Reviewer's report

Title: Obesity, metabolic syndrome, impaired fasting glucose and microvascular dysfunction: a principal component analysis approach

Version: 2  Date: 22 June 2012

Reviewer: Mark Noble

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Review of Obesity, metabolic syndrome, impaired fasting glucose and microvascular dysfunction: a principal component analysis approach
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by AJ Drake-Holland & MIM Noble

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Major Comments

In our opinion, a complete rewrite of the study is required

General: We think that the concept of this study is relevant to important clinical problems, (1) that of evaluating insulin resistant subjects before they develop type 2 diabetes mellitus and (2) because such subjects develop cardiovascular disease (see Stubbs PJ, Alaghband-Zadeh J, Laycock JF, Collinson PO, Carter GD, Noble MIM. Heart 1999;82:443-447). Unfortunately the paper is badly written. We think you should publish the data if it can be presented in a scientific manner. If the authors are prepared to do so, we recommend that you ban abbreviations. The presentation here is of obscure statistical results, e.g., the figure presents a scattergram of “PC 3” whatever that is versus “PC 1” whatever that is. What we want to see are plots of what we take to be the important resultant variables of this study in metabolic syndrome, namely the nail bed vascular measurements that are used as indices of microvascular function, plotted against the various possible independent variables that might influence such microvascular function. Particularly, completely missing is a plot of nail bed vascular properties versus the insulin resistance index, the product of fasting plasma insulin and glucose. This index has shown that thin patients, particularly of Asian ethnic origin are insulin resistant, even though they are not obese, so we are not interested much in waist circumference and BMI. Again, not all patients with high insulin resistance index are hypertensive, so we are not much interested in BP either. Lipid analysis is irrelevant in the detection of insulin resistance, because deviation from so-called normal lipid levels are extremely common in non-insulin resistant subjects. In our opinion the inclusion of all these variables merely obfuscates the real issue here.

Important papers on this subject are ignored, e.g., Duncan et al Lancet 1995 ii
Abstract: misuse of word “parameter” which is a constant in an equation. We think you mean Indices?

Methods’ PCA (perchloric acid?), WC (water closet?), FPG, and FCD, are not an acceptable abbreviations. Some indication of recruitment bias of subjects should be here.

What constant in what equation was used in the analysis of microvascular function? PC1 (1st personal computer?) and PC4 (4th personal computer?) are not an acceptable abbreviations. BMI, TG, CRP, HDL are not defined here but left to the end of the paper when it is too late to prevent reader annoyance. How were metabolic syndrome and nutritive microvascular reactivity defined?

Methods: Study population appears to be by selection. Inevitably this suggests bias. Was everyone presenting with a defined variable included without exclusion criteria other than those stated being applied? How can baseline data be “aggregated”? How many subjects failed to attend or withdrew or fell out?

Measurement of blood pressure does not depend on the sphygmomanometer, it depends on the investigator’s technique. The systolic level should be measured as the pressure that just occludes arterial blood flow measured by ultrasound. The next best thing is to measure the pressure at which the pulse just disappears. The diastolic level is notoriously inaccurate unless measured by catheter in the artery connected to a manometer. Presumably waist circumference was measured by tape measure. Most authorities now prefer a measurement of abdominal fat by MRI.

In statistics, PC (personal computer) is an unacceptable abbreviation for something else. We are not familiar with the statistics package used on which reliance seems to have been completely based. What were the precise...
manipulations of numbers used? “PCs are linear combinations of original variables with some degree of correlation”. What does this mean? Why was a non-linear correlation possibility not explored? We would prefer a straight forward exploration of the correlation (preferably non-parametric) if any with nail bed reactive hyperaemia and glucose, nail bed reactive hyperaemia and insulin, and nail bed reactive hyperaemia and the product of glucose and insulin (the insulin resistance index). In each case performed fasting. In each case a presentation of the variance related to the independent variable and the variance not related to the independent variable. In each case the probability of no correlation.