Analysis of cardiovascular dynamics: new approach for predicting of pre-eclampsia

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Pre-eclampsia (PE) is a serious disorder with high morbidity and mortality occurring during pregnancy. 3-5 % of all pregnant women are affected. Early prediction is still insufficient in clinical practice. Although most pre-eclamptic patients show pathological uterine perfusion in the second trimester, this parameter has a positive predictive accuracy (PPA) of only 30 %, which makes it unsuitable for early, reliable prediction.

96 pregnant women in whom Doppler investigation detected perfusion disorders of the uterine arteries were included in the study. 24 of these pregnant women developed PE after the 30th week of gestation. During pregnancy, additional several non-invasive continuous blood pressure recordings were investigated over 30 minutes under resting conditions by means of a finger cuff. The time series extracted of systolic as well as diastolic beat-to-beat pressures and the heart rate were studied by variability and coupling analysis to find predictive factors preceding genesis of the disease.

In the period between the 18th and the 26th weeks of pregnancy, three special variability and baroreflex parameters were able to predict PE several weeks before clinical manifestation. Discriminant function analysis of these parameters was able to predict PE with a sensitivity and specificity of 87.5 % and a positive predictive value of 70 %.

The combined clinical assessment of uterine perfusion and cardiovascular variability demonstrates the best current prediction of PE in the second trimester.

References

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