58 - AlGaInP LASER EFFECTS ON NEUROPATHYC ULCERS HEALING ON LOWER EXTREMITIES IN CARRYING PATIENTS OF DIABETES MELLITUS.

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INTRODUCTION

The Mellitus Diabetes it is a chronic and complex metabolic riot characterized for compromise of the glucose´s metabolism and others substance energy producers. It constitutes an important problem of the public health, due to high prevalence and morbimortality. With development of incapable chronical complications, high costs generated by the treatment and reduction of the work´s capability of people in productive age.

The anatomopathologic changes of Mellitus Diabetes attain several organs, however inferior members and in private feet are so much affected mainly in advenced diseases period.

Feet complications are generated by the illness attain more than 13,5 million of brazilians or 8% of the population. According to recent studies informations in each six amputated patientes by no traumatic hurtes, five of them are by feet problems, among them neuropathyc ulcers.

From frequently multifactorial etiology the diabetic foot is characterized for a triad: the vasculopathy responsable for the microangiopathy development (thicken of capilar base membrane) and of the macroangiopathy (atherosclerosis); neuropathyc that takes a protector´s heat and pressure sensation´s loss, proprioception and finally the motors changes that modify the foot architecture.

In view of these problems the laser has been so much used in neuropathyc ulcers treatment to aim at to increase of the wounded regeneration speed together with reduction of swell and pain.

The basic principle of laser therapy is the stimulated emission of radiation produced through of a selection of a material or appropriate substance (diode) that when stimulated it will produce a great number of identical photons through the environment excitment. The most used equipment in the physiotherapeutical practice until the moment are the Helium-neon (HeNe) and arseneto of gallium (AsGa)and and recently there were launched in the national market the ones of Aluminum-Gallium-Indio-Match (AlGaInP) and Arseneto-Gallium-Aluminum (AsGaAl), which possess specific characteristics. The advantages of the equipment of AlGaInP and of AsGaAl are based on the emitted average power (30mW), which is very superior to the one of HeNe (2mW) or to the one of AsGa and in the generator material (semiconductors) being in the form of a diode, which facilitates the device´s project and its use in respect to the one of HeNe, since it does not have necessity of the optic fiber.

The laser stimulates the daily pay-formed substance release (histamine, prostaglandin, serotonin) acting as pro-inflammatory, being able to modify the normal enzymatic reactions. Some researches have been showed that laser stimulates the ATP´s production increasing the mitotic and phagocytic activity. It is possible that laser activates the new vessel formation and promotes the microcirculation, increasing increasing the granulation fabric production, together with an increase of fibroblasts activity and collagen production resulting in healing process acceleration.

In view of that peripheral neuropathy causes a great number of amputations and damage for the patientes and for the health´s system, it becomes relevant the research concerning the lasertherapy benefits in the ulcers healing, it allows a return of the person to daily life activities, gives back independence and life quality. Due to the restricted number of studies and the scartity of randomized test, it is of basic importance the studies´development in humans, it allows to evaluate at great length the laser effects in diabetic ulcers healing.

So, this study has the objective of to verify the AlGaInP laser effects on neuropathyc ulcers healing on lower extremities in carrying patients of diabetes mellitus.

METHODOLOGY

The research was defined as a clinical study almost experimental like intervention carried out at physiotherapy clinic of Southwestern State University of the Bahia, the sample is composed by 06 diabetic patientes and neuropathyc ulcers carriers taken care in the Continued Extension Project: Physiotherapeutic Cares ulcers healing on lower extremities. The exclusion criteria were the absence of Diabette Mellitus veined or arterial ulcers, wiht local and/or systemic infection, and no involvement of the research for free and spontaneous will. This study it was submitted and approved front the Committee of Ethics of the Southwestern State University of the Bahia, Jequié/BA campus, it was adopted the recommendations of the Health department, in the resolution n.º 196, de October, 10, 1996, referring the research with humans. People who participated of the research assign term of free and clarified assent.

Selected patients were taken care with AlGaInP laser (aluminum, gallium, indian and match)of the IBRAMED mark applied promptly to the edges and the stream bed of the wound, with a 4 dose of J/cm ², three times a week in days alternated in the period of 08/23/2006 the 05/02/2007.

Before begins the treatment the patients had been evaluated and for the analysis of the informations it were used two measures on the ulcers bigger height (vertical length) and greater width (horizontal length). From these measures its areas had been calculated using the mathematical formula of an ellipse, this is justifyed due to the fact that ulcers have irregular form, it´s being similar to this geometric form, similar to this geometric form,so A = (ð . l . h).¼, where A corresponds to the ellipse area ð is a constant value that valley approximately 3,1416; l: bigger width and h: bigger height. For results analysis it was used no Wilcoxon parametric test, the sample was small it presents shunting line high standard or still great variability between the data, and these

data had been described through decriptive tables and analyses.

RESULTS

Six patients were submitted to the treatment with AlGaInP Laser of, carriers of neuropathyc ulcers, totalizing eight ulcers. These individuals had been submitted to the evaluation and its ulcers had been measured, at the beginning and in the end of the treatment, getting themselves, therefore an initial area and a final area, as they are followed below in the picture:

Picture 01: Distribution of initial and final areas of the ulcers. Jequié/BA, 2006.

ÚLCERS	INITIAL DATE	INITIAL AREA	FINAL DATE	FINAL AREA
Úlcer 01 Alaíde	09/11/2006	3,53 cm²	11/29/2006	0,00 cm²
Úlcer 02 Cícero	11/06/2006	59,69 cm²	06/06/2007	15,56 cm²
Úlcer 03 Agnaldo	08/23/2006	7,85 cm²	12/04/2006	7,85 cm²
Úlcer 04 Renato MID	08/16/2006	13,82 cm²	03/19/2007	8,83 cm²
Úlcer 05 Renato MIE	08/16/2006	62,83 cm²	03/19/2007	60,47 cm²
Úlcer 06 Eloina	03/05/2007	20,02 cm²	05/21/2007	14,72
Úlcer 07 Antonio Paulo Dorsal ulcer	02/26/2007	10,60 cm²	05/02/2007	6,28 cm²
Úlcer 08 Antonio Paulo Ulcera calcaneal	02/26/2007	15,70 cm²	05/02/2007	14,13 cm²

Wilcoxon test with p-value of 0,018

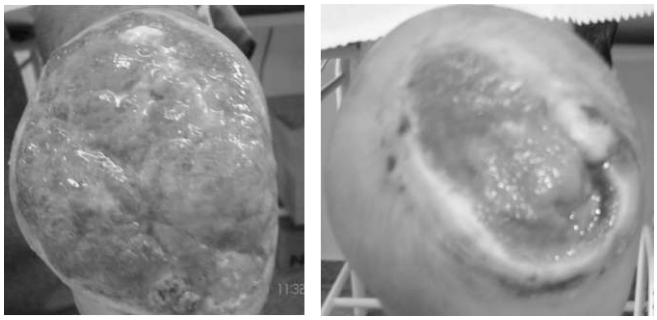
When analysing the results above,can be observed that in the ulcer 01 there was complete healing , ulcers 02,04,06 and 07 there was a reduction in its significative areas, inthe ulcer 05 there was few answer to the teraphy and the ulcer 03 did not answer the treatment with laserteraphy. Therefore we can afirm, through Wilcoxon test that the treatment with laser is efficient for healing of neuropathyc ulcers on lower extremities in carrying patients of diabetes mellitus, therefore we have a p-value of 0.018, it is not accept the hypothesis that the treatment is not efficient.

Such results can be visualized in the figures below:

Presentation of 01 ulcer before and after the treatment. Jequié/BA, 2006.



Presentation of 02 ulcer before and after the treatment. Jequié/BA, 2006.



DISCUSSION

The treatment of many kinds of chronic ulcers through low intensity laser had begun in the final of decade of 1960 and beginnig of decade of 1970 where it was used a source of He-Ne and dosagens until 4 J/cm^2. On the basis of the success in terms of the regeneration speed of wounds and reduction of pain told by the first studies, the modality got popularity mainly, presenting resulted positive in the cases most chronic and untreatable. The use of laser spread out so much in Europe and in the United States, however in Brazil its use is reduced.

Several works involving studies with laser were done in decade os 60, 70 and 80 which were observed a significant increase of leukocytes that participate in the phagocytosis greater collagen´s synthesis of for the fibroblasts treated and an acceleration to the cellular division. Moreover it was also noticed that there was a precocious regeneration of lymphatic vases in the treated groups, what it took it to conclude that the laser facilitated the development of the fabric of granulation.

The parameters of the laser used to encourage the release of substantiate daily pay-formed (histamine, prostaglandin, serotonin) with pro-inflammatory action and modification of the reactions the enzymatic level that had seemed more effective had been in a 4 intensity of J/cm ².

In a study in which it was used the laser of AsAGa beaten with dose of 4J/cm2 got an increase in the speed of healing in

relation to the group control. Another study in 1999 with AlGaInP laser using parameter concluded that there was acceleration of the cicatricial fabric formation, promoting the wounds regeneration.

It is possible that laser actice the formation of new vessels and promote a microcirculation, it increase the production of granulation fabric together with the increase of fibroblasts activity and collagen´s production, it results in acceleration of healing proces. Studies done in patients with ulcers in lower extremities had evidenced that patients treated with lase had gotten greater reduction of the area of the ulcer, greater granulation fabric formation, and greater relief of pain.

Such effect are of great relevance in the treatment of neuropathyc ulcers, it was verified increase in the haeling speed, with better resolution of the inflammatory process, improves of the circulation and increase of the fibroblast activity with improvement of the quality of the fabric new formed. These effects had been also verified in this research.

Some research has shown that the laser stimulates the ATP production increasing the mitotic and Phagocytic activity. Some studies in the decade of 70 had mainly observed an increase of the Phagocytic and mitotic activity,besides of a bigger stimulation of the fibroblasts generating a precocious regeneration.

The beneficial effect of the laser have been verified in beaten way, of low intensity, in the continuous way or with raised intensity, there is a bigger risk of cutaneous injuries.

In this study it was opted to using the beaten laser, to an intensity of 4 W/cm, for being a dose indicated for healing, among the cited effect.It were observed good results with the treated ulcers, therefore an increase in the healing speed was noticed, with results statistically significant and confirmed through the not-parametric test of Wilcoxon, which the p value was equal the 0,018.

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ABSTRACT

The objective of this study was to verify the AlGaInP laser effects on neuropathyc ulcers healing on lower extremities in carrying patients of diabetes mellitus. To take care of oneself a research of clinical character almost experimental, of the type intervention, carried in the physiotherapy Clinical School of the UESB, of which six patients participated with total of eight ulcers. It was found an average reduction of the ulcers with p was verified equal value the 0,018. It is concluded that the AlGaInP laser´s application, in dose of 4J/cm^2, punctual and in the edges revealed efficient, promoting improvement in the cicatricial process.

KEY-WORDS: Diabetes Mellitus, cicatrization, laser, ulcers.

L'EFFET DU LASER DE L'ALUMINIUM, DU GALLIUM, DE L'INDIEN ET DE L'ALLUMETTE (ALGAINP) DANS LA CICATRIZATION DES ULCÈRES DE NEUROPATIQUES DANS LES MEMBRES INFÉRIEURS DES PATIENTS DIABÉTIQUES.

RESUMÉ

L'objectif de cette étude devait vérifier l'effet du laser d'ALGAINP dans le cicatrization des ulcères de neuropatiques dans les membres inférieurs dans les patients portants du diabète Mellitus. Il s'agit d'une recherche du caractère clinique presque expérimental, du type intervention, exécuté dans la clinique et l'école de Fisioterapie de l'UESB, auquel avaient participé six patients présentant tout le nombre de huit ulcères. On a été vérifiée la réduction moyenne des ulcères traités avec la valeur égale 0.018. On a conclui que l'application du laser ALGAINP, dans la dose de 4J/cm, le message de sollicitation et dans les bords a indiqué efficace, favorisant l'amélioration du processus cicatriciel.

MOTS-CLÉS: Diabète Mellitus, cicatrization, laser, ulcères.

LOS EFECTOS DEL LÁSER DE ALGAINP EN LA CICATRIZACION DE LAS ÚLCERAS NEUROPÁTICAS EN LA EXTREMIDADES INFERIORES DE PACIENTES DIABÉTICOS

RESUMEN

El objetivo de este estudo fue verificar los efectos del láser de AlGaInP en la cicatrizacion de las úlceras neuropáticas en la extremidades inferiores en pacientes portadores del Diabettes Mellitus. Se trata de una pesquisa de carácter clínico casi experimental del tipo intervencion realizado en la Clinica Escuela de Fisioterapia de la UESB, en la cual participaran seis pacientes con total de ocho ulceras. Se verificó reducíon media de las ulceras tratadas con p valor igual a 0,018. Se concluiu que la aplicacíon del láser en dosis de 4J/cm^2, puntual y en las bordas se mostró eficaz promovendo mejoras en el proceso de cicatrizacion.

PALABRAS-CLAVE: Diabetes Mellitus, cicatrizacion, láser, úlceras.

OS EFEITOS DO LASER DE ALUMÍNIO, GÁLIO, ÍNDIO E FÓSFORO (ALGAINP) NA CICATRIZAÇÃO DE ÚLCERAS NEUROPÁTICAS EM MEMBROS INFERIORES DE PACIENTES DIABÉTICOS.

RESUMO

O objetivo deste estudo foi verificar os efeitos do laser de AlGaInP na cicatrização de úlceras neuropáticas em membros inferiores em pacientes portadores de Diabetes Mellitus. Trata-se de uma pesquisa de caráter clínico quase experimental, do tipo intervenção, realizado na Clínica Escola de Fisioterapia da UESB, no qual participaram seis pacientes com total de oito ulceras. Verificou-se redução média das úlceras tratadas com p valor igual a 0,018. Conclui-se que a aplicação do laser de AlGaInP, em dose de 4J/cm^2, pontual e nas bordas mostrou-se eficaz, promovendo melhora no processo cicatricial.

PALAVRAS-CHAVE: Diabetes Mellitus, cicatrização, laser, úlceras.