

## Conference Paper

# Laser Therapy in Correction of Optimization of Surgical Endointoxication

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## Abstract

The problem of endointoxication remains one of the most urgent in modern surgery. The severity of the intoxication syndrome is determined not only by the intensity of the entry of toxic substances into the bloodstream from the lesion focus, but also by the adequacy of the functioning of the main mechanisms of detoxification - elimination of toxins.

Clinical and laboratory studies of 62 patients with acute peritonitis were performed. To this end, daily sessions of laser therapy with "Matrix" were conducted for 5 days after the operation, using a head of KLO<sub>3</sub> (radiation with a wavelength of 635 nm, 2 mW). Laser irradiation of blood through the skin in the projection of the ulnar vein was performed for 30 minutes.

Using laser therapy for patients with acute peritonitis led to the reduction of the endogenous intoxication severity. The level of medium-mass molecules ( $\lambda = 280$  nm) decreased by 13.3-26.2% compared to the control, the level of average-weight molecules ( $\lambda = 254$  nm) decreased by 15.5-32.6% ( $p < 0.05$ ) against the background of laser therapy.

Thus, the use of laser therapy in patients with acute peritonitis has led to a decrease in the severity of endogenous intoxication. One of the significant components of this treatment is its ability to improve microcirculation and, as a result, to correct lipid peroxidation and hypoxia, which reduces catabolic phenomena (one of the sources of endogenous intoxication). Clinical and laboratory studies have established that the effectiveness of such treatment decreases with severe forms of peritonitis.

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## 1. Introduction

The problem of endointoxication remains one of the most urgent in modern surgery. The severity of the intoxication syndrome is determined not only by the intensity of the entry of toxic substances into the bloodstream from the lesion focus, but also by

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the adequacy of the functioning of the main mechanisms of detoxification - elimination of toxins [1]. Correction of endogenous intoxication can only be effective when influencing both of these components. Of particular interest is laser therapy, which, as shown in many works, has a number of positive effects in treating various pathologies [2, 3].

## 2. Research objective

to study the effectiveness of laser therapy in the correction of endointoxication in acute peritonitis.

## 3. Materials and methods

Clinical and laboratory studies of 62 patients (divided into 2 groups) with acute peritonitis of various genesis were performed. In the first group (comparison group) (n = 32), patients underwent standardized therapy after the operation, in the second (basic) group (n = 30) patients had also laser therapy sessions. To this end, daily sessions of laser therapy with "Matrix" were conducted for 5 days after the operation, using a head of KLO<sub>3</sub> (radiation with a wavelength of 635 nm, 2 mW). Laser irradiation of blood through the skin in the projection of the ulnar vein was performed for 30 minutes. Patients of the 2 groups were comparable in age, sex, concomitant diseases, severity and genesis of peritonitis.

Standard laboratory tests and laser Doppler flowmetry with the help of the analyzer microcirculation "LAKK-o2" were conducted; the intensity of lipid peroxidation, phospholipase activity, hypoxia, endogenous intoxication were evaluated. The statistical data was processed using the "Biostat" software package with the calculation of the t-test, the average arithmetic sample (M), the arithmetic mean error (m). The Pearson correlation coefficient was calculated.

## 4. Results

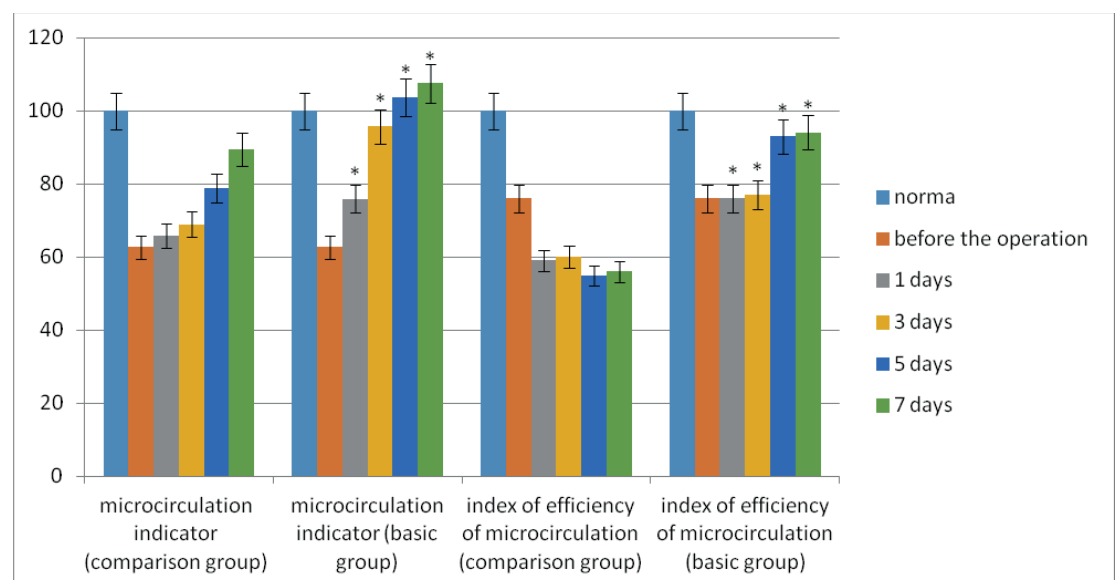
Application of laser therapy in patients with acute peritonitis has led to a decrease in the severity of endogenous intoxication. The level of medium-mass molecules ( $\lambda = 280$  nm) decreased by 13.3-26.2% compared to the control, the level of medium-mass molecules ( $\lambda = 254$  nm) decreased by 15.5-32.6% ( $p < 0.05$ ) against the background of laser therapy.

The level of effective concentration of albumin increased by 8.3-15.2% ( $p < 0.05$ ), the albumine binding reserve - by 9.1-18.3% ( $p < 0.05$ ). The toxicity index of plasma albumin was reduced by 12.5-23.4% ( $p < 0.05$ ).

It has been found that when using laser therapy for peritonitis, the level of diene conjugates in the blood plasma decreased by 13.1-22.6%, triene conjugates decreased by 16.1-19.7% ( $p < 0.05$ ), malonic dialdehyde - by 13.2-18.3% ( $p < 0.05$ ) compared to the control. The activity of phospholipase A2 decreased by 7.9-16.8% ( $p < 0.05$ ).

The level of lactic acid in the blood plasma of patients with acute peritoneal nerve was reduced by 13.4-22.7% ( $p < 0.05$ ), a hypoxia index fell by 7.3-15.1% ( $p < 0.05$ ) in comparison with control against the background of laser therapy.

The effect of laser therapy on microcirculation was noticed. Thus, the microcirculation rate increased by 10.2-17.9% ( $p < 0.05$ ) as compared with the control, the index of microcirculation efficiency - by 16.8-26.3% ( $p < 0.05$ ). At the same time, the shunting index fell by 11.7-22.9% ( $p < 0.05$ ) (**Figure 1**).



**Figure 1:** Indices of microcirculation in peritonitis with remaxol and laser therapy.

Thus, the use of laser therapy in acute peritonitis significantly reduces the severity of endotoxemia. One of the significant components of this treatment is its ability to improve microcirculation and, as a result, to correct lipid peroxidation and hypoxia, which reduces catabolic phenomena (one of the sources of endogenous intoxication). Clinical and laboratory studies have also established that the effectiveness of such treatment decreases with severe forms of peritonitis.

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