OBSERVATIONS

Offspring of Patients With Diabetes Exhibit a Clustering of Psychosocial Distress and Inflammatory and Metabolic Risk Factors

Family history of type 2 diabetes is associated with vascular, inflammatory, and metabolic abnormalities (1). Although psychological distress has been similarly associated with these same biological abnormalities (2) and found to significantly predict 20-year incidence of coronary heart disease (3), no study has examined the relationship of family history of diabetes with markers of psychological distress. We examined the relationship between parental history of diabetes and metabolic and inflammatory biomarkers and indicators of psychosocial distress (i.e., depression, hostility, anger, and social support) measured by validated self-report scales. Subjects were 68 nonsmoking and apparently healthy nondiabetic adults (aged 33 ± 10 years; 56% female; 40% minorities, 26% of whom were African American) recruited from the community. Exclusion criteria included a history of chronic medical or psychiatric conditions or current use of over-the-counter or prescribed medications, including exogenous hormones. Subjects were free from acute infections and reported no injuries or medical procedures 1 week before laboratory visit.

Twenty-four percent of subjects reported having at least one parent with diabetes. A positive parental history was not associated with sex, ethnicity, fasting glucose, age, C-reactive protein, interleukin-6, anger, depression, or social support. Similar to previous observations, subjects with a family history of diabetes had a higher BMI (4,5) (27 ± 6.6 vs. 24.5 ± 3.8 kg/m^2, $P = 0.07$), significantly higher insulin resistance as derived from homeostatis model assessment (5) (median 1.70 [interquartile range 1.19–1.90] vs. 1.30 [0.80–1.82], $P = 0.04$), and significantly higher fasting plasma insulin (5) (10.3 ± 9 vs. 6.7 ± 4 μU/ml, $P = 0.02$). However, the relationships of insulin resistance and fasting plasma insulin to parental history were mediated by BMI but not age, ethnicity, or sex. Hostility was significantly associated with a parental history of diabetes (22 ± 8 vs. 17 ± 7, $P = 0.03$ [hostility levels assessed by a total score representing the sum of 50 true/false items extracted from the Minnesota Multiphasic Personality Inventory, with the total score ranging from 0 to 50 and increasing scores representing total hostility]) without attenuation by age, ethnicity, or sex. Subjects with a parental history of diabetes showed a clustering of risk factors: depression correlated with fasting insulin ($r = 0.64$, $P = 0.06$) and insulin resistance ($r = 0.62$, $P = 0.075$); anger correlated with C-reactive protein ($r = 0.66$, $P = 0.078$); and social support negatively correlated with fasting insulin ($r = -0.62$, $P = 0.075$). Subjects with a negative family history did not exhibit this clustering pattern.

Our results replicate previous observations that parental history of diabetes is associated with metabolic and inflammatory biomarkers (1) and further suggest that individuals with a parental history of diabetes also evidence greater psychosocial distress. The most novel finding is our observation that, in this population, biological and psychosocial risk factors clustered in those with a parental history, suggesting that biobehavioral factors act in concert to increase future risk of diabetes. This clustering of factors underscores the complex heritability and linkage of traits associated with type 2 diabetes. Future studies should use a prospective design to examine additive risk from this combination of biobehavioral factors in a population at risk for diabetes.

JESSICA E. SHILL, MD[1]
MARK N. FEINGLOS, MD, CM[1,2]
EDWARD C. SUAREZ, PHD[2]

From the [1]Division of Endocrinology, Department of Medicine, Diabetes and Nutrition, Duke University Medical Center, Durham, North Carolina; and the [2]Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, North Carolina.

Corresponding author: Edward C. Suarez, suare001@mc.duke.edu.

DOI: 10.2337/dc08-1482

References

1. Tesauro M, Rizza S, Iantorno M, Campia U, Cardillo C, Lauro D, Leo R, Turriziani M, Cocciolillo GC, Fusco A, Panza JA, Scuteri A, Federici M, Lauro R, Quon MJ: Vascular, metabolic, and inflammatory abnormalities in normoglycemic offspring of patients with type 2 diabetes mellitus. *Metab Clin Exp* 56:413–419, 2007
2. Suarez EC, Boyle S: The relationship between insulin resistance and psychological risk factors of cardiovascular disease: is inflammation the link? In *Annual Meeting of the American Psychosomatic Society*. Vancouver, Canada, 2005
3. Boyle SH, Michalek JE, Suarez EC: Covariation of psychological attributes and incident coronary heart disease in US Air Force veterans of the Vietnam War. *Psychosom Med* 68:844–850, 2006
4. Hilding A, Eriksson AK, Agardh EE, Grill V, Ahlbom A, Efendic S, Ostenson CG: The impact of family history of diabetes and lifestyle factors on abnormal glucose regulation in middle-aged Swedish men and women. *Diabetologia* 49:2589–2598, 2006
5. Humphriss DB, Stewart MW, Berrish TS, Barriocanal LA, Trajano LR, Ashworth LA, Brown MD, Miller M, Avery PJ, Alberti KG, Walker M: Multiple metabolic abnormalities in normal glucose tolerant relatives of NIDDM families. *Diabetologia* 40: 1185–1190, 1997