Introduction: Sex hormones are specific factors contributing to the regulation of cardiovascular system (CVS). The influence of the individual hormones and their menstrual variability on the CVS in women remains unclear.

The aim of this study was to assess the relationship between sex hormones and parameters describing arterial stiffness and other hemodynamic variables.

Materials and methods: Fifty-five healthy regularly menstruating women (30±5 yrs of age; BMI 22.2±3.7 kg/m2) were hormonally evaluated at the early follicular phase (EFP): [Estradiol (E2), Testosterone (T)], late follicular phase (LFP): [E2] and midluteal phase (LP):[E2 and Progesterone (P)]. Non-invasive continuous aplanation tonometry (Colin BMP7000, Japan) to measure peripheral (radial) pulse pressure (PP) wave with subsequent on-line reconstruction of central (aortal) PP wave (Sphygmocor Mx, Australia) was performed in the three menstrual phases. Pearson and Spearman correlations were used in statistical analysis.

Results: There were no significant correlations between E2 and analyzed hemodynamic parameters during the menstrual cycle. Significant correlations between serum P and diastolic blood pressure in the radial artery (r=0.29, p=0.04), and the ascending aorta (r=0.30, p=0.03), as well as between serum P and mean pressure (r=0.28, p=0.047) during the LP were found. We also demonstrated the significant inverse correlation between the ratio of E2:P in the LP and vascular stiffness parameters: peripheral Augmentation Index (pAI) (r= -0.31, p=0.03), central Augmentation Index (cAI) (r= -0.33, p=0.02), central Augmentation Pressure (cAP) (r= -0.35, p=0.01). A significant inverse correlation of T with cAP was found (r= -0.27, p=0.047) in the EFP.

Conclusion: The interplay between sex hormones may play an important role in the regulation of hemodynamics and arterial stiffness in reproductive age women.