Paediatrics

Instability of diagnosis in childhood metabolic syndrome

Krystyna Matyka, Senior Lecturer in Paediatrics, University of Warwick Medical School

Over the last 5 years I have been seeing obese children and assessing them for comorbidities. I am aware that a large variety of clinical, biochemical and physiological parameters are abnormal in these children, yet defining metabolic risk in childhood is difficult. I look jealously at those straightforward clinical risk algorithms that are available to physicians dealing with adults! The main issue in paediatric medicine is that children are growing and developing. If I see a child who is 10 years old and find that they have impaired glucose tolerance or hypertension, it is not clear whether or not they are going to grow out of the problem, nor what factors may determine the outcome and hence influence my short-term clinical management.

This dilemma is highlighted in the paper by Goodman and colleagues, summarised to the right. In this study, over 1000 adolescents were assessed for the metabolic syndrome using a variety of diagnostic criteria at baseline and then 3 years later. There is no established definition of metabolic syndrome in childhood and so three different approaches were used and compared: American Heart Association (AHA) guidelines for adults; paediatric AHA guidelines used in previous research studies; and International Diabetes Federation guidelines. The authors found that not only did over 50% of adolescents 'lose' their metabolic diagnosis, new cases were also found during the course of the study with a cumulative incidence rate of 3.8–5.2%. The authors felt that metabolic syndrome classification may not be an effective method for risk stratification in paediatrics and would not recommend early intervention using pharmacotherapy. Instead, they suggest a greater emphasis on managing established lifestyle risk factors, such as physical activity.

Another paper by Allen et al, in the *Journal of Pediatrics* (summarised below) may provide some insight into how this approach may be integrated into a process of care and assessment. In this study of just over 100 obese children (mean age 12.8 ±1.4 years), the authors found that maximal oxygen uptake during an exercise test (a measure of physical fitness) was a predictor of insulin resistance, independent of body fat percentage.

All children with problems of excess weight are given lifestyle interventions and it is possible that regular fitness assessments could provide both information regarding metabolic risk as well as feedback for the young person on their progress. Defining a cut-off for further intervention may prove difficult and, obviously, more work in this area is necessary. However, children are not just smaller versions of adults – which may be why standard metabolic assessments are inappropriate. New problems deserve new solutions and alternative avenues need to be pursued.

JOURNAL OF PEDIATRICS

Fitness predicts fasting glucose levels in obese children

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

1 Recruited to this study were 106 overweight (BMI > 95th percentile) children. The average age was 12.8 ±1.4 years.

2 Cardiovascular fitness was measured by maximal volume of oxygen utilisation per kilogram of lean body mass. Also measured were fasting glucose concentrations.

3 Independent of one another, body fat percentage and fitness level were significantly associated with fasting glucose levels ($P<0.001$ and $P<0.0001$, respectively).

4 Male participants were found to have a stronger association between fitness and body fat than females.

5 From these results the authors emphasise the importance of exercise as a diabetes-prevention strategy in obese children.

Allen DB, Nemeth BA, Clark RR et al (2007) Fitness is a stronger predictor of fasting insulin levels than fatness in overweight male middle-school children. *Journal of Pediatrics* **150**: 383–7

CIRCULATION

Transient clinical categorisation of metabolic syndrome in adolescents

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

1 The aim of this study was to discover whether or not metabolic syndrome, as classified by AHA and IDF definitions, was a stable condition throughout adolescence.

2 From 2001, 1098 students from Ohio, US (mean age: 15 years; range: 12.2–19.3 years) were followed for 3 years as part of the Princeton School District Study. Records were taken of their BMI; systolic and diastolic blood pressures; waist circumference; and their levels of glucose, HDL-c, triglycerides and insulin.

3 Metabolic syndrome was defined by the adult parameters set out by the AHA and IDF, and also by the modified paediatric AHA guidelines.

4 Regardless of the definition of metabolic syndrome used, approximately half of those who were diagnosed with metabolic syndrome at baseline were no longer classified so after 3 years: AHA: 49% (95% CI 32–66%); IDF: 53% (95% CI 38–68%); paediatric AHA: 56% (95% CI 42–69%).

5 The cumulative incidence rates of new cases of metabolic syndrome were: AHA: 4.4%(95% CI 3.3–5.9%); IDF: 5.2% (95% CI 4.0–6.8%); paediatric AHA: 3.8% (95% CI 2.8–5.2%).

6 In terms of implications for practice, the authors state that the possible change in adolescents' diagnosis of metabolic syndrome over time implies that such a diagnosis has low clinical use. Subsequently, they advise caution when medication forms part of disease management.

Goodman E, Daniels SR, Meigs JB, Dolan LM (2007) Instability in the diagnosis of metabolic syndrome in adolescents. *Circulation* **115**: 2316–22

'Average school marks were significantly lower for those born to mothers with diabetes during pregnancy.'

'Identification of [acanthosis nigricans] could help in the rapid identification of high-risk individuals who may benefit from diabetes counselling.'

ANNALS OF FAMILY MEDICINE

Increased type 2 risk factors associated with acanthosis nigricans prevalence

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

1 Previous studies have shown the association between the dermatological condition acanthosis nigricans and hyperinsulinaemia. This study set out to investigate whether or not this extended to an association with type 2 diabetes in young people.

2 The setting was a practice-based research network in southwestern US communities. In total, 1133 individuals aged 7 to 39 years were sampled in this cross-sectional study.

3 Hypertension, as defined by the Joint National Committee, was found in 3% of those aged 7 to 19 years.

4 Forty-three per cent of 7–19 year olds were overweight (BMI in 85th–94th percentile) or obese (BMI at or above 95th percentile).

5 Acanthosis nigricans was identified in 17% of those aged 7 to 19 years.

6 A significant, positive correlation was found between the number of risk factors for type 2 diabetes and the prevalence of acanthosis nigricans($P<0.001$).

7 In the total studied population (aged 7–39 years) the ratio for prevalence of type 2 diabetes in those with acanthosis nigricans was 1.97 (95% CI 1.18–3.27; $P=0.01$).

8 The 96 clinicians who collected data for this study reported that a diagnosis of acanthosis nigricans often led to discussions regarding lifestyle modification. Thus, identification of this condition could help in the rapid identification of high-risk individuals who may benefit from diabetes counselling.

Kong AS, Williams RL, Smith M et al (2007) Acanthosis nigricans and diabetes risk factors: prevalence in young persons seen in southwestern US primary care practices. *Annals of Family Medicine* **5**: 202–8

DIABETOLOGIA

Diabetes in pregnancy linked to poor school performance

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

1 The authors set out to study the impact of diabetes during pregnancy with the child's school performance.

2 Of children born between the years 1973 and 1986 in Sweden, the mothers of 6397 were identified as having had diabetes during pregnancy. The school marks for these children at the end of compulsory schooling (~16 years of age) were compared to those from 1300683 controls.

3 Average school marks were significantly lower for those born to mothers with diabetes during pregnancy (3.13 versus 3.23; $P<0.001$) and they were less likely to complete compulsory schooling (OR: 1.25; 95% CI: 1.10–1.43).

Dahlquist G, Källén B (2007) School marks for Swedish children whose mothers had diabetes during pregnancy: a population-based study. *Diabetologia* **50**: 1826–31

DIABETES CARE

Fall in frequency of DKA in under-15s with type 1 diabetes

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

1 In a study into the frequency of diabetic ketoacidosis (DKA) among children with type 1 diabetes in northern Finland, data from 585 individuals under the age of 15 years were collected retrospectively for between 1982 and 2001.

2 There were fewer cases of DKA (where pH<7.30) at diagnosis of type 1 diabetes between 1992 and 2001 than between 1982 and 1991 (15.2% versus 22.4%; $P=0.028$).

3 Between 1997 and 2001 31.1% of those diagnosed with type 1 diabetes were under 5 years of age, significantly higher than the previous four 5-year periods ($P=0.017$).

4 The frequency of DKA in under-5s was lower from 1992 to 2001 than it was between the years 1982 and 1991 (17.7 versus 32.1%, respectively; $P=0.052$).

5 The authors highlighted that although frequency of DKA fell in the under-15s, those aged <2 years remain at high risk.

Hekkala A, Knip M, Veijola R (2007) Ketoacidosis at diagnosis of type 1 diabetes in children in northern Finland: temporal changes over 20 years. *Diabetes Care* **30**: 861–6

JOURNAL OF PEDIATRICS

DCCT standards lead to intensification of treatment for type 1

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

1 This study evaluates the changes in type 1 diabetes control before and after the standards set out in the DCCT had begun to be used in clinical practice.

2 Participants in group 1 were aged 8–16 years and enrolled in 1997–1998, 4 years after the DCCT. Group 2 comprised individuals enrolled from 2002–2003, 9 years post-DCCT.

3 Compared with group 1, group 2 monitored their blood glucose levels more regularly (39% versus 72% monitored >4 SMBG tests per day; $P<0.001$); more frequently had 3 or more injections per day or used a pump ($P<0.001$); and significantly better blood glucose control at baseline and study end ($P=0.03$; $P=0.04$, respectively).

4 The authors suggest that these results illustrate the changes made in paediatric diabetes care in recent years.

Svoren BM, Volkening LK, Butler DA (2007) Temporal trends in the treatment of pediatric type 1 diabetes and impact on acute outcomes. *Journal of Pediatrics* **150**: 279–85