

9. THE MODERN MATERNAL HEMODYNAMIC FEATURES FOR PREDICTION OF PREECLAMPSIA

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Despite a significant volume of literature regarding placental dysfunction in PE, data regarding the cardiac changes associated with PE are more scant, and also more controversial. The conventional belief was that early PE is associated with reduced cardiac output (CO) and increased total vascular resistance (VR), with maternal cardiac function succumbing early in the disease process. With regard to late PE, the original data implied that this was a condition of raised CO and reduced total VR, however this model has not been reported consistently. The majority of PE is late, and has classically been described as "maternal" PE. By and large, maternal PE remains unexplained. We were proposed that whilst intrinsic placental dysfunction and the mal-adaptation of the maternal cardiovascular system leads to early-onset PE, late PE is associated with an acquired placental dysfunction as a result of the maternal heart not being able to meet the demands of the placenta.

The fundamental difference between man, as an upright creature, in the postural form of adaptation to earthly gravity from animals with pronograde postural statics and quadrupedal locomotion, and hence in the exceptional relevance for his CVS of the gravitational (hydrostatic) factor of blood circulation. And not just in the dynamic organization of the circulatory state of the cardiovascular system, but in the hemodynamic support of pregnancy and human life activity as a whole in the characteristic specific conditions of upright.

Objective: To evaluate the predictive values of the circulatory syndromes in preclinical possibilities development of PE.

Investigations of the circulatory syndromes of CVS and hemodynamic supporting of pregnancy was carried out in the first trimester in 114 women with physiological pregnancy (PP) and in 132 pregnant women with GE who had preeclampsia in the II and III trimesters. The control group consisted of 137 healthy non-pregnant women. The comprehensive registration of main parameters of the central and peripheral hemodynamics was conducted through the standard method of tetrapolar thoracic and regional rheography in the condition of active orthostatics (immediately in standing position) and clinical repose (15-20 min after translocation pregnant women in lying position) (Fig.1). We determined of circulatory syndromes by correlation of minute volume of blood (MVB) while standing/lying – I type (hypokinetic condition) and III type (hyperkinetic condition) of hemodynamics. The hemodynamic risk was determined in accordance with the index of hemodynamic nonoptimality (IHN). Women who had GE, there was a significant ($p < 0.01$) decrease in the proportion of optimal states with type I and a significant ($p < 0.01$) increase in states with type III of the circulatory state of the CVS. This type was associated with a suboptimal and strained state of hemodynamics in the regime of antigravitational supply of blood circulation in the basic postural conditions of a person's life activity creature (standing, sitting, walking) and pregnant with minimizing restorative capacities in a lying position. In women with PP in the I trimester according to the integral criteria CAS-2,3 and IHN were a clear trend in optimization of circulatory support of pregnancy (CSP) which was expressed in a decrease in the manifestation of circulatory syndromes of hemodynamic risk.

In pregnant women with GE, there were an obvious prevalence of circulatory unbalanced states. In the first trimester in total for

CAS-2,3 and IHN nevertheless, a significantly significant (specific) group among the circulatory units that did not differ from the state of PP and with negative dynamics was not determined, then already in II and especially III trimesters CSP significantly ($p < 0.01$), the conditions with a negative orientation were prevailed. In general, CSP with GE was characterized by a negative dynamics in comparison with physiological pregnancy. Not only negative dynamics was observed in the abdominal circulation, but in the I and II trimesters the proportion of pregnant women with IHN $> 30\%$ with GE were significantly more prevalent in our investigation ($p < 0.05$).

Comparison of the circulatory condition of the CVS by differences in the manifestation of the hyperreflexivity of arterial vessels between the PP and GE (Fig. 1) in the standing position were demonstrated the adaptive orientation, which is expressed in PP in a significantly lower manifestation of hyperresistive arterial blood vessel syndromes (green). Conversely, non-adaptive directionality in GE was reflected in the systemic enhancement of hyperresistance in comparison with PP (red color).

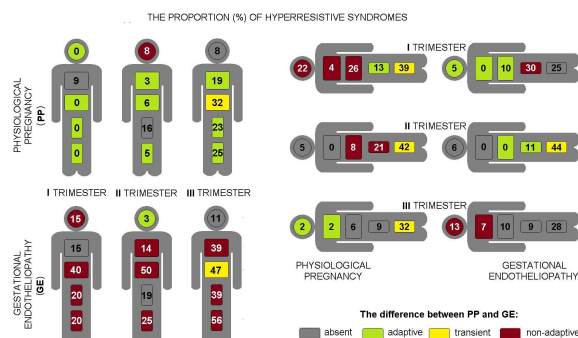


Figure 1. The comparative anthropophysiological characteristics of the hemodynamic model of the circulatory condition of the CVS

According to our investigations the optimization of hemodynamical supporting in PP was mechanism of vasodilator "slippage" of arterial vessels from the systemic vasoconstriction as the hemodynamic equivalent of endothelial activity. The predictors of PE in pregnant women were hyperkinetic type of circulation (by an anthropophysiological ratio of standing/lying), integral indicators of functional depreciation of the circulatory syndromes of CVS - hemodynamic risk (by IHN $> 30\%$), circulatory syndromes of arterial or venous blood insufficiency in abdominal and pelvic regions.

Conclusions. Preeclampsia as a disease entity not solely due to the placenta, but as a cardiovascular-placental syndrome. Our results obtained that the predictors of PE were hemodynamic syndromes of insufficiency and circulatory limitation. During physiological pregnancy, there was a pronounced manifestation of the circulatory phenomenon of "slippage" of the abdominal vessels and an increase in the autoregulatory component of the hemodynamic support of the feto-placental complex, with gestational endotheliopathy - a significant limitation of CAS.

(Section HDP-Preeclampsia)

10. THE NEW METHODOLOGY FOR APPRAISAL OF MATERNAL HEMODYNAMICS

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