pregnant women		Amniotic fluid			Urine mg/L		
		\bar{x}	SD	Kv	\bar{x}	SD	Kv
		Healthy	N/50			2.129	0.683
With EPH gestosis	N/50	3.729	0.867	23,2	1.920	0.880	45,8

Table 3. - *Correlation coefficient values r for alpha₂ macroglobulin between the particular media.*

Pregnant women		Maternal serum-	Maternal serum-	Maternal serum-
		Umbilical cord serum	Amniotic fluid	Urine
Healthy	N/50	0.42		0.20
With EPH gestosis	N/50	0.89	p < 0.01	0.32
				0.53
				p < 0.05

DISCUSSION

Stenbach *et al.* (6) succeeded in detecting alpha₂ macroglobulin in fetal embryo as early as 29 days after conception. Concentrations were the same as in the adults in the course of neonatal period and ranged from 2.20 - 3.80 g/L, but rapidly increased after that period. Our values in healthy pregnant women were 2.87 g/L., and that was in accordance with the results of these Authors. It was shown that in children between 2 and 4 years of age a significant increase of the values occurred even for 2 - 3 times compared to the adults, and that the values came to normal after the age of 10. This is characteristic of humans only, while in other living creatures these changes are not registered.

There are some discrepancies among the Authors in relation to the concentrations of this specific protein in the course of pregnancy.

Nedner *et al.* (7) found that the significant increase of alpha₂ macroglobulin occurred during pregnancy and that this increase persisted. Ganrot *et al.* (8) did not agree with this opinion since they found the increase in the first three months of pregnancy only, and Walker (9) was of the opinion that the significant increase occurred only between 37th and 38th week of pregnancy, but if these values were observed in the total quantity of the circulating plasma, they had not been significantly changed. Hann (10) established no significant changes in the course of pregnancy of healthy women. Such a different attitude towards alpha₂ macroglobulin concentrations changes is the consequence of the different techniques used, conditions for material, time period between assaying and analyzing and some other conditions. We used the reliable technique of nephelometry, which is a precise, one and found significant reduction in maternal sera of pregnant women with EPH gestoses.

This reduction was even more pronounced in the umbilical cord sera. We performed determinations in the amniotic fluid of pregnant women with EPH gestoses and expressed the values in mg/L. We found a reduction in the affected women, but it was not statistically significant.

CONCLUSION

The method of nephelometry on the Immunochemistry Analyzer is a reliable method and can detect even low concentrations of alpha₂ macroglobulin, which we have confirmed by its determination in different media.

A significant reduction in maternal sera was found in pregnant women with EPH gestoses, which was more prominent in the umbilical cord serum. Urine values reduction was not statistically significant.

We are of the opinion that special attention should be paid to these changes of alpha₂ macroglobulin and deserve investigations that be continued in other high risk pregnancies.

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