

Paediatrics

Effects of a controlled hypoglycaemia test on QTc in adolescents with type 1 diabetes



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Sudden, unexpected death during sleep (the “dead in bed” syndrome) is a recognised association with type 1 diabetes and seems to occur mainly in young people and adolescents. Luckily, the phenomenon is extremely rare, but the mechanism

is poorly understood. It has been postulated that nocturnal hypoglycaemia could trigger an arrhythmia as a result of prolonged cardiac repolarisation in susceptible individuals. It is not clear why episodes occur only at night, although cardiac events in the general population do tend to occur more commonly in the early hours of the morning and may reflect changes in autonomic tone that occur during differing stages of the sleep cycle.

In a small pilot study (summarised alongside) the authors experimentally induced hypoglycaemia in 16 adolescents with type 1 diabetes, including one girl whose twin sibling with diabetes was found dead in bed at the age of 16 years. Blood glucose concentrations were kept at euglycaemia for 30 minutes followed by a period of hypoglycaemia, with blood glucose concentrations between 2.5 and 3.5 mmol/L for 60 minutes. Urine was collected for catecholamine assay as

a surrogate measure of the strength of the counterregulatory response, and potassium concentrations were measured.

During the period of hypoglycaemia, two-thirds of the adolescents showed evidence of an adrenergic response, with an increase in blood pressure and heart rate and signs of sweating. Potassium concentrations decreased during hypoglycaemia. A significant prolongation of QTc occurred in all subjects, with a mean increase of 146 ± 44 ms; the greatest increase occurred in the girl with the family history of sudden death. There was no correlation between QTc values during euglycaemia and hypoglycaemia. There was also no correlation between serum potassium concentration and QTc duration.

These results confirm data previously obtained from adults under experimental conditions of the effect of hypoglycaemia on cardiac repolarisation. The authors were understandably disappointed that the degree of QTc prolongation could not be predicted from the resting electrocardiogram, although the study was small. It was suggested that measurement of QTc during controlled hypoglycaemia could be used to characterise those people at greatest risk of sudden death. This would then enable studies of possible interventions designed to prevent this most devastating complication of childhood diabetes.

DIABETIC MEDICINE

“Hypo” test examines QTc in adolescents at risk of “dead in bed” syndrome

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

1 Hypoglycaemia-related cardiac dysrhythmia (especially prolonged cardiac repolarisation) is thought to contribute to an increased mortality rate in adolescents with type 1 diabetes (often referred to as the “dead in bed” syndrome).

2 The aim of the study was to examine the ventricular repolarisation response in 16 adolescents with type 1 diabetes.

3 QTc, blood glucose level, potassium level, heart rate, blood pressure and urinary metanephrine levels were monitored while participants received insulin titrated from an insulin clamp to mimic the transition from mild hyperglycaemia to hypoglycaemia.

4 Insulin doses were titrated to maintain normoglycaemia for 60 minutes in phase 1; in phase 2, doses were titrated to maintain glycaemia between 3.5–2.5 mmol/L for 60 minutes.

5 All participants tolerated the test well and showed a normal QTc during the transition from mild hyperglycaemia to euglycaemia during phase 1. During phase 2, all adolescents showed a marked prolongation of QTc, averaging 146 ± 44 ms (range 70–230 ms).

6 The longest QTc, at 630 ms, was measured in the sibling of an adolescent found “dead in bed”. Further studies are needed to determine the hypoglycaemia test’s prognostic value.

Rothenbuhler A, Petit Bibal P, Le Fur S, Bougneres P (2008) Effects of a controlled hypoglycaemia test on QTc in adolescents with type 1 diabetes. *Diabet Med* **25**: 1483–5

DIABETOLOGIA

CSII therapy improves children’s mood and behaviour

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

1 To determine the effect of continuous subcutaneous insulin infusion (CSII) therapy on behaviour, mood and learning, 32 children (aged 6–16 years) with type 1 diabetes were enrolled in the study.

2 A cognitive test assessed learning, the Behaviour Assessment System for Children assessed mood and behaviour, and HbA_{1c} was used to measure glycaemic control.

3 Assessments were made before the start of CSII therapy and 6–8 weeks later.

4 HbA_{1c} and cognitive ability significantly improved after commencement of CSII therapy, with fewer mood-related symptoms and behavioural problems reported.

Knight S, Northam E, Donath S et al (2009) Improvements in cognition, mood and behaviour following commencement of CSII therapy in children with type 1 diabetes mellitus: a pilot study. *Diabetologia* **52**: 193–8

COCHRANE DATABASE OF SYSTEMATIC REVIEWS

Weight loss in obese children achieved by lifestyle interventions

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

- 1 Childhood obesity is a prevalent condition that can lead to significant short- and long-term health problems.
- 2 More information is needed on the best way to treat obesity in children and adolescents.
- 3 This review examined the effectiveness of lifestyle, drug and surgical interventions for treating childhood obesity.
- 4 A literature search identified 64 studies on different interventions for treating obesity in a total of 5230 obese children.
- 5 Lifestyle interventions (such as physical activity, diet and behaviour modification) were examined in 54 articles and drug treatment examined in 10 articles.
- 6 Meta-analyses showed that lifestyle intervention can effectively reduce weight in obese young people after 6–12 months.
- 7 For moderate to severely obese adolescents, a lifestyle intervention in combination with the drugs orlistat or sibutramine effectively reduces weight.
- 8 However, a range of adverse effects were recorded in some trials of drug treatment, so these should be used with caution.
- 9 High-quality studies are needed to examine the long-term benefits of weight management in obese children.

Oude Luttikhuis H, Baur L, Jansen H et al (2009) Interventions for treating obesity in children. *Cochrane Database Syst Rev* Issue 1. Article no: CD001872. DOI: 10.1002/14651858.CD001872.pub2

BRITISH JOURNAL OF GENERAL PRACTICE

Parents with type 2 diabetes give their children advice

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

- 1 Parents with type 2 diabetes have an important role in giving preventive advice to their children.
- 2 To determine how much advice is offered, 221 parents with

type 2 diabetes who had offspring without diabetes (aged 20–49 years) completed a questionnaire.

- 3 In total, 83.3% (184) parents believed that they should offer advice to their offspring, with 62.4% (138) actually imparting advice.
- 4 Advice-giving behaviour was increased in parents with complications, in those who perceived their offspring had a high risk of developing diabetes and in those living with their offspring.

Nishigaki M, Kobayashi K, Kato N et al (2009) Preventive advice given by patients with type 2 diabetes to their offspring. *Bri J Gen Pract* **59**: 37–42

PAEDIATRIC DIABETES

Foot care advice is important for young people with diabetes

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

- 1 The study examined the effectiveness of foot care education to prevent diabetic foot complications in children and adolescents with type 1 or 2 diabetes.
- 2 The study comprised 557 children and adolescents with type 1 or 2 diabetes who were screened for foot problems at baseline.

- 3 Participants and parents were given foot care advice to follow.
- 4 In total, 312 participants were followed-up 3–6 months later and were screened again for foot problems.
- 5 A total of 532 foot complications were found at baseline (557 people) and 161 at follow-up (312 people).
- 6 Foot care education significantly reduced modifiable foot problems in this young age group.
- 7 As improved foot care has been linked with a reduction in diabetes-related lower limb amputations in adults, preventive education aimed at young people with diabetes is likely to reduce future risk of complications.

Rasli MHM, Zacharin MR (2008) Foot problems and effectiveness of foot care education in children and adolescents with diabetes mellitus. *Pediatr Diabetes* **9**: 602–8

JOURNAL OF PAEDIATRICS

Smoking worsens metabolic control

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

- 1 The study examined the effect of smoking on metabolic control and other cardiovascular (CV) risk factors in 27 561 adolescents (<20 years) with type 1 diabetes.
- 2 Smoking was self-reported in 0.1% of children <11 years, in 5%

of 11- to 15-year-olds and in 28.4% of 15- to 20-year-olds. These results correspond with smoking rates in the general population.

- 3 Multivariate analysis with adjustments showed that smokers had higher HbA_{1c}, triglyceride and total cholesterol levels and diastolic blood pressure, an unfavourable lipid profile and lower high-density lipoprotein cholesterol levels than non-smokers.
- 4 Smoking worsens metabolic control and increases CV risk in adolescents with type 1 diabetes.

Hofer SE, Rosenbauer J, Grulich-Henn J et al (2009) Smoking and metabolic control in adolescents with type 1 diabetes. *J Pediatr* **154**: 20–3

“As improved foot care has been linked with a reduction in diabetes-related lower limb amputations in adults, preventive education aimed at young people with diabetes is likely to reduce future risk of complications.”