

**The effectiveness of ultrasound debridement for topical treatment of wounds without active infection at a critical ischemia in diabetic foot syndrome**

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**The aim** of the study is estimation the effectiveness of ultrasound debridement for treatment for diabetic foot syndrome taking into consideration the degree of tissue ischemia of the lower limbs. **Material and methods.** The research group (RG) consisted of 42 patients who received ultrasound debridement as a topical treatment. Control Group (CG) consisted of 27 patients who underwent traditional acute debridement with adequate drainage. Patients classified according PEDIS. For ultrasonic treatment it was used SONOCA- 180 with the sonotrode «hoof». Treatment was performed with an operating frequency of 25 kHz. Transcutaneous determination of partial pressure in the tissues of the lower extremity was conducted by TCM- 400, produced by Radiometer (Denmark) according to standard methods. For objectification measurement area of ulcers we were using digital camera and a specially- designed together with NTU «KPI» hardware-software complex «WoundVeiver». Evaluated as absolute ulcer area (in square centimeters) and the relative speed and healing (RSH). The relative rate of wound healing was determined by the formula  $RSH = (1 - S1/S0) * 100 \%$ , where S1- ulcer this area over a period of treatment, S0 – The initial area of ulcers.

**Results and discussion.** When  $TcPO_2 < 19$  mm Hg, the RSH in the RG was  $11,15 \pm 3,77 \%$  per 4 weeks compare to  $8,83 \pm 5,58 \%$  in the CG ( $p > 0.05$ ). A slight wound healing was achieved only as result of medicament revascularization. 9 patients with ultrasound group and 7 patients with CG were performed amputation at the level of the thigh or lower leg for 1 – 7 months after treatment. When  $TcPO_2$  ranges from 20 to 29 mm Hg. the difference of RSH between the ultrasound group and the GC becomes statistically significant ( $p < 0.01$ ),  $45,27 \pm 11,35 \%$  per 4 weeks in RG vs.  $28,02 \pm 8,80 \%$  per 4 weeks in CG. There was no any complications when using the device. In 11 of 17 patients with RG (at  $19 < TcPO_2 < 30$  mm Hg.) observed 50 % of the healing of ulcers within 4 weeks of treatment, compared to 1 of 12 patients in a similar level to the control  $TcPO_2$  subgroup (which is an important prognostic factor). **Conclusions.** Using of ultrasound debridement significantly improves wound healing provided minimally sufficient blood supply. In cases of the initial  $TcPO_2$  less than 19 mm Hg. significant healing occurs only under conditions of parallel medical revascularization. With its inefficiency – healing was impossible.