

75. Blood flow perfusion and molecular response after ESWT in chronic skin ulcers

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Device and producing company:

DermaGold (USA), Tissue Regeneration Technologies (TRT) Orthowave 180 (Outside USA), MTS Europe GmbH

Introduction: This prospective study evaluated the efficacy of extracorporeal shockwave treatment (ESWT) in chronic skin ulcers and compared with hyperbaric oxygen therapy (HBO), and investigated the antibacterial and regeneration effects.

Methods: 105 patients with 112 chronic skin ulcers were randomly divided into two groups. There were 60 patients with 67 ulcers in the ESWT group and 45 patients with 45 ulcers in the HBO group. Both groups showed similar demographic characteristics. Patients in ESWT group received shockwave treatment, whereas patients in HBO group received HBO therapy. Blood flow perfusion culture and sensitivity and biopsy were performed before and after treatment. The evaluations included clinical assessment, blood flow perfusion scan bacteriological study, histomorphological examination, and immunohistochemical analysis.

Results:

The overall results showed: completely healed in 39%, improved in 51% and unchanged in 10% for the ESWT group; and 18% completely healed, 51% improved and 31% unchanged for HBO group ($P = 0.007$). ESWT group showed significantly better blood flow perfusion and considerably more active cell proliferation and concentration than HBO. On immunohistochemical analysis, ESWT group showed significant increases of eNOS, VEGF and PCNA expressions and decreases of TUNEL expression over the HBO group. The culture results revealed significant decreases in bacteria growth after treatment, but no difference was noted between the two groups.

Discussion:

ESWT is more effective than HBO in treating chronic diabetic skin ulcers. ESWT significantly improves blood flow perfusion associated with increased angiogenesis, increases cell proliferation and decreases cell apoptosis.

Conclusion: ESWT is effective for treating chronic diabetic ulcers. The application of ESWT results in increased angiogenesis with improved blood flow perfusion molecular responses and tissue regeneration in chronic skin ulcers.