INTRODUCTION

The process of development of atherosclerosis is precended by endothelial dysfunction of blood vessels and the development of a local inflammatory process. The endothelium is involved in the regulation of vessel tone, blood cell adhesion to vessel walls, the formation of blood clots and also in the control of vasoactive properties. Early and accurate assessment of endothelial function may help in understanding the etiology of these diseases and in determining the effectiveness of treatment of vascular diseases.

Arriving at an assessment begins with an understanding of the endothelial response to blood flow. As blood flows through the artery, shear stress is generated on the surface of endothelium and alters vascular reactivity, resulting in a mechanical stimulus, numerous vasoactive mediators are released from the endothelial cells. It is established that flow-mediated dilation (FMD) of the vessel correlates well with the release of nitric oxide (NO). The percentage change in FMD is determined by comparing the diameter of the vessel occluded after reactive hyperaemia with the baseline diameter before vessel occlusion. It was demonstrated that a change of the magnitude of FMD not only reflects the endothelial function but also depends on the value of the arterial wall's mechanical properties.

In the pilot study of the FMDr of the radial artery, we have found that the baseline diameter DB is not significantly correlated with any of the other measured variables. In the group of CAD patients, FMDr results revealed that the FMDr was not lower than 8% for any of the subjects from group I. The cut-off value of FMDr = 7.5% was not lower than 0.001. This allows us to consider the true differences between distributions of the two examined groups. Although the data from both groups are not normally distributed, the p-values of the MWW and the KS test are much smaller than 0.001 (Fig. 7).

The Pearson correlation coefficient between SR and FMDr/SR (r = 0.48), which is less than 0.5. The nonlinear character of FMDr/SR versus SR relation was confirmed. The time span, TS, from cuff release until peak dilation, is not a useful parameter from the point of view of the Pearson correlation coefficient, FMDr, because of its confirmed diagnostic significance.

The shear rate, SR, does not differentiate the healthy volunteers and CAD patients. The two groups do not have significantly different distributions and both mean values of SR and p-values are not lower than 0.05. The Pearson’s correlation coefficient suggests that the difference in means to equal 0 could not be rejected, with a p-value > 0.05. The FMDr values for group II could not be considered normally distributed, but the equality of variances was confirmed, as previously, the p-value > 0.05 of the Ansari-Bradley test suggests that the MWW test can be used to measure differences in medians. Indeed, the FMDr/SR values for both groups are highly indistinguishable between the two groups; the hypothesis that the difference in means is equal to 0 could not be rejected, with a p-value > 0.05. The FMDr values for group I could not be considered normally distributed, but the equality of variances was confirmed, as previously, the p-value > 0.05 of the Ansari-Bradley test suggests that the MWW test can be used to measure differences in medians. Indeed, the FMDr/SR values for both groups are highly indistinguishable between the two groups; the hypothesis that the difference in means is equal to 0 could not be rejected, with a p-value > 0.05.