Clinical *DIGEST 2*

Cardiovascular journals

NCEP definition of MS successfully predicts diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 The authors aimed to assess whether suggested modifications to the National Cholesterol Education Program (NCEP) definitions of the metabolic syndrome (MS) will improve the criteria's ability to predict diabetes. Suggested modifications include changes to or the requirement of glucose or obesity criteria.

2 Another aim of the study was to compare the ability of various MS criteria, markers of insulin resistance (IR) and inflammation, and impaired glucose tolerance (IGT) in the prediction of diabetes.

3 Participants (aged 40–69 years; n=822) were from the Insulin Resistance Atherosclerosis Study, who did not have diabetes at baseline.

4 After 5.2 years, 148 people had developed diabetes: IGT, MS definitions and IR markers all significantly predicted this.

5 Modifying or requiring glucose, obesity or IR components in NCEP-defined MS did not affect the predictive ability of the definition, as defined by area under the receiver operator characteristic (AROC) curve. Similarly, adding IR and inflammation variables to the NCEP definitions did not significantly alter the definition's predictive ability, as defined using the AROC curve.

6 The International Diabetes Federation and NCEP MS definitions predicted diabetes at least as well as the World Health Organization's definition. The authors conclude that additions and modifications to the NCEP MS definition has a limited impact on its ability to successfully predict the development of diabetes.

Hanley AJ, Karter AJ, Williams K et al (2005) Prediction of type 2 diabetes mellitus with alternative definitions of the metabolic syndrome: the Insulin Resistance Atherosclerosis Study. *Circulation* **112**: 3713–21

Predicting diabetes using metabolic syndrome definitions

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The metabolic syndrome (MS) represents a cluster of cardiovascular risk factors, is highly prevalent and has generated a great deal of interest. MS is a predictor of incident type 2 diabetes, and cardiovascular morbidity and mortality. However, controversy persists regarding its precise definition. The World Health Organization (WHO), International Diabetes Federation (IDF) and National Cholesterol Education Program (NCEP) definitions similarly emphasise dyslipidaemia and hypertension but differ in a number of aspects including, in the WHO definition, the use of microalbuminuria and the requirement of post-challenge hyperglycaemia or insulin resistance (IR) and, in the IDF definition, of central obesity (defined by waist circumference, with ethnicity-specific cut-off points). The degree to which proposed modifications to glucose or obesity criteria or the addition of C-reactive protein (CRP) influences the predictive ability of MS is unclear.

The objective of Hanley and colleagues' study (abstracted on left) was to compare the ability of various MS definitions as well as impaired glucose tolerance (IGT), markers of IR and CRP to predict incident type 2 diabetes. A total of 822 people from the Insulin Resistance Atherosclerosis Study were followed for 5.2 years. The magnitude of association with incident diabetes was strongest for IGT, while WHO, IDF and NCEP definitions of the MS demonstrated similar predictive values for incident diabetes. Although IR and CRP were both associated with incident diabetes, modification of MS criteria by their inclusion did not, however, significantly influence the prediction of incident diabetes. IGT was not significantly better in predicating incident diabetes than any of the MS definitions.

Visceral fat is associated with a more detrimental profile than excess subcutaneous fat, resulting in the increasing use of waist circumference as a measure of adipocity. This study, however, demonstrated that the use of body mass index in place of waist circumference in the NCEP criteria had little impact on diabetes prediction – an observation that partly may be due to the fact that waist circumference is an imprecise measure of visceral adipose tissue.

Although the addition of CRP may enhance the predictive value of MS criteria with respect to cardiovascular disease, this study demonstrated no such effect with respect to incident diabetes and may be related to the concept that only strong measures of association translate into improvements in classification accuracy.

Measures of IR, IGT and various MS definitions appear useful in identifying people at risk of developing diabetes. The IDF and NCEP criteria may be especially useful as they can be more readily applied in clinical practice. The relative utility of the IDF and NCEP criteria in predicting cardiovascular disease remains unclear. While this study provides further data supporting the role of MS in identifying people at risk of diabetes, the development of screening strategies for the same people is awaited.

Diabetes is a strong predictor of HF risk

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

1 The authors aimed to develop prognostic models for people with chronic heart failure (HF).

2 Data were from 7599 participants in the Candesartan in Heart failure: Assessment of Reduction in Mortality and morbidity (CHARM) programme with chronic HF and with and without left ventricular systolic dysfunction.

3 Final models included 21 predictor variables for cardiovascular death/HF hospitalisation and for death.

4 The three most powerful predictors were older age (>60 years), diabetes and lower left ventricular ejection fraction (<45 %).

5 These models can stratify risk and help define how patient characteristics relate to clinical course; diabetes was found to be a strong, independent predictor of chronic HF.

Pocock SJ, Wang D, Pfeffer MA et al (2006) Predictors of mortality and morbidity in patients with chronic heart failure. *European Heart Journal* **27**: 65–75

'A large number of asymptomatic patients with type 2 diabetes with few risk factors might have occult coronary artery disease and might be missed on the basis of current American Diabetes Association guidelines.'

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

People with type 2 diabetes found to have CAD despite few risk factors

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 The authors sought to verify the effectiveness of current American Diabetes Association (ADA) screening guidelines in identifying asymptomatic people (with type 2 diabetes) with coronary artery disease (CAD).

2 The study included 1899 asymptomatic people with type 2 diabetes (age ≤60 years). Of these, 1121 had two or more associated risk factors (RFs) for CAD (A), and the remaining 778 had one or less RF for CAD (B).

3 In the two study groups the prevalence of abnormal myocardial contrast echocardiography (MCE; 59.4% versus 60%) and of a significant CAD (64.6% versus 65.5%) was similar, irrespective of RF profile.

4 However, coronary anatomy differed between the two groups: group B had a lower prevalence of three-vessel disease (7.6% *vs* 33.3%), of diffuse disease (18.0% *vs* 54.9%) and of vessel occlusion (3.8% *vs* 31.2%). Coronary anatomy did not allow any revascularisation procedure in 45% of people in group A.

5 The findings of the study suggest that a substantial number of asymptomatic individuals with type 2 diabetes have myocardial perfusion defects and significant CAD independently from RF profile.

6 Thus a large number of asymptomatic patients with type 2 diabetes with few RFs might have occult CAD and might be missed on the basis of current ADA guidelines.

Scognamiglio R, Negut C, Ramondo A et al (2006) Detection of coronary artery disease in asymptomatic patients with type 2 diabetes mellitus. *Journal of the American College of Cardiology* **47**: 65–71

EUROPEAN HEART JOURNAL

Ranolazine improves glycaemic control

Readability	✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓

1 The anti-anginal efficacy and safety of ranolazine in people with diabetes (189) and in those without diabetes (634) included in the Combination Assessment of Ranolazine in Stable Angina trial were studied.

2 Ranolazine produced similar improvements in exercise parameters, nitroglycerin use and angina frequency in patients with and without diabetes.

3 Adverse events were similar between groups.

4 Fasting glucose and lipids remained unaltered in participants with diabetes after 12 weeks of treatment.

5 In those with diabetes, ranolazine significantly decreased HbA_{1c}. The HbA_{1c} concentrations appeared to remain consistent over time during long-term treatment.

Timmis AD, Chaitman BR, Crager M (2006) Effects of ranolazine on exercise tolerance and HbA_{1c} in patients with chronic angina and diabetes. *European Heart Journal* **27**: 42–8

AMERICAN JOURNAL OF CARDIOLOGY

MS linked with silent CAD

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 The authors investigated a possible association between metabolic syndrome (MS) and silent coronary artery disease (CAD) in people with type 2 diabetes.

2 The prevalence of MS was evaluated in 169 people with uncomplicated diabetes and silent CAD, and in 158 people with diabetes without myocardial ischaemia on exercise electrocardiography (ECG), 48 hours ambulatory ECG and stress ECG.

3 The Homeostasis Model Insulin-Resistance Assessment (HOMA) was used to estimate insulin resistance.

4 The prevalence of MS and HOMA was significantly higher in those with CAD than in those without CAD. Multiple logistic regression analysis showed that MS was associated with silent CAD.

5 Among those on diet alone or oral agents, the HOMA was the strongest predictor of silent CAD.

6 The data have shown an independent association of MS and insulin resistance with silent CAD in people with type 2 diabetes.

Gazzaruso C et al (2006) Association of the metabolic syndrome and insulin resistance with silent myocardial ischemia in patients with type 2 diabetes mellitus. *American Journal of Cardiology* **97**: 236–9

INTERNATIONAL JOURNAL OF CARDIOLOGY

Acarbose reduces CV risk in people with impaired glucose metabolism

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

1 An important strategy to reduce cardiovascular (CV) risk in people with impaired glucose metabolism is to reduce postprandial hyperglycaemia.

2 Acarbose reduces postprandial hyperglycaemia by delaying carbohydrate absorption from the small intestine.

3 In this study of 1429 people with impaired glucose tolerance, acarbose reduced the risk of any CV event by 49%, of an acute myocardial infarction by 91% and of developing hypertension by 34%.

4 Results suggest that acarbose is useful in reducing the risk of CV events in individuals with impaired glucose metabolism.

Zeymer U (2006) Cardiovascular benefits of acarbose in impaired glucose tolerance and type 2 diabetes. *International Journal of Cardiology* **107**: 11–20

'Results suggest that acarbose is useful in reducing the risk of cardiovascular events in patients with impaired glucose metabolism.'

Cardiovascular disease

AMERICAN JOURNAL OF CARDIOLOGY

Tight control can prevent diastolic dysfunction

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

1 The aim of this prospective study was to evaluate the influence of glycaemic control on diastolic function in 36 normotensive people with inadequately controlled type 1 diabetes.

2 After the basal evaluation, insulin therapy was modified to improve glycaemic control. HbA$_{1c}$, left ventricular (LV) echocardiography, 24-hour blood pressure (BP) monitoring and laboratory tests were repeated after 6 months in all participants and after 12 months in 27 participants.

3 At the basal evaluation, LV anatomy and systolic function were normal in all patients, and diastolic function was impaired in 14 participants.

4 After 6 months the mean values of body mass index, 24-hour BP and LV anatomy and systolic function were unchanged; mean HbA$_{1c}$ was decreased and mean values of diastolic parameters were significantly improved.

5 After 12 months the mean values of all BP, metabolic and LV parameters were unchanged.

6 Percent changes of diastolic parameters were inversely correlated with percent changes of HbA$_{1c}$, considering changes from the basal to the 6-month evaluation, as well as changes from the 6- to the 12-month evaluation.

7 In conclusion, in normotensive people with type 1 diabetes, a close relation was found between glycaemic control and LV diastolic function, which improves when glycaemic control improves. Therefore, diastolic dysfunction can be prevented or reversed, at least partly, by tight glycaemic control.

Grandi AM, Piantanida E, Franzetti I (2006) Effect of glycemic control on left ventricular diastolic function in type 1 diabetes mellitus. *American Journal of Cardiology* **97**: 71–6

AMERICAN JOURNAL OF HYPERTENSION

Improved BP control decreases diabetes-related morbidity and mortality

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 This study evaluated the prevalence and determinants of severe, sustained, uncontrolled hypertension in a national cohort of 64 105 veterans with diabetes.

2 Using mean BP measurements from three visits in the year 2000, the prevalence of sustained BP readings ≥160/100, ≥140/90 or ≥130/80 mmHg were determined.

3 Over a mean interval of 131 days, 6347 (9.9%) of the 64 105 veterans with diabetes had a mean BP ≥160/100 mmHg. Similarly, 25 924 (40.4%) had a mean BP ≥140/90 mmHg and 38 296 (59.7%) had a mean BP ≥130/80 mmHg.

4 Independent predictors of mean BP ≥160/100 mmHg included age, ethnicity, education level, cardiovascular comorbidities, alcohol use and number of BP-lowering medications.

5 Although the prevalence of uncontrolled hypertension is lower than previously reported, there are continued opportunities for improvement in BP control that represent the most cost-effective, modifiable risk factor in decreasing diabetes-related morbidity and mortality.

6 The authors recommend the use of linked administrative datasets to identify high-risk sub-populations for disease-management programmes.

Greenberg JD, Tiwari A, Rajan M et al (2006) Determinants of sustained uncontrolled blood pressure in a national cohort of persons with diabetes. *American Journal of Hypertension* **19**: 161–9