Estimating risk of clinically evident neuropathy in type 2 diabetes: a UKPDS risk equation

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Identifying people with type 2 diabetes (T2DM) most at risk of developing neuropathy is problematic. We have used UK Prospective Diabetes Study (UKPDS) data to develop a neuropathy risk calculator.

Of 5102 UKPDS patients, 1845 without prevalent neuropathy and with requisite data were analysed. Clinically evident neuropathy was defined as the first of: absent ankle jerks, vibration perception threshold (VPT) >25V (both toes), or erectile dysfunction (males). As neuropathy status was assessed triennially, multivariate Weibull survival models were fitted to allow for interval censoring and patients sampled at random times after diagnosis to improve generalizability to different diabetes durations.

During mean (SD) 5.9 (2.9) years follow-up, 535 new neuropathy cases occurred (229 absent ankle jerks, 180 VPT>25, 126 erectile dysfunction). Univariate associations (p<0.05) were age, sex, HbA1c, systolic blood pressure (SBP), body mass index (BMI), height, macroalbuminuria (urine albumin ≥300mg/l) and diabetes duration. All but SBP remained significant in a multivariate analysis (p=0.051).

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\text{t-year risk} = 1 - \exp\left(-0.0001 \times 1.060^{\text{AGE}-55} \times 0.6263^{\text{FEMALE}} \times 1.139^{\text{HbA1c}-7.2} \times 1.057^{\text{BMI}} \times 1.026^{\text{HEIGHT}} \times 2.484^{\text{MACROALBUMINURIA}} \times 1.077^{\text{DIABETES DURATION}} \times t^{1.315}\right)
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Ethnicity, smoking status, total:HDL cholesterol ratio, LDL cholesterol, triglycerides, and waist circumference were not significantly associated with neuropathy risk.

Conclusions
Likelihood of developing clinically evident neuropathy can be calculated from readily available clinical information.