

THE SIGNIFICANT OF COMPLEMENT AND IMMUNOGLOBULIN DETERMINATION IN HEALTHY PREGNANT WOMEN AND PATIENTS WITH EPH GESTOSES

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Summary: Complements C3 and C4, IgG, IgM, IgA and properdin factor B (PFB) were determined in maternal blood sera, sera from the umbilical cord and amniotic fluid in the group consisting of 30 healthy pregnant women and 30 patients with EPH gestoses. PFB and IgG were measured in urine, as well.

Significant decrease of C3 complement in maternal sera and PFB in urine was found in the group with EPH gestoses, while a slight C4 complement enhancement was recorded in both maternal sera and the blood sera from the umbilical cord. PFB was conspicuously increased in maternal blood sera.

IgG level was higher in the blood sera from the umbilical cord in comparison with that found in maternal sera in both groups examined.

IgG, IgM and IgA levels were decreased in the group of patients with EPH gestoses in all fluids examined, while IgA level was significantly increased in the sera prepared from the blood from the umbilical cord.

INTRODUCTION

EPH gestoses are systemic diseases of pregnant women characterized by oedema, proteinuria and hypertension. Griswold *et al.* ⁽¹⁾ listed different terms used for these diseases: late gestoses, toxemia of pregnancy, gravidity toxicoses, disgravidity and gravidity intoxications, but in their opinion the most suitable term would be EPH gestoses, which is the most frequently used.

Lechtig *et al.* ⁽²⁾ point out that both economic status and nutritional habits play an important role in the etiology of this disturbance. Jeffcoate ⁽³⁾ considers previous illnesses as a significant factor for the development of EPH gestoses. Due to numerous theories and different opinions related to the development of this disease, it is also called "theory disease". Studying different theories concerning the etiology of EPH gestoses. Berger *et al.* ⁽⁴⁾ "where is the truth in this illness of hy-

potheses?" Although numerous etiopathological studies of this disease have been performed up to date, opinions on its etiology differ even after a century of serious discussions ⁽⁵⁾.

In this work complements and immunoglobulins of healthy pregnant women and those with EPH gestoses were determined with the aim of shedding some more light on this very interesting disease.

MATERIAL AND METHODS

The investigations described in this paper included a group of 30 healthy pregnant women and 30 patients with EPH gestoses hospitalized the Clinical Centre, Belgrade Medical Faculty, University of Belgrade.

The determination of complement C3 and C4, PFB, immunoglobulins G, M and A in the maternal sera, sera prepared from umbilical cord blood and amniotic fluid were carried out by nephelometric method. In addition IgG and PFB were measured in urine samples, as well. The results were statistically analyzed.

Table 1. – Levels of C3 and C4 and Properdin factor B in healthy pregnant women and the patients with EPH gestoses.

Sample			Healthy pregnant women no. 30			Patients with EPH gestoses no. 30		
			\bar{x}	SD	KV	\bar{x}	SD	KV
C3.	Maternal serum	g/L	1.382	0.388	28.1	1.150	0.377	32.8
	Umbilical cord blood serum	g/L	0.699	0.127	18.2	0.735	0.222	30.1
	Amniotic fluid	mg/L	—	—	—	12.427	2.577	20.7
C4.	Maternal serum	g/L	0.257	0.083	32.3	0.290	1.210	41.6
	Umbilical cord blood serum	g/L	0.114	0.038	33.1	0.152	0.068	44.8
	Amniotic fluid	mg/L	—	—	—	1.698	0.361	21.3
PFB.	Maternal serum	g/L	0.383	0.077	20.2	0.493	0.219	44.6
	Umbilical cord blood serum	g/L	0.149	0.064	43.1	0.148	0.055	37.3
	Amniotic fluid	mg/L	—	—	—	4.989	1.404	28.1
	Urine	mg/L	3.944	1.915	48.6	2.771	1.095	39.5

RESULTS

Numerical values for the content of complements C3, C4 and PFB in blood sera, umbilical cord sera, amniotic fluid and PFB in the urine of pregnant women with EPH gestoses and the corresponding controls are listed in tables 1 and 2.

It can be seen (tables 1 and 2) that significant decrease of complement C3 was recorded in the blood sera of the patients with EPH gestoses, while no significant changes of this parameter in the

sera prepared from the umbilical cord blood samples were observed.

The level of complement C4 was somewhat increased in both the maternal sera and sera prepared from the blood taken from the umbilical cord.

PFB was significantly elevated in blood sera of the patients with EPH gestoses and decreased in the corresponding urine samples.

Results obtained by determination of immunoglobulins are summarized in tables 3 and 4. Immunoglobulins G, M and A

Table 2. – Correlation coefficient (r) for complements level in different body fluids.

Sample		Healthy pregnant women no. 30	Patients with EPH gestoses no. 30
C3.	Maternal serum, Umbilical cord blood serum	0.122	0.550 $p < 0.05$
	Maternal serum - Amniotic serum	—	0.192
C4.	Maternal serum, Umbilical cord blood serum	0.541 $p < 0.05$	0.771 $p < 0.01$
	Maternal serum - Amniotic serum	—	0.170
PFB.	Maternal serum, Umbilical cord blood serum	0.050	0.432
	Maternal serum - Amniotic fluid	—	0.043
	Maternal serum - Urine	0.370	0.034

Table 3. — Content of IgG, IgM and IgA in healthy pregnant women and the patients with EPH gestoses.

Sample			Healthy pregnant women no. 30			Patients with EPH gestoses no. 30		
			\bar{X}	SD	KV	\bar{X}	SD	KV
IgG.	Maternal serum	g/L	9.053	1.287	14.2	8.483	1.848	21.8
	Umbilical cord blood serum	g/L	10.128	1.492	14.8	9.288	2.334	25.1
	Amniotic fluid	mg/L	—	—	—	130.990	30.354	23.2
	Urine	mg/L	4.428	2.247	50.7	4.224	1.396	33.0
IgM.	Maternal serum	g/L	1.530	0.535	35.0	1.470	0.504	34.3
	Umbilical cord blood serum	g/L	0.266	0.221	82.9	0.204	0.117	57.6
	Amniotic fluid	mg/L	—	—	—	5.453	1.193	21.9
IgA.	Maternal serum	g/L	1.844	0.677	36.7	1.647	0.392	23.8
	Umbilical cord blood serum	g/L	0.024	0.010	44.2	0.100	0.038	38.5
	Amniotic fluid	mg/L	—	—	—	5.458	1.049	19.2

were measured in maternal blood sera and the umbilical cord blood sera, while immunoglobulin G was simultaneously estimated in urine samples.

As seen in tables 3 and 4, the content of IgG, IgM and IgA was reduced in the blood sera of the patients with EPH gestoses, while a significant IgA increase in the sera prepared from the umbilical cord blood was registered. IgG level in urine samples also reduced.

It is interesting to note that IgG values were higher in the sera from the

umbilical cord blood than in the corresponding maternal sera, while the opposite holds true for both IgM and IgA. The content of IgG in the amniotic fluid was conspicuously higher in comparison with the amount of the other two immunoglobulins measured.

DISCUSSION

Our results are in agreement with the data of Williams *et al.* ⁽⁶⁾ who found an increased IgG level in the sera prepared

Table 4. — Correlation coefficient (*r*) for immunoglobulin levels in different body fluids.

Sample		Healthy pregnant women no. 30	Patients with EPH gestoses no. 30
IgG.	Maternal serum, Umbilical cord blood serum	0.527 $p < 0.05$	0.730 $p < 0.01$
	Maternal serum - Amniotic fluid	—	0.215
	Maternal serum - Urine	0.159	0.063
IgM.	Maternal serum, Umbilical cord blood serum	0.075	0.561 $p < 0.05$
	Maternal serum - Amniotic fluid	—	0.405
IgA.	Maternal serum, Umbilical cord blood serum	0.155	0.203
	Maternal serum - Amniotic fluid	—	0.045

from the blood samples taken from the umbilical cord in relation to the amount of this immunoglobulin in the maternal blood sera. These Authors explained this increase in terms of activation of the enzymatic mechanism(s) responsible for IgG transfer into the foetal circulation which is especially active before the birth in order to provide a newborn with this immunoglobulin for the first postnatal period before the onset of immunoglobulin synthesis.

Increased IgG concentration in the samples taken from the umbilical cord could also be a consequence of hemoconcentration, or tendency to equalize its level in maternal and foetal sera, although the influence of some other factors should also be taken into account. Strong uterine contractions during childbirth could mechanically affect IgG level in umbilical cord blood.

Cauchi *et al.* ⁽⁷⁾ found a slight increase of C3 and C4 levels during the entire gestation period, which returned to normal values six weeks after the child's birth.

Šulović *et al.* ⁽⁸⁾ and Jevremović observed a decreased IgG concentration in the patients with EPH gestoses, resulting in a reduced defence mechanism of the organism against infections. The property of this immunoglobulin to pass the placental barrier provides the protection of an infant during the early postnatal period.

Bendster *et al.* ⁽¹⁰⁾ found an increased IgG amount in the maternal sera in the cases of fetal death in utero and explained this enhancement in terms of interrupted transplacental passage, demonstrating the great diagnostic significance of this immunoglobulin determination.

CONCLUSION

Investigations of complements and immunoglobulins in healthy pregnant women and patients with EPH gestoses revealed statistically significant changes in individual parameters not only in the maternal blood sera, but also in the blood sera from the umbilical cord, amniotic fluid and urine. These results suggest that determination of these parameters might be useful in other disturbances related to pregnancy as well.

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