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OPTOELECTRONIC DEVICE FOR OF COLLATERAL CIRCULATION OF LOWER EXTREMITIES IN PATIENTS WITH LOCAL HYPERTENSIVE-ISCHEMIC PAIN SYNDROME

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Abstract

The given paper analyzes principles of interaction and analysis of the reflected optical radiation from biotissue in the process of assessment of regional hemodynamics state in patients with local hypertensive- ischemic pain syndrome of amputation stumps of lower extremities, applying the method of photoplethysmography.

Keywords: *microcirculation level, photoplethysmography, level of blood filling, biotissue, biomedical signal, stumps.*

INTRODUCTION

Nowadays more and more methods, based on application of laser and optoelectronic devices are introduced in medical diagnostics. These methods include photoplethysmographic method (PPM), that enables to measure blood flow and vascularity both in basal veins and arteries and in peripheral vessels and capillaries. The problem of violations of the peripheral blood circulation is becoming more important.

In conditions of modern scientific and technological progress which is increasingly causing a negative influence on the environment, including human health, the age of many diseases associated with disorders of the peripheral blood circulation began to fall critically.

For successful treatment of a disease it is important to conduct timely diagnosis, because identification of some problems at an early stage greatly increases the probability of the patient's full recovery. Therefore, the development of new diagnostic devices is making great contribution to the development of modern medicine.

RESULTS

Three weeks after treatment all the patients felt considerable decrease of pain and improvement of general state. Patients of the first group, where semiclosed fasciotomy was applied , suffered from moderate manifestations of painful and circulatory disorders in amputation stump. Patients complained to periodic aching, dull pain in amputation stump. In the area of stump end bluish discoloration of skin and moderate venous hyperemic were recorded in 33% (4) of patients. In the patients of the second group, where to semiclosed fasciotomy revasculating osteatrepanation was added, primary healing of post-operative wound, lack of pain syndrom both under loading and in motionless state were observed. Skin of amputation stump became of pale-red discoloration, congestive and vascular manifestations sharply decreased. Diagrams of microcirculation level assessment prior to therapy and after treatment of the patients of I and II groups (Fig.1)

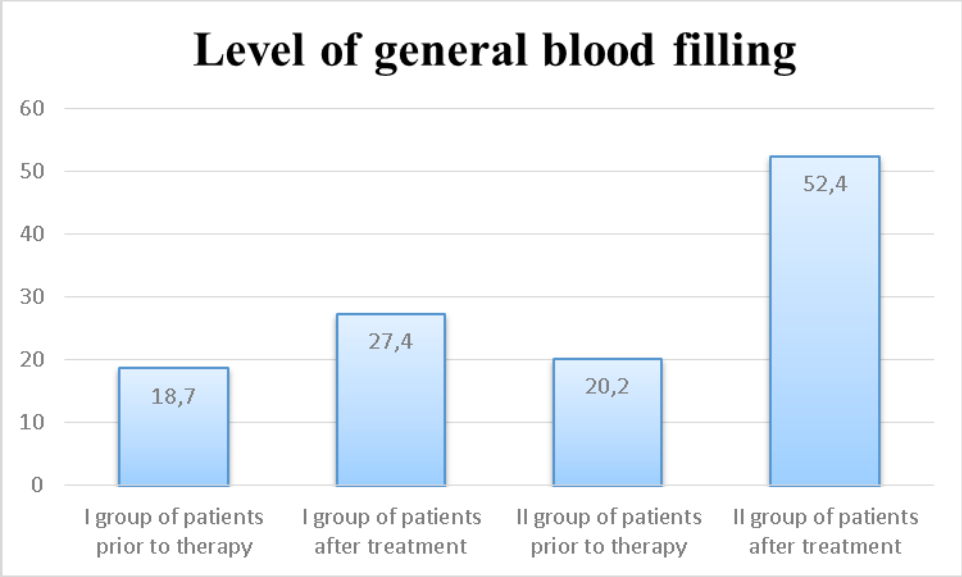

Figure 1. Diagrams of microcirculation level assessment prior to therapy and after treatment of the patients of I and II groups

CONCLUSIONS

Paper analyzes the principles of interaction and analysis of the reflected optical radiation from biotissue in the process of assessment of regional hemodynamics state in patients with local hypertensive-ischemic pain syndrome of amputation stumps of lower extremities, applying the method of photoplethysmography.

Local hypertensive-ischemic pain syndrome of amputation stumps of lower extremities is developed on the background of vascular and ischemic disorders in the tissues of stump and is manifested by the pain, edema, increase of subfascial pressure, sharp decrease of regional hemodynamics indices.

Surgical treatment of local hypertensive-ischemic pain syndrome of amputation stumps of lower extremities by the method of semiclosed fasciotomy in combination with revasculazing osteotrepanation enabled to improve considerably regional hemodynamics in the tissues of stump and reduce pain and congestive disorders

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