



The Use of Low-Level Laser Therapy (LL LT) in the Symptomatic Treatment of Vulvar Cancer IV st.

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Abstract

Cutaneous squamous cell carcinoma (CSCC) is a malignant tumor originating from keratinocytes in the epidermis, which seriously affects people's life safety. Heat shock proteins (HSPs) are molecular chaperones that help maintain protein stability and are involved in tumor activities. However, there is currently no systematic study of HSPs in CSCC. In this study, we used qPCR and WB to explore the expression of 14 HSPs at mRNA and protein levels in human immortalized keratinocytes HACAT cells, human CSCC cell lines COLO-16 and SCL-1 cells, and collected human CSCC samples for histological verification. Eventually, we found that the expression levels of different HSPs in CSCC were different. HSPB6, HSPB8 and HSPB11 showed no dysregulation in CSCC. HSPB4, HSPB5, HSPB7, HSPB10 and HSP40 were significantly upregulated in CSCC cells, while HSPB1, HSPB9, HSP60, HSP70, HSP90 and HSP100 were significantly downregulated. In summary, we validated the expression of 14 common HSPs in CSCC, which may lay the foundation for the study of HSPs in CSCC.

Introduction

Program of treating oncological diseases using LLLT started in 1988 [1-4]. During this program had been investigated different wavelengths of laser radiation in case of using it in different areas of medicine [5-7]. During last 30 years has been accumulated the great experience of using infrared (IR) laser radiation in IV st. oncology diseases treatment [8,9]. From the start of program in 1988 the power of laser radiation increased from 5W to 100W per pulse due to this, the time and dose of laser radiation has significantly increased. This progress realized due to new era laser installations.

Case Report

Female patient A. (82 years old) (with extirpation of the uterus with appendages and resection of the large omentum in 2006 due to uterine carcinoma IV st.) from April 2020

started feeling pain and burning sensation in vulvar area. Later has appeared ulcerations in the vulva. Because of Covid-19 epidemic patient couldn't get necessary treatment. She got gynecological consultation only in 29.06.2020. MRI scan appear edvulvar cancer. We couldn't exclude partial involvement of the adjacent parts of the vagina and urethra in the process (Figure 1).

Cytological examination – unspecified vulvar dysplasia. Patient get recommendation to get consultation with an oncologist-gynecologist.

11.07.2020 patient hospitalized with acute ischemic cerebral circulation disorders in the right cerebral artery basin.

13.07.2020 the course of the disease complicated by a paroxysm of atrial fibrillation. The heart rate restored. CT showed that there were no signs of infiltrative changes in the. There was no increase in

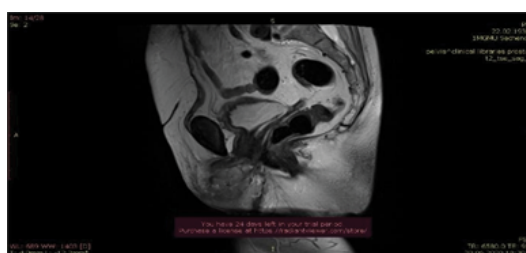


Figure 1. Involvement of the adjacent parts of the vagina and urethra in the pathological process.

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intra-abdominal and pelvic lymph nodes. Signs of pulmonary hypertension. Concomitant disease: Essential hypertension III st., Hypothyroidism (medically compensated). Basilar artery bifurcation aneurysm. Chronic pyelonephritis. Dyslipidemia.

8.08.2020 in a state of moderate severity, the patient again hospitalized in the cardiology department of the hospital. Trasthoracic echocardiography - violation of the local systolic function of the left ventricle on the background of atrial fibrillation. Aortic insufficiency I st. Mitral insufficiency I st. Tricuspid insufficiency I st. CT showed signs of post-inflammatory changes in the basal parts of the lungs. After the treatment, the phenomena of heart failure decreased, blood pressure stabilized (130/80 millimeters of mercury).

6.10.2020 hospitalized in cancer hospital. MRI scan made on 8.10.2020 appeared formation of the vulva with invasion of the adjacent parts of the vagina and the lower parts of the urethra. Metastases to single inguinal lymph nodes on both sides (27x34x40 mm- on the right side, 19x23x30 mm - on the left side) (Figure 2).

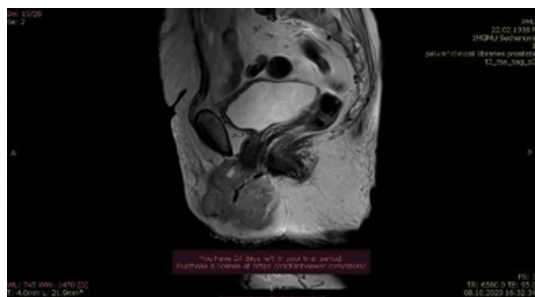


Figure 2. Vulva with invasion of the adjacent parts of the vagina and the lower parts of the urethra.



Figure 3. Vulva with invasion of the adjacent parts of the vagina and the lower parts of the urethra.

CT showed multiple small irregular foci in both lungs (Figure. 3). The presence of multiple metastases noted in the lungs. Biopsy - Squamous cell keratinizing vulvar cancer. An attempt to conduct radiation therapy on the tumor area and regional nodes (8 sessions) failed due to a sharp deterioration in the patient's condition. There was leukopenia, severe weakness, high fever. The pain syndrome was intensified, Shortness of breath appeared. Diagnosed Covid-19. The patient was discharged home for symptomatic treatment.

Materials and Methods of Treatment

Because of denied chemotherapy and surgical treatment, and the course of palliative radiation therapy was not effective it

decided to conduct an outpatient course of laser therapy. Laser therapy performed 3 times a day at intervals of 3 hours for 10 days. We used infrared laser ИКлазер – wavelength 910 nm, power 100 watts per pulse (Firm «Technika»). The perineum irradiated in the tumor area, regional lymph nodes and lungs, in the projection of metastases. According to the standard scheme, treatment prescribed – pacemakers, immunomodulators, hormones, probiotics, analgesics and drugs to reduce intoxication. The dose received by the tumor area, regional nodes and metastases in the lungs calculated using the following formula:

Surface irradiation energy density, J/cm²

$$Q = \frac{P_p \tau_p F t}{60 S},$$

P_p – Pulse Power, W,

τ_p – Pulse Width, s,

F – Pulse Frequency, Hz,

t – Time of irradiation, min

S – area of the irradiated surface, sm².

Complains

The patient complained of severe pain in the perineum. Copious bloody discharge. Was noted a strong weakness (patient couldn't move by herself), diarrhea in the last 2 weeks, absence of appetite, sleeplessness.

St. Presens

At the time of examination - the condition of moderate severity. Cutaneous covering is pale. The tongue is dry. Edema on the lower extremities. Temperature – 35,5 C. Pulse

- 120 BPM, blood pressure 90/50 millimeters of mercury, Rhythm disturbances (single extrasystoles), dyspnea. Forced respiration - weakened in the upper and middle sections on both sides.

St. Localis

The outer labia are inflamed, swollen (especially the right one). Covered with dirty fibrinous films. Copious bloody discharge. Multiple metastases from 0.3 to 1.2 mm, ulceration on both sides (Figure 4).



Figure 4. Before laser therapy. Multiple metastases from 0.3 to 1.2 mm, ulceration on both sides of labia before laser therapy

The First Course of using LT

Course of laser therapy started at 28.10.2020.

The surface irradiation density of the tumor area was $-25 \times 10^{-5} \text{ J/cm}^2$

The surface irradiation density of the inguinal lymph nodes was $-36 \times 10^{-5} \text{ J/cm}^2$

The surface irradiation density of the lungs in the projection of metastases was $-25 \times 10^{-7} \text{ J/cm}^2$

After first day of treatment noted a positive effect: reduction of pain syndrome and normalization of sleep.

On day 2, the blood in the secretions fade away. Temperature increased up to 36.1 C., blood pressure 100/60 millimeters of mercury, pulse 110 BPM.

On day 3, the temperature returned to 36.4 C., blood pressure 110/70 millimeters of mercury, pulse 90 BPM.



Figure 5. After 5 days of lather therapy. Labia covered with ointment during the first course of treatment.

On day 5, the phenomena of diarrhea completely disappeared. Decreased weakness, restored appetite. The patient was able to walk independently. Temperature up to 36.4 C., blood pressure 120/70 millimeters of mercury, pulse 90 beats per minute. The discharge decreased in light color. (Figure 5).

On day 10, the patient's condition is satisfactory. She had good appetite. Weakness disappeared. The patient began to move around the house on her own. The pain syndrome decreased as the LLLT was carried out and by the end of the course the pain completely disappeared. The discharge has almost disappeared. Temperature stabilized at 36.4 C, blood pressure 130/90 millimeters of mercury, pulse 76 BPM.

2 weeks after the laser therapy, the condition is satisfactory. There is practically no discharge. There is no pain syndrome. Sleep and appetite are normal. There is no weakness. The patient takes walks in the fresh air. Temperature up to 36.5 C, blood pressure 130/90 millimeters of mercury, pulse 70 BPM.

Medications – retained pacemakers, hormones, probiotics.

St. Localis

The outer labia have decreased in size. Erosion has disappeared. The skin has acquired a normal color (Figure. 6).



Figure 6. After 2 weeks of LLLT. Outer labia have decreased in size. Erosion has disappeared. The skin has acquired a normal color



Figure 7. Slight increase in metastases in the lungs with newly appeared foci

The Second Course of using LT

The repeated course carried out from 12 to 12/21/2020 at the urgent request of the patient. On the control CT scan, there was a slight increase in metastases in the lungs, new foci appeared (Figure 7).

MRI- Lymph nodes in the inguinal region of the same size. We did not found metastases in the abdominal cavity. The size of the formation did not change.

Complains

Complaints of headaches, weakness. Periodic increase in blood pressure to 140-150 / 80-90 millimeters of mercury. Rhythm disturbances. Notes slight pain and burning in the area of education, which is stopped by using an anti- inflammatory cream. Small, light discharge without blood.

St. Presens

The condition is satisfactory. Complaints about lack of appetite. The skin is somewhat pale. The tongue is wet. There is no swelling. Temperature – 36.4 C. Pulse 84 BPM, blood pressure 140/90 millimeters of mercury., Rhythm disturbances (single extrasystoles), Forced respiration – weakened in the upper and middle parts of the lungs on both sides.

St. Localis

The outer labia are somewhat swollen, enlarged in size. The right one is enlarged much more than left one. On both labia there are multiple metastases from 0.7 to 0.2 mm.

Results of Second LT Course

Canceled due to the ineffectiveness of LT. According to the standard program, LT performed on the tumor and regional lymph nodes.

The surface irradiation density of the tumor area was $-25 \times 10^{-5} \text{ J/cm}^2$

The surface irradiation density of the inguinal lymph nodes was $-36 \times 10^{-5} \text{ J/cm}^2$

After prescribed hypotensive therapy, blood pressure is 100/70 millimeters of mercury. Pulse is 70 BPM. The patient noted an improvement in her condition. Decreased weakness, appetite



Figure 8. After second course LLLT. Slightly decreased labia, on the right one some swelling remained.

appeared. Patient started to move more and more. Local clinical presentation had no changes

St. Localis -The size of the outer labia decreased slightly, some swelling remained (Figure 8)

Discussion

The patient's condition slowly worsened due to concomitant severe cardiovascular pathology, pulmonary pathology. The control CT of the lungs showed an increase in the size and number of metastases. The phenomena intoxication increased.

Suddenly, with the phenomena of acute heart failure, the patient died on 8.01.2021.

The main task of the LT course was completed. At first we managed to improve the quality of life of the patient. To stop the development of the tumor process. Reduce pain syndrome and the amount of discharge. Until the last day, the patient was active. She moved independently. She served herself, did light housework. Relatives and the patient assessed the effect of laser therapy as positive. The main thing is that we managed to improve the quality of life of the patient. To alleviate the suffering of both the patient and her loved ones.

Conflict of interest

The author declare no conflict of interest.

P.S. Video interview (in Russian language) with patient and her daughter. https://t.me/+yJ_tOEOj5kQwMzky

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