

Research Article

Anti-Inflammatory effects of low-level laser therapy (660 nm) in the early phase in carrageenan-induced pleurisy in rat

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KEYWORDS

inflammation • LLLT • pleurisy

ABSTRACT

Background and Objective

In the classic model of pleurisy there is little evidence about the anti-inflammatory effects of low-level laser therapy (LLLT) as well the dosage characteristics, such as wavelength, total energy, number and pattern of treatment. In this study we investigated the potential effects of LLLT on modulating the pro-inflammatory and anti-inflammatory mediators of acute inflammation in a rat pleurisy model.

Study Design/Materials and Methods

A sample of 48 female Wistar rats were divided into control and experiential groups. An inflammation was induced by carrageenan (0.2 ml) injected into the pleural cavity. At 1, 2, and 3 hours after induction a continuous wave (20 mW) diode laser of the InGaAlP (660 nm) type was used in the four laser groups with different doses and treatment patterns. One group received a single dose of 2.1 J and the other three groups received a total energy of 0.9, 2.1, and 4.2 J. Four hours later the exudate volume, total and differential leukocytes, protein concentration, NO, IL-6, IL-10, TNF- α , and MCP-1 were measured from the aspirated liquid.

Results

All the treatment patterns and quantity of energy studied show significant reduction of the exudate volume ($P < 0.05$). Using energy of 0.9 J only NO, IL-6, MCP-1 and IL-10 are significantly reduced ($P < 0.05$). On the other hand, higher energies (2.1 and 4.2 J) significantly reduce all variables independently of the treatment pattern. The neutrophil migration has a straight correlation with the TNF- α ($r = 0.551$) and NO ($r = 0.549$) concentration.

Conclusions

LLLT - 660 nm induced an anti-inflammatory effect characterized by inhibition of either total or differential leukocyte influx, exudation, total protein, NO, IL-6, MCP-1, IL-10, and TNF- α , in a dose-dependent manner. Under these conditions, laser treatment with 2.1 J was more effective than 0.9 and 4.2 J. *Lesers Surg. Med.* 40:500-508, 2008. © 2008 Wiley-Liss, Inc.

Accepted: 27 May 2008

DIGITAL OBJECT IDENTIFIER (DOI)