Degree of sensory loss predicts the risk of foot ulceration in patients with diabetes mellitus

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Abstract

Background: The aim of this study was to assess the relationship between the degree of loss of foot sensation at baseline and incident foot ulceration (DFU) in a cohort of patients with diabetes, using a valid instrument for the assessment of sensory loss.

Methods: (Non)-neuropathic subjects (n=416) participating in the observational Rotterdam Diabetic Foot (RDF) Study were followed prospectively (median 955.5 days (IQR, 841.5-1121)). Subjects underwent sensory testing of the feet (39-item RDF Study Test Battery) at baseline and were assessed regarding incident DFU. Seven groups of incremental degree of sensory loss were distinguished, according to the RDF-39 sum score. Kaplan-Meier and Cox's regression analyses were used to determine the independent hazard of baseline variables for new DFU.

Results: 40 participants developed DFUs. The mean incident rate of new-onset ulceration from study start was 4.5 (95%CI: 3.3 to 6.1) per 100 person-years, which increased significantly from 0 to 67.70 in the seven groups ($X^2(6)=129.704$, $p<0.0005$). Predictors for DFUs were higher RDF-39 score (aHR: 1.173, $p<0.0005$) and kidney function (aHR: 1.022, $p=0.016$). Disease-free survival in patients without prior DFU was predicted by the RDF-39 with a positive likelihood ratio of 3.77. Prior DFU suggests increased mortality risk.

Conclusions: The degree of sensory loss at baseline was associated with progression to DFU during follow-up. Grading the loss of sensation using the RDF Study Test Battery may result in a more precise risk stratification compared to the use of the 10 g monofilament according to current guidelines.