

Streszczenie w języku angielskim

INTRODUCTION

Oral mucositis (OM) is a common side effect of chemotherapy and radiation therapy used to treat cancer. The clinical manifestations are redness of the mucosa, as well as ulcerations that appear over time, which can cause pain and secondary fungal and bacterial infections. This can worsen the prognosis and treatment options for underlying disease. Low-level laser light is absorbed by cells, causing a number of changes in their metabolism. Extracellular matrix metalloproteinases (MMPs) are involved in many body processes, both physiological and pathological.

AIM OF THE STUDY

The main aim of the study was to evaluate the efficacy of low-level laser therapy in the treatment of oral mucositis in children with cancer.

MATERIAL AND METHODS

The study group consisted of 43 patients diagnosed with oncological disease aged 2-18 years. The group was divided into two subgroups: patients with symptoms of oral mucositis and patients without changes in the oral cavity. 21 healthy patients were included in the control group. A subjective and objective dental examination was performed. For oncology patients with OM, the location of lesions, their severity according to WHO scale and the level of pain were determined using VAS visual analog scale. These children underwent laser therapy (using CTL 1106MX diode laser with a wavelength of 810 nm). Parameters used: 4 J, 110 mW, 36 seconds/each point. Therapy was performed daily until symptoms decreased or disappeared. Unstimulated saliva was collected from all patients to evaluate the concentration of MMP-1, MMP-2, MMP-3, MMP-7, MMP-8 and MMP-9.

RESULTS

Differences in caries intensity and hygiene habits were found between the study groups. The severity of oral mucositis before the therapy was varied. Before laser therapy II°, III°, and IV° OM were diagnosed. After using the laser light, a significant decrease in the intensity of clinical symptoms ($p=0.000$) and pain ($p=0.000$) was observed. Oral mucositis lesions were most frequently on the cheeks (88.5%) and tongue (50.0%). The most common type of lesions were erythema, erosions and ulcerations. After the laser therapy, the greatest reduction in the severity of oral mucositis and pain sensations of patients concerned the lesions located on the lips ($p = 0.035$) and in the throat ($p = 0.017$). Significant differences were found in the concentrations of MMP-1, MMP-2, MMP-3, MMP-7, MMP-9 in the saliva of patients with oral mucositis compared to healthy people, with the exception of MMP-8. There was a significant decrease in MMP-3 after laser therapy ($p=0.011$), however its level was still significantly high compared to the control group ($p=0.000$) and the study group without OM ($p=0.025$). MMP-1, MMP-2, MMP-3 and MMP-7 differed significantly between oncology patients with and without oral mucositis. In the group with OM before laser therapy, a significant positive correlation was noted between the level of MMP-1 and MMP-3 and the degree of OM ($p=0.007$) and the severity of pain ($p=0.032$) ($p=0.01$). After laser therapy, there was a significant negative correlation between the concentration of MMP-9 and degree of OM. The number of laser therapy treatments depended on the degree of oral mucositis and the intensity of pain symptoms.

A significantly lower level of white blood cells was observed in patients with oral mucositis compared to the group without symptoms ($p=0.000$). There was also a significant increase in this parameter after laser therapy ($p=0.008$). A higher level of CRP was observed in patients with OM compared to those without changes in the oral cavity ($p=0.000$). After laser treatment, CRP levels remained high compared to patients without lesions in the oral cavity ($p=0.003$). The neutrophils count in patients with OM was significantly lower than in those without OM ($p=0.025$). Among patients with oral mucositis, a statistically significant positive correlation was found between the degree of OM ($p=0.001$) and pain sensations expressed using the VAS scale ($p=0.012$) and the number of laser therapy procedures performed.

CONCLUSIONS

1. The use of a low-power laser resulted in a significant reduction in pain and alleviation of clinical symptoms of oral mucositis in children undergoing chemotherapy.
2. Oncological patients had different habits than healthy people, which affected the differences in the intensity of caries.
3. Oral mucositis lesions most often affected the cheeks and tongue.
4. The location of oral mucositis influenced the change in the severity of symptoms.
5. The degree of oral mucositis and the severity of pain affected the number of laser therapy treatments performed.
6. Significant differences in the concentrations of MMP-1, MMP-2, MMP-3, MMP-7, MMP-9 in the saliva of patients with oral mucositis compared to healthy people were found. After laser therapy, there was a significant decrease in the concentration of MMP-3 in saliva.
7. There were differences in C-reactive protein, white blood cell and neutrophil counts between patients with and without lesions in the oral cavity.

KEY WORDS

oral mucositis, matrix metalloproteinases, low-level laser therapy, chemotherapy, oncological disease