

Radial extracorporeal shock wave therapy (rESWT) in wound healing – a prospective randomized Placebo-controlled animal trial

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Introduction:

Shock waves were initially used to treat wound healing disorders. First results showed good outcomes. Radial shock waves were not applied in wound healing until now.

Methods:

In an epigastric skin flap model the effect of radial extracorporeal shock waves was investigated in rats (Male Sprague Dawley rats weighing 300 to 350 g). A total of 25 subjects randomly received assigned treatment. All subjects underwent surgery to create a specific skin flap with reduced perfusion due to ligation of the epigastric artery and vein. After surgery the subjects were assigned into 3 groups. The first group received 300 shock waves with an ED of 0.13 mJ and 2 Hz, the second group received 600 shock waves with an ED of 0.13 mJ and 4 Hz, the third group received a placebo. To quantify the effect, planimetry and laser Doppler imaging (LDI) were performed 7 days after intervention and compared to baseline.

Results:

Baseline showed homogeneity regarding all criteria. Seven days after treatment rats receiving a total of 600 SW at 0.13 mJ showed significantly better outcomes compared to placebo and rats receiving 300 SW at 0.13 mJ. These significantly better outcomes after 600 SW at 0.13 mJ were found in both criteria (Planimetry and LDI). The group receiving 300 SW at 0.13 mJ showed slightly better outcomes but they were not significant compared to placebo. Only minor side effects such as petechial bleeding and edema were observed.

Discussion:

These findings demonstrate positive effects in a rat model. The clinical effect size remains unknown and needs to be determined.

Conclusion:

rESWT is an effective and safe method to treat wound healing with impaired perfusion conditions after surgery. The effect size reaches clinical relevance. These initial findings have to be verified in further studies. Clinical feasibility trials could start to calculate the clinical effect size of radial shock waves in perfusion-related wound healing disorders.