

Biocrystalloscopic technologies in personification of metabolic rehabilitation for patients with burns

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Many studies, including the work of our team proved the formation of oxidative stress in patients with thermal injury. This leads to the need of its pathogenetic correction, which can be performed by the use of active forms of oxygen and nitric oxide.

On the other hand heterogeneity of the state of oxidative metabolism demonstrated even in clinically identical patients that determines the feasibility of technologies of individualization of treatment and rehabilitation.

Based on the above the aim of this study was to assess the role of biocrystalloscopic methods to personify of bioradical therapy in patients with burns.

Materials and methods

To implement the technology (bicrystalloemics pre-test) we received blood samples with the formation of serum prior to the appointment bioradical therapy. These samples were centrifugated according to standard methods. The next stage was carried out by dehydration of blood serum with several potential doses of the therapeutic agent. The result of dehydration of the formed biological systems was assessed using own system of semi-quantitative indicators. The optimum dose of the compound was selected as concentration, which is most close to the intact sample values.

The effectiveness of the technology was studied in 45 patients with thermal injury, divided into 3 equal groups, which were comparable in the depth and area of the burn and age-sex structure. The first group (n=15) received standard therapy, second group (n=15) was additionally prescribed a course of daily inhalations of singlet oxygen in single mode (100% generator power), and the patients of the third group (n=15) the power of the latest picked individually (50, 75 or 100%) based on the results biocrystalloemics pre-test. Singlet oxygen-air mixture was created using the "Airnergy Professional plus" (Germany).

The effectiveness of treatment of patients was assessed by the dynamics of the local status, as well as according biochemiluminescence analysis (Fe-induced biochemiluminescence). As the main evaluation parameters used the maximum intensity of the flash is considered as an indicator of the maximum ability of the biosubstrate to oxidation, and reverse of the light sum of chemiluminescence is characterizes the total antioxidant activity of biological environment.

The obtained data were statistically processed in the program Statistica 6.1 for Windows.

Results

It was found that representatives of the second group for burn patients was milder compared to the first group that resulted in the acceleration of epithelialization of burn wounds, optimization of parameters characterizing endogenous intoxication (in particular, the level of average weight molecules) and the state of oxidative metabolism of the blood of the victims. This confirms earlier obtained data about the efficacy of inclusion inhalations of singlet oxygen in a complex algorithm of management of severe burned patients. At the same time for all the above criteria the advantage of the third group relative to the second were fixing.

Similar results occurred for the dynamics of biochemiluminescence blood serum of patients with formed groups. So, during the course of standard therapy for 10-12 days post-burn period an increase in the maximum flash to 1.57 times compared with healthy people has noted ($p<0.05$), whereas patients of the second group revealed a less significant increase of the level parameter (1.4-fold; $p<0.05$). Application of bicrystalloemics pre-test for individualization of treatment in terms of choice of power generator provided minimal

stimulation of processes of lipid peroxidation (only at 25% higher than in healthy subjects; $p<0.05$).

These trends are fully confirmed and the dynamics of antioxidant activity of blood serum. It is revealed that on the background of standard treatment in patients of the first group recorded a two-fold reduction of the relevant indicator in comparison with the physiological norm ($p<0.05$). Addition to the standard non-personalized algorithm with the course of inhalations of singlet oxygen contributed to the increase of this parameter by 27% relative to the victims of the first group ($p<0.05$), and the use of individualization – on 46%, respectively ($p<0.05$).

Conclusion

Our researches have establish, that personification with bicrystalliomics pre-test promotes the improvement of results of bioradical therapy of burn victims. This is reflected in the clinical data and the results of biochemiluminescence analysis of blood serum.