Endothelium-Dependant Brachial Artery Flow-Mediated Vasodilatation in Patient with Diabetes Mellitus with and without Coronary Artery Disease

Sir,

This is in reference to the excellent original article “Endothelium-depandent brachial artery flow-mediated vasodilatation in patient with diabetes mellitus with and without coronary artery disease by K Bhargava et al”, an important information on the subject of endothelial dysfunction in the north Indian population. May I add that data on the subject has also been available in the southern and western population from India. R Ravikumar et al have compared the FMD and Augmentation Index (AI) in diabetic and non-diabetic subjects and correlated these measurements with the carotid IMT in the CUPS-9 study. FMD values were significantly lower among diabetic subjects compared with non-diabetic subjects (2.1 ± 2.95% vs 6.64 ± 4.38%, p < 0.0001). At any given age, diabetic subjects in the study had significantly higher AI and lower FMD values compared to non-diabetic subjects. In our study from the western Indian population (“Non-invasive assessment of endothelial dysfunction by brachial artery flow-mediated dilatation in prediction of coronary artery disease in Indian subjects” - in process citation. Indian Heart Journal), prevalence of CAD was higher among subjects with endothelial dysfunction (ED) compared to those without endothelial dysfunction. (57.5% vs 34.7%, p = 0.013). Prevalence of endothelial dysfunction was significantly higher among subjects with CAD as compared to those without CAD (76.4% vs 55.8%, p = 0.012). Multiple regression analysis using CAD as a dependant variable revealed a statistically significant association with endothelial dysfunction (p = 0.033) even after inclusion of the traditional risk factors into the model.

Endothelial dysfunction has been defined as a flow-mediated dilatation less than 4.5%. The authors may provide univariate analysis of the ED percentage in each subgroup with a FMD less than and more than 4.5% and a multivariate regression analysis of the determinants of FMD in subjects with type 2 diabetes. Age and glycosylated hemoglobin have been shown to be determinants of FMD in diabetic subjects in the CUPS 9 study. BMI and individual lipid values, rather than including them together as under the heading of dyslipidemia (Table 1) will be more meaningful in the multivariable analysis.

The commendable work from Escorts Heart Institute, Delhi should encourage more data from other parts of the country.

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Reply from the Author

I extend my sincere thanks to Dr. Jadhav for appreciation of our work. I agree that published data is available regarding FMD in Indian population but our study is the first one to have evaluated relationship of endothelial dysfunction as assessed by FMD with presence or absence of DM and CAD simultaneously. In CUPS-9, FMD was compared only between diabetics and non-diabetics and it was not aimed at comparing the same between CAD and non-CAD patients. Finding of similar degree of FMD impairment in diabetics without CAD and CAD patients without diabetes in our study has provided another evidence for the CAD risk equivalence of diabetes.

Regarding the cut-off value of FMD for identifying endothelial dysfunction, different studies have obtained different range of values. The study by Schroeder et al is one such study in which 122 consecutive patients undergoing coronary angiography were enrolled and an FMD value of ≤4.5% was shown to identify presence of CAD with reasonable diagnostic accuracy. However, as we know, endothelial function is influenced by a large number of factors including cardiovascular risk factors, ethnicity, medications etc, it would be inappropriate to apply results of one particular study to all the different patient subsets uniformly. Wide discrepancies in the study protocols and the results obtained in different studies conform to this. In fact, even the recently published reports of International Branchial Artery Reactivity Task Force on FMD and ACC/AHA expert committee on non-invasive tests of atherosclerotic burden have not mentioned any cut-off value for impaired FMD.

Finally, multivariate analysis of different parameters with FMD being the dependent parameter in diabetic patients in our study revealed age and presence of CAD to be the only independent predictors of FMD (out of age, male sex, HT, dyslipidemia, smoking, family history of premature CAD, fasting and post-prandial blood sugar and presence of CAD). When presence of CAD was excluded from this analysis, age
and smoking became the independent predictors of FMD. Glycosylated hemoglobin was not measured in these individuals as has already been mentioned in our study. Dyslipidemia and not the individual lipid values were considered for the analysis as some of our patients were already on statins that would have resulted in erroneous results.

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