

The Dairy Council for Northern Ireland presents



Causes & Prevention of
Metabolic Syndrome

a conference for health & education professionals

Wednesday 5th April 2006
at W5, The Odyssey, Belfast

Causes & Prevention of Metabolic Syndrome

Programme of Events

09.30

Registration and coffee

10.00

Professor Sean Strain, University of Ulster

Chairperson's introduction

10.10

Dr Stephen Hull, Mater Hospital, Belfast

Introduction & overview - the challenge of metabolic syndrome

10.45

Dr Lynn Moore, University of Boston, USA

Diet and the prevention of metabolic syndrome in children

11.20

Coffee

11.50

Professor Peter Elwood, University of Wales

Diet and metabolic syndrome in adults - evidence from the Caerphilly and other cohorts

12.25

Dr Kirsten Rennie, University of Ulster

The role of physical activity in reducing the risk of metabolic syndrome & other chronic diseases

13.00

Lunch

13.50

Dr Barbara Stewart, University of Ulster

The psychological underpinnings of metabolic syndrome

14.25

Professor David Phillips, University of Southampton

Diet during pregnancy - does metabolic syndrome start in the womb?

15.00

Professor Gary Frost, University of Surrey

GI diets - the answer to metabolic syndrome?

15.35

Discussion

15.45

Close

The challenge of metabolic syndrome

Dr Stephen Hull, Mater Hospital, Belfast

The metabolic syndrome has, since its description as 'Syndrome X' in 1988, become a much-loved and discussed concept in both the medical and lay press. The continuing increase in the rates of obesity and type 2 diabetes have helped fuel this focus on the topic of metabolic syndrome as a risk marker for both type 2 diabetes and cardiovascular disease.

Studies in the USA have shown that 25% of the population and more than 40% of middle-aged and elderly people may have the metabolic syndrome. Other studies have shown that perhaps more than 50% of those who present with or have had cardiovascular disease have the metabolic syndrome and the metabolic syndrome has been associated with increased rates of cardiovascular disease and mortality.

It has even been proposed that the increased prevalence of obesity, metabolic syndrome and type 2 diabetes may reverse the improvement in the outcome from cardiovascular disease seen since the 1970s because of the reduced smoking, better treatment of raised blood pressure and LDL-cholesterol and the improved pre-hospital management of acute cardiovascular events.

It is therefore logical that identification and appropriate treatment of individuals with metabolic syndrome may help reduce, delay or prevent the burden of type 2 diabetes and cardiovascular disease.

However, there remains considerable uncertainty and debate on the origins or causes of metabolic syndrome, whether it is a disease in its own right or just a convenient 'bystander', its definitions and associations, how to identify individuals who have it and how to treat it.

Diet and the prevention of metabolic syndrome in children

Dr Lynn Moore, Section of Preventive Medicine & Epidemiology
Boston University School of Medicine, USA

The rising rates of obesity in children and adolescents worldwide are now well-known. Most of the elements of the metabolic syndrome have been shown to cluster in these overweight children and adolescents. In particular, levels of central adiposity, insulin resistance and blood pressure have risen among the young. Since all of the components of the metabolic syndrome track from childhood to adulthood, identification of these risk factors early in life is a particular interest. Among children, waist circumference is the strongest predictor of the development of subsequent metabolic syndrome. In fact, an increased level of central obesity is considered an essential component of the metabolic syndrome in both children and adults. The second strongest predictor of the syndrome during childhood is blood pressure.

There is a pressing need for data on the effects of dietary intake patterns on the development of metabolic syndrome. This talk will use data from the Framingham Children's Study and NHANES to examine the effects of diet on the components of the metabolic syndrome with a particular focus on the effects of dairy on central adiposity and blood pressure during childhood and adolescence.

Diet and metabolic syndrome in adults - evidence from the Caerphilly and other cohorts

Professor Peter Elwood, Dr Janet Pickering, Dr Ann Fehily

Department of Epidemiology and Public Health, University of Wales College of Medicine, Cardiff

Two aspects of the metabolic, or insulin resistance syndrome raise problems. First, the variety of quite different definitions which have been used make it difficult to draw general conclusions about the syndrome from the literature. Second, while a syndrome is a concurrence of several symptoms associated with a morbid process, the term implies more than a chance aggregation of symptoms and signs. This last will be explored within the Caerphilly cohort study, but other writers have already commented critically on the point.

We defined the 'syndrome' in terms of raised levels of two or more of the following: fasting blood glucose and/or serum insulin; blood pressure; serum cholesterol and/or triglyceride, and body mass index.

The Caerphilly cohort gave rise to two dietary data-sets. Two and a half thousand men, aged 45-59 years, completed a semi-quantitative food frequency questionnaire (FFQ) with help from their partners. A representative sub-sample of 665 men also kept a seven-day weighed food intake record (WDI).

The prevalence of the 'syndrome', so defined, was found to be about 18%. These men had a significantly raised incidence of vascular disease, and of death from any cause, their risk being around 1.4 to 2.0 relative to that in men without the syndrome. Furthermore, there was a strong and significant gradient in men according to the number of criteria of the syndrome, and for men with all four criteria the relative risks were around 3.0.

A strong negative gradient was found in the occurrence of the 'syndrome' with milk intake, the odds, adjusted for age, energy, social class and smoking, falling to 0.05 (0.26-0.98) in the men with the highest intakes of milk relative to that in men without the syndrome. A closely similar relationship was found in the men who had kept a seven-day intake record. Consumption of dairy foods (the total weight of milk, butter, cheese, cream and yoghurt recorded in the WDIs) showed much the same trend, though somewhat weaker than that with milk alone.

For half the men in the cohort, data was available on how they had been fed as infants. This gave no evidence of any significant association between having been breast fed and the occurrence of the syndrome.

Relationships between the syndrome and foods other than dairy were examined, including carbohydrates, sucrose, fats, bread, fibre and magnesium. Results will be presented against the background of results from other published studies.

The role of physical activity in reducing the risk of metabolic syndrome & other chronic diseases

Dr Kirsten Rennie, Northern Ireland Centre for Food and Health (NICHE)
University of Ulster, Coleraine

There is now irrefutable evidence that physical activity is important for maintaining health throughout life and reducing the risk of chronic diseases. The recent Chief Medical Officer's report recommended that for general health, young people should include at least 60 minutes of at least moderate intensity physical activity a day and in adults at least 30 minutes of activity a day and 45-60 minutes of moderate intensity activity is needed to prevent obesity. However, there is some debate whether these recommendations are enough to prevent weight gain and the development of features of the metabolic syndrome.

Research in this area is not straightforward as physical activity is a complex and difficult behaviour to measure, particularly in young people. However, with advances in the use of objective instruments such as accelerometers and heart rate monitoring, it is now possible to quantify the intensity of daily activity on a minute-by-minute basis in studies for several days. Evidence is emerging from these studies on the duration and level of activity required to reduce the risk of developing the metabolic syndrome and whether recommendations need to be tailored for different age groups, such as for children and older people.

What types of activity are most beneficial for preventing the metabolic syndrome? The most obvious effect of physical activity is by increasing energy expenditure, by reducing the time spent sedentary and increasing the overall time during the day spent active. Hence, physical activity interacts with diet in preventing excess body fat gain and obesity-related diseases.

Physical activity may also have strong independent effects on the risk of developing the metabolic syndrome in addition to reducing body fatness. Resistance training and specific activities that improve aerobic fitness may directly impact on features of the metabolic syndrome, such as improving insulin sensitivity and blood pressure. This has led to the suggestion that it may be possible to be 'fat but fit' with physical activity being just as important as the level of body fatness in preventing the metabolic syndrome and obesity-related diseases.

The psychological underpinnings of metabolic syndrome

Dr Barbara J Stewart-Knox , Northern Ireland Centre for Food and Health (NICHE)
University of Ulster, Coleraine

The Metabolic Syndrome is a cluster of factors associated with increased risk of developing coronary heart disease (CHD) and/or type 2 Diabetes. The syndrome comprises insulin resistance, dyslipidaemia, essential hypertension and visceral obesity.

Metabolic syndrome (MS) is associated with certain risky lifestyle practices. It is also more common among the socio-economically disadvantaged and appears to be triggered by adverse social circumstances and chronic stress. There is also accumulating evidence to suggest that individuals who have certain personality and behaviour traits are especially predisposed to MS. This paper explores potential psychological pathways to MS taking into consideration the interplay between a range of psycho-social, demographic and lifestyle factors thought to contribute to the development of the syndrome. The need for a holistic approach to understanding the aetiology of the metabolic syndrome is emphasised.

Diet during pregnancy - does metabolic syndrome start in the womb?

Professor David Phillips, MRC Environmental Epidemiology Unit
University of Southampton

A series of studies suggest that diabetes and the metabolic syndrome (the cluster of conditions related to diabetes which include hypertension, dyslipidaemia and central obesity) are related to low birthweight. The relationships are continuous and not just confined to the very smallest babies. Because birthsize is more related to the fetal nutrient supply than to genetic factors, these observations led to the hypothesis that metabolic syndrome may occur as a consequence of an adverse prenatal environment.

This hypothesis is supported by human data linking maternal nutrition or maternal nutritional reserves, as indicated by body fatness, to features of the metabolic syndrome in the offspring. It is also supported by studies in experimental animals showing that prenatal undernutrition leads to raised blood pressure or altered glucose tolerance in the subsequent generation. Current clinical studies are unravelling the mechanisms involved in this phenomenon which is termed 'fetal programming'.

GI diets - the answer to metabolic syndrome?

Professor Gary Frost, School of Biomedical and Molecular Sciences
University of Surrey

Glycaemic index is a physiologically measure of the impact that the available carbohydrate in a food has on post prandial glycaemia. The glycaemic index of a food is a function of many aspects of the food itself but gives an impression of the physiological impact of the carbohydrate within the food that is not gained from chemical analysis. Glycaemic index was originally developed as a tool to improve glycaemic control in people with diabetes. In diabetes there is strong evidence of the benefit of low glycaemic index diets on glycaemic control, lipid levels and clotting.

Recently epidemiological evidence (although not conclusive) points to a role of low glycaemic index / low glycaemic load diets in reduction of risk of type 2 diabetes a end product of metabolic syndrome. This has triggered a lot of interest in the role of low glycaemic index diets in metabolic syndrome. The evidence for control trials of low glycaemic index carbohydrate having a direct effect on insulin sensitivity is mounting. Also there is evidence for the effects of low glycaemic index diets on other aspects of the metabolic syndrome such as triglycerides, HDL-cholesterol, body composition, clotting. These will be reviewed.

The mechanism of action is currently unknown but a possibility will be explored in this talk.



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