

Streszczenie w języku angielskim

Female sex hormones, estradiol (E2) and progesterone (PG), have influence on the brain, however, there is little known about the influence during the menstrual cycle in healthy women and in particular during the transition from one cycle to another. It is well known that disruptive hormonal changes occur during this period, so it can be assumed that this should be reflected in the variability of cerebral blood flow. The aim of this study was to assess the relationship between the changing serum concentrations of E2 and PG over a period of 4 days, between the 26th day of the menstrual cycle and the 2nd day of the next cycle, and the parameters of cerebral perfusion measured twice using the magnetic resonance imaging method in a group of young healthy women. Repeated measurements were used to evaluate the measurement uncertainty of the resonance method in the quantification of global and local cerebral perfusion.

Twenty-one healthy, regularly menstruating volunteers, aged 20 to 27 years, were recruited for the study. On days 26th and 2nd of the cycle, serum E2 and PG concentrations were determined and cerebral perfusion was measured using a non-invasive technique of pulsed arterial spin labeling in magnetic resonance imaging. Cerebral perfusion was measured globally, at the hemispheric level as well as at regional levels.

The study showed high inter-individual and intra-individual variability in the concentrations of E2 and PG during the transition from one menstrual cycle to another. Similarly, high variability was observed in cerebral perfusion parameters and analyzes showed that a statistically significant component of this variability was explained by the decreases in serum E2 and PG concentrations during the transition from one menstrual cycle to another. Pulse and blood pressure did not influence the perfusion significantly during the transition period.

In most women cerebral perfusion parameters, with the exception of hemispheric perfusion at the level of the lateral ventricles and perfusion of the parietal region on the left side, were lower on the 2nd day of the cycle and this decrease correlated with a decrease in E2 concentration. It was shown that the effect of E2 on the overall cerebral perfusion at the level of the lateral ventricles and in the temporal and parietal regions on the left side was potentiated by the decrease in PG concentration between the 26th and the 2nd day of the cycle. The blood flow imaging method was characterized by moderate repeatability and reliability, which was mainly influenced by high biological variability. This should be taken into account when planning MR perfusion studies in menstruating women.