EFFECTS OF LOW-LEVEL LASER IRRADIATION ON VEGF EXPRESSION OF MELANOMA CELL LINES

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Impact of low-level laser irradiation on tumor cell lines remains controversial. Vascular endothelial growth factor (VEGF) is a key molecule to form new blood vessels, which contribute for cancer development and growth. The aim of this study was to evaluate the effects of different light fluences on human melanoma SKMEL 37 cells and murine melanoma B16F10 cells using a near infrared laser (λ= 780 nm) with output power of 40 mW delivering energies of 1.2, 3.6 and 6 J (fluences of 30, 90 and 150 J/cm^2, respectively). The cell lines were irradiated 24 h after they were seeded in a 96-well plate at a density of 5x10^3 cells per well, in triplicate at three different days. Following irradiation, both cell line supernatants were stored in Eppendorf tubes at -20°C until VEGF-A expression measurement. Specific ELISA kits were used according to cell line (murine or human). Samples and standard solutions were added in a 96-well plate antibody-coated and incuba ted over night at 4°C. Reagent dilution and set time followed fabricant instructions. The stop solution was added and the absorbance was read in a microplate reader at 450 nm. Results showed a non-statistically significant difference among treated and control groups for both cell lines. These findings indicate that irradiation with near infrared laser does not influence VEGF expression on melanoma cell lines regardless the fluence used and should be tested to prevent cancer growth in preclinical assays.

EFFECTS OF PHOTOBIOMODULATION ON BREAST TUMOR- BEARING MICE BEFORE RADIOTHERAPY

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Photobiomodulation (PBM) has been studied to modify the cellular response to ionizing radiation. However, its combination with radiotherapy (RT) has not been reported in cancer treatment. The aim of this study was to evaluate the effects of PBM applied before RT on breast tumor-bearing mice. Female BALB/c mice were inoculated with breast 4T1 cells into mammary fat pad and divided into 4 groups (n =5 per group): control (with no treatment), only RT, and PBM combined to RT in two different protocols. RT was locally applied using a ^{60}Co source with dose of 60 Gy in fractions of 15 Gy. For PBM, a red laser (660 nm, 500 mW/cm^2) was used in two regimes: single exposure 24 h before RT (fluence of 150 J/cm^2) and immediately before each RT session (fluence of 37.5 J/cm^2 per session). After treatment, tumor volume, platelets, white and red blood cell levels were evaluated during 14 days. Our results showed no statistically significant differen ces in t umor volume, platelet and red blood cell levels comparing control, RT and PBM+RT groups. However, PBM was able to sustain normal white blood cell levels compared to RT and control groups. In addition, mice that received PBM concomitant with RT presented a longer survival. In fact, for this group only 12.5 % of the animals died during experimental period. These findings indicate that PBM could be combined to RT to provide therapeutic anti-cancer benefits.

PHOTOBIOMODULATION IN CUTANEOUS INJURY CAUSED BY USE OF CIRCULAR EXTERNAL FIXATOR: CASE SERIES

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Background: The Circular External Fixator (CEF) is an orthopedic device made of steel, aluminum or carbon, with the function of maintaining the rigidity or stability of the severely traumatized bone structure, which connects to the CEF through wires and/or pins. The injury to the skin caused by wires and/or pins does not receive as much attention as the bone injury, can leading to complications, such as pain and infection, increasing the recovery time or even leading to new surgery. Purpose: To avoid or alleviate the signs and symptoms of injuries to the skin insertions of wires and pins during the use of CEF. Material and *Methods:* Conventional treatment with 0.9% saline and essential fatty acids associated with laser photobiomodulation (PBM) λ = 660 nm, beam area of 0.126 cm2, I = 796 mW/cm2, H = 4J/cm2, t = 5s, E = 0.5 J, 4 points per insertion. The interventions occurred from the 3rd postoperative period, every 72h, for 16 weeks. Scale of Bate s-Jensen, visual analogic scale of pain and lesion temperature of 6 participants were evaluated. Results are presented as mean ± standard deviation.
Results: In the first session, the Bastes-Jensen scale score was 16 ± 3, pain 2 ± 0 and 36.1°C ± 6. In the 4th session, the Bastes-Jensen scale decreased to 13 ± 2, pain 0 ± 0, 36.0°C ± 6.
Discussion and Conclusion: There was adequate healing, improved local pain, decreased inflammation, and restoration of physical function after FBM. New randomized controlled trial will be conducted.

EVALUATION OF LIGHT ABSORPTION OF CELL LINES CULTIVATED UNDER NUTRICIONAL STRESS

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Background: Photobiomodulation (PBM) is based in the use of light to modulate different cellular process, including proliferation, migration and cellular viability. The cellular response to PBM is dependent on the absorption of light photons by chromophores. In vitro studies have demonstrated that PBM can promote or inhibit the malignant behavior of oral cancer cells. In addition, the effects of PBM in a specific cell type is dependent of light absorption and culture conditions.
Purpose. The aim of this study was to evaluate the effects of nutritional stress in the absorption spectrum of cell lines before and after PBM.
Material and Methods. The oral cancer cell line SCC9 and the immortalized cell line HaCAT were cultivated and divided in the following groups: 0% FBS, 5% FBS and 10% FBS added in the culture medium and without irradiation; LED+ 0% FBS, LED+ 5% FBS and LED+10% FBS, with the following irradiation parameters: 550 nm, 6J/cm^2, 80mW, 248s during three consecutive days. After treatment, cells were collected, resuspended in phosphate buffer solution (PBS) and the absorbance was measured using the USB-2000 spectrophotometer.
Results: No statistically significant difference was observed between the 0% FBS, 5% FBS and 10% FBS and LED + 0% FBS, LED + 5% FBS and LED + 10% FBS groups in both cell lines evaluated.