First aid treatment for thermal injuries with cold water removes heat and decreases inflammation. However, perfusion in the ischemic zone surrounding the coagulated core can be compromised by cold-induced vasoconstriction and favor burn progression. The aim of this study is to evaluate the effect of local warming on burn progression in the rat comb burn model. 24 male Wistar rats were randomly assigned to either no treatment (control) or application of cold (17 °C) or warm (37 °C) water applied for 20 min. Evolution of burn depth, interspace necrosis, and microcirculatory perfusion were assessed with histology, planimetry, respectively with Laser Doppler flowmetry after 1 h, as well as 1, 4, and 7 days. Consistent conversion from a superficial to a deep dermal burn within 24 h was obtained in control animals. Warm and cold water significantly delayed burn depth progression, however after 4 days the burn depth was similar in all groups. Interspace necrosis was significantly reduced by warm water treatment (62±4% vs. 69±5% (cold water) and 82±3% (control); p<0.05). This was attributed to the significantly improved perfusion after warming, which was present 1 h after burn induction and was maintained thereafter (103±4% of baseline vs. 91±3% for cold water and 80±2% for control, p<0.05). In order to limit damage after burn injury, burn progression has to be prevented. Besides delaying burn progression,
the application of warm water provided an additional benefit by improving the microcirculatory perfusion, which translated into increased tissue survival.