



Science Photo Library

Herbal approaches to combating the rise in childhood diabetes

Yaso Shan examines the rise in type 2 diabetes in children and suggests some herbal approaches to treating the disease

The global increase in the prevalence of Type 2 (adult-onset or non-insulin dependent) diabetes in children has prompted much discussion and concern as a major public health issue. Previously unheard of in children, non-insulin dependent diabetes mellitus (NIDDM) has long been regarded as a disease afflicting only adults, particularly those who are middle-aged or elderly. Incidence of the disease in the younger population, particularly children, should signal a warning to examine current dietary choices, lifestyle practices and childhood obesity, all contributory factors in this disease.

Though rare in childhood, recent reports indicate a potential epidemic emerging, particularly in specific ethnic minority groups in the US. Genetically predisposed individuals within the African-American population are at risk, as are Hispanics and descendants of the Pima Indians. This is a trend that

appears to be repeating itself across all racial groups within cross-sections of the US population. Moreover, cases are being reported worldwide in countries such as Libya, Japan, India, Australia and Canada (Drake *et al* 2002). The first UK cases were identified and reported in 2000 following studies in the West Midlands and Leicester. In these areas, there is a high proportion of South Indians in the local population who are genetically predisposed to NIDDM, with a strong family history for the condition (Ehtisham *et al* 2000), as are children with an African-Caribbean background. Further cases have been reported from 18 other UK centres (Ehtisham 2003), including four cases in Caucasian adolescents in the south and west regions of England (Drake *et al* 2002). This is a scenario that is likely to become more prevalent given the current epidemic of childhood obesity in the UK.

alternative health

Studies in India reveal that the predisposition in 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 a larger consumption of fish and soya products compared to their Western counterparts. 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. 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.

This is compounded by the fact that there has been no comprehensive survey in the UK, coupled with a lack of information or education on diagnosis. The lack of a widespread screening programme for the target group means that the true incidence is at best confined to evidential reporting. Current UK studies focus on areas where there is a large percentage of ethnic minorities, especially of South Indian origin. Does this accurately reflect a national trend when childhood obesity, a significant factor in NIDDM, is prevalent in all racial groups within the UK?

Genetic predisposition

Genetic predisposition to NIDDM is poorly understood but it is thought to be due to underlying mechanisms that make certain systems more susceptible than others. This has a racial bias but is by no means exclusive to the risk groups recorded. Whether this risk transfers to the younger population remains a matter of conjecture but observational studies clearly indicate a significant increase in diabetes in children that must be examined beyond the parameters of genetic predisposition.

There is no doubt that modern diet and lifestyle practices of the West add to any existing predisposition to NIDDM. What is alarming, however, is the increased incidence in children of all ethnic and racial groups, which is presenting itself as a new and urgent problem within the public domain. Genetic factors substantially increase risk of onset and must be addressed to avoid the long-term consequences of serious complications that are associated with this disease. Public awareness and health education directives that adhere to a stringent protocol for prevention strategies within primary healthcare management are more pressing than ever.

The prevalence of childhood obesity will significantly increase the risk of NIDDM at a younger age.

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 it has been demonstrated that diet and environment prove to be the most important interdependent criteria in any preventative measure. 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.

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. This first-line approach will require much support from immediate family, school and friends. It must also aim to stabilise the weight, preventing any weight gain while the child grows into his or her own weight. Second line approaches may involve the use of conventional drugs that increase cellular sensitivity to insulin, such as Metformin® or through increasing insulin secretion where there is impaired pancreatic β -cell activity (such as Sulphonylureas®). However, the unpleasant side effects of most of these drugs often results in poor compliance and significantly, the safety implications of long-term use in children are yet to be confirmed. Additionally, the drugs may be too potent for the very young. A third-line treatment option where the condition remains unresponsive to drugs or where diagnosis is unclear, particularly in asymptomatic children, is insulin.

Herbal remedies

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 can have more appeal than using 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. Fenugreek seeds have been shown to reduce fasting and postprandial blood glucose in animal models (Vats et al 2002). Moreover,

References

- Ahmed N et al (1999) Effect of *Momordica charantia* (Karola) extracts on fasting and postprandial serum glucose levels in NIDDM patients. *Bangladesh Medical Research Council Bulletin*. 25, 1, 11-13.
- Bone K (2002) *Gymnema sylvestre* in diabetes. *Modern Phytotherapist*. 7, 1, 7-11.
- Drake AJ et al (2002) Type 2 diabetes in obese white children. *Archives of Disease in Childhood*. 86, 3, 207-208.
- Ehtisham S (2003) The emergence of type 2 diabetes in childhood: diagnosis, management and outlook. *Modern Diabetes Management*. 4, 3, 2-6.
- Ehtisham S et al (2000) Type 2 diabetes in UK children - an emerging problem. *Diabetic Medicine*. 17, 12, 867-871.
- Gupta A et al (2001) Effect of *Trigonella foenum-graecum* (fenugreek) seeds on glycaemic control and insulin resistance in type 2 diabetes mellitus: a double-blind placebo controlled study. *The Journal of the Associated Physicians of India*. 49, 1057-1061.
- Joffe DJ (2001) Effect of extended release *Gymnema sylvestre* leaf extract alone or in combination with oral hypoglycaemics or insulin regimes for type 1 or type 2 diabetes. *Diabetes in Control Newsletter*. 76, 1.
- Leatherdale BA et al (1981) Improvement in glucose tolerance due to *Momordica charantia* (Karela). *British Medical Journal (Clinical Research Edition)*. 282, 6279, 1823-1824.
- Matthews DR et al (2002) Children with type 2 diabetes: the risks of complications. *Hormonal Research*. 57 (suppl 1): 34-39.
- Sabin M et al (2002) Childhood obesity and type 2 diabetes. *NTPlus*. 98, 19, 49-50.
- Vats V et al (2002) Evaluation of anti-hyperglycaemic and hypoglycaemic effect of *Trigonella foenum-graecum* Linn, *Ocimum sanctum* Linn and *Pterocarpus marsupium* Linn in normal and alloxanised diabetic rats. *Journal of Ethnopharmacology*. 79, 1, 95-100.

clinical trials show that adjunct use improves overall glycaemic control with reduced insulin resistance in mild cases (Gupta *et al* 2001). There is also a favourable effect on hypertriglyceridaemia.

Momordica 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 that is of interest here. Studies show that it controls the production of insulin, thus promoting blood sugar control (Leatherdale *et al* 1981). The active constituents are charantin (a mixture of steroid-type compounds) and Polypeptide P, an insulin-like protein, shown to decrease blood glucose when injected subcutaneously into diabetic patients. Other clinical trials have

myrtillus (bilberry), *Ginkgo biloba* (ginkgo) or *Vitis vinifera* (grapeseed).

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 emphasis should be placed on reducing the incidence of childhood obesity that 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. However, this is by no means straightforward since most children have no obvious symptoms and it is often difficult to distinguish from type 1 diabetes. In cases of uncertainty, classification can be achieved through detection of a combination of biochemical markers such as C-peptide levels and autoimmune markers (Matthews and Wallace 2002), though this is not always definitive. Another clue would be to ascertain *acanthosis nigricans*, a dark pigmentation and velvety thickening of the skin – a cutaneous marker for insulin resistance.

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

also demonstrated similar effects (Ahmed 1999). Palatability will certainly be an issue of compliance with *Momordica*, particularly in children, who at the best of times are choosy about foods. The juice is potentially bitter but it is this very bitterness that combats the cravings for sweet foods.

Based on this principle, sugar cravings can be addressed through taking *Gymnema sylvestre* (gymnema), a herb that temporarily anaesthetises the taste buds corresponding to sweet foods. Foods that are high in sugar cannot be tasted and thus the addictive consumption of foods with a high sugar content is reduced. For this reason, gymnema must be administered in liquid form on the tongue since tablet or capsule form exert no therapeutic effect. Clinical trials have shown it enhances the production of endogenous insulin either through regeneration of damaged β -cells or by revitalising any existing ones. Moreover, it is effective in treating reactive hypoglycaemia, sugar cravings and weight loss, probably partly due to its action in disrupting sugar absorption in the small intestine (Bone 2002). Other clinical trials have also shown that adjunct therapy with gymnema significantly improves glycaemic control in diabetic patients (Joffe 2001). Its efficacy is only manifested in cases of diabetes, being ineffective in healthy individuals.

Various other herbs are also considered by medical herbalists, in preventing the long-term complications such as diabetic retinopathy. Useful herbs for this would include extracts of *Vaccinium*

Treatment rationale

There are serious considerations when establishing a treatment rationale and management programme for children. 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.

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 via either conventional, herbal or adjunct therapy. 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 all communities in Britain ■

Yaso Shan MNIMH is a Consultant Medical Herbalist, Brackebury Natural Health Clinic. Visit www.centellaherbal.co.uk or call 020 8741 9264 for more information

With many thanks to the Science Information Team at Diabetes UK