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Diabetic nephropathy and organochlorine pesticides

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Abstract

Nephropathy, or kidney disease, is a major, potential complication of diabetes. We assessed the association of 6 organochlorine pesticides, and pesticide metabolites, in blood, with diabetic nephropathy in the 1999-2004 National Health and Nutrition Examination Survey (NHANES). Diabetes was defined as diagnosed or undiagnosed (glycohemoglobin ≥6.5%), and nephropathy defined as urinary albumin to creatinine ratio >30 mg/g, representing microalbuminuria or macroalbuminuria. The proportion of the sample with diabetic nephropathy was 2.4%, and proportion having diabetes without nephropathy was 5.3%. Only *p,p'*-DDT (dichlorodiphenyltrichloroethane) was associated with diabetic nephropathy. Beta-hexachlorocyclohexane, oxychlordane, *trans*-nonachlor, and heptachlor epoxide were associated with diabetes without nephropathy, but not with diabetic nephropathy, as might be expected given the relative sizes of each group. A metabolite of DDT, *p,p'*-DDE (dichlorodiphenyltrichloroethylene) was not associated with either diabetic nephropathy or diabetes without nephropathy. When all 6 pesticides, and pesticide metabolites were elevated the odds ratio (OR) for diabetic nephropathy was 3.39 (95% CI 1.23-9.29), which was higher then that of *p,p'*-DDT alone. When one or more of the 6 compounds were elevated, there was a strong association with diabetes without nephropathy (OR=3.64, 95% CI 1.78-7.44). These results differ from what we expected given the associations of dioxin and dioxin-like compounds with diabetic nephropathy that we found previously. As the kidneys function to remove waste products from the blood, diabetic nephropathy could be either the cause or the effect (or both) of exposure to DDT. Diabetes with and without nephropathy should be analyzed as independent outcomes in future investigations involving DDT.

Biography

Charles J. Everett, PhD is Affiliate Faculty in the Master of Environmental Studies Program at the College of Charleston. He has published 79 articles and book chapters in the fields of environmental epidemiology, medicine and soil science.

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