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Environmental co-exposure to cadmium and lead and the association with diabetic kidney disease; another reason to avoid smoking and alcohol intake in patients with T2DM?

G.D. Laverman^{1,3}, I.J.M. Hagedoorn¹, S. van Huizen¹, C.M. Gant¹, R.G.H.J. Maatman², G.J. Navis³ and S.J.L. Bakker³

¹Department of Internal Medicine/Nephrology, ZGT Hospital, Almelo and Hengelo, the Netherlands

²Department of Clinical Chemistry, ZGT Hospital, Almelo and Hengelo, the Netherlands

³Division of nephrology, Department of Internal Medicine, University of Groningen, University Medical Centre Groningen, Groningen, the Netherlands

Background: Environmental factors contributing to diabetic kidney disease (DKD) in type 2 diabetes mellitus (T2DM) are incompletely understood. We investigated whether blood concentrations of cadmium (Cd) and lead (Pb) were associated with prevalent DKD, and to which extent diet and smoking contribute to blood Cd and Pb concentrations.

Methods: We performed a cross-sectional analysis in 240 patients with T2DM included in the DIAbetes and LifEstyle Cohort Twente (DIALECT-1). Blood Cd and Pb concentrations were determined from EDTA whole blood samples. Cd-Pb co-exposure was calculated by addition of Cd and Pb Z-scores. The association between Cd-Pb and DKD (CKD-epi <60ml/min/1.73m² and/or albuminuria) was determined using multivariate logistic regression. The association between diet (derived from food frequency questionnaire), smoking and Cd and Pb was determined using multivariate linear regression.

Results: Almost half of all participants had DKD (49%). Median blood concentrations were 0.33 ug/l (IQR: 0.21-0.57 ug/l) for Cd and 1.45 ug/dl (IQR: 0.83-1.86 ug/dl) for Pb, all below the values known for acute toxicity. Higher Cd-Pb was associated with a 32% higher risk for DKD (OR: 1.317 (1.071-1.620), p=0.009). Smoking status was positively associated with Cd (β : 0.479, p<0.001) and alcohol intake with Pb (β : 0.299, p<0.001), while there was no association between dietary intake and Cd or Pb.

Conclusion: The association between higher Cd-Pb and prevalent DKD might suggest Cd and Pb contribute to progressive DKD. The higher Cd-Pb associated with smoking and alcohol might provide another mechanism by which these intoxications adversely affect renal health in T2DM.

Biography

Goos Laverman studied Medicine in Groningen and was subsequently trained as internist-nephrologist. He completed his PhD at the age of 32 years at the Groningen University. He spent one year of research at the Mario Negri Institute in Bergamo, Italy. He is the principal investigator of the "Diabetes and Lifestyle Cohort Twente" and also PI of several clinical studies. He has published more than 75 papers in the field of Nephrology and Diabetes.

g.laverman@zgt.nl