Paediatrics

Variations in glycaemic index and postprandial glucose excursions monitored by CGMS

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Maintaining good glycaemic control in people with type 1 diabetes involves a constant balance between insulin, food and exercise. Increasingly, children and young people are being prescribed intensive insulin regimens that also require intensive "eating" regimens. Programmes are being designed and taught with the aim of supporting individuals in adjusting insulin dose based on carbohydrate intake (Waller et al, 2008). Yet, as these regimens intensify, it becomes more obvious that there is still a lot for us to learn, in terms of variability of glycaemic profiles postprandially, and how to tailor insulin dose to different foods. This is especially noticeable for people using insulin pump therapy, where different bolus profiles are used, if, for example, pasta is consumed.

A study by Ryan et al (summarised to the right), has examined the influence of glycaemic index (GI) and insulin type on postprandial glucose excursions as measured by continuous glucose monitoring systems (CGMS). Investgations were performed in the morning around the breakfast meal and the conditions were standardised with respect to preceding exercise and the carbohydrate content of the evening meal. Breakfast seemed rather unappealing, with either low- or high-GI white bread ham sandwiches (Vegemite for vegetarians), and either apple juice (low GI), or lucozade (high GI) consumed. These meals were chosen to provide a significant difference in GI profile between the two meals consumed and are unlikely to accurately reflect normal dietary intake. Four test conditions were applied: low-GI meal with preprandial rapid-acting insulin; low-GI meal with postprandial (15 minutes post-meal) rapid-acting insulin; low-GI meal with preprandial soluble insulin; and high-GI meal with preprandial rapid-acting insulin. The data showed that, when using preprandial rapid-acting insulin, a high-GI meal led to a significantly higher post-meal glucose excursion when compared with a low-GI meal, with a maximum difference of 4.2mmol/L. Additionally, the time taken for the glucose concentration to return to normal was approximately 40 minutes longer after a high-GI meal. Interestingly, there was little difference in the post-meal glucose excursion between preprandial rapid and soluble insulins with a low-GI meal. Finally, postprandial rapid-acting insulin led to a significantly higher post-meal glucose excursion, compared with a preprandial dose, with a maximum difference of 2.5mmol/L, although the time to a return to normal was the same in both conditions.

So what have I learnt? That postprandial rapid-acting insulin does not seem to be a sensible option in the clinical scenario where a person is old enough to eat all that they are offered. I have also learnt that it may be possible to apply this fairly simple but illuminating research protocol to the clinical scenario and I may start to use CGMS in more creative ways for my own education and that of my patients. There is still a lot to learn about diet and diabetes.

Waller H, Eiser C, Knowles J et al (2008) Pilot study of a novel education programme for 11–16 year olds with T1DM: the KICk-OFF course. Archives of Disease in Childhood 93: 927–31

DIABETES CARE

Low-glycaemic index meals help reduce postprandial glucose excursions

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

1 This study investigated the effect of glycaemic index (GI) on postprandial glucose excursions (PPGEs) in children with type 1 diabetes, and assessed the optimum insulin doses for low glycaemic index meals.

2 Data from 20 children with diabetes were included in this study, and diet and glucose levels were monitored (the latter with continuous glucose monitoring systems) over a period of 4 days.

3 Participants consumed both high-GI meals (defined as a GI of 84), with standardised doses of preprandial ultra-short-acting insulin; and low-GI meals (GI of 48) with preprandial regular or ultra-short-acting insulin, or postprandial ultra-short-acting insulin.

4 Participants consuming low GI meals with accompanying treatment with ultra-short-acting insulin had a significantly lower PPGE compared with those consuming high-GI meals ($P<0.02$).

5 Compared with ultra-short-acting insulin, treatment with regular insulin before a low-GI meal resulted in a marginally higher PPGE value (by 1.1mmol/L) after 30 minutes only ($P=0.015$).

6 Preprandial ultra-short-acting insulin in combination with a low-GI meal is the optimal combination for reducing PPGE.

Ryan RL, King BR, Anderson DG et al (2008) Influence of and optimal insulin therapy for a low-glycemic index meal in children with type 1 diabetes receiving intensive insulin therapy. *Diabetes Care* **31**: 1485–90

DIABETES CARE

Parents want more information about long-term diabetes complications

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

1 Children with type 1 diabetes face a variety of long-term health complications. This study focused on the parents and carers of children with diabetes, and their knowledge of the long-term complications associated with the condition.

2 A total of 47 adults, representing 33 children with type 1 diabetes between the ages of 8 and 18, participated in 1 of 13 focus groups.

3 Data collected included details on how information on the long-term complications of diabetes was gained by parents or carers, and in what form or extent, and at what stage of disease or age of the patient the information was presented.

4 Most parents expressed anxiety about the extent of long-term complications for their children. All expressed a wish for a flexible, collaborative approach for conveying information on future complications.

5 Participants stated that information specific to the individual's age and duration of diabetes would be preferred.

6 Challenges listed by parents included motivating their children and long-term burnout related to diabetes care.

7 Although most participants gained information in many different ways, erroneous information was not common.

8 These data provide valuable indications on how information regarding long-term diabetes complications should be handled in future between medical professionals and family carers.

Buckloh LM, Lochrie AS, Antal H et al (2008) Diabetes complications in youth: qualitative analysis of parents' perspectives of family learning and knowledge. *Diabetes Care* **31**: 1516–20

PEDIATRIC DIABETES

Use of alternative medicine for the treatment of diabetes in children

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

1 Use of complementary or alternative medicine (CAM) is well-documented in adults with diabetes, but frequency of CAM use in children is not known. This study investigated the prevalence of CAM use, perceived efficacy of treatment and the underlying reasoning for CAM use from the parental perspective.

2 A total of 228 families completed an anonymous questionnaire regarding CAM use; 18.4% of participants used one or more CAM, with homeopathy and vitamins being the most popular treatments.

3 Although the need for insulin was not disputed, the main motivation for CAMs use was to improve well-being and to try every available option.

Dannemann K, Hecker W, Haberland H et al (2008) Use of complementary and alternative medicine in children with type 1 diabetes mellitus - prevalence, patterns of use, and costs. *Pediatric Diabetes* **9**: 228–35

PEDIATRIC DIABETES

No difference in hypoglycaemia after high-fat bedtime snack

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

1 This study evaluated the potential benefits of consumption of a high-fat snack at bedtime versus a snack containing the same amount of carbohydrate and protein but with a lower fat content, in terms of the incidence of nocturnal hypoglycaemia.

2 A total of 10 children participated in this study; using a web-based tool, participants were allocated a high- or low-fat snack for 12 separate nights; insulin dosage was determined with the usual algorithm used by the patient.

3 Overall, pre-snack glucose levels were similar in all participants; the incidence of both hypoglycaemia during the night and hyperglycaemia was similar in both snack groups.

4 This study identified no significant difference between the effect of high- or low-fat pre-bedtime snacks.

Wilson D, Chase HP, Kollman C et al (2008) Low-fat vs. high-fat bedtime snacks in children and adolescents with type 1 diabetes. *Pediatric Diabetes* **9**: 320–5

PEDIATRIC DIABETES

Low rate of remission in young children and adolescents

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

1 The authors of this study aimed to indentify whether or not different rates of remission apply in different age groups of patients with type 1 diabetes; 152 patients with newly diagnosed diabetes participated and were separated into age groups (group 1: aged <5 years; group 2: aged 5–12 years; and group 3: aged >12 years) and studied over 1 year.

2 Participants in the youngest group (group 1) and those in the oldest group (group 3) had lower rates of partial remission (26.8% and 29%, respectively) compared with children in group 2 (56%, P=0.002).

3 Thus, partial remission is lowest in young children and adolescents with diabetes. In young children, it is thought that the low rates of remission might be attributable to more aggressive beta-cell destruction.

Bowden SA, Duck MM, Hoffman RP et al (2008) Young children (<5 yr) and adolescents (>12 yr) with type 1 diabetes mellitus have low rate of partial remission: diabetic ketoacidosis is an important risk factor. *Pediatric Diabetes* **9**: 197–201

> *"The main motivation for complementary or alternative medicine use was to improve well-being and to try every available option."*