Frequency-modulated electromagnetic neural stimulation enhances cutaneous microvascular flow in patients with diabetic neuropathy.


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AIM: The aim of this study was to investigate the effects of frequency modulated electromagnetic neural stimulation (FREMS), a recently developed safe and effective treatment of painful diabetic neuropathy, on cutaneous microvascular function. METHODS: Thirty-one patients with painful neuropathy were enrolled in a randomised, double-blind, crossover FREMS vs. placebo study; each received two series of 10 treatments of either FREMS or placebo in random sequence within no more than 3 weeks. Patients were studied at baseline, end of FREMS and placebo series, and after 4 months of follow-up. Cutaneous blood flow was measured by laser doppler flowmetry and partial tissue tension of oxygen (TcPO(2)) and carbonic anhydride (TcPCO(2)) by oxymetry at the lower extremities in basal resting conditions and as incremental response after thermal stimulation. RESULTS: Crossover analysis showed no consistent differences between FREMS and placebo. After 4-month follow-up, a 52% increase of cutaneous blood flow was observed in resting conditions (P=.0086 vs. baseline), while no differences were observed as incremental flow after warming; compared with baseline, no significant differences were observed for TcPO(2) and TcPCO(2), both in resting conditions and as incremental response to warm. CONCLUSION: These results indicate that 10 treatments with FREMS may induce an enhancement of microvascular blood flow measurable at 4 months of follow-up. The findings of this study will need to be confirmed in a larger, adequately powered study (ClinicalTrial.gov Id: NCT00337324).

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