

Management of type 1 diabetes



Cause of dead in bed syndrome still a mystery

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It's rare, devastating and usually totally unexpected: that dreaded call from a parent of one of your patients with type 1 diabetes telling you that their son or daughter has been discovered dead in bed. These are rarely the wild ones who have had multiple admissions with diabetic ketoacidosis because of insulin omission; instead, they are usually below the radar, with neither high nor dangerously low HbA_{1c}.

We've known about dead in bed syndrome for at least three decades but the cause has remained a mystery. The Sheffield University research group, led by Professor Simon Heller, has long suspected hypoglycaemia as the cause, but since hypoglycaemia is so common and dead in bed syndrome so rare, this has remained difficult to explain.

The study by Novodvorsky and colleagues (summarised alongside) adds further evidence that hypoglycaemia can be proarrhythmogenic and that

the effects on the heart have a diurnal difference, with nocturnal hypoglycaemia causing bradycardia and electrocardiogram changes not seen during daytime episodes.

The case is not proven, but these findings do suggest arrhythmia during hypoglycaemia as a possible cause of dead in bed syndrome. This does not mean that dead in bed syndrome is caused by hypoglycaemia, but it does lead to speculation that some individuals may be more at risk than others. What is clear is that insulin treatment must aim to improve glycaemic control and reduce the risk of microvascular complications, but achieve this without risking daytime and especially nocturnal hypoglycaemia.

We are fortunate that a new generation of basal insulins that reduce this risk is available. We must not limit their use on the basis of cost if there are obvious benefits for the individual with T1D. ■

Diabetes Res Clin Pract

Implications of fasting on glycaemic control

Readability ✓✓✓✓

Applicability to practice ✓✓✓✓

WOW! Factor ✓✓✓

1 These authors sought to assess attitudes towards fasting in Ramadan, frequency of complications and the effects of fasting on glycaemic control in young people with T1D.

2 Sixty-five people aged 10–18 years who planned to fast participated in the study, which involved two hospital visits, questionnaires, HbA_{1c} recordings and a log of fasting days.

3 Overall, 37% had reduced HbA_{1c} after Ramadan, 11% had similar levels and 52% had worsened levels.

Mean HbA_{1c} increased non-significantly from 70 to 73 mmol/mol (8.6% to 8.8%).

4 Of 38 insulin pump users, 42% had improvements in HbA_{1c} over Ramadan, 47% deteriorated and 11% remained the same. Of the 27 on multiple daily injections (MDI), 30% improved, 42% worsened and 11% remained the same.

5 Of the 38 pump users, 55% had at least one episode of severe hypoglycaemia, in contrast to 48% of those on MDI (P =non-significant).

6 Participants were able to fast on a significant number of days. Breaking a fast when complications arose made fasting safe. No difference in acute complications or changes in HbA_{1c} was observed between pump and MDI users.

Deeb A, Qahtani NA, Akle M et al (2017) Attitude, complications, ability of fasting and glycaemic control in fasting Ramadan by children and adolescents with type 1 diabetes mellitus. *Diabetes Res Clin Pract* **126**: 10–15

Diabetes Care

Hypoglycaemia effect on ECG in young people with T1D

Readability ✓✓✓✓

Applicability to practice ✓✓✓✓

WOW! Factor ✓✓✓✓

1 Hypoglycaemia continues to be a major limiting factor in the management of T1D. Although hypoglycaemia-induced cardiac dysrhythmia has been linked with dead in bed syndrome, direct evidence linking electrocardiogram (ECG) changes and dead in bed syndrome is missing.

2 This study set out to examine the effect of daytime and night-time hypoglycaemia on ECG activity in young people with T1D.

3 Thirty-seven people (aged <50 years and diagnosed with T1D at least 4 years previously) underwent 96 hours of simultaneous ambulatory ECG and blinded continuous glucose monitoring while symptomatic hypoglycaemia was recorded.

4 Bradycardia was more than six times more frequent during nocturnal hypoglycaemia compared with nocturnal euglycaemia (incident rate ratio [IRR], 6.44 [95% confidence interval (CI), 6.26–6.63]). However, it was significantly less frequent during daytime hypoglycaemia compared with daytime euglycaemia (IRR, 0.023 [95% CI, 0.002–0.26]).

5 Altogether, 44 nocturnal and 69 daytime hypoglycaemic episodes were analysed. The median duration of nocturnal hypoglycaemia was 60 minutes, longer than daytime episodes (44 minutes).

6 The authors conclude that daytime and nocturnal hypoglycaemia have different cardiac electrophysiological effects. These data add to the body of evidence suggesting that hypoglycaemia is proarrhythmogenic.

Novodvorsky P, Bernjak A, Chow E et al (2017) Diurnal differences in risk of cardiac arrhythmias during spontaneous hypoglycaemia in young people with type 1 diabetes. *Diabetes Care* **40**: 655–62

Diabet Med

Understanding poor glycaemic control over transition

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! Factor	✓✓✓✓

1 This 4-year, retrospective study of 126 young people with T1D in Denmark aimed to describe and compare changes in glycaemic control between the last 2 years in paediatric care and the first 2 years in adult care, and to identify risk factors for poor glycaemic control.

2 Mean HbA_{1c} remained constant at 80 mmol/mol (9.4%) during the 2 years before transfer; however, it decreased significantly during the 2 years after transition by 3 mmol/mol (0.3%) each year.

3 The gap between paediatric and adult diabetes care ranged from 1 to 397 days (median, 76 days).

4 A 1-month increase in the gap between paediatric and adult care was associated with an average increase in HbA_{1c} at the first adult visit of 2 mmol/mol (0.2%). However, the longer the gap, the faster HbA_{1c} decreased thereafter.

5 Parental divorce had a significant effect on glycaemic control. Young people with divorced parents had mean HbA_{1c} levels that were 14 mmol/mol (1.3%) higher. HbA_{1c} was also higher among young adults with a learning disability and/or mental health condition.

6 In conclusion, glycaemic control improved slightly during the first 2 years after transfer to adult care, but the mean HbA_{1c} remained above recommended levels. There is a general need to support young people in self-management, especially those with divorced parents, a learning disability or a mental health condition, and those who are not attending clinics.

Castensøe-Seidenfaden P, Jensen AK, Smedegaard H et al (2017) Clinical, behavioural and social indicators for poor glycaemic control around the time of transfer to adult care: a longitudinal study of 126 young people with diabetes. *Diabet Med* **34**: 667–75

Diabet Med

Factors influencing DAFNE attendance

Readability	✓✓
Applicability to practice	✓✓✓✓
WOW! Factor	✓✓✓✓

1 These authors used cross-sectional data to investigate the factors influencing uptake of the Dose Adjustment for Normal Eating (DAFNE) structured education programme among adults with T1D in two South London boroughs.

2 Of 1107 people studied, 73% had not attended the DAFNE programme.

3 Compared with attenders, non-attenders were more likely to be male (59% vs 48%), older (mean, 39 years vs 35 years), non-white (30% vs 20%) and from an area of social deprivation (Index of Multiple Deprivation [IMD] score, 31 vs 28).

4 Regression analysis showed that people with higher baseline HbA_{1c} were more likely to attend, with an HbA_{1c} over 75 mmol/mol (>9.0%) doubling the likelihood of attendance (odds ratio [OR], 1.96) compared with an HbA_{1c} <58 mmol/mol (7.5%).

5 The authors suggest that this may have been via effects on perception of disease severity. Clinicians should use opportunities to encourage attendance at a time when motivation is high.

6 Social deprivation was associated with non-attendance, with the highest three quartiles of IMD score less likely to attend (OR, 0.52–0.58) compared with the lowest quartile.

7 Male gender (OR, 0.74) made attendance less likely and each additional decade of age reduced the likelihood of attendance by 23%.

8 The authors call for efforts to encourage these groups to attend structured education, and for further research to adapt education to suit local and societal needs.

Harris SM, Shah P, Mulnier H et al (2017) Factors influencing attendance at structured education for type 1 diabetes in south London. *Diabet Med* **34**: 828–33

Diabetes Care

Trajectories of metabolic control in adolescents

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! Factor	✓✓✓✓

1 Young people frequently fail to meet targets for glycaemic control, and increases in HbA_{1c} in adolescence are frequently observed.

2 Using a group-based modelling approach, these authors aimed to identify distinct patterns of glycaemic control in 6433 children, adolescents and young adults (aged 8–19 years) with T1D in Germany and Austria.

3 Five distinct trajectories of glycaemic control were observed. Three groups (approximately 80% of participants) had stable glycaemic control at varying HbA_{1c} levels, while two (approximately 20%) exhibited deterioration in glycaemic control from either high or intermediate levels.

4 HbA_{1c} rose from childhood to young adulthood in all five groups; however, only these last two groups had large increases.

5 The two groups that experienced a deterioration in HbA_{1c} had a lower frequency of self-monitoring of blood glucose and had less physical activity per week. Daily insulin doses were also higher, which may reflect increased insulin resistance, hormonal changes or reduced compliance during puberty.

6 Gender and age at diabetes onset did not differ between trajectories. However, a deterioration in HbA_{1c} was associated with shorter height, suggesting that poor control may stunt growth.

7 Groups with stable control contained fewer people from a migrant background, in whom language barriers and communication problems may have been present.

Schwandt A, Herrmann JM, Rosenbauer J et al (2017) Longitudinal trajectories of metabolic control from childhood to young adulthood in type 1 diabetes from a large German/Austrian registry: a group-based modeling approach. *Diabetes Care* **40**: 309–16

“Insulin treatment must aim to improve glycaemic control and reduce the risk of microvascular complications, but achieve this without risking daytime and especially nocturnal hypoglycaemia.”