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Fasting plasma glucose as a predictor of vascular outcomes in those without diabetes mellitus

The relationship between increasing fasting blood plasma glucose among people with diabetes and incidence of cardiovascular disease remains controversial. Some previous studies in non-diabetic populations have revealed increased fasting blood glucose values to be associated with an increased risk of cardiovascular disease (Meigs et al, 2002; Selvin et al, 2005). However, in studies examining the risk of cardiovascular disease, this association with fasting blood glucose and cardiovascular risk has not been corroborated by other studies using fasting plasma glucose values themselves or other glycaemic parameters (Coutinho et al, 1999; DECODE Study Group, 2001). Examining the studies of patients with impaired fasting glucose reveals a moderate association with cardiovascular risk factors, albeit in cross sectional studies but not with cardiovascular events (Pankow et al, 2007). Further, meta-analyses examining the relationship between fasting blood glucose and cardiovascular disease have demonstrated that the majority of the studies examined, failed to reveal an independent effect of fasting blood glucose as predictive for cardiovascular disease when correcting for other risk factors. Indeed, the majority of these studies have been cross sectional and there are a few prospective studies that investigated the association of fasting blood glucose and incident cardiovascular events, particularly in a multi-ethnic population. Of course, this is important, as differences in cardiovascular risk factors and event rates in different ethnic groups may contribute differently to the association between fasting blood glucose and cardiovascular events.

Therefore, the Northern Manhattan Study (NOMAS featured in this edition of *CardioDigest*), may provide significant new evidence as it is a population based study designed to evaluate the incidences of cardiovascular events and identify risk factors in a multi-ethnic urban community (summarised on page 64) All subjects were without a history of diabetes, stroke or myocardial infarction and were followed for an average of 5 to 7 years for ischaemic stroke, myocardial infarction, and combined vascular events defined as either ischaemic stroke, MI or vascular death. When adjusting for risk factors, fasting blood glucose was associated with significantly increasing risks of combined vascular event (hazard ratio: 1.20), and myocardial infarction (hazard ratio: 1.21), but the effect was seen to be as strong with incident ischaemic stroke (hazard ratio: 1.13).

Thus this elegant prospective study demonstrates that the risk of vascular outcomes continuously increases with fasting blood glucose. The concept that there is a linear relationship of increasing glucose level and risk of cardiovascular disease appears to be strengthened, and would, of course, emphasise the need for fasting glucose reductions in patients who already have impairment of glucose tolerance, either as impaired fasting glycaemia or impaired glucose tolerance. Consequently, perhaps we will move forward to utilising fasting glucose values as an adjunct to calculation of cardiovascular risk in patients without diabetes mellitus, impaired fasting glycaemia or impaired glucose tolerance, in order to contribute to applicability of appropriate treatments.

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Coutinho M, Gerstein HC, Wang Y et al (1999) The relationship between glucose and incident cardiovascular events. A metaregression analysis of published data from 20 studies of 95,783 individuals followed for 12.4 years. *Diabetes Care* **22**: 233–40

DECODE Study Group, the European Diabetes Epidemiology Group (2001) Glucose tolerance and cardiovascular mortality: comparison of fasting and 2-hour diagnostic criteria. *Archives of Internal Medicine* **161**: 397–405

Meigs JB, Nathan DM, D’Agostino RB Sr et al (2002) Fasting and postchallenge glycaemia and cardiovascular disease risk: the Framingham Offspring Study. *Diabetes Care* **25**: 1845–50

Pankow JS, Kwan DK, Duncan BB et al (2007) Cardiometabolic risk in impaired fasting glucose and impaired glucose tolerance: the Atherosclerosis Risk in Communities Study. *Diabetes Care* **30**: 325–31

Selvin E, Coresh J, Golden SH et al (2005) Glycaemic control and coronary heart disease risk in persons with and without diabetes: the Atherosclerosis Risk in Community study. *Archives of Internal Medicine* **165**: 1910–16