FLEXIBLE INSULIN REGIMENS FOR TEENAGE PATIENTS WITH DIABETES

AUTHORS Emma Day, BSc, RSCN, RGN, is clinical nurse specialist, diabetes home care; Sara Keay, BSc, RD, ADP, is senior dietitian; both at Birmingham Children’s Hospital NHS Foundation Trust.


This article outlines a patient education programme used to prepare teenagers for switching from a twice-daily insulin regimen to a more flexible insulin regimen. It also compares the results of using a group education approach with one-to-one training of teenagers.

The advantage of the MDI regimen are:
- The potential to reduce the patient’s body mass index;
- Having the option to give long-acting insulin at any point over 24 hours;
- Improved diabetes control;
- The option for teenagers of getting up late in the morning;

The potential to reduce the patient’s body mass index;
- Having the option to give long-acting insulin at any point over 24 hours;
- Improved diabetes control;
- The option for teenagers of getting up late in the morning;

Following the launch of long-acting insulin analogues in summer 2002 the diabetes home-care unit team was overwhelmed by the number of young people requesting that they be transferred to a multiple daily injection (MDI) regimen.

Before switching to the new regimen, all the young people were using twice-daily insulin mixtures. With these, insulin must be injected at a regular time in the morning and once again in the evening, with very little flexibility. In addition, carbohydrates must be consumed every two to two-and-a-half hours in order to avoid hypoglycaemia and achieve good blood glucose control.

The advantages of the MDI regimen are:
- The potential to reduce the patient’s body mass index;
- Having the option to give long-acting insulin at any point over 24 hours;
- Improved diabetes control;
- The option for teenagers of getting up late in the morning;

Flexible mealtimes and sizes of meals and the removal of the need to eat regular carbohydrate snacks.

To begin the education of adolescent patients wanting to commence MDI;
To assess food intake and the insulin needs of the individual;

To enable patients on MDI to estimate the carbohydrate content of particular foods and the corresponding insulin dose;
To encourage peer-group support and to answer any questions that arose.

Before the meeting, young people completed a three-day food diary with help from parents. The amount of carbohydrate in the food was assessed and a fixed insulin dose suggested, using the equation of one unit of insulin for every 10g carbohydrate as a baseline to calculate dosage. This remains unchanged for the first 5–7 days.

Dose calculation

When the long-acting insulin analogue glargine was first introduced into everyday practice we developed a protocol for calculating the necessary dosage.

Glargine is a ‘peakless’ insulin and its action lasts between 22 and 24 hours. It is given once a day, usually in the evening, and the patient can choose the time. However, it must be given at the same time each day.

Our team decided to use a protocol specifying that half of the total daily dose be given as basal insulin (reduced by either 10% if HbA1c is greater than 8.5% or by 20% if HbA1c is less than 8.5%). The remaining proportion of the dose is given as a rapid-acting insulin analogue, usually aspart (NovoRapid) or lispro (Humalog), split over three doses and given with food.

For the full version of this paper including the background and implementation of the project and full references, log on to nursingtimes.net, click NT Clinical and Archive and then Clinical Extra.
Module one
During module one of the programme several procedures took place:
- The insulin and pen supplied by the GP were checked by nursing staff;
- The different actions of twice-daily insulin and MDI insulin were discussed using insulin profile charts;
- The timing and a single site for glargine injection were chosen;
- The young people injected their first dose of glargine with the support of the nurse;
- The patients gave themselves (with nurse supervision) a mealtime (fixed) dose of bolus insulin with a packed meal brought from home. The dietitian took this opportunity to discuss the carbohydrate content of this meal.
- Before going home the young people were instructed:
  - To start looking at carbohydrate labelling on food packets;
  - To weigh carbohydrate-containing foods (for example cereals, potatoes, rice and pasta) to assess their own typical portion size and hence carbohydrate intake when eating these foods;
  - That any food containing carbohydrate will require them to inject insulin. Initially it was thought that small snacks containing 10g carbohydrate or less did not require an injection of insulin but current practice is to inject for any carbohydrate food, however small;
  - That healthy eating is important to achieve an appropriate BMI;
  - That three or four blood glucose tests are required both before and after eating. This is to help assess whether the dose of insulin is correct;
- To self-adjust the glargine dose by increasing it by two units each day until morning/fasting blood glucose levels are less than 7mmol/l;
- To call the team 7–10 days after starting the new regimen to review their blood glucose results. These instructions and details of initial insulin doses were also given in a written format. A programme for teaching parents was designed to run alongside the young people’s programme. Parental influence and support should not be underestimated in promoting good blood glucose control in this age group (Silverstein et al, 2005).

Module two
The objective of this module was to teach young people more about carbohydrate counting. A large part of the module was dedicated to:
- Assessing carbohydrate in food;
- Visualising the difference in appearance between cooked and uncooked foods that are high in carbohydrate, in order to appreciate volume differences in portion sizes after cooking;
- Looking at hidden sources of carbohydrate in foods, for example in sausages and beefburgers;
- Managing eating outside the home;
- Sports management;
- Illness management;
- Alcohol management;
- Basic maths.
- This module was largely made up of practical sessions. A quiz was used with questions on the carbohydrate content of specific foods and prepared meals.
- At the end of the group session the young people were taken out to eat and given a chance to put into practice their new carbohydrate-estimating knowledge. A buffet was also arranged for the teenagers to share. Both experiences proved invaluable in giving them confidence in different situations. The confidence to assess accurately and then calculate the correct amount of bolus insulin for this meal was only achieved by pre- and post-meal blood glucose checks and expert support in calculating the doses of insulin required.
- Regular telephone contact and visits to the clinic were maintained after the completion of this module.

CONCLUSION
Of 62 patients, 42 were taught about MDI on a one-to-one basis and the remaining 20 were taught in groups. The BMI results take into account that many of the young people were still growing and should continue to gain weight during this time. One patient lost 8.3kg while maintaining an HbA1c of 7.5%. Others also achieved significant weight loss while improving HbA1c levels.
- Our findings show that there is a reduction in HbA1c and BMI when patients are changed to MDI. There was a greater reduction in BMI among those young people who attended the group training sessions compared with those who attended one-to-one training sessions.
- There is insufficient data to be able to speculate on the reason for the improved results for those attending the group training sessions, and the self-selecting nature of the groups is a limiting factor in drawing conclusions. However, one of the key differences between the training given to the groups was the meal out.

REFERENCES
