Relationships between electrochemical skin conductance and kidney disease in Type 2 diabetes

Freedman et al.

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Abstract

Background: SUDOSCAN® non-invasively measures peripheral small fiber and autonomic nerve activity using electrochemical skin conductance. Since neuropathy and nephropathy are microvascular Type 2 diabetes (T2D) complications, relationships between skin conductance, estimated glomerular filtration rate (eGFR), and urine albumin:creatinine ratio (UACR) were assessed.

Methods: Two hundred five African Americans (AA) with T2D, 93 AA non-diabetic controls, 185 European Americans (EA) with T2D, and 73 EA non-diabetic controls were evaluated. Linear models were fitted stratified by population ancestry and T2D, adjusted for covariates.

Results: Relative to EA, AA had lower skin conductance (T2D cases p<0.0001; controls p<0.0001). Skin conductance was also lower in T2D cases vs. controls in each population (pb0.0001, AA and EA). Global skin conductance was significantly associated with eGFR in AA and EA with T2D; adjusting for age, gender, BMI, and HbA1c, positive association was detected between skin conductance and eGFR in AA T2D cases (parameter estimate 3.38, standard error 1.2; p = 5.2E−3), without association in EA T2D cases (p = 0.22).

Conclusions: Non-invasive measurement of skin conductance strongly associated with eGFR in AA with T2D, replicating results in Hong Kong Chinese. SUDOSCAN® may prove useful as a low cost, non-invasive screening tool to detect undiagnosed diabetic kidney disease in populations of African ancestry.