

[O18] PREDICTION MODEL FOR PLANTAR FOOT ULCER RECURRENCE IN HIGH-RISK DIABETES PATIENTS

Wouter Aan De Stegge¹, Ameen Abu-Hanna², Sicco Bus¹

¹Academical Medical Center, Department of Rehabilitation, University of Amsterdam, Amsterdam, Netherlands

²Academical Medical Center, Department of Medical Informatics, University of Amsterdam, Amsterdam, Netherlands

Aim: The aim of this study was to construct a prediction model for plantar foot ulcer recurrence in high-risk diabetes patients, and to internally validate its predictive performance.

Method: Data were retrieved from a multicenter randomized controlled trial on plantar foot ulcer recurrence (n = 171).¹ Demographic and disease-related data, barefoot and in-shoe peak plantar pressure, footwear adherence, and daily walking activity were entered in a multivariate logistic regression analysis. Variable selection was based on correlation analysis and the Akaike information criterion. Two logistic regression models were created, the first on all plantar foot ulcers (intention to treat, ITT), the second on all plantar foot ulcers from unrecognized repetitive stress. Performance was assessed by the area under the receiver operating curve (AUC, score 0-100), calibration graphs, and the Brier score (0-1). Internal validation was done by bootstrapping based on 1000 resamples.

Results/Discussion: The linear predictor of the first model on 71 patients who had a recurrent plantar foot ulcer in 18 months follow-up was: $-0.92 + 0.82 * \text{Living alone} + 0.039 * \text{Months duration of a previous ulcer} - 0.05 * \text{Variation in 7-day measured daily stride count} + 1.59 * \text{Presence of a minor lesion (abundant callus, blister, hemorrhage)}$. The AUC was 0.72, and Brier score 0.21. The linear predictor of the second model on 41 patients with a recurrent ulcer from unrecognized repetitive stress was: $-1.85 + 0.031 * \text{Months duration of a previous ulcer} - 0.071 * \text{Number of months that the previous ulcer was healed} + 2.0 * \text{Presence of a minor lesion}$. The AUC was 0.78, and Brier score 0.16. Both models produced predicted probabilities from under 1% to more than 90%. The calibration graphs showed for the first model no marked deviations between the predicted and observed probabilities, the second model displayed some deviation in the middle range of the predicted probabilities.

Conclusion: These are the first prediction models for plantar foot ulcer recurrence. Based on the above-mentioned variables both models showed a fair discrimination ability between no ulcer and ulcer recurrence. Even so both models can predict ulcer recurrence with a risk score between 1% to more than 90%. The models may have utility in informing patients about future risks and guide doctors and patients in joint decision making on further treatment and follow-up.

¹Bus SA, Waaijman R, Arts M, et al. Effect of custom-made footwear on foot ulcer recurrence in diabetes. *Diabetes Care*. 2013;36:4109-16.