PREDIAGNOSTICS OF PREECLAMPSIA
DIFFERENCES BETWEEN PREECLAMPSIA
AND OTHER PATHOLOGIES IN THE FIRST TRIMESTER OF PREGNANCY

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Objectives:

Preeclampsia (PE) is a significant cause of maternal mortality and morbidity. Placental Growth Factor (PlGF) in combination with doppler ultrasound detects reliably the risk of PE. To choose the appropriate treatment, we have to know the differences between PE and other pathologies. Nowadays, there is no doubt that the very basic precondition for development of preeclampsia is the presence of trophoblast cells in mother's blood circulation and, therefore, the immune mechanisms play a key role in the onset of pathophysiologic chain.

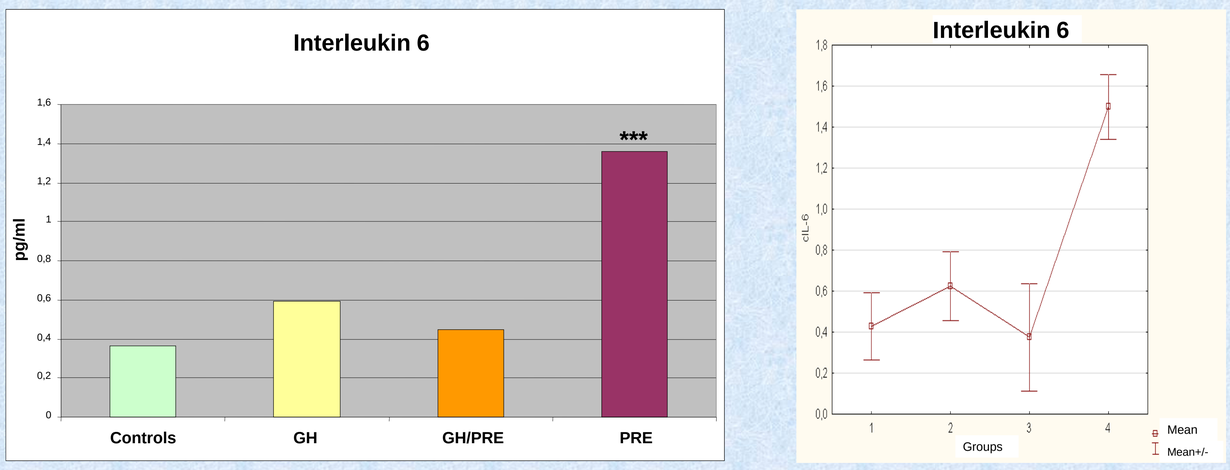

Fig.1: Interleukin 6 in the first trimester of gravidity (K-W test: $\chi^2(3)=14{,}909$; p=0,002)

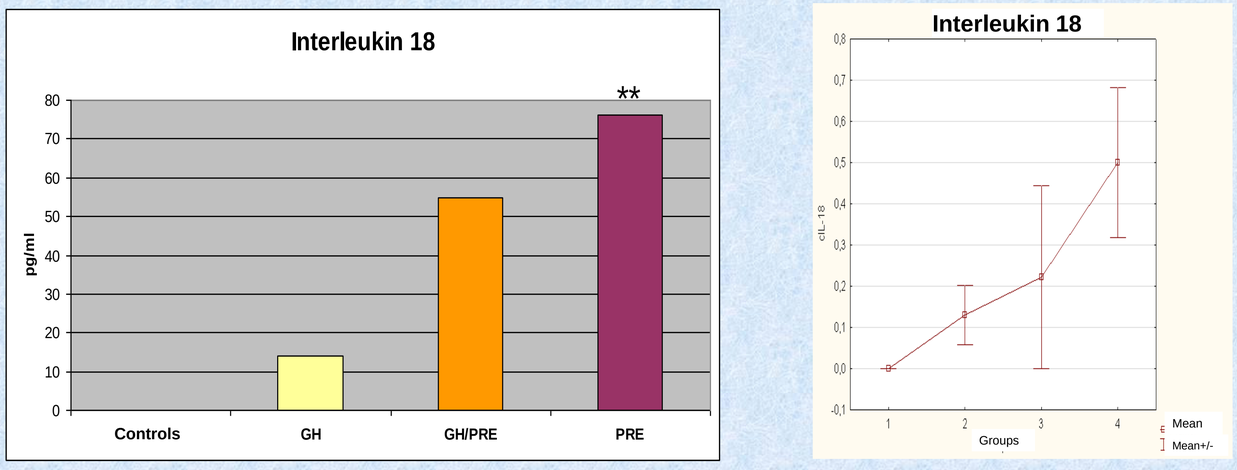

Fig.2: Interleukin 18 in the first trimester of gravidity (K-W test: $\chi^2(3)=10{,}261$; p=0,016)

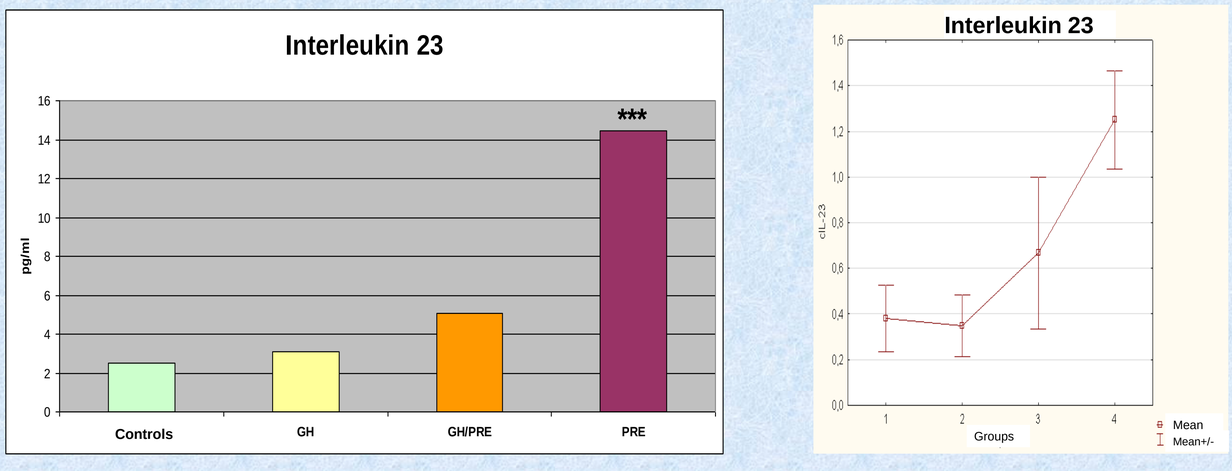

Fig.3: Interleukin 23 in the first trimester of gravidity (K-W test: $\chi^2(3)=14{,}925$; p=0,002)

gw	n		3. p.		5. p.		25. p.	Median		75. p.	95. p.	
	PE	CZ	PE	CZ	PE	CZ	CZ	PE	CZ	CZ	PE	CZ
9	116	2	9.7	6.1	10.1	6.9	10.8	16.9	14.8	20.2	28.2	31.8
10	162	7	10.6	7.5	12.3	8.4	13.2	19.8	18.1	24.7	36.0	38.9
11	159	53	11.9	9.2	12.7	10.3	16.2	23.7	22.1	30.3	38.2	47.6
12	148	109	13.6	11.3	15.6	12.6	19.8	27.2	27.1	37.0	50.9	58.2
13	107	71	16.0	13.9	18.7	15.5	24.3	33.6	33.2	45.4	58.5	71.2

Tab.1: Values of PlGF (pg/ml) in the first trimester. Correlation between the values of data from Perkin Elmer (PE) and our data from Czech Republic (CZ). (gw – gestational week, n – number of patients)

Methods and measured markers:

Markers:
PlGF (Delfia Xpress) with doppler ultrasound diagnostics (mean pulsatility index of uterine artery - mPI-UtA)
Serum anti-cardiolipin autoantibodies IgG (ACLA–G) and IgM (ACLA–M)
Interleukins (IL): IL-6, IL-12, IL-15, IL-16, IL-17, IL-18 and IL-23 (ELISA)

The PlGF levels were examined on Delfia Xpress in 600 sera.
For the evaluation of prediagnostic methods we make the group of 168 women consists of two subgroups:
1. determination of ACLA–G and ACLA–M (n=88)
2. determination of interleukins (n=80).
These subgroups were subsequently divided according to the development of pregnancy in the 3rd trimester. Each subgroup consists of equal number of pathological and physiological pregnancies.

In this study, we selected five special groups of pregnancy pathologies which were connected with preeclampsia:
a) gestational hypertension with blood pressure higher than 140/90
b) gestational hypertension with microalbuminuria (proteinuria lower than 300 mg/day)
c) preeclampsia – gestational hypertension with proteinuria (higher than 300 mg/day)
d) gestational diabetes mellitus
e) group B streptococcus positivity

Results:

Levels of PlGF for 3rd, 5th, 25th, 50th, 75th and 95th precentiles within 9th-13th weeks correspond to the percentiles and cut-off levels published by Perkin Elmer. PlGF linear increase within 9th-13th week was identical with published data. In PE patients, the PlGF levels in 9th-13th week of pregnancy were significantly decreased ($p<0.0001$) in comparison with those in normal pregnancies.
In PE was higher the percentage of ACLA-G positivity ($p<0.001$) and the concentrations of IL-6 ($p = 0.002$), 18 ($p = 0.016$) a 23 ($p = 0.002$) were elevated. In other pathologies was higher only percentage of ACLA-M positivity ($p<0.001$).
IL-15 was positive only in the patients who developed either severe preeclampsia, or a preeclampsia combined with lupus syndrome, in the 3rd trimester.
IL-16 was elevated only in the group a) (gestational hypertension).
Other parameters did not differ significantly.

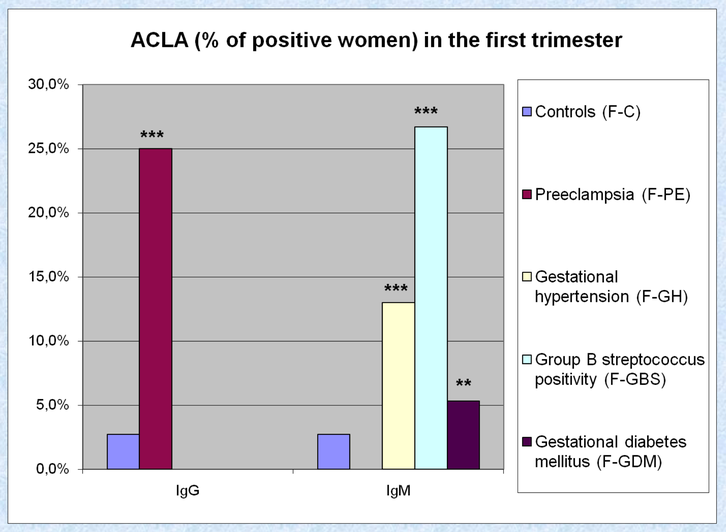

Fig. 4: Occurrence of elevated serum levels of anti-cardiolipin autoantibodies. Values are expressed as per-cent incidence of women with positive anti-cardiolipin autoantibodies in the serum in the first trimester of gravidity. Statistical significance in comparison with control values: (** p<0,01; *** p<0,001)

Conclusions:

Abnormal mPI-UtA and PlGF ratio are common in PE. Our results bring evidence of the inverse relationship between the degree of the decreased PLGF levels and clinical severity of preeclampsia.The interleukin changes are involved in the PE pathogenesis,but this impact was so far not studied.Therefore it was the aim of our examination.The positivity of some followed interleukins and ACLA-G may indicate that the immune mechanism play a key role in the onset of pathophysiological chain of PE. Elevation of biochemical and immunological markers can help to contribute to the prediagnostics of patients with PE in the third trimester. Some markers can probably predict the development of particularly severe pathologies and can differentiate between prediagnostics of PE and other pathologies.

Acknowledgement:

This research was supported by: PRVOUK–P25/LF1/2; MZČR–RVO–VFN 64165; FNM 64203; CZ.2.16/3.1.00/24022; IGA NT13770