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Innovative radiofrequency electrotherapy significantly reduces cornea perforation in an alkali burn murine model

Alfredo Ruggeri; Timur Dyrdin; Marco Barbariga; Paolo Rama; Giulio Ferrari

+ Author Affiliations & Notes

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Abstract

Purpose : An innovative treatment for ocular surface diseases, based on the administration of a radiofrequency electrical current containing a specific spectrum of frequencies (QMR), was recently shown to be effective in the dry eye syndrome. We investigated the effectiveness of this treament in reducing the perforation rate in alkali burn corneas.

Methods : Forty 6-week old C57Bl/6 mice underwent 1N alkali burn to induce a severe cornea inflammation. The QMR treatment (Rexon-Eye, Resono Ophthalmic, Italy) was started immediately after the model induction and consisted in 2 sessions per week for 3 weeks. Each session included a 20 min treatment, where the QMR radiofrequency current was applied (following a 30 seconds ON/30 seconds OFF protocol) to one eye of the 20 treated animals, using a small metal electrode touching the cornea. The remaining 20 animals underwent a fake treatment, where the electrode was also positioned over the cornea but no current was administered. All the animals were monitored during the 3-week treatment and for 1 additional week, and the presence of cornea perforations was assessed clinically with a slit-lamp by an ophthalmologist.

Results : The time course of the percentage of corneas without perforations over the four weeks of the experiment, for both treated and control animals, is reported in Fig. 1. The Gehan-Breslow-Wilcoxon test was performed to assess the difference between the two curves, which was statistically significant (P value <0.0001).

Conclusions : The use of the QMR treatment to reduce the incidence of corneal perforations in alkali burn mice was highly effective, supporting the use of this technology in the treatment of severe corneal inflammation.

This is an abstract that was submitted for the 2018 ARVO Annual Meeting, held in Honolulu, Hawaii, April 29 - May 3, 2018.

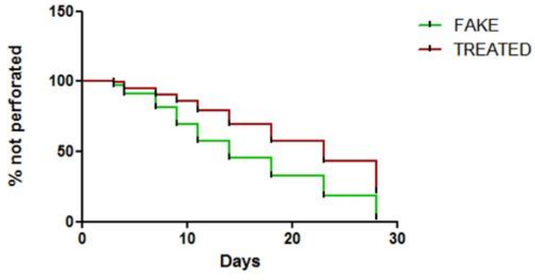

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Fig 1: Percentage of corneas without perforation as a function of time, for treated (green line) and control (red line) mice.