

# The role of systemic inflammation in the development of pregnancy and obstetric complications

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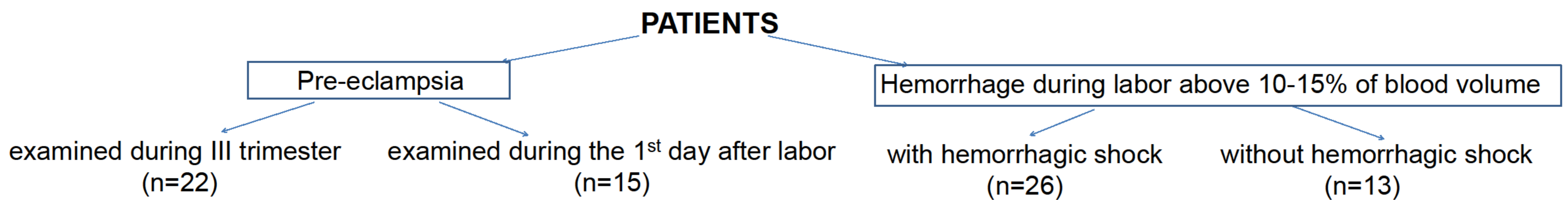
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## INTRODUCTION AND OBJECTIVE

**Systemic inflammation (SI)** is a typical process integrating some phenomena such as systemic inflammatory reaction, microthrombosis, tissue alteration, distress of neuroendocrine system.

**Objective.** To evaluate the role of SI in the development of pregnancy and critical obstetric complications.



**Control group** – healthy women (n=24)

**Comparison group** – patients with normal labor (n=12)

## METHODS

**I.** Levels of interleukins (IL-6, IL-8, IL-10), tumor necrosis factor (TNF) $\alpha$ , C-reactive protein (CRP), cortisol, myoglobin, troponin I, D-dimer were measured in plasma («Immulite», Siemens Medical Solutions Diagnostics, USA).

**II.** Six concentration ranges of the five studied serum factors (values range 0 to 5, or 0 to 6 for IL-10) were determined and expressed as Reactivity Indices (RI) in accordance with their biological significance (Table 1).

**Table 1 - Ranges of absolute parameter values and corresponding Reactivity Indices**

Parameters	Norm (RI-0)	Reactivity Index (RI) scores					
		1	2	3	4	5	6
IL-6, pg/ml	<5.0	5-10	10-40	40-200	200-1000	>1000	-
IL-8, pg/ml	<10.0	10-25	25-100	100-500	500-2500	>2500	-
IL-10, pg/ml	<5.0	-	5-10	10-25	25-100	100-500	>500
TNF $\alpha$ , pg/ml	<8.0	8-16	16-40	40-160	160-800	>800	-
CRP, mg/dl	<1.0	1-3	3-15	>15	-	-	-

**III.** Three highest RI score values were selected out of five. The sum of these is the Coefficient of Reactivity (CR) (value range 0 to 16). Reactivity Levels (RL) were determined within the CR range (Table 2).

**Table 2 - CR values and corresponding reactivity levels (RL)**

CR	0-1	2-4	5-7	8-10	11-13	14-16
RL	0	1	2	3	4	5

**IV.** The SI score takes into account the RL and other phenomena (1 point for the presence of each). The value of 5 points or more is interpreted as proof of present systemic inflammation (Table 3).

**Table 3 – The Systemic Inflammation score**

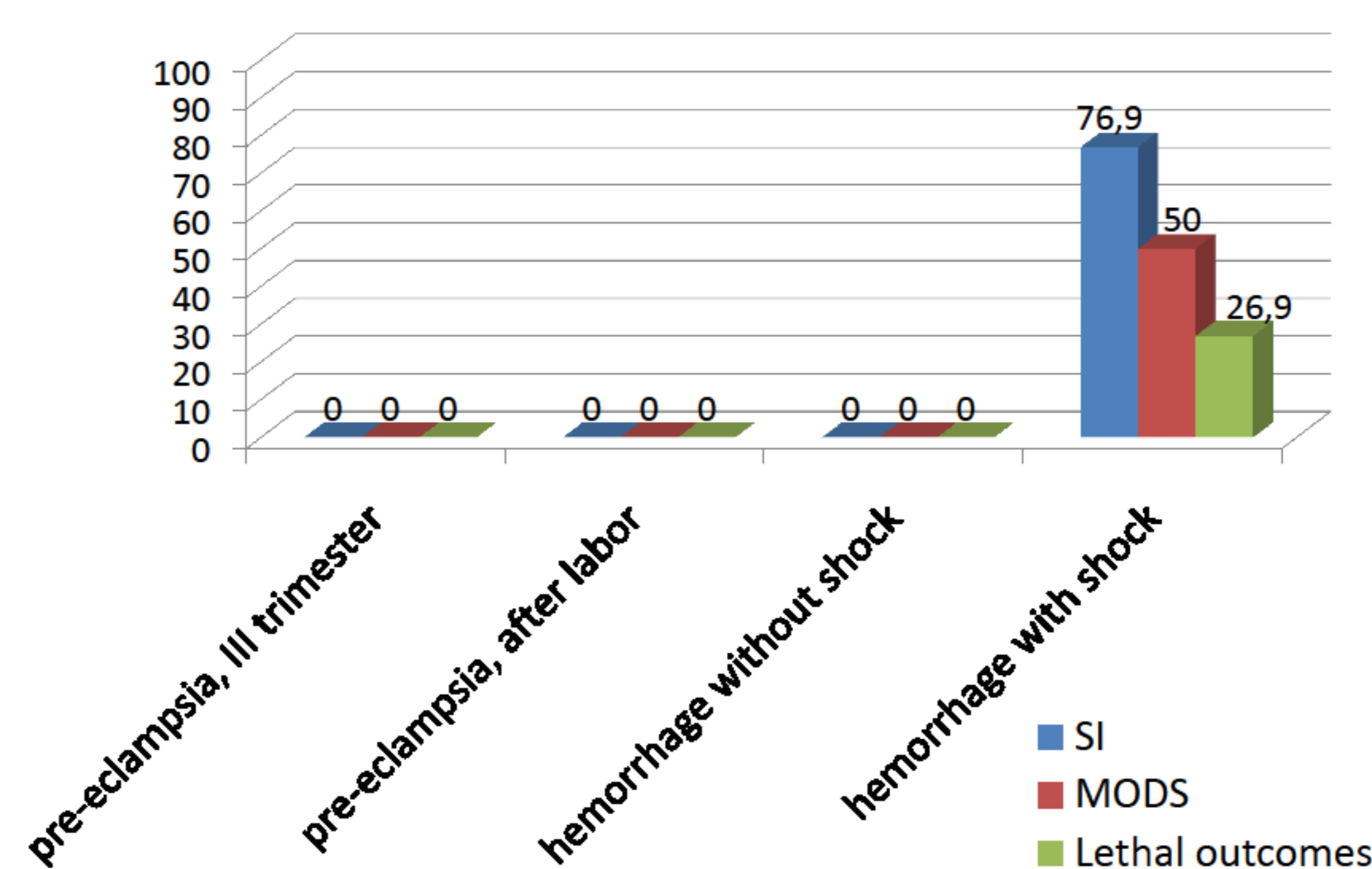
Phenomena	Criteria	Points	Note
<b>SIR- Cytokinemias</b>	Values of RL 0-5	2-5	Values of RL 0-1 excepts acute SI
<b>Microthrombosis</b>	D-dimer > 500 ng/ml	1	or DIC –syndrome, e.g. DIC scale $\geq$ 5 score [6]
<b>Distress of neuroendocrine system</b>	Cortisol > 1380 or < 100 nmole/l (Norm 170-690 nmole/l)	1	In case of absence of the criteria, but in glucocorticoid therapy <sup>†</sup> +1 point to score
<b>Systemic alteration</b>	Troponin I $\geq$ 0,2 ng/ml and/or myoglobin $\geq$ 800 ng/ml <sup>‡</sup>	1	Troponin does not sum up in case of myocardial infarction
<b>MODS</b>	SOFA score and/or criteria of MODS	1	Phenomenon and syndrome are non-specific to SI

**Table 4 – Definition of SI phenomena**

	Systemic inflammatory reaction	Microthrombosis	Distress of neuroendocrine system	Systemic alteration
pre-eclampsia, III trimester	22,7	9,1	0	0
pre-eclampsia, after labor	73,3	33,3	0	0
hemorrhage without shock	92,3	92,3	15,4	0
hemorrhage with shock	100	96,2	38,5	65,4

**Conclusion:** The hemorrhagic shock is a damage factor, caused systemic inflammation development. Systemic inflammation determines state severity, probability of MODS and lethal outcomes.

## RESULTS



SI was diagnosed only in patients with hemorrhagic shock. MODS and lethal outcomes were detected only in this group too. Meanwhile, SI developed in 100% dead persons and in 84,6% MODS-patients. Pre-eclampsia was attended an increased levels of proinflammatory cytokines and CRP (as systemic inflammatory reaction manifestation), but not other phenomena and SI in whole.

