

[P62] ASSESSMENT OF MICROCIRCULATION IN THE FOOT OF PEOPLE WITH DIABETES WITH LASER SPECKLE CONTRAST IMAGING

O. A. Mennes¹, J. J. van Netten², J. G. van Baal², W. Steenbergen³

¹Ziekenhuisgroep Twente, Almelo and Hengelo, Netherlands, University of Twente, Enschede, Netherlands, Almelo, Netherlands

²Ziekenhuisgroep Twente, Almelo and Hengelo, the Netherlands

³University of Twente, Enschede, the Netherlands

Aim: One of the greatest challenges in diabetic foot disease is estimating the impact of peripheral ischemia. Currently used non-invasive diagnostic techniques only provide rough indications. Laser Speckle Contrast Imaging (LSCI) is a promising non-invasive technique to assess microcirculation. The aim of our study was to investigate the stability, reproducibility and validity of LSCI for determination of microcirculation in the foot of people with diabetes.

Method: We performed a prospective cohort clinical study. Thirty-three patients with diabetes mellitus and a foot ulcer were included. Patients were, based to the current IWGDF classification of perfusion, divided in two groups: non-ischemic and ischemic. We performed LSCI scans of the dorsal and plantar side of the ulcerated foot and the contralateral foot. The microcirculation at baseline was determined and followed by two different occlusion tests. All scans were performed twice by the principal investigator and a third time by an experienced clinician. Furthermore, ankle blood pressure, ankle-brachial index (ABI), toe blood pressure and TcpO₂ were measured in both feet.

Results/Discussion: The overall intra- and inter-observer agreement were both high and significant for the assessment of microcirculation at baseline and for the occlusion tests (intra-observer: ICC > 0.85; p < 0.001; inter-observer: ICC > 0.7; p < 0.05). The correlation between LSCI and ABI, toe pressure and TcpO₂ was weak (r < 0.5). The microcirculation at baseline (measured with LSCI) was non-significantly lower in ischemic feet compared to non-ischemic feet (40.2 vs. 51.1; p > 0.05); microcirculation for the occlusion tests was significantly lower in ischemic feet (61.9 and 34.9 vs. 100.8 and 66.8; p < 0.05). The LSCI values of the microcirculation at baseline in the ulcerated foot were significantly higher compared to the contralateral foot (46.1 vs. 39.8; p < 0.05) and non-significantly higher during the occlusion tests (82.2 and 55.0 vs 74.4 and 49.1; p > 0.05).

Conclusion: LSCI is a stable, reproducible and valid technique for assessment of microcirculation in feet of people with diabetes, with low intra- and inter-observer variability. LSCI can be useful in the determination of peripheral ischemia in diabetic foot ulcers. Although more clinical studies are needed to determine the prognostic power of LSCI, the results of this study are a promising first step towards improved diagnostics among these patients.