sense of well-being or perceived quality of life. The study by Nathan et al. has provided data that patients can survive with combined pancreas/kidney transplants and that these grafts can function well. Under these set of circumstances, the patients perceive an improved quality of life. This is not surprising because their underlying disease has, indeed, been cured, at least temporarily. However, it is disappointing that the authors did not provide data concerning the functional status of the patients. Were they working or in school before the transplant? If so, did they continue afterward, or if not, did they begin school or work with the functioning grafts in place? Follow-up data from Morel et al. (4) would indicate that children who receive a kidney transplant have an improved quality of life but are also holding jobs or continuing their education.

Thus, the data of Nathan et al. are important because they not only assess the morbidity and mortality of the patients and allografts but also determine whether such transplantation efforts make a difference to the patient who is being subjected to the procedures. The goal of future research should be to improve on the technical and immunological aspects of transplantation and to assess the quality of life the patients are receiving. Research in the latter area is just beginning to be performed and presented.

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Influence of Regional Adiposity on Atherogenic Risk Factors in Men and Women With Type II Diabetes

BAYNES C, HENDERSON AD, ANYAOKU V, RICHMOND W, JOHNSTON DG, ELKELES RS: THE INFLUENCE OF REGIONAL ADIPOSITY OF ATHEROGENIC RISK FACTORS IN MEN AND WOMEN WITH TYPE 2 DIABETES. *DIABETIC MED* 8:458–63, 1991

OBJECTIVE— This study was designed to *1*) determine whether body fat distribution could predict lipid, lipoprotein, apolipoprotein and blood glucose concentrations, and blood pressure better than overall adiposity in non-insulin-dependent (type II) diabetes and if this relationship was similar for both sexes; 2) determine whether sex differences in lipoprotein risk factors in type II diabetes can be entirely explained by body fat distribution; and 3) examine the relationship between hepatic lipase and the waist-hip ratio (WHR) because this enzyme may be one mechanism by which the WHR and sex affect high-density lipoprotein (HDL) cholesterol.

RESEARCH DESIGN AND METHODS— This study is a cross-sectional study of 47 type II diabetic subjects (26 men, 21 women) matched for age, body mass index (BMI), and blood glucose control. All had been diagnosed for >6 mo at the time of the study and had no clinical evidence of macrovascular disease, hypertension, abnormal renal, liver, or thyroid function.

PATIENTS— All subjects were of stable weight and metabolic control, and none had ever received insulin or were taking any medication known to affect carbohydrate or lipid metabolism. Overall adiposity was assessed by BMI (kg/m^{-2}) and regional adiposity by the minimum waist circumference to the maximum hip circumference ratio (WHR). Blood pressure was measured in the standard manner. Blood was obtained for the determination of HbA_1, insulin, C-peptide, lipids, lipoproteins, and apolipoproteins (apo) after an overnight 12-h fast. After blood sampling heparin was given intravenously and blood was drawn at 15 min and frozen

for subsequent measurement of lipoprotein lipase and hepatic lipase activities. Differences between means for men and women were assessed by Student's unpaired *t* tests. Univariate relationships were examined with Pearson's correlation coefficients and one-way analysis of variance was used to evaluate whether the method of treatment (diet alone n = 17, sulfonylurea n = 19, and metformin n = 5) had an effect on any of the variables assessed.

Table 1—*High-density lipoprotein (HDL) subfraction cholesterol, apolipoprotein A-I concentrations, and hepatic lipase activities in 10 men and 10 women with non-insulin-dependent diabetes after matching for waist-hip ratios*

	Women (n = 10)	Men (n = 10)
Waist-hip ratio	0.87 (0.83–0.94)	0.89 (0.83–0.93)
HDL cholesterol (mM)	1.27 (0.82–1.81)	1.10 (0.84–1.43)
HDL_2 cholesterol (mM)	0.32 (0.07–0.72)	0.22 (0.05–0.41)
HDL_3 cholesterol (mM)	0.92 (0.74–1.2)	0.74 (0.66–0.87)*
Apolipoprotein A-I (g/L^{-1})	1.76 (1.5–2.08)	1.46 (1.26–1.76)*
Hepatic lipase activity ($mmol \cdot h^{-1} \cdot L^{-1}$)	9.8 (4.4–23.1)	13.0 (6.4–29.1)

Geometric mean (range in parentheses).
*$P < 0.01$.

PRIMARY OUTCOME— Results of this study show that *1)* WHR was significantly greater in men, 2) serum total cholesterol (TC), HDL cholesterol, HDL_2, HDL_3, and apoAI were significantly higher in women, whereas triglyceride (TG) concentrations and apoB were similar for men and women, as were fasting insulin, C-peptide and insulin-C-peptide ratio, and 3) lipoprotein lipase activity was similar between the sexes; however, hepatic lipase activity was significantly higher in men.

RESULTS— BMI and WHR were significantly related to TG, insulin, and C-peptide in both sexes. In women, HDL cholesterol was negatively associated with BMI, but not WHR. By contrast, in men, WHR but not BMI was negatively related to HDL cholesterol, HDL_2, and apoAI and positively related to hepatic lipase. For both sexes neither BMI or WHR were related to systolic or diastolic blood pressure. In a subset of 10 men and 10 women who were matched on WHR, the sex difference in HDL cholesterol, HDL_2, and hepatic lipase activity was no longer present; however, apoAI and HDL_3 remained significantly lower in men (Table 1).

CONCLUSIONS— The authors conclude that WHR is a better predictor of several atherogenic risk factors than BMI in men (but not women) with type II diabetes and that sex differences in risk factors can only partially be explained by differences in body fat distribution.

COMMENTARY— Because of the well-known sex difference in body fat distribution, the assessment of regional adiposity is important in determining its influence on sex differences in risk factors for cardiovascular disease (CVD). Failure to evaluate body fat distribution may bring about erroneous findings related to overall body fat and size. Several studies previously indicated that regional adiposity contributes significantly to sex differences in lipoprotein concentrations in nondiabetic adults (1,2). Because type II diabetes constitutes a disorder highly associated with obesity and CVD risk in both men and women, it is important to assess the well-known association of central adiposity to risk profile in this population and to examine whether a difference exists between men and women.

This study confirms what has been found in nondiabetic adults in regard to sex differences in HDL cholesterol and its subfractions, as well as hepatic lipase activity (3). Baynes et al. were reasonably thorough in controlling for several possible confounding factors (i.e., BMI, blood glucose control, and age). However, there may be other important factors that influence lipids, lipoproteins, and adiposity in type II diabetes. Regular exercise, for example, affects insulin sensitivity and secretion, HDL cholesterol, apoAI, TG, lipoprotein lipase, and hepatic lipase activities. Therefore, it could be important to assess the habitual physical activity level of the subjects to control for these effects.

Possibly the most important finding in this study is the correlation between WHR and hepatic lipase activity, which may be the link between central body fat and low HDL cholesterol concentrations, the mechanism behind which is not known. These authors suggest that an increase in nonesterified fatty acid flux and associated insulin resistance go along with a large abdominal fat mass, which may enhance hepatic lipase activity (4,5). The results of this study are important in extending previous findings in nondiabetic adults to a group with type II diabetes. The observations and conclusions made by the authors are generally warranted; however, because of the small number of subjects it would be beneficial to have these results repeated in a larger study group. Another word of caution in interpreting the results, which the authors themselves site, is that only a small amount of a variation in several of the measures is accounted for by either BMI or WHR. This suggests that other factors, e.g., hormonal,

are as important as indices of adiposity in influencing CVD risk factors.

The study supports the need for further research in this area, in particular to develop multidisciplinary research strategies that incorporate physical measures of adiposity and its distribution with metabolic studies of physiological mechanisms, which may be responsible for abnormal lipid and lipoprotein profiles and/or glucose intolerance and insulin resistance. These types of studies performed both in normal subjects and those with abnormalities in carbohydrate metabolism (glucose intolerance/insulin resistance) would illuminate a presently shaded area. Barbara N. Campaigne, PhD Children's Hospital Medical Center Cincinnati, Ohio

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