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# Diabetes and Herbal Medicine

The dramatic increase in the prevalence of Type II (adult-onset or non-insulin dependent) diabetes in children has prompted much discussion and has raised concern as a major public health issue. Previously unheard of in children, non-insulin dependent diabetes mellitus or NIDDM has long been regarded as a disease afflicting only adults, particularly those who are middle-aged or elderly. The alarming rise of NIDDM in the younger population, especially children, should signal a warning to examine current dietary choices, lifestyle practices and childhood obesity, all contributory factors in this disease. NIDDM is rapidly posing as a major medical problem both in America and here in Britain.

Worryingly, in certain states of America, NIDDM in childhood is reaching epidemic proportions, particularly in specific ethnic groups, notably the African-Americans, Hispanics and descendents of the Pima Indians. Arguably, this is a trend that now appears to be fast repeating itself across all racial groups within cross-sections of the population in the US. Notwithstanding the statistics, research data on this emerging medical crisis is at best scant and lacking in scientific rigour. Neither are they sufficiently indicative of large scale findings of any given population.

NIDDM is also a concern amongst the developing nations. Studies in India reveal that the predisposition of South Asians to an increased risk of NIDDM and cardiovascular disease (CVD) is associated with abdominal obesity. Japan is also witnessing secular trends in childhood obesity coupled with an inevitable risk of NIDDM. This is somewhat surprising since the Japanese diet is generally regarded as healthier owing to the relatively larger percentage of fish and soya products consumed compared to the average Western diet. The growth of the fast-food industries in these countries could account for the rise in childhood obesity in addition to the proportionate increase in NIDDM cases in children and adolescents.

There is no doubt that modern diet and lifestyle practices of the West add to any existing predisposition to NIDDM. What is clearly alarming however, is the increased incidence in children of all ethnic and racial groups, which is presenting itself at large as a new and urgent problem within the public domain. Clearly, racial bias and family history in disease risk, such as diabetes was always present in a culture where other risk factors such as obesity and heart disease are equally serious concerns within Western society. True, genetic factors substantially increase risk of onset, especially now in childhood and must be addressed without delay in order to avoid the long-term consequences of serious complications that are associated with this disease. It is evident that adequate health education and public awareness of all such diseases is more pressing than ever.

In order to fully appreciate the impact of this condition, especially now that its onset is occurring at an earlier age, it is imperative that basic underlying physiological mechanisms of this potentially fatal disease are examined. Diabetes mellitus involves an inability to utilise glucose, the body's principle source of energy. Abnormality in glucose metabolism is closely associated with insulin deficiency by the pancreas or equally and more recently recognised, cellular resistance to insulin, referred to as Syndrome X. The consequential rise in blood sugar levels can reach dangerous highs causing damage to blood vessels and other organs. The first of two types (Insulin-dependent diabetes mellitus or IDDM) is due to a lack of insulin production by the pancreas, therefore regular injections of insulin are needed. It invariably occurs in those under 40, most commonly in those aged between 10 and16 years.
Type II diabetes or NIDDM on the other hand does not usually require regular injections of insulin since the pancreas does produce some hormone though its endocrine function is impaired. The minimal quantities of insulin produced are insufficient to sustain normal glucose metabolism and so dietary measures form an essential part of treatment and management. This form of diabetes principally occurs in those over 40 years, hence the recent concern over its alarming increase in the younger generation, particularly in children.

Symptoms can vary from excessive thirst, fatigue and weakness to heart attack or stroke in serious cases. Long-term complications can lead to diabetic nephropathy (kidney damage or failure), diabetic retinopathy (blurred vision and other visual disturbances) and/or diabetic neuropathy (tingling or numbness in the legs, feet or fingers).

There is no question that dietary factors and lifestyle practices are predominantly the principle causes in onset. Risk factors such as obesity, poor diet and a lack of exercise are well-documented and strongly implicated in adult-onset diabetes, particularly when an excessive demand on the pancreas over time has subsequently impaired its function through overuse and resultant damage. Equally, the abundance of refined carbohydrates in our diets, especially from infancy is one of the reasons given for a system unresponsive to insulin, creating the clinical presentation of Syndrome X. This, in conjunction with chronic obesity strongly contributes to the pre-diabetic state. In over 30% of cases, NIDDM can be controlled by substantial weight loss and exercise. Patient management may also involve the administration of oral hypoglycaemics (anti-diabetic drugs) or in a few cases, injections of insulin.

The recent and controversial success of the Atkins' Diet has generated much discussion on the potential dangers of radical diets that advocate foods previously considered 'bad' when on a weight-loss programme. However, when viewed in its entirety, the Atkins Diet was initially aimed at combating chronic obesity based on the principle that abnormal glucose metabolism and cellular insensitivity to insulin was the result of a carbohydrate-induced metabolic disorder with a subsequent 'hyperinsulin' state within the bloodstream. In a health context, the Atkins' Diet aimed to exploit the inherent physiological mechanism within our systems that utilises stored fat in a similar manner that hibernating animals sustain themselves throughout winter and to limit the potential life-threatening complications that can result from excessive weight including NIDDM. Despite the well-publicised risks associated with this diet (such as kidney failure and the possible risk of cancer), it does provide a short-term, yet effective remedy to the altered metabolism that has resulted as a consequence of prolonged exposure to poor dietary habits. The diet itself has its limitations and ill advised amongst those who only wish to shed a few pounds. Sustained weight loss amongst those who are chronically obese can only safely be achieved through strict adherence of the tried and tested method advocated by qualified experts in nutrition and dietetics in order to

prevent dietary deficiencies and other risks associated with radical programmes such as the Atkins Diet.

Chronic obesity in the UK population, a product of Western diets and sedentary lifestyle raises important questions in other areas of public health. Smoking-related and alcohol-related diseases which, if viewed as self-inflicted, warrant an effective health education programme on a large scale that is applicable to all sectors of the population. This becomes more pertinent if patients are now requested to enter into a 'contract' with their GP for treatment and equally, when people are beginning to sue large fast food corporations for their obesity. This may seem absurd in light of the choices that appear entirely of free will.

It is evident that the increased incidence of childhood obesity will significantly increase the risk of NIDDM at a younger age. This is a cause for concern. Arguably, obesity is a major factor in the development of this emerging epidemic and though evidence for its contribution is largely epidemiological, it certainly appears to be overwhelming. Obesity is the result of interaction of both genetic and environmental determinants and on numerous occasions it has been demonstrated that diet and environment prove to be the most important inter-dependent criteria in any preventative measure.

Ostensibly, environmental/behavioural factors, such as obesity, are required to convert genetic susceptibility into clinical diabetes. Research now reports that impaired glucose tolerance and insulin resistance, conditions that are precursors to NIDDM, are highly prevalent in children and in adolescents who are obese. Obesity in children is also related to abnormalities in cholesterol levels, blood pressure and insulin concentrations. Administering glucose tolerance tests in overweight children may be helpful in identifying those at high risk of diabetes.

In examining epidemiological studies of NIDDM in children and adolescents of North America, perhaps there are lessons for the UK, particularly if an already over-burdened NHS is to cope with the rising incidence of this condition and if emphasis is to be placed on preventative medicine within the primary healthcare sector.

Obesity is now thought to affect as many as 1 in 3 children in the US with a 30% increase in NIDDM in a short time period. Obese children and adolescents are 12.6 times more likely than non-obese to have higher fasting blood insulin levels (hyperinsulinaemia) – a risk factor for diabetes. A similar statistic for the UK is surely only a matter of time. The high incidence of obesity in children has been attributed to the increased consumption of calorie-dense foods containing a high proportion of simple (refined) sugars and fat, in combination with reduced amounts of complex carbohydrates and foods that are low in fibre. The temptations and choices for a young person are enormous and a palate that is well defined in childhood is extremely difficult to redefine later on in adulthood. Moreover, it can be difficult to ensure that young children and adolescents receive the proper medical care that is required in NIDDM. Major studies in the US and the UK have shown that the risk of complications can be markedly reduced with effective blood glucose control.

Causes of obesity should, in theory, be straightforward enough, namely in the substantial disparity that exists between energy intake and energy expenditure. Moreover, it is really only a small percentage of cases where there is a genuine metabolic disturbance that has culminated in this condition and which has not been created through poor dietary practices. However, the recent identification of a gene that is responsible for addictive behaviour has made possible the suggestion

that chronic obesity through food addiction occurs in parallel fashion to some of the most addictive substances in our society such as alcohol and drugs. Leptin, the hormone product of this gene is an important satiety factor secreted by our fatty (or adipose) tissue. Thus, regulating eating habits could now be a genetic impossibility for some according to some experts in addictive behaviour. However, it is likely that more research is necessary in identifying the role of genes in screening of obesity and in therapy.

Additionally, two new taste buds have now been identified; one is specifically designed to detect fat (named umami) and the other that is heightened for MSG or monosodium glutamate (a common flavour enhancer). This could further explain the palate that we have developed for pre-packaged fast foods, all products of Western diets. The taste bud for MSG is hardly surprising considering that MSG is a chemical relation of salt that has a more pronounced taste and flavour, hence its popularity in fast foods.

The treatment choices for NIDDM in childhood triggered by obesity should first rely on a radical dietary and lifestyle modification as a means of safe and reliable control of obesity. Conventional drugs for Type II diabetes may be too potent for the very young and not surprisingly since they were initially designed for adults. Herbal remedies on the other hand are gentle remedies and many of the herbs widely used in certain parts of the world for diabetes have proven clinical effects. Effective treatment and management of NIDDM in adults using herbal remedies has more appeal than conventional drugs in a climate that is rapidly embracing alternative therapies that are in keeping with nature. This is very much the case both in the US and here in Britain.

Herbs of choice such as *Trigonella foenum-graecum* (fenugreek) and *Galega officinalis* (goat's rue) are both effective hypoglycaemics directly combating the high sugar levels where pancreatic activity is still present but is significantly reduced. Similarly *Mormordica charantia* (bitter melon or bitter gourd) is a popular vegetable in the Asian subcontinent, parts of Africa and South America but it is the extracted juice that is administered as a drink. Palatability will certainly be an issue of compliance, particularly in children, who at the best of times are choosy about foods. The juice is potently bitter but it is this very bitterness that combats the cravings for sweet foods that is thought to contribute to the excessive consumption of sugar. Based on this principle, sugar cravings can equally be addressed through taking *Gymnema sylvestre* (gymnema), a herb that temporarily numbs the taste buds corresponding to sweet foods. Consequently, foods that are high in sugar cannot be tasted and thus the addictive consumption of foods with a high sugar content is reduced. Both bitter melon (also known as kerela) and gymnema have exhibited their therapeutic efficacy on numerous occasions in various clinical trials.

Diabetes has a complex clinical presentation resulting from an altered glucose metabolism. It can be destructive and debilitating in the long-term, particularly if it goes undiagnosed and untreated for many years. Diet, environment and lifestyle all contribute to this condition and equal emphasis should be placed on reducing the incidence of childhood obesity which predisposes the system to NIDDM at a very young age. Early diagnosis is essential in preventing the long-term complications of NIDDM, particularly heart disease, stroke, kidney disease and associated disorders involving the eyes and the nervous system. These are serious considerations when establishing a treatment rationale and management programme. Education and information are vital aspects of public health and in establishing criteria for public awareness, targeting children and parents alike should be a priority. The situation is now acute owing to the alarming increase in childhood obesity coupled with a similar increase in NIDDM in the same population group.

The health of the nation, particularly the health of our children warrants urgent attention if preventing the inevitable consequences of age and decline does not become progressively symptomatic of the younger generation. In setting targets for reducing the current incidence of obesity and NIDDM in children, it is imperative to consider the proper and effective treatment of the diabetic patient that carefully integrates diet, lifestyle and education, along with medication either conventional or herbal. In the case of the chronically obese, it must be stated at the outset that it is not mere appearance that is an issue but the fact that the child is at severe medical risk. Education of the parent on this fundamental and alarming fact may serve as the crucial trigger for radical change in dietary practices and lifestyle choices within our society.

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