Electrotherapy Promotes Healing and Microcirculation of Infrapopliteal Ischemic Wounds: A Prospective Pilot Study.

ORIGINAL INVESTIGATION

Goldman, Robert MD; Rosen, Mark MD; Brewley, Barbara RNC, CRC; Golden, Michael MD

Abstract:
OBJECTIVE: To determine if high-voltage pulsed current (HVPC) electrotherapy augments ischemic wound healing and increases periwound microcirculation.

DESIGN: A prospective, randomized, single-blinded, sham-controlled clinical trial was conducted on a homogenous subset of quasistable ischemic wounds.

INTERVENTION: Active HVPC or sham HVPC was applied to wounds for a 14-week period.

MAIN OUTCOME MEASURE: Wounds were monitored every 4 weeks, except 2 weeks between weeks 12 and 14, for wound area, wound appearance, and microcirculation, which was measured by transcutaneous oxygen (TcPO2) levels and laser Doppler flow.

RESULTS: Ischemic wounds treated with active HVPC decreased in size, contrary to the expected increase in ischemic wound size that was observed in wounds in the control group (P < .05, Student t test; week 4). A trend toward smaller wound area occurred in wounds in the HVPC group compared with wounds in the control group (week 14). Among the HVPC group, an improvement in periwound microcirculation occurred at weeks 8 (P < .05, TcPO2; P < .01, laser Doppler) and 12 (P < .05, laser Doppler). These increases suggest that HVPC promotes arteriolar vasodilation and dermal capillary formation. HVPC was well tolerated.

SCONCLUSION: The results of this study demonstrate that HVPC decreased the area of ischemic wounds, reversing the expected increase in wound size, and improved microcirculation. The promising results of this pilot study require a larger Phase II study to confirm and generalize these findings.

CLINICAL RELEVANCE: Electrotherapy may prove to be a relatively safe and effective complement to surgical revascularization to improve the odds of healing ischemic wounds and promoting limb salvage.

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