THE IMPACT OF PHYSICAL ACTIVITY ON ENDOTHELIAL FUNCTION AND THE DYNAMICS OF PLATELET AGGREGATION ACTIVITY

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Background

Currently, unhealthy dietary habits and insufficient physical activity are important risk factors for obesity and cardiovascular diseases. Hypodynamia may contribute to metabolic disorders, atherosclerosis, and deterioration of vascular endothelial function. The endothelium plays an important role in the regulation of vascular tone, blood fluidity, microcirculation, and immune responses. Endothelial dysfunction may be associated with an increased risk of thrombosis, stroke, and myocardial infarction. Although physiological platelet aggregation is essential for hemostasis, excessive platelet activation may contribute to thrombus formation.

Adequate physical activity is an important component of maintaining endothelial function, improving blood circulation, and optimizing metabolic status. Regular, individualized, moderate-intensity exercise may stimulate nitric oxide (NO) synthesis and improve vascular function. Intravenous laser blood irradiation (VLOK) is used as a physiotherapeutic approach aimed at improving blood rheological properties and microcirculation. Therefore, studying the combined effects of physical activity and VLOK on platelet aggregation and endothelial function is relevant for cardiovascular prevention and rehabilitation.

Aim

To assess changes in platelet aggregation activity under the combined use of physical activity and VLOK therapy, to support endothelial function, and to develop practical approaches aimed at cardiovascular disease prevention.

Objectives

1. To evaluate the effects of physical exercise and VLOK therapy on platelet aggregation activity.

2. To study the effectiveness of individualized, light- and moderate-intensity physical exercises and the combined use of VLOK.

3. To develop practical recommendations aimed at reducing the risk of cardiovascular diseases based on the obtained findings.

Materials and Methods

The study material consisted of patients who underwent observation and treatment at the Medical Impuls LLC clinic. At the initial stage of the study, clinical and laboratory parameters were assessed in 15 patients. Some patients had obesity and cardiovascular diseases. Complete blood count, coagulogram, and platelet-related parameters were evaluated.

Laboratory examinations were performed before and after physical activity and VLOK therapy. Physical exercise was selected individually according to the functional capabilities of each patient and consisted mainly of light- and moderate-intensity activities. VLOK therapy was performed using a certified modern device available at the clinic according to the established physiotherapeutic protocol. Parametric and non-parametric statistical methods were planned for data analysis, including the t-test and analysis of variance, using appropriate statistical software.

The present study should be considered a preliminary clinical observation. Because of the small sample size, the findings should not be directly generalized to the broader population.

Results

In patients with obesity and cardiovascular diseases, the initial examinations demonstrated increased platelet-related parameters and cholesterol levels; elevated blood pressure was also recorded in some patients. Following the combined physical activity and VLOK intervention, repeated laboratory examinations were performed in 15 patients.

The follow-up assessment demonstrated a tendency toward positive changes between the initial and subsequent examinations. Improvements were observed in parameters associated with blood rheological properties and microcirculation. Individualized physical activity may support vascular endothelial function, improve blood circulation, and stimulate NO synthesis. The addition of VLOK therapy may provide an additional effect aimed at improving blood rheological properties and microcirculation.

However, because these preliminary findings were obtained from only 15 patients, they should not be interpreted as definitive evidence of treatment efficacy. They provide a basis for further studies with larger samples and appropriate control groups.

Conclusion

Individualized physical activity combined with VLOK therapy may represent a promising rehabilitation approach aimed at improving blood rheological properties, microcirculation, and parameters associated with platelet activity. Moderate-intensity physical exercise may play an important role in supporting endothelial function and stimulating NO synthesis. Positive clinical and laboratory dynamics were observed after the combined intervention in the preliminary observations. Nevertheless, prospective studies with larger sample sizes, appropriate control groups, and adequate statistical power are required to confirm these findings.