EFFECT OF LASER THERAPY ON MIOTOXICITY AFTER APPLICATION OF BUPIVACAINE

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Local anaesthetics are drugs the act as reversible blockers of neural conduction, avoiding the transmission of pain, sensory, motor and autonomic information to the Central Nervous System. They're mostly used in pre-surgical e odontological procedures and as pain relievers for pos-surgical procedures and chronic pain therapy.

One of the biggest issues of local anaesthetics are the collateral reaction, which include inflammation, myotoxicity and neurotoxicity.

On another aspect Low Level Laser Therapy (LLLT) it's recommended in case of tissue damage cause by surgery and/or accidental. This therapy has been employed as an anti-inflammatory, regenerative and analgesic action, as it present a regenerative action of the muscle as to increase fibroblast activity, to promote revascularisation of the injured area and to promote a correct synthesis of collagen. We then sought to analyse the effects of LLLT after the application of bupivacaine to muscle fibres of the sternomastoid muscle.

Ten male Wistar rats were used, from the Unesp Central Vivarium. All animals received injections of 0.5% bupivacaine in the right antimere, and injections of the 0.9% sodium chloride solution which was used as the control group in the left antimere.

Group A received 1 daily application for 5 consecutive days of GaAs diode laser, with a wavelength of 904 nanometers, output power (average) of 50 mW (milliwatts), emission area Beam of 0,01 cm^2. Group B received no treatment at all.

After the periods of injections and laser therapy applications, all animals were anaesthetised by intraperitoneal injection of Ketamine (Dopalen - 90mg / kg) and Xilazine (Rompun - 10mg / kg). Blood samples were then taken from 5 animals from each experimental group (via cardiac puncture), blood was centrifuged at 936RCF and 4 ° C for 10 minutes, with the objective of quantifying Creatine Kinase (CK) and Lactate Dehydrogenase (LDH).

After blood withdrawal, the sternomastoid muscles were removed to be submitted to the following analyses: Morphological analysis of muscle fibres and counting of central nuclei and Picrossirius Red staining and quantification of collagen.

The results of the quantification of serum levels of CK and LDH showed that there was no statistically significant difference between the Control and Laser groups.

Regarding the tissue quantification of CK and LDH levels, it can be observed that the CK activity in the right antimere's muscles are statistically larger when compared to the left in the Control group. After application of LLLT, there was no statistically significant difference between the antimeres, however when the groups were compared, there was a decrease in CK in the right antimer of the Laser group when compared to the Control.

When the muscle activity of LDH was analysed, there was a statistically significant increase in the right antimere when bought to the left in both groups. There was no difference when comparing the groups in both antimere.

When comparing the numbers of fibres with central nuclei of the left and right antimeres, either with or without laser application. Thus an extremely significant difference is noted, showing the myonecrotic effects of bupivacaine. In addition to the comparison of right and left antimeres in the counting of fibres with peripheral nuclei, the reduction of fibres with peripheral nuclei in the right antimere is observed, also because of the myonecrotic effects of bupivacaine. A significant difference was also observed when comparing the right antimere of the Control and Laser groups indicating that the application of LLLT increased the number of fibres with peripheral nuclei showing the cellular proliferation effect of LLLT.

Considering the results observed in this morphological analysis, it was decided to perform a semiquantitative analysis, which consisted in the graduation of the tissue components (inflammatory infiltrate, atrophy and necrosis). This analysis revealed that the right antimere

muscles had significantly higher scores related to inflammation, atrophy and necrosis. When the anaesthetic was associated with the laser, an attenuation of the general pathological processes was observed. In relation to chloride, only minor alterations were observed regarding the inflammation and when associated with the Laser, they remained unchanged.

The analysis of collagen fibres dyed with picrosiruses revealed that in the control group that underwent bupivacaine treatment it presented few muscle fibres and a great amount of collagen. The data presented that the Bupivacaine Control group showed a significant increase when compared to the other groups, the Laser Bupivacaine group showed a significant decrease when compared to the Bupivacaine Control group and presented an increase in relation to the groups that underwent the injection of sodium chloride .