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Is the daily routine measurement of transcutaneous tissue oxygen tension ($tcpO_2$) a helpful tool in estimating the risk for non-healing in diabetic patients with non-palpable pedal pulses without chances for revascularization?

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Background: Adequate tissue oxygenation is crucial for wound healing. We evaluated whether daily routine transcutaneous tissue oxygen tension ($tcpO_2$) measurement can be used to predict chances for healing in diabetic patients with non-palpable pedal pulses without chances for revascularization.
Material and Methods: $TcpO_2$ measurements were performed at the dorsum of the forefoot of diabetic patients with active foot ulcers in a standardized setting. Patients were divided into three subgroups according to their initial $tcpO_2$-readings (group 1: $tcpO_2$ <20 mmHg, group 2: $tcpO_2$ 20-40 mmHg, group 3: $tcpO_2$ >40 mmHg). Patients with palpable pedal pulses or clinical signs of soft tissue infection were excluded. No patient was eligible for revascularization. Wounds were followed up for 365 days or until healing or amputation if earlier. Results are expressed as median [min-max]. Probability of healing was assessed by Kaplan-Meier method. Differences between the groups were calculated by Kruskal-Wallis or CHI-square test. **Results:** 154 consecutive patients were included. Median initial wound area was calculated to be 1.17 [0.02-99] cm^2 and $tcpO_2$ 32 [0-89] mmHg. Median duration of follow-up was 91 [7-365] days. The overall probability of healing was 65% within one year of treatment. The three subgroups were highly comparable for baseline characteristics. Probability of healing was significantly different between the groups (p=0.032). Low $tcpO_2$-values were associated with increased soft tissue infection rates (p=0.037) and an increased likelihood of hospitalization during follow-up (p=0.027). Moreover, amputation rates were decreasing along with rising $tcpO_2$-readings (p=0.026). However, major amputation rates were not different between the groups (p=0.426). **Conclusions:** Routine assessment of $tcpO_2$ is suitable as a clinical screening tool for estimating the risk of non-healing in diabetic foot ulcers without palpable peripheral pulses and chances for revascularization.