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Association between diabetes and Type 2 Cardiorenal Syndrome: An analysis of National Health and Nutritional Examination Survey between 1999-2010

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Introduction: Diabetes is known to be associated with chronic kidney disease (CKD) and cardiovascular disease independently. Type 2 cardiorenal syndrome (CRS), a recently defined syndrome, is characterized by a primary renal failure that progressively leads to cardiac dysfunction. The effect of diabetes on CRS has not been explored in a multi-ethnic population. In this retrospective secondary analysis the hypothesis was tested if diabetes modifies the effect of cardiovascular disease on CKD.

Methods: The National Health and Nutrition Examination Survey (NHANES) is a cross sectional survey done on the non-institutionalized population of the United States by the Center for Disease Control and Prevention and National Center for Health Statistics. All patients from the nationally representative NHANES study, 20 years and older between the years 1999-2010 were included in the analysis. Glomerular filtration rate (GFR) was derived from the Cockcroft-Gault equation. A GFR of less than 60 was considered to be CKD as previously validated. CVD was determined by the self-reported diagnosis of coronary heart disease, angina, stroke, congestive heart disease, and heart attack. Analysis was performed using complex samples logistic regression to determine relationship of diabetes on Type 2 CRS. All missing variables were excluded.

Results: Data was available for 28,139 individuals (52% females vs. 48% males). The prevalence of CKD among the population was 9.6% in Non-Hispanic Whites, 8.9% in African-Americans, and 4.5% in Hispanics. The overall unadjusted odds ratio for CKD to no CKD was 6.89 (95% confidence interval [CI], 6.13-7.75, $p < 0.001$). The adjusted OR was elevated, 2.25 (CI 1.56-3.23, $p < 0.001$), among individuals with diabetes but close to 1.0 (1.43 CI 1.16-1.76, $p < 0.05$) among patients without diabetes after the results were controlled for medical (hypertension, cholesterol status, obesity, smoking status, current infection, and C-reactive protein) risk factors and demographic (education level, ethnicity, gender, and age) risk factors.

Conclusion: Individuals who have CVD and diabetes may have seven times higher likelihood of developing CKD than those that do not have CVD. Consequently, diabetes may need to be addressed and monitored closely in a patient who has Type 2 CRS. Health care practitioners need to be made aware of this potential effect on Type 2 CRS. More longitudinal studies need to be done to understand the precise role of diabetes in the context of CRS.

Biography

Srikanta Banerjee, M.D., MPH is a faculty member at the University of Roehampton School of Health Sciences. He received his M.D., MPH, and postdoctoral trainings in USA, the UK, and the Caribbean. He received additional training at the Centers for Disease Control and Prevention in public health and microbiology. His research activities cover cardiovascular disease, diabetes, chronic kidney disease, community health, and biostatistics.

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