Successful Use of a Sucrose-Containing Enteral Formula in Diabetic Nursing Home Elderly

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The prevalence of diabetes among the elderly is high (1), and many elderly diabetic patients require formula feeding for nutritional support. Traditionally, sucrose-containing formulas are seldom administered to diabetic patients, since it is assumed that the high content of simple sugars will lead to a rapid elevation in blood glucose levels. However, sucrose actually has a moderate glycemic index (2), and there is no evidence that carbohydrate from sugars is more rapidly absorbed than from starch (3). Also, a high-sucrose diet did not adversely affect glycemia in subjects with type 2 diabetes (4). Finally, the position statement of the American Diabetes Association in 2002 (5) states that the intake of sucrose-containing foods by diabetic individuals need not be restricted.

The prevalence of diabetes among residents of long-term care institutions is ~18% (6), and patients may require prolonged formula feeding. The use of high-fat, low-carbohydrate commercial formulas for diabetic patients is controversial (7), and their usefulness in prolonged nutritional support may be limited.

The purpose of our study was to examine the effect of a sucrose-containing high-calorie, high-protein, in-house formula on the nutritional state and glycemic control of elderly diabetic patients in a long-term care institution.

RESEARCH DESIGN AND METHODS — We performed a prospective observational study assessing the nutritional outcome and glycemic control of elderly patients with type 2 diabetes receiving long-term (up to 6 years) sucrose-containing formula feeding as the sole source of nutrition, as compared with nondiabetic subjects. Of 143 patients, 34 (24%) were determined to have a diagnosis of type 2 diabetes based on a fasting blood glucose >120 mg/dl or two 2-h postprandial blood glucose values >200 mg/dl. Weight (monthly), blood glucose (irregular), and serum albumin (irregular) were recorded.

This study is a continuation of a previous study (8) that showed an increase in weight and the maintenance of protein status of frail elderly using an in-house low-cost formula with vitamin and mineral supplementation. The formula provides 1,360 kcal, 56 g protein, and 12 g fiber/l, with 48% kcal derived from carbohydrate (36% total kcal from sucrose), 16% from protein, and 36% from fat (40% from monounsaturated fatty acids). The formula has a calculated glycemic index of 50, based on the international tables of glycemic index (9).

The statistical analysis utilized the SPSS for Windows software (SPSS, Chicago, IL).

RESULTS — The 34 patients with type 2 diabetes did not differ from the total study group with regard to age and baseline diagnoses (other than diabetes) (Table 1). There were more women in the diabetic group than in the nondiabetic group (77 vs. 56%, \( P = 0.04 \)), and the mean duration of feeding was shorter (8.5 compared with 11.6 months). Neither mortality (50 vs. 53% at 1 year) nor mean weight change per month (0.63 vs. 0.45 kg) differed significantly. A total of 5 patients were treated with insulin and 12 with oral agents at stable doses. A further 17 were managed by diet alone, and of these, 2 (12%) subsequently required oral hypoglycemic agents at a low dose.

Although serum glucose increased significantly in the diabetic patients (mean change per month being 2.69 vs. 0.26 mg/dl in the total group; \( P = 0.001 \)), this was not sufficient to have an adverse effect on the level of glycemic control of these patients. This is indicated by a mean value for HbA1c (A1C) of 5.6% (51 tests in 16 diabetic patients) within the acceptable range of 4.3 to 5.8 for nondiabetic patients. Also, in patients with at least two measurements of A1C (38 tests in six patients), the mean (±SD) difference between the last and first measurement was 0.53 ± 1.34 (NS). Mean 2-h postprandial serum glucose following the ingestion of a 250-mL bolus of the formula was 142 mg/dl (59 tests in eight diabetic patients), which is well within the normal range of <200 mg/dl.

CONCLUSIONS — We found that it is acceptable to use a sucrose-containing enteral formula for the nutritional support of elderly nursing home diabetic patients. The patients, who were fed solely by this formula, increased their weight and maintained their protein status (8). Also, their glycemic control remained reasonable for the duration of the study. The value of the A1C did not increase significantly, but the small number of patients involved in the analysis limits the generalizability of our findings, and thus further study of this measure is indicated.

The formula used in our study may have several advantages over existing commercial diabetes formulas when used in long-term care of diabetic patients. Our formula provides higher amounts of calories and protein than the standard com-
commercial formulas used in diabetes such as Glucerna (Abbott Laboratories, Abbott Park, IL) (1,360 vs. 1,000 calories/l; protein 56 vs. 42 g/l). Commercial diabetic formulas tend to have a high fat content. Our formula has less fat than the commercial diabetic formulas (36 vs. 42 g/l). Commercial formulas used in diabetes such as Glucerna (Abbott Laboratories, Abbott Park, IL) (1,360 vs. 1,000 calories/l; protein 56 vs. 42 g/l). Commercial diabetic formulas tend to have a high fat content. Our formula has less fat than the commercial diabetic formulas (36 vs. 42 g/l). Commercial formulas used in diabetes such as Glucerna (Abbott Laboratories, Abbott Park, IL) (1,360 vs. 1,000 calories/l; protein 56 vs. 42 g/l). Commercial diabetic formulas tend to have a high fat content. Our formula has less fat than the commercial diabetic formulas (36 vs. 42 g/l). 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