The aim of this study was to find out the relation between peripheral changes in oxygen desaturation and cardiovascular changes during the incremental increase in workload. A synchronous observation of changes in oxygen desaturation (StO2) in m.vastus lateralis, changes in arterial blood pressure and 12 leads ECG during the bicycle ergometry was performed. In Spectra Tissue Spectrometer, Standart System Model 325 was used for the registration of changes in StO2 and a system Kaunas–load was employed for registration and analysis of 12 lead ECG. The subjects (24 healthy males) underwent a 50W increase in workload every 60 seconds (60 revolitions/min) and they exercised to a predetermined goal (submaximal heart rate) unless distressing cardiovascular symptoms supervened.

The results obtained during the study showed that the dynamics of StO2 was in dependence on the functional preparedness of the participant of the study. All participants of the study can be divided into two groups concerning the type in changes of StO2 during the workload. First group – decrease in curve of StO2 up to the end of incremental increase in workload and these participants has demonstrated higher performance abilities, i.e. more exercise steps performed. The second group – decrease in StO2 curve was observed at onset of exercising but it was changed to increase of curve during the last steps of exercise test. These changes were in coincidence of significant increase in ST-segment depression.

The values of correlation between changes in StO2 and changes in arterial pulse pressure increased gradually along to exercise intensity: \( r = -0.62 \) (at 50 W); \( r = -0.28 \) (at 100 W); \( r = -0.06 \) (at 150 W); \( r = -0.038 \) (at 200 W); \( r = 0.32 \) (250 at W); \( r = 0.53 \) (at 300 W). The changes in pulse pressure during the exercising are in close relation with the changes in arterial blood-flow in a calf muscles (Buliuolis et al.). Concerning the results obtained during this study we conclude that the registered changes in StO2 were in close relation with the load persons have passed by and reflect the peripheral vascular vasodilatation or vasoconstriction effects. The second phase in curve of StO2 during the heavy workload correspond steep vasodilation of peripheral vessels and it is a sign of limited abilities of cardiac muscle.

References

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