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To heal or not to heal: predictive value of in vivo reflectance-mode confocal microscopy in assessing healing course of human burn wounds.

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ABSTRACT

The purpose of this study was to assess if the healing course of burn wounds of indeterminate depth can be predicted based on serial in vivo reflectance-mode confocal microscopy (RMCM) analysis. Twenty-four patients (mean age, 33.1±11.4 years; mean burn size: 6% TBSA) were investigated at 12, 36, and 72 hours after burn of indeterminate depth and retrospectively grouped into healing group (HG: 16 patients) and nonhealing group (NHG: eight patients). Noninjured skin served as controls. The following parameters were assessed: quantitative blood cell flow (BCF), basal layer thickness (BLT), and inflammatory cells. At 12 hours postburn, BCF increased to 101.67±7.64 cells/min in HG vs 85±50 cells/min in NHG compared with controls (56.5±2.3 cells/min). At 36 and 72 hours, BCF increased to 115±10 cells/min and 125±50 cells/min in HG vs decreased to 80±5 cell/min and 75±5 cells/min in NHG ($P<.05$). At 12 hours postburn, BLT increased to 19.43±0.93 microm in HG vs 29±1 microm in NHG compared with controls (15.40±0.60 microm, $P<.05$). In HG, further gradual increase of BLT to 20±1 microm (36 hours) and 21±1 microm (72 hours) was observed, whereas BLT was destroyed after 36 hours in NHG. Qualitative assessment found insignificant amount of IC in controls and low amount in HG until 72 hours postburn, whereas progressive increase in IC from low amount (12 hours) to numerous (36 hours) and massive (72 hours) was observed in NHG. RMCM enables simultaneous evaluation of microcirculation, histomorphology, and inflammatory cell trafficking in burn wounds. RMCM may help to predict whether burns of indeterminate depth have the potential to heal and can be a valuable tool to clinicians to guide early therapeutic decision-making process in burn patients.