

## Paediatrics

### DIABETES CARE

#### Lack of agreement between IFG and IGT criteria

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

**1** A number of studies have shown a lack of agreement between impaired fasting glucose (IFG) measurement and the diagnosis of impaired glucose tolerance (IGT). This study aimed to describe IFG and IGT agreement in overweight or obese children.

**2** The children (n=533), aged 4–17 years, had fasting glucose tests and two-hour glucose tests after an oral glucose load. Children were excluded if they had fasting plasma glucose  $\geq 126$  mg/dl.

**3** Estimations were made of the diagnostic parameters of the original and revised IFG definitions for detecting IGT and the  $\kappa$  test was used to analyse the agreement.

**4** Using the new criteria, IFG prevalence increased from 6.2 to 13.3%. IFG prevalence became closer to IGT prevalence (14.8%) and sensitivity was increased to 36.7% from 26.6%.

**5** Only 29 of the 71 children with IFG had IGT (40.8%) so the revised IFG criteria were not useful for identifying cases of IGT.

**6**  $\kappa$  test results showed that there was poor agreement between revised criteria IFG definition and two-hour test results after oral glucose load.

**7** Under the new definition, the proportion of false-positive cases increased by 61%.

**8** In overweight and obese children, sensitivity of IFG for detecting IGT is moderately increased with the new definition, however over half of cases are not detected and the false-positive rate increased.

Gómez-Díaz, Herrera-Márquez R, Aguilar-Salinas CA et al (2004) Lack of agreement between the revised criteria of impaired fasting glucose and impaired glucose tolerance in children with excess body weight. *Diabetes Care* **27**: 2229–33

#### Diagnosing diabetes in childhood



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**T**he global epidemic of obesity has dramatically changed the epidemiology of childhood diabetes, with the emergence of type 2 diabetes as an important childhood disorder. More and more children are now being referred with severe obesity for medical evaluation and screening for diabetes or impaired glucose tolerance (IGT), to the extent it has become commonplace.

The diagnostic criteria used for defining diabetes in adults are used similarly in children and often only one fasting sample of blood is taken to look for impaired fasting glycaemia. A paper from Mexico City suggests that this may not be enough to highlight those children either with type 2 diabetes or with IGT. In this study 533 children, age range 4–17 years, who were either overweight or obese, underwent a full oral glucose tolerance test. These results were then analysed using two definitions of impaired fasting glycaemia: the 1997 definition with glucose between

6.1–6.9 mmol/l; and the 2003 revised definition of 5.5–6.9 mmol/l. A total of 24 (4.5%) children were found to have type 2 diabetes and 79 (14.8%) had IGT. Using a fasting glucose test alone only five children would have been identified as having type 2 diabetes using the 1997 criteria, and 11 using 2003 impaired fasting glycaemia criteria. This could have significant implications for their medical management and consequently their long-term outcome. Furthermore, only 29 children with IGT, less than 50%, would have been identified as having pre-diabetes with a fasting blood glucose using the new, lower definition.

Although there are no data to suggest that interventions, such as intensive lifestyle regimens or metformin, may be beneficial in childhood to delay or prevent the progression to type 2 diabetes, studies are being planned. In the meantime a number of paediatricians are using metformin in children with IGT. Although performing a full oral glucose tolerance test is labour intensive, it seems this is the only reliable way to diagnose type 2 diabetes and IGT in children.

### DIABETES CARE

#### Physical fitness and the metabolic syndrome

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

**1** Data from studies of adults suggest that physical fitness and activity are important variables when considering risk of type 2 diabetes and the metabolic syndrome.

**2** A school-based study of 589 young (age  $9.6 \pm 0.44$  years) Danish children compared standard metabolic risk factors including blood pressure, insulin, and lipid profiles, and compared them to data on physical activity and fitness.

**3** Physical activity was assessed using accelerometers and physical fitness using a maximum cycle ergometer test to exhaustion.

**4** Metabolic risk was inversely correlated with physical activity.

**5** Physical fitness was inversely correlated with insulin and triglyceride concentrations as well as systolic blood pressure and skinfold thickness.

**6** Physical fitness modified the effect of physical inactivity on metabolic risk, i.e. those that were inactive but had a higher level of physical fitness had a lower metabolic risk score.

**7** Physical inactivity per se could store up metabolic problems for children.

Brage S, Wedderkopp N, Ekelung U et al (2004) Features of the metabolic syndrome are associated with objectively measured physical activity and fitness in Danish children: the European Youth Heart Study. *Diabetes Care* **27**: 2141–48

**‘Pump therapy in pre-school children was not associated with clinically significant differences in glycaemic control as compared with intensive injection therapy. The rationale for initiating CSII in this age group should be based on patient selection and lifestyle preference.’**

**‘...from a parent’s perspective, diabetes is not a static disease [...] its psychologic impact changes over time, with increasing psychosocial implications as a result.’**

JOURNAL OF PEDIATRICS

**Insulin pump therapy in toddlers**

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

- The recent NICE assessment of continuous subcutaneous insulin infusion (CSII) highlighted a lack of good quality research into the benefits of pump therapy in childhood. This is a randomised controlled trial of CSII in children under five years with diabetes.
- Children with diabetes duration of greater than 12 months were randomly assigned to CSII (n=21) or to continue their standard therapy (n=21), which was a conventional insulin regimen in almost 75 %. Randomisation was performed after a half-day education session on intensive insulin management.
- As in many previous studies there was a significant lowering of HbA<sub>1c</sub> in the short term in children on CSII but this effect disappeared after six months.
- As in many previous studies no assessment was made of patient or family quality of life. This is essential when considering which patients may be suitable for a lifestyle intervention such as CSII.
- More studies are still needed to examine the benefits of CSII in subgroups of children with type 1 diabetes.

DiMeglio LA, Pottorff TM, Bod SR, et al (2004) A randomised, controlled study of insulin pump therapy in diabetic preschoolers. *Journal of Pediatrics* **145**: 380–84

JOURNAL OF PEDIATRICS

**The changing impact of serious illness in childhood**

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

- This study compared three cohorts: 268 parents of children with cancer, 203 parents of children with diabetes and a community cohort of control

DIABETES CARE

**Impact of improving diabetes care on severe hypoglycaemia**

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

- This 10-year study examined the changing prevalence of severe hypoglycaemia (SH) in a cohort of 1335 children aged between 0–18 years with a mean follow-up of five years.
- Over the 10-year period there was a trend towards more intensive insulin regimens and greater use of analogue insulins. There have been changes in approaches to patient education and it is likely that physician knowledge and use of the new regimens has also improved.

**3** The mean clinic HbA<sub>1c</sub> decreased from 10.9±1.7 % to 8.1±1.5 %. This lowering was associated with an increased risk of SH, although for the latter five years of the decade the incidence of SH did appear to plateau despite a continuous lowering of HbA<sub>1c</sub>.

**4** SH was more common in younger children, less than six years of age, but insulin regimen appeared to have little impact on rates of SH.

**5** CSII (used since 1999) has resulted in lower rates of SH despite a significantly lower HbA<sub>1c</sub> in this group.

**6** It is likely that better use of different insulin regimens through patient education and increased physician confidence may be equally important.

Bulsara MK, Davis A, Holman CDJ et al (2004) The impact of a decade of changing treatment on rates of severe hypoglycemia in a population-based cohort of children with type 1 diabetes. *Diabetes Care* **27**: 2293–98

CLINICAL CHEMISTRY

**Metabolic syndrome in childhood**

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

- This study has examined the link between C-reactive protein (CRP) and metabolic risk markers in three child cohorts of 9, 13 and 16 year olds. Body mass index (BMI), blood pressure (BP), insulin lipids and CRP were measured in approximately 750 children in each cohort, with data from boys analysed separately.
- CRP was related to BMI with an increase of 1 SD of BMI

leading to an increase of 57 % in CRP concentrations. There was also a correlation with fasting insulin concentrations but this was diminished when adjusted for BMI.

**3** Individuals with a CRP in the upper quartile for age and sex were 1.4, 1.7 and 2.3 times more likely to have high systolic BP, high triglyceride and low HDL-cholesterol respectively.

**4** The link between increasing weight and metabolic risk in childhood is causing great concern and studies are needed to define the most appropriate management for this group of children.

Lambert M, Delvin EE, Paradis G et al (2004) C-reactive protein and features of the metabolic syndrome in a population-based sample of children and adolescents. *Clinical Chemistry* **50**: 1762–68

parents. Psychosocial approaches to management of paediatric diabetes and cancer are standardised in Sweden.

**2** The authors used a multidimensional self-report questionnaire examining four categories: uncertainty, loss of control, self-esteem and negative feelings.

**3** Parents of children with diabetes had similar scores to parents of children with cancer with respect to feelings of uncertainty and loss of control at diagnosis. These feelings improved over time in parents of children with diabetes,

possibly due to their active involvement with diabetes management.

**4** Feelings of distress did not diminish in the parents of children with diabetes suggesting that a ‘danger over’ situation never arrives and instead they confront more challenges over time.

**5** This study not only highlights the importance of supportive and educational initiatives for parents of children with diabetes but that these measures need to adapt over time.

Boman KK, Vikten J, Kogner et al (2004) Serious illness in childhood: the different threats of cancer and diabetes from a parent perspective. *Journal of Pediatrics* **145**: 373–79