

## Paediatrics

### We must learn how to use CGMS well



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**R**egular self-monitoring of blood glucose (SMBG) has long been a part of day-to-day diabetes management, yet there are surprisingly few data on the usefulness of this measure. One study suggested that children performing one or fewer blood tests per day had an average HbA<sub>1c</sub> of  $9.1 \pm 0.34\%$  compared with a value of  $8.0 \pm 0.31\%$  in those performing five or more blood tests (Levine et al, 2001). However it is not clear whether frequent SMBG improves control or just that those with better control do more SMBG.

Two studies have been published recently looking at the clinical use of continuous glucose monitoring systems (CGMS). In the study by Yates et al (see right), 36 young people with type 1 diabetes were randomised to either 3-weekly 72-hour CGMS recordings or intermittent SMBG. Insulin adjustments were made on the basis of CGMS or SMBG. The authors found that, although there was a significant improvement in HbA<sub>1c</sub> from baseline in both study groups, there were no significant differences between those using CGMS and those using SMBG.

Lagarde et al (see below) used a similar study design in 27 children and found that those in the CGMS group had a significantly lower HbA<sub>1c</sub>

at 6 months, whereas those in the SMBG did not. However, there was no significant difference between the two methods of testing blood glucose.

Although CGMS has been available now for some time, our understanding of the best way to use this clinical tool is still developing. From personal practice there is no doubt that CGMS does have a place for some children with diabetes: a randomised, controlled trial produces mean data for a group of participants and may obscure individual benefit. However, in my case, one of the problems is that although an extremely sophisticated piece of computerised machinery is used to collect the blood glucose data, a middle-aged, astigmatic consultant paediatrician has to interpret the data which is churned out at an average reading every 5 minutes. Further advances need to be made so that tools are developed which may be able to interpret patterns based on readings that are produced in such abundance. In the conclusions of the paper by Yates et al important comments are made: 'The adoption of new therapies follows a characteristic trajectory of rapid uptake, abandonment as limitations are identified and then an eventual plateau as appropriate limitations are agreed upon.' We must not abandon this tool – we must learn how to use it well.

Levine B, Anderson BJ, Butler DA et al (2001) Predictors of glycaemic control and short-term adverse outcomes in youth with type 1 diabetes. *Journal of Pediatrics* **139**: 197–203

### DIABETES CARE

### Continuous glucose monitoring system as useful as SMBG

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

**1** This trial examined the effect of continuous glucose monitoring system (CGMS)-guided insulin therapy adjustment on glycaemic control in young people with diabetes on intensive diabetes treatment regimens with continuous subcutaneous insulin infusion (CSII) or insulin glargine.

**2** Young people with diabetes who had HbA<sub>1c</sub> <10% and had been on CSII or insulin glargine for at least 3 months were recruited.

**3** A total of 36 people were randomised to insulin adjustment on the basis of 72-hours of CGMS every 3 weeks or intermittent self-monitoring of blood glucose (SMBG) for 3 months.

**4** HbA<sub>1c</sub> and fructosamine were measured at baseline, 6 weeks and 12 weeks. Follow-up HbA<sub>1c</sub> was measured at 6 months.

**5** Although both groups had a significant improvement in HbA<sub>1c</sub> levels from baseline values, there was no difference in the degree of improvement in HbA<sub>1c</sub> at 12 weeks between the CGMS and the SMBG (control) groups.

**6** Improved HbA<sub>1c</sub> in the CGMS group was at the cost of increased duration of hypoglycaemia.

**7** CGMS is as useful as intermittent fingerstick SMBG and frequent review in improving diabetes control in people who have reasonable control on near-physiological insulin regimens.

Yates K, Hasnat Milton A, Dear K, Ambler G (2006) Continuous glucose monitoring-guided insulin adjustment in children and adolescents on near-physiological insulin regimens. *Diabetes Care* **29**: 1512–7

### PEDIATRIC DIABETES

### Continuous glucose monitoring system improves control

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

**1** The aim of this trial was to establish if continuous glucose monitoring system (CGMS) use improves metabolic control in children with type 1 diabetes.

**2** Adjustments in treatment for the intervention group (n=18) were based on CGMS and self-monitoring of blood glucose data (SMBG), while only

SMBG data were used for the control group (n=9).

**3** While the decrease in HbA<sub>1c</sub> of  $0.61 \pm 0.68\%$  in the intervention group was statistically significant ( $P=0.03$ ), the decrease in HbA<sub>1c</sub> of  $0.28 \pm 0.78\%$  in the control group was not.

**4** The differences in HbA<sub>1c</sub> between groups was not statistically significant ( $P=0.13$ ).

**5** Use of CGMS may improve metabolic control without increasing the risk of hypoglycaemia.

Lagarde WH, Barrows FP, Davenport ML et al (2006) Continuous subcutaneous glucose monitoring in children with type 1 diabetes mellitus: a single-blind, randomized, controlled trial. *Pediatric Diabetes* **7**: 159–64

## THE JOURNAL OF PEDIATRICS

### Diabetes-related bullying needs attention

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

- This study aimed to establish the relationship between diabetes-related bullying, diabetes self-management, metabolic control and depression in children and adolescents with type 1 diabetes.
- A total of 167 young people with diabetes were assessed for diabetes-related bullying and depression at their scheduled diabetes care visits, and HbA<sub>1c</sub> levels were checked.
- Parents provided opinions for a clinician-rated index of the child's diabetes self-management.
- Diabetes-related bullying was positively related to HbA<sub>1c</sub> levels and negatively related to overall self-management, specifically to adherence to glucose testing and dietary tasks.
- Symptoms of depression partly mediated the relationship between self-management and diabetes-related bullying.

Storch EA, Heidgerken AD, Geffken GR et al (2006) Bullying, regimen self-management, and metabolic control in youth with type 1 diabetes. *The Journal of Pediatrics* **148**: 784–7

## THE JOURNAL OF PEDIATRICS

### Socio-economic status has more impact on HbA<sub>1c</sub> levels than race

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

- The impact of factors that may interfere with glycaemic control in young people with diabetes was investigated in this study.
- A database review of 455 people under 18 years who had diabetes for at least 6 months was studied; sex, age, ethnicity, diabetes duration, mode of insulin administration, body mass index, HbA<sub>1c</sub> levels and socio-economic status (SES) were recorded.
- Mean HbA<sub>1c</sub> level was 7.6 ± 1.4%; 31 % of the study group did not meet the therapeutic target of <8.0%.
- Female sex, older age, longer duration of diabetes, injection [rather than pump] therapy and lower SES were identified as being significantly associated with higher HbA<sub>1c</sub> level.
- Most young people attained glycaemic targets at least as good as the Diabetes Control and Complications Trial recommendations.

Springer D, Dziura J, Tamborlane WV et al (2006) Optimal control of type 1 diabetes mellitus in youth receiving intensive treatment. *The Journal of Pediatrics* **149**: 227–32

## PEDIATRIC DIABETES

### Unclear impact of fear of hypoglycaemia on diabetes management

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

- Researchers tested the hypothesis that hypoglycaemic history and trait anxiety contribute to fear of hypoglycaemia (FOH) in adolescents with type 1 diabetes and their parents.
- Relationships between FOH and metabolic control, symptom perception and use of insulin-pump treatment were also analysed.
- A total of 39 adolescent–parent pairs completed questionnaires and HbA<sub>1c</sub> measures were taken.
- Trait anxiety and frequency of severe hypoglycaemic episodes were significant predictors of FOH in adolescents, and accounted for nearly 50 % of the variance.
- Parental FOH was predicted by whether they believed their child carried emergency glucose.
- Parental-trait anxiety significantly correlated with child-trait anxiety, but parent–child levels of FOH were unrelated.
- Trait anxiety and FOH were unrelated to reported symptoms, and FOH was not lower in adolescents with insulin pumps.
- FOH in adolescents with type 1 diabetes and their parents is complex and is influenced by multiple behavioural, personality and situational factors – its impact on diabetes management is not clear.
- The rising global incidence of type 1 diabetes implies that there is a need for continued monitoring of incidence to assess and plan prevention strategies.

The DIAMOND Project Group (2006) Incidence and trends of childhood type 1 diabetes worldwide 1990–1999. *Diabetic Medicine* **23**: 857–66

‘Symptoms of depression partly mediated the relationship between self-management and diabetes-related bullying.’

## DIABETIC MEDICINE

### Global rise of type 1 diabetes

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

- Examination of the worldwide trends and incidence of type 1 diabetes was the objective of this study.
- The incidence of type 1 diabetes was investigated in children aged ≤14 years from 112 centres in 57 countries; trends were analysed by fitting Poisson regression models to the dataset.

- A total of 43 013 cases of type 1 diabetes were diagnosed in the populations of 84 million children.
- The age-adjusted incidence of type 1 diabetes varied from 0.1 per 100 000/year in China to 40.9 per 100 000/year in Finland.
- The average annual increase in incidence was 2.8 % (2.4 % in 1990–1994 and 3.4 % in 1995–1999).
- The trends showed significant increases in type 1 diabetes worldwide except in Central America and the West Indies where the trend was an annual decrease of 3.6 %.
- In European populations the trend in incidence decreased with age.

‘The rising global incidence of type 1 diabetes implies that there is a need for continuing monitoring of incidence to assess and plan prevention strategies.’