

Management of type 1 diabetes

The importance of achieving target HbA_{1c} level



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It may seem obvious to healthcare professionals who manage people with diabetes that HbA_{1c} is an important indicator of future risk of developing microvascular complications, but unfortunately there is no getting away from

it. The study by Giordano et al (2011; summarised alongside) investigated the occurrence of early microvascular complications in a group of 376 people with type 1 diabetes. The marked difference in risk of developing retinopathy or microalbuminuria when their HbA_{1c} level was <7% (<53 mmol/mol) is both encouraging and depressing.

I recently conducted an evaluation of diabetes control in 16- to 25-year-old people with type 1 diabetes in Sheffield. The results were depressing not because of the very high mean HbA_{1c} level (9.8% [84 mmol/mol]) but

because of the tiny number of people who managed to normalise their HbA_{1c} level at some point during the first year after diagnosis.

Like the study by Giordano et al (2011), others have demonstrated that early good control preserves C-peptide production and improves long-term glycaemic control. This study also revealed that HbA_{1c} level at diagnosis affects the risk of developing diabetic retinopathy but not microalbuminuria. While we may not be able to influence HbA_{1c} level at diagnosis (which suggests that earlier detection is key), intensification of treatment from this point onward is essential.

Maybe the next CQUIN (Commissioning for Quality and Innovation) target should be the proportion of people with recently diagnosed type 1 diabetes who achieve target HbA_{1c} level during the first year after diagnosis? The differences between diabetes centres might be surprising, but one thing is for sure – that difference would narrow pretty quickly!

“This study revealed that HbA_{1c} level at diagnosis affects risk of developing diabetic retinopathy but not microalbuminuria.”

EUROPEAN JOURNAL OF INTERNAL MEDICINE

HbA_{1c} is the only factor that predicts microvascular complications

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

- 1 An association between microvascular complications and metabolic control in T1D has been demonstrated by several epidemiological studies.
- 2 The authors of this longitudinal observational study aimed to evaluate the predictive role of the main clinical and biochemical parameters in determining microvascular complications.
- 3 Data were analysed from 376 participants with T1D who were hospitalised between 1991 and 2005 (mean follow-up, 10.9±4.3 years).
- 4 Clinical and laboratory parameters, such as residual beta-cell function, beta-cell autoimmunity and HbA_{1c} levels, were analysed by stepwise Cox regression.
- 5 Men were more likely to develop microalbuminuria compared with women (hazard ratio [HR], 1.82; 95% confidence interval [CI], 1.01–3.28; *P*=0.044). A higher mean HbA_{1c} value than other participants (HR, 2.80; 95% CI, 1.63–4.83; *P*<0.001), longer duration of disease (95% CI, 1.10–3.57; *P*=0.022) and younger age of diabetes onset (HR, 0.53; 95% CI, 0.03–0.92; *P*=0.026) were also associated with a higher risk of microalbuminuria.
- 6 The authors concluded that HbA_{1c} is the only parameter that is predictive of the development of microangiopathy in T2D. Other parameters were useful for diagnosis but did not predict future complications.

PEDIATRIC DIABETES

Boys' ability to cope with emotions affects their diabetes management

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

- 1 This study aimed to analyse the impact of self-regulation skills among adolescents with T1D affect adherence and glycaemic control.
- 2 A total of 109 adolescents with T1D aged 12–18 years and their primary caregiver participated in the study.
- 3 Caregivers and adolescents were interviewed separately about treatment adherence. The caregivers

completed a questionnaire and glycaemic control was assessed by HbA_{1c} level in the adolescents.

- 4 Executive functioning and emotion regulation deficits were significantly associated with worse treatment adherence and glycaemic control in boys; emotion regulation was the primary self-regulation measure.
- 5 The authors did not identify any significant associations for girls.
- 6 The authors concluded that to maximise boys' treatment adherence and diabetes control, the ability to cope with various stressors and emotions may be as important as higher-order thinking skills.

Graziano PA, Geffken GR, Williams LB et al (2011) Gender differences in the relationship between parental report of self-regulation skills and adolescents' management of type 1 diabetes. *Pediatr Diabetes* 12: 410–8

Giordano C, Amato MC, Ciresi A et al (2011) Predictors of microvascular complications in type 1 diabetic patients at onset: the role of metabolic memory. *Eur J Intern Med* 22: 266–74

“... decreases in interstitial glucose levels with both exercise sessions, continuous moderate-intensity plus intermittent high-intensity exercise may protect against nocturnal hypoglycaemia.”

DIABETOLOGIA

G6PD deficiency accelerates retinopathy

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

- The authors of this study investigated how deficiency of a key regulatory enzyme in a glucose metabolism pathway – glucose-6-phosphate dehydrogenase (G6PD) – affects diabetic retinopathy.
- Participants were people with T1D of 15-years' duration who were G6PD-deficient ($n=19$) or sufficient ($n=35$).

3 Standard field colour photographs were taken of each participant's eyes and retinopathy was graded.

4 Almost 90% of participants in both groups had retinopathy but proliferative retinopathy was only identified in people deficient in G6PD ($P=0.0036$, compared with G6PD sufficient). A trend towards increased frequency of microalbuminuria was also identified in the G6PD deficient.

5 The authors concluded that G6PD deficiency accelerates the microvascular complications of diabetes.

Cappai G, Songini M, Doria A et al (2011) Increased prevalence of proliferative retinopathy in patients with type 1 diabetes who are deficient in glucose-6-phosphate dehydrogenase. *Diabetologia* **54**: 1539–42

PEDIATRIC DIABETES

Eating disorders associated with T1D in adolescence

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

- The authors investigated the association between age of onset of T1D and the subsequent development of a severe eating disorder such as anorexia nervosa (AN) or bulimia nervosa (BN).
- A total of 53 women with T1D and AN or BN were referred to the

diabetes clinic. The control group was 49 women with T1D who regularly attended the diabetes clinic. The historical control group consisted of 941 women who had attended the clinic for the first time.

3 Women in the eating disorder group developed diabetes significantly more frequently than the historical control group ($P<0.011$).

4 The authors concluded that girls who develop T1D in adolescence are at greater risk of subsequent eating disorders.

Takii M, Uchigata Y, Kishimoto J et al (2011) The relationship between the age of onset of type 1 diabetes and the subsequent development of a severe eating disorder by female patients. *Pediatr Diabetes* **12**: 396–401

DIABETIC MEDICINE

Trends in the incidence of T1D from 1991–2008

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

- Data from the UK General Practice Research Database were analysed to look at T1D incidence trends between 1991 and 2008 in 0- to 14- and 15- to 34-year-olds.
- A total of 3002 individuals were diagnosed during that period.

Incidence of T1D increased from 11 to 24 per 100 000 person-years in boys and 15 to 20 per 100 000 person-years in girls.

3 In adults, the incidence increased from 13 to 20 per 100 000 person-years in men, and from 7 to 10 per 100 000 person-years in women.

4 The authors of this study concluded that the incidence of T1D has continued to increase and the increase was greater in children than in young adults.

Imkampe AK, Gulliford MC (2011) Trends in type 1 diabetes incidence in the UK in 0- to 14-year-olds and in 15- to 34-year-olds, 1991–2008. *Diabet Med* **28**: 811–4

DIABETIC MEDICINE

Type of exercise may impact nocturnal hypoglycaemia

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

1 The physiological responses and associated glycaemic changes to either continuous moderate-intensity exercise or continuous moderate-intensity exercise plus intermittent high-intensity exercise were compared in athletes with T1D.

2 Interstitial blood glucose levels were measured in 11 athletes with T1D over 2 sedentary control days and 1 day where the athletes had one session of continuous moderate-intensity exercise in the afternoon and 1 day with the same session plus intermittent high-intensity exercise.

3 Heart rate, respiratory exchange ratio, oxygen utilisation, ventilation and blood lactate levels were higher during the session that included high-intensity exercise compared with the one that did not (all $P<0.05$).

4 Continuous moderate-intensity exercise plus intermittent high intensity exercise was associated with less post-exercise hypoglycaemia (5.2 vs 1.5% of the time spent with glucose <4.0 mmol/L) and more post-exercise hyperglycaemia (33.8 vs 20.4% of time >11.0 mmol/L) compared with continuous moderate-intensity exercise alone.

5 The authors concluded that despite similar decreases in interstitial glucose levels with both exercise sessions, continuous moderate-intensity plus intermittent high-intensity exercise may protect against nocturnal hypoglycaemia.

Iscoe KE, Riddell MC (2011) Continuous moderate-intensity exercise with or without intermittent high-intensity work: effects on acute and late glycaemia in athletes with type 1 diabetes mellitus. *Diabet Med* **28**: 824–32