

Editorial Commentary

Bridging the Gap: Transition From Pediatric to Adult Diabetes Care

It is well known that bridging the cultures of pediatric and adult medicine is a challenge for adolescents and young adults with type 1 diabetes, their families and healthcare providers. The rate of acute complications such as diabetic ketoacidosis with excess morbidity and mortality among this population is high.

Published reports have highlighted the difficulties young adults face during this transition period. Blum (1) defines transition as “a purposeful, planned movement of a young person from child-centered to adult-oriented health care systems.” However, “transfer,” rather than transition, often occurs. Transfer is a sudden, arbitrary event whereby the patient is transferred from pediatric to adult services with referral information only. With unplanned, abrupt transfer, the onus is on the young adult to attend the next appointment in the adult care setting, and there is a high risk that the patient will abandon care altogether (2).

In 1996, Pacaud and colleagues surveyed patients in Montreal, Quebec, Canada, to determine the existence of difficulties after the transfer from pediatric to adult diabetes care (3). They found that 50% of respondents expressed either having challenges or had a delay or loss of regular follow-up during this time. Other studies (4,5) have reported that loss to follow-up rates of approximately 25% may occur in the first few years after transfer from pediatric care. Frank (5) observed that young adults who defaulted from regular follow-up tended to resurface in the medical system months or years later with a diabetes-related crisis which otherwise may have been prevented. The consequences of poor glycemic control on the acute and chronic complications of diabetes are well-documented for this age group. In Canada, from 1997 to 2000, there were 134 deaths in persons with diabetes age 20 to 29 years, a death rate >3 times higher than that for 20- to 29-year-olds who do not have diabetes (6).

In this issue of *Canadian Journal of Diabetes*, Pacaud and colleagues report a descriptive study that is a replication of their 1996 survey, this time undertaken in Calgary, Alberta, Canada (7). The authors investigated whether the problems described in Montreal would be generalizable to another city that uses a different healthcare delivery model for transfer. They confirmed the results from their earlier report: 52% of respondents expressed difficulties with transfer, had a delay of regular follow-up or were currently without routine care.

Pacaud suggests there may be specific characteristics about this population rather than the model of service delivery that account for the difficulties experienced in transfer.

She hypothesized that this may be explained by delayed psychosocial maturation displayed by a lack of self-care independence needed to navigate successfully through the adult healthcare system. Transfer from pediatric to adult diabetes care occurs at a time of many changes in school, family relationships, employment, religious and political values and personal maturity, all in the context of declining parental influence and involvement. Adolescents and young adults with type 1 diabetes face challenges that differ from those of children and older adults with this disease. Not only do they deal with the usual peer pressures to engage in such risk-taking behaviours as alcohol, tobacco and illicit drugs, they also must face the day-to-day demands of living with chronic disease: frequent blood glucose monitoring, carbohydrate counting, multiple daily doses of insulin and continuous problem solving in the management of hypoglycemia and hyperglycemia. Non-medical challenges include scheduling and attending multiple medical/educational appointments, disclosing and discussing medical needs with others (coaches, school personnel, friends) and maintaining diabetes supplies (8). Studies have shown that coping with these demands is problematic for young people. Inadequate treatment compliance, poor glycemic control, negative attitudes toward their disease and delayed social maturation into adulthood are some of the associated challenges (9).

There is an overwhelming consensus in the literature that strategies to ensure successful transfer to adult diabetes care need to be developed, although there is currently no practice that is readily agreed upon. Possible approaches include information brochures and checklists that cover the process of transition as well as diabetes knowledge, adolescent transition clinics attended by both pediatric and adult teams, a transition coordinator who would be responsible for facilitating the transition, or a shared care model where the patient alternates for a period of time between pediatric and adult systems (10). It is important to note that at the time of each survey, neither Montreal nor Calgary had a specific transition program or clinic. Several published reports have evaluated different transition programs, including 2 described by Pacaud in the present study (7). In Toronto, after the disappointing results of their 1996 study (5), a transition program targeting teens, parents and healthcare professionals was developed and implemented at the Hospital for Sick Children. Seventy-six youth (mean age: 21 years) who took part in this transition program were evaluated. The authors reported a high success rate: 93% were receiving

regular follow-up, most with an adult endocrinologist and some with a Diabetes Education Centre (11).

Studies have recently been published that used non-medical case management to encourage routine diabetes care visits to provide information and emotional support, monitor adherence and foster problem-solving skills in patients with type 1 diabetes without offering medical advice (8,12). Case managers were college graduates with no formal medical education, trained by research and medical staff. In each study, the authors concluded that use of non-medical case management was a cost-effective approach to improving outcomes in their patients. This may prove to be an important model to provide seamless transition from pediatric to adult diabetes care, especially in areas where no specialized clinic for young adults with type 1 diabetes exists. More research is required in this area.

Studies such as those published by Pacaud and colleagues (3,7) provide an important contribution to the literature by describing the difficulties that young adults face in the transfer from pediatric to adult diabetes care. The challenge now is to translate the unique needs of this vulnerable group into innovative solutions to keep them engaged in the medical system.

Norma Van Walleggem RD CDE

*Diabetes Education Resource for Children and Adolescents
Winnipeg, Manitoba, Canada*

REFERENCES

1. Blum RWM, Garell D, Hodgman CH, et al. Transition from child-centered to adult health-care systems for adolescents with chronic conditions. A position paper of the Society for Adolescent Medicine. *J Adolesc Health*. 1993;14:570-576.
2. Viner R. Transition from pediatric to adult care. Bridging the gaps or passing the buck? *Arch Dis Child*. 1999;81:271-278.
3. Pacaud D, McConnell B, Huot C, et al. Transition from pediatric care to adult care for insulin-dependent diabetes patients. *Can J Diabetes*. 1996;20(4):14-20.
4. Whittaker C. Transfer of young adults with type 1 diabetes from pediatric to adult diabetes care. *Diabetes Q*. 2004(Spring):10-14.
5. Frank M. Factors associated with non-compliance with a medical follow-up regimen after discharge from a pediatric diabetes clinic. *Can J Diabetes*. 1996;20(3):13-20.
6. Health Canada. *Responding to the Challenge of Diabetes in Canada. First Report of the National Diabetes Surveillance System*. Ottawa, ON: Ministry of Health; 2003. Publication no. H39-4/21-2003E.
7. Pacaud D, Yale JF, Stephure D, et al. Problems in transition from pediatric care to adult care for individuals with diabetes. *Can J Diabetes*. 2005;29:13-18.
8. Svoren BM, Butler D, Levine B, et al. Reducing acute adverse outcomes in youths with type 1 diabetes: a randomized controlled trial. *Pediatrics*. 2003;112:914-922.
9. Wysocki T, Hough BS, Ward KM, et al. Diabetes mellitus in the transition to adulthood: adjustment, self-care, and health status. *J Dev Behav Pediatr*. 1992;13:194-201.
10. McGill M. How do we organize smooth, effective transfer from pediatric to adult diabetes care? *Horm Res*. 2002;57(suppl 1):66-68.
11. Frank M, Perlman K, Hamilton A, et al. Evaluation of a transition from pediatric to adult diabetes care program [abstract]. *Can J Diabetes*. 2002;26(suppl 1):254. Abstract 10.
12. Sacco WP, Morrison AD, Malone JL. A brief, regular, proactive telephone "coaching" intervention for diabetes: rationale, design, description, and preliminary results. *J Diabetes Complications*. 2004;18:113-118.

Editorial Commentary

The Role of the Glycemic Index in Diabetes Management: How Practical Is It?

The pillars of diabetes self-management include self-monitoring of blood glucose (SMBG), medication adjustment of oral antihyperglycemic agents and/or insulin and lifestyle changes regarding nutrition and exercise. With respect to lifestyle, healthcare practitioners and patients alike are being bombarded by new approaches and tools at an increasing speed.

Nutrition therapy in diabetes has come a long way from the "starvation approach," used in pre-insulin days, and rigid exchange diets. Now that healthcare practitioners have a better understanding of the impact of carbohydrate on BG control, we have different approaches to incorporating this effect: constant carbohydrate keeps carbohydrate load stable at all meals, while carbohydrate counting adds flexibility to eating

and medication adjustment, particularly insulin, for variable amounts of carbohydrate consumed at different meals.

Unfortunately, carbohydrates have now been labelled the "axis of evil" in the war being waged by the latest weight loss diet fads, such as Atkins®, The Zone, South Beach Diet™ and others. These diets blame carbohydrates for promoting insulin secretion and weight gain, and recommend a low- or even no-carbohydrate diet as a way to lose weight. The sustainability of such diets is minimal at best, as exemplified by the thousands of people who have tried them but ultimately regained lost weight. Now, another concept has gained attention, the glycemic index (GI), which in essence combines many of the above nutritional therapy principles, i.e. exploring

the varying metabolic impact of carbohydrate depending on its source.

As with all novel nutritional therapies, the GI has attracted its fair share of supporters and detractors. As Marion Franz stated during her recent presentation at the 2004 Canadian Diabetes Association Professional Conference and Annual Meetings, in areas of nutritional controversy there is an onus to search out the evidence and make evidence-based recommendations, while at the same time carefully measuring outcomes in order to provide continued outcome evidence (1).

The GI was first proposed by Jenkins (2,3) to characterize the rate of carbohydrate absorption after a meal, as defined as the area under the glucose response curve after the consumption of 50 g of carbohydrate from a test food, divided by the area under the glucose response curve after the consumption of 50 g of carbohydrate from a control food (either white bread or liquid glucose). The glycemic load (GL) is another concept that may prove more useful in practice. It is defined as the weighted GI of individual foods multiplied by the percentage of dietary energy as carbohydrate (4). GL corrects for foods with different macronutrient composition based on glycemic response, e.g. a carrot has a high GI but a low GL compared with a potato.

What are some of the evidence-based outcomes utilizing GI? In this issue of *Canadian Journal of Diabetes*, Kalergis and colleagues present a very detailed review of GI, with particular emphasis on its role in diabetes management (5). The review discusses numerous studies, including original animal studies and now human, epidemiological and clinical studies, that demonstrate the benefit of a low-GI diet in improving glycemic control in people with diabetes and in decreasing the risk of developing diabetes in high-risk individuals.

GI has been studied in diabetes, cardiovascular disease (CVD) and obesity. The benefits/concerns ratios can be summarized as follows. With regard to diabetes, utilizing GI appears to decrease the risk of developing type 2 diabetes and to decrease glycosylated hemoglobin (A1C) in type 1 diabetes, although in some studies, the effect was modest and long-term effect has not yet been determined. For some individuals, GI may be easier to utilize than carbohydrate counting. On the other hand, GI may result in increased fat intake. And there still is a need to carbohydrate count for a meal, particularly when rapid-acting insulins are being used.

General benefits of the GI have been seen in decreasing CVD risk factors, e.g. lipid profiles through use of GI and in facilitating weight loss. But the concerns remain: sustainability of results, inappropriate choice of replacement foods with regard to fat content, and general calorie quality and quantity.

The American Diabetes Association still does not endorse the use of GI as a nutritional tool in the management of diabetes. To be of benefit, GI use needs to be translated into appropriate, evidence-based, long-term improvements in outcomes, including glycemic and lipid control and perhaps weight loss. The evidence to date is still not sustained enough for some.

Part of the problem in utilizing GI as a nutritional tool is its realistic application. Many other factors influence the glycemic response to food besides GI. Foremost is the fact that people eat mixed meals and not individual foods. This may be addressed by determining GL rather than GI. But other confounding factors include the physical form of the food, acidity, fibre content and cooking or processing methods.

GI does not address all aspects of glycemic control in diabetes and, if used alone, it also does not necessarily equal good nutrition. But the evidence of benefit should not be ignored; perhaps the best approach is a realistic one that utilizes the principles of the GI, but applies them in a practical way. GI can be combined with education about portion size, general food composition and the benefit of choosing whole grains and higher-fibre foods over more refined and processed foods. This should be incorporated into an educational program that also advocates well-spaced meals that distribute carbohydrate throughout the day and the need for daily physical activity. Insulin-using individuals, in particular, will further need to count carbohydrates in order to determine insulin dosage.

As Kalergis and colleagues conclude, the GI is not meant to replace existing and proven tools in the nutritional management of diabetes (5). Rather, it is another useful tool that can be utilized in either individually tailored diabetes regimens or as part of a general strategy to decrease the risk of developing diabetes, CVD or obesity in target populations. What remains is the task of gathering longer-term evidence of its benefits and, perhaps more importantly, translating the evidence in a practical sense into daily practice.

Sora Ludwig MD FRCPC

Department of Internal Medicine, University of Manitoba
Diabetes and Chronic Diseases Unit, Manitoba Health
Winnipeg, Manitoba, Canada

REFERENCES

1. Franz MJ. *Are We Ready to Use the Glycemic Index as a Guide for Dietary Success in Glycemic and Weight Management? We Are Not Yet Ready*. Quebec City, Quebec: 8th Canadian Diabetes Association Professional Conference and Annual Meetings. October 28-31, 2004.
2. Jenkins DJA, Wolever TMS, Taylor RH, et al. Glycemic index of foods: a physiological basis for carbohydrate exchange. *Am J Clin Nutr*. 1981;34:362-366.
3. Ludwig DS. The glycemic index. Physiological mechanisms relating to obesity, diabetes and cardiovascular disease. *JAMA*. 2002;287:2414-2423.
4. Willett W, Manson J, Liu S. Glycemic index, glycemic load, and risk of type 2 diabetes. *Am J Clin Nutr*. 2002;76(suppl): 274S-280S.
5. Kalergis M, De Grandpré E, Andersons C. The role of the glycemic index in the prevention and management of diabetes: A review and discussion. *Can J Diabetes*. 2005;29:27-38.