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Relationship between haemorheological parameters and endothelial functional characteristics in patients with arterial hypertension

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Introduction: Arterial hypertension (AH) is considered as an important risk factor for cardiac and cerebrovascular complications. In spite of established endothelial dysfunction and increase in some coagulation parameters while AH, there is still lack of data regarding an association between blood rheology and endothelial functional status. The purpose of this study was to investigate relationships between haemorheological parameters and endothelial functional characteristics in patients with AH.

Methods: 57 patients with AH (mean age \pm SD, 51.26 \pm 1.94; 30 men and 27 women) and 17 healthy volunteers were included in the study. All the subjects were undergone to the investigation of blood rheology and high resolution vascular Doppler-ultrasound of brachial artery. Correlation analyses between parameters were performed using Pearson's bivariate correlation coefficient.

Results: Compared with normotensive subjects, hypertensive patients had significantly higher levels of all the haemorheological parameters, namely platelet adhesive and aggregative activity, fibrinogen concentration, plasma viscosity, erythrocyte aggregability and hematocrit level ($P<0.001$). Flow-mediated vasodilatation (FMD %) was lower in hypertensive population (6.49 \pm 1.58 vs. 13.73 \pm 1.21; $P=0.000$). Initial (D0) and after reactive hyperemia test vascular diameters (D1) were practically similar in the two study groups ($P=NS$), but ΔD (D1-D0) was significantly higher in the control group (0.25 \pm 0.06 vs. 0.54 \pm 0.04; $P=0.000$). Patients with AH in comparison with control subjects had statistically significant negative correlation between FMD%/ ΔD and all the haemorheological parameters ($P<0.01$).

Conclusion: According to the study data, we can suggest that blood rheology and endothelium are two interconnected system. Therefore, both of them get deteriorated while arterial hypertension.

Recommendations: While management of patients with AH treatment should be directed to the improvement of endothelial function and correct blood rheology to decrease potential risk of cerebro- and cardiovascular complications.