THE PROFILE OF THE PATIENT WITH PREECLAMPSIA DEPENDING ON CARDIOVASCULAR RISK

**ELENA MIHĂLCEANU[1]*, EDUARD CRAUCIUC[2], EUGEN UNGUREANU[3],
OVIDIU TOMA[3], DRAGOŞ CRAUCIUC[2],
MARIANA BRATU[4], MIRCEA ONOFRIESCU[1]**

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Abstract. Preeclampsia is an important problem of public health, leads among the main causes of mortality and morbidity worldwide. There are many patho-psychological abnormalities of preeclampsia, but its etiology is poorly known. **Aim.** The study intends to find out the possibilities and limitations in diagnosing and treating this disease. The **objective** of this study was to establish that the C reactive protein is an efficient marker of preeclampsia and it correlates significantly with the severity of this disease. **Material and method.** The patients were selected from the pregnant women who were hospitalized in "Cuza Vodă" Iaşi Clinical Hospital of Obstetrics and Gynecology (n=82), in the period of time between 2003 and 2012, with a gestational age of over 20 weeks, and who came here for a speciality consult. The study was retrospective and case-control type; it was focused on the clinical-progressive aspects of preeclampsia, by checking the correlation of inflammatory parameters with blood pressure for a lot of pregnant women with preeclampsia, in comparison with a lot of normal pregnant women. **Results.** The severe forms of preeclampsia can be found in older age (25-43 years old), with an average around 37 years old (p=0.02). According to the cases studied, the severity of preeclampsia was noticed for average values of blood pressure of about 155 mmHg (p<0.001). The average values of C reactive protein were significantly higher for women with severe preeclampsia (89.14 ± 51.31 mg/l) (p<0.001). **Conclusions.** The severe forms of preeclampsia represent a major cause for maternal morbidity and mortality, especially in the complicated cases with HELLP syndrome and acute pulmonary edema, cerebral hemorrhage, acute respiratory infections, cuoagulopathy.

INTRODUCTION

Prior to the year 2002, the studies could not establish a definite connection between C reactive protein and preeclampsia and this aspect was shown by Johnston C (2002); besides neither Cuanfang QUI nor Luthy DA in 2004, obtained significant correlations of these parameters (5, 8).

Kumru S. (2006) highlights the positive correlation between CRP and average blood pressure and proteinuria. This study also highlights the relations between C reactive protein and the clinical and biochemical parameters in preeclampsia; the increased values of haemoglobin, creatinine, TGO, TGP, LDH, sanguine urea and proteinuria are associated with increased values of C reactive protein (9).

With the purpose of establishing reference values of CRP for the normal pregnant women and also for those with preeclampsia, Hwang HS and collab (2007) prove the possibility of using CRP as a marker of severity in preeclampsia (7).

In recent research, Stefanovic M (2009) focuses on the endothelial dysfunction as anomaly in preeclampsia and draws the conclusion that in preeclampsia there is an increased resistance to insulin, but CRP as a marker of inflammation is not increased and is not associated with the severity of preeclampsia (12).

Carl A and collab (2008), prove in a recent study the fact that a value of over 3 mg/l is a good predictor for cardiovascular and inflammatory risk for pregnant women with a history of preeclampsia/eclampsia (4).

Also, Mihu D. and collaborators establish CRP as a marker for the severity of preeclampsia and of the infant weight at birth (10) in a work that was published in 2008.

In his study that was reported in the year 2011, Can Murat uses mean blood pressure as a severity indicator of preeclampsia and it proves a direct association with the inflammatory reaction (3).

A prospective study, initiated by Behboudi G. and collaborators (2012) on a lot of 778 pregnant women, establishes a reference value of 4,5 mg/dl for C reactive protein (1), and Bită M (2010) studies a lot of 400 pregnant women and establishes the threshold over which you can predict eclampsia as being over 5 mg/l (2).

AIM

Hypertension is the most common medical complication during pregnancy. The study intends to find out the possibilities and limitations in diagnosing and treating preeclampsia.

OBJECTIVE

The objective of this study was to establish that the C reactive protein is an efficient marker of preeclampsia and it correlates significantly with the severity of this disease and the monitoring the level of the C reactive protein during the first trimester of pregnancy reduces the risk of getting a systemic inflammation and also the cardiovascular risk.

MATERIAL AND METHODS

The diagnostic and the evaluation of the severity of preeclampsia are based on the measurements of maternal blood pressure in the third trimester of pregnancy. If the value of the blood pressure is increased before week 20 of pregnancy, this is considered high blood pressure pre-existing the pregnancy. The measurements can be influenced by a series of factors: equipment, the resting period prior to the determination, patient posture (the right arm has to be in a strict horizontal position, at the same level with the heart – the blood pressure is lower in lateral decubitus than if the patient is sitting). The diastolic value will be determined when the sounds stop (11).

There have been two lots of study that were constituted depending on the symptomatic triad: hypertension associated with proteinuria and/or edema: Preeclampsia Group –54 patients with a gestational age over 20 weeks, with high blood pressure and proteinuria and the Control Group–28 normal pregnant women.

The 82 women in the sample, reported to the feminine population of Iaşi county (n=414,475*), represent 19.78 $^o/_{oooo}$ with a sample error of ±10.5% when compared to IC95% (Table I).

For the group of normal pregnant women, the age varied from 17 to 42, with a mean value of 29.52 ± 5.84 years old, and for the group of patients with preeclampsia, the age was situated in the interval between 19 and 45, with a mean of the lot of 29.56 ± 7.67 years old, without showing significant differences between the lots from the statistical point of view (p=0.854).

Depending on diastolic blood pressure increases, preeclampsia can be divided in 3 clinical forms: mild (<100 mmHg); moderate (100-110 mmHg); severe (> 110 mmHg).

Table I. Sample size by age groups

Age group	Feminine population of Iaşi* county	Sample		
		n	$^o/_{oooo}$	% of the sample
< 19 years old	23889	3	12.56	3.66
20-24 years old	34495	20	57.98	24.39
25-29 years old	32683	26	79.55	31.71
30-34 years old	33676	14	41.57	17.07
35-39 years old	31037	10	32.22	12.20
40-44 years old	30196	8	26.49	9.76
45-49 years old	20393	1	4.90	1.22
Total	414475	82	19.78	100.00

* Source: http://www.smarQuest.ro/ro/resources.html and Romanian Statistical Yearbook 2011.

RESULTS AND DISCUSSIONS

The cases studied show a share of 13% patients with severe preeclampsia and 48.1% with moderate preeclampsia.

The severe forms of preeclampsia appear in older age (25-43 years old), with an average around 37 years old, while the moderate and mild forms are associated with an average of 28-29 years old (p=0.02).

The present study underlined the fact that when the average blood pressure is over 120 mmHg, the relative risk of having severe preeclampsia is 2.2 higher.

57.1% of the pregnant women with severe preeclampsia and 44.7% of the pregnant women with less severe forms of preeclampsia (moderate or mild) had a pathological urinalysis. However, this distribution of frequency is not statistically significant (p=0.833).

The cases studied did not show edema for the patients with severe preeclampsia, but they appeared for 6 patients (12.8%) with moderate or mild preeclampsia, even though the presence of the edema could not be significantly associated with the severity of preeclampsia.

Table II. Statistical differences between the forms of preeclampsia

Parameter	Preeclampsia				Statistical significance		RR	IC95%
	severe (n=7)		Mild and moderate (n=47)					
	N	%	N	%	χ^2	P		
Age ≥ 30 years old	6	85.7	16	34.0	4.74	**0.029**	2.52	1.53÷4.15
SBP ≥ 160 mmHg	7	100.0	33	70.2	1.48	0.224	1.42	1.18÷1.72
DBP ≥ 100 mmHg	7	100.0	26	55.3	3.41	**0.024**	1.81	1.40÷2.34
Mean BP >100 mmHg	7	100.0	21	44.7	5.42	**0.019**	2.24	1.63÷3.08
Pathologic urinalysis	4	57.1	21	44.7	0.04	0.833	1.28	0.62÷2.62
Edema	0	-	6	12.8	0.13	0.720	-	-
Obesity	1	14.3	1	2.1	0.27	0.606	6.71	0.47÷9.58

The close relation between adiposity and CRP can be a possible explanation for the lack of predictability of CRP in the studies that do not take into account these variables. An increased CRP is a useful parameter in assessing the risk of severity of preeclampsia for the pregnant women with an increased body mass index in the third trimester of pregnancy (6, 13, 14). Our cases showed that obese patients have a 6.71 times higher risk of getting severe preeclampsiaThe individual values of C reactive protein varied from 6 to 192 mg/l, for the group of patients with preeclampsia, with a very wide variation of the set of values (99%), most patients having registered values in the confidence interval (IC95%): 26.18-45.60 mg/l (42.6%), but 14.9% of the patients with preeclampsia had much increased values of this parameter registered.

For normal pregnant women, C reactive protein showed a few values that were over the reference limit (<10 mg/l), but most of them had values <6 mg/l (82.1%).

The mean values of C reactive protein were significantly higher for women with severe preeclampsia (89.14 ± 51.31 mg/l), while in the case of pregnant women with mild preeclampsia the mean value of this parameter was 22.86 ± 21.35 mg/l (p=0.001).

Table III. Statistical indicators of C reactive protein depending on the severity of preeclampsia

Preeclampsia	N	Mean	Std. Deviation	Std. Error	Confidence interval		Min	Max	p
					- 95%CI	+95%CI			
mild	21	22.86	21.35	4.66	13.14	32.58	6	96	
moderate	26	32.08	27.10	5.31	21.13	43.02	6	96	**0.001**
severe	7	89.14	51.31	19.39	41.69	136.60	48	192	
Total	54	35.89	35.57	4.84	26.18	45.60	6	192	

Based on the cases studied, the mean values of haemoglobin show a slight anaemia for the group of pregnant women with preeclampsia (p=0.198), without being influenced by its severity (p=0.451).

Table IV. Statistical indicators of haemoglobin depending on the severity of preeclampsia

Preeclampsia	N	Mean	Std. Deviation	Std. Error	Confidence interval		Mean	Max	p
					- 95%CI	+95%CI			
mild	21	10.59	2.22	0.48	9.57	11.60	6.8	15.0	
moderate	26	10.93	2.36	0.46	9.98	11.88	5.8	15.8	0.451
severe	7	11.80	1.09	0.41	10.79	12.81	10.5	13.4	
Total	54	10.91	2.18	0.30	10.31	11.50	5.8	15.8	

In the cases of severe preeclampsia, the mean values of the hematocrit were slightly lower (33.93% ± 2.92) in comparison with the ones found in the moderate forms (34.87% ± 6.11) (p=0.847).

Table V. Statistical indicators of the hematocrit depending on the severity of preeclampsia

Preeclampsia	N	Mean	Std. Deviation	Std. Error	Confidence interval		Min	Max	p
					- 95%CI	+95%CI			
mild	21	33.96	6.11	1.33	31.18	36.75	24.0	44.0	
moderate	26	34.87	6.11	1.20	32.40	37.34	21.0	47.0	0.847
severe	7	33.93	2.92	1.10	31.23	36.63	30.0	38.5	
Total	54	34.39	5.74	.78	32.83	35.96	21.0	47.0	

For the patients with severe preeclampsia, the main maternal and fetal impairment, that seldom has an unfavourable prognosis, is HELLP syndrome.

CONCLUSIONS

In the present study we proved that the plasmatic level of C reactive protein is correlated in a significant manner directly with the systolic/diastolic or mean blood pressure.

The high plasma level of the C reactive protein was associated with slightly increased values of haemoglobin and hematocrit.

Monitoring the level of the C reactive protein during the first trimester of pregnancy reduces the risk of getting a systemic inflammation and also the cardiovascular risk.

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[1] "Gr.T.Popa" University of Medicine and Pharmacy, Iasi, Romania
„Cuza Vodă" Iaşi Clinical Hospital
[2] "Gr.T.Popa" University of Medicine and Pharmacy, Iasi, Romania
„Elena Doamna" Iaşi Clinical Hospital
[3] "Alexandru Ioan Cuza" University, Iasi, Romania
[4] Emergency Hospital „Sf. Apostol Andrei" Galaţi

* emih2001@yahoo.com