Management of type 1 diabetes

Tight control, sloppy driving?

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Hypoglycaemia is one of the most feared complications of the treatment of diabetes and one that discourages people with diabetes from achieving tight glycaemic control – getting up in the middle of the night to consume a Mars bar is not only the wrong treatment but likely to make a new lover a little anxious! Yet, in the UK, data on the incidence of hypoglycaemia are sparse.

We know there are >11 000 hypoglycaemic admissions annually to hospitals in England (Hospital Episode Statistics, 2010), and probably double that number of severe hypoglycaemic episodes treated in the community by ambulance services without admission (Yorkshire Ambulance Service, *personal communication*). Retrospective studies suggest that people on insulin are more likely than their non-insulin treated conterparts to have road traffic accidents associated with hypoglycaemia (Cox et al, 2006), but little is known about the frequency of hypoglycaemia while driving.

Cox et al (2009; summarised alongside) provide the first prospective study to look at driving mishaps among people with type 1 diabetes. Some 400 people in three geographically separate parts of the USA were enrolled. Over 12 months, an astonishing 52% of participants reported at least one hypoglycaemia-related driving mishap, 32% reported two or more, and 5% reported six or more.

I am not sure if Americans are just bad drivers, but 22% of the participants reported a car collision during the year. Although hypoglycaemia was common while driving, only 2.4% reported a car collision attributed to hypoglycaemia. Somewhat surprisingly, participants using insulin pump therapy to manage their diabetes were 35% more likely to experience a hypoglycaemia-related driving mishap than those using insulin injections.

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The authors suggest that healthcare professionals should enquire about hypoglycaemia while driving as a routine part of the assessment of people with diabetes. They recommend that people with diabetes should not drive with a blood glucose level <5 mmol/L to reduce the risk of driving while hypoglycaemic – advice we clinicians would do well to reinforce.

Continuous glucose monitoring system studies suggest that hypoglycaemia is just as common among insulin-treated people with type 2 diabetes as it is in type 1 diabetes (Cox et al, 2006), so these data are likely to be widely applicable.

Cox DJ, Kovatchev B, Vandecar K et al (2006) Hypoglycemia preceding fatal car collisions. *Diabetes Care* **29**: 467–8

Hospital Episode Statistics (2010) *Inpatient Data*. NHS Information Centre, London. Available at: tinyurl.com/cq7gxl (accessed 05.05.10)

DIABETES CARE

High frequency of driving mishaps related to hypos

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

1 Cognitive-motor function can be negatively affected by hypoglycaemia and has implications for driving among people with diabetes.

2 The authors collected prospective data on the occurrence of apparent hypoglycaemia-related driving performance impairments in a USA population over 12 months.

3 People (n=515) with type 1 diabetes (diagnosis >12 months previous) and a legal driver's license were enrolled from Virginia, Massachusetts and Minnesota. Of those enrolled, 452 completed all data collection and were analysed.

4 Mean age of participants was 42.4±12.5 years, estimated average HbA_{1c} was 7.8±0.8% (62±9 mmol/mol) and an average of 16 000±10 000 miles were driven per year per person.

5 Driving mishaps comprised collisions, citations, losing control, automatic driving, someone else taking over driving and moderate or severe hypoglycemia while driving.

6 During the study period, 52% of participants reported at least one hypoglycaemia-related driving mishap, while 32% reported two or more and 5% reported six or more.

7 Some 22% reported collisions during the study period, but only 2.4% attributed a collision to hypoglycaemia.

8 Insulin pump therapy was associated with mishaps (P=0.002), as was a history of severe or mild hypoglycaemia, collision or mishap (all P<0.001).

9 The authors concluded that clinicians should discuss the risks of hypoglycaemia during driving during reviews with people with diabetes.

Cox DJ, Ford D, Gonder-Frederick L et al (2009) Driving mishaps among individuals with type 1 diabetes: a prospective study. *Diabetes Care* **32**: 2177–80

"In the 12 months following commencement of a gluten-free diet ... children [with coeliac disease], HbA_{1c} worsened and reached levels similar to those of control children."

DIABETIC MEDICINE

HbA_{1c} worsens following initiation of gluten-free diet for coeliac disease

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

1 Impact on growth and HbA_{1c} level was investigated among children with type 1 diabetes (T1D) and asymptomatic coeliac disease.

2 Fourty-nine children (<16 years old) with T1D and coeliac disease (diagnosed by antibody screening and jejunal biopsy) were age-, sex- and duration-of-diabetes- matched to 49 non-coeliac disease children (control).

3 No difference in growth was seen in the case and control children.

4 Prior to coeliac disease diagnosis, mean HbA_{1c} was significantly lower among case children (8.3±1.1% [67±12 mmol/mol]) compared with control children (8.7±0.9% [72±10 mmol/mol]; P=0.02).

5 In the 12 months following commencement of a gluten-free diet in the case children, HbA_{1c} worsened and reached levels similar to those of control children (8.9±1.5 vs 8.8±1.5% [74±16 vs 73±16 mmol/mol]).

6 Following adjustment for insulin dose, regimen and other variables, diagnosis of coeliac disease and commencement of a gluten-free diet remained significantly associated with an increase in HbA_{1c} during the first 12 months (odds ratio 1.56 [95% CI, 1.16–2.10]; P=0.003).

7 The authors hypothesised that the deterioration of HbA_{1c} following commencement of a gluten-free diet may be due to abnormalities in the small bowel mucosa.

Sun S, Puttha R, Ghezaiel S et al (2009) The effect of biopsy-positive silent coeliac disease and treatment with a gluten-free diet on growth and glycaemic control in children with type 1 diabetes. *Diabet Med* **26**: 1250–4

DIABETES RESEARCH AND CLINICAL PRACTICE

Clinic normotension masks hypertension in people with T1D

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

1 Normotensive people (n=188) with type 1 diabetes (T1D) were recruited consecutively in this Brazillian cross-sectional study.

2 Participants were assessed for diabetic retinopathy, urinary albumin excretion rate and ambulatory blood pressure (BP).

3 Masked hypertension and nocturnal hypertension were found in 13.6% and 23.3%, respectively, of those who were normotensive in clinic (n=103).

4 Diabetic retinopathy was associated with night systolic and diastolic BP (P=0.009 and P=0.04, respectively) and masked nocturnal hypertension (P=0.01).

5 Many people with T1D and a clinic BP <130/80 mmHg likely have masked nocturnal hypertension.

6 Ambulatory BP monitoring may be the only was to identify increased risk of diabetic retinopathy among normotensive people with T1D.

Rodrigues TC, Canani LH, Viatroski RS et al (2010) Masked hypertension, nocturnal blood pressure and retinopathy in normotensive patients with type 1 diabetes. *Diabetes Res Clin Pract* **87**: 240–5

DIABETIC MEDICINE

Parental fear of hypos linked to higher child HbA_{1c}

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

1 Parents (mothers, n=103; fathers, n=97) of children with diabetes were enrolled and their scores for the Hypoglycaemia Fear Survey – Parent (HFS-P) and Hopkins Symptom Checklist (HSC) were analysed against their child's disease-specific data.

2 Higher HFS-P worry scores were significantly associated with higher HbA_{1c} levels (P=0.008), more than seven problematic hypoglycaemic episodes in the past year (P=0.005) and comorbid disease (by parent report; P=0.006).

3 Higher HFS-P behaviour scores were associated with mothers and parents whose child was not receiving insulin pump therapy (P<0.001, both).

4 The findings highlight the need for parental guidance and support in the management of their child's diabetes.

Haugstvedt A, Wentzel-Larsen T, Graue M et al (2010) Fear of hypoglycaemia in mothers and fathers of children with type 1 diabetes is associated with poor glycaemic control and parental emotional distress: a population-based study. *Diabet Med* **27**: 72–8

DIABETES CARE

Intensified therapy fails to improve beta-cell function in T1D

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

1 The authors investigated whether beta-cell function in people with long-standing type 1 diabetes (T1D) could be improved by the intensification of insulin therapy and the addition of agents that are beta-cell protective and weaken autoimmunity.

2 In this prospective, open-label, cross-over trial, participants (n=20; T1D duration 21.3±10.7 years) were enrolled and optimal glycaemic control was achieved.

3 Participants (n=16) were randomised to receive insulin alone, insulin plus exenatide, with or without daclizumab for 6 months, then crossed over.

4 While insulin requirements dropped in the exenatide arm (P=0.0062), a regimen of intensified insulin, exenatide and daclizumab failed to improve beta-cell function as measured by serum C-peptide in this cohort.

Rother KI, Spain LM, Wesley RA et al (2009) Effects of exenatide alone and in combination with daclizumab on beta-cell function in long-standing type 1 diabetes. *Diabetes Care* **32**: 2251–7