


Meal replacements: An educational tool for weight reduction in patients with diabetes in rural areas

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Richard J Santen, Emeritus Professor of Medicine at the University of Virginia, discusses how meal replacements can aid successful weight loss for individuals with diabetes living in rural, underserved communities

The incidence and prevalence of type 2 diabetes mellitus is increasing worldwide in parallel with that of obesity. Poorly controlled patients with diabetes mellitus can benefit from a consultation with an endocrinologist. However, patients living in rural, financially challenged, underserved areas in the US do not have access to endocrinologists to help manage their diabetes. This lack of specialists has resulted primarily from a marked workforce gap, particularly in underserved rural areas. A program developed by the author of this manuscript utilized telemedicine to evaluate and manage patients with diabetes attending rural, Federally Qualified Community Health Centers in the US. The rationale was to teach patients about diet, exercise, and medication management. The program has been successful in that hemoglobin A1c levels decreased from $10.3 \pm 1.94\%$ to $7.78 \pm 1.5\%$ in 139 patients completing the program. As evidence of the success of the self-management component, when patients were discharged from the program but followed for the next six to 18 months, the average hemoglobin A1c remained stable. However, the major failure of the study was that body weight did not change significantly. Recent guidelines strongly suggest that control of patients with type 2 diabetes requires a reduction in body weight and consider this equally important as glucose control.

Enhancing weight reduction in patients with diabetes in rural areas

The patients living in rural areas are generally poorly educated concerning diet and choose calorically dense food because of its lower cost. These issues underlie the difficulty in weight reduction.

Rationale for study: We reasoned that six months on meal replacements might be an excellent educational tool to teach patients about the value of caloric restriction on glucose control and weight reduction.

Protocol: We selected the Nutrisystem D diabetes meal replacements, which were supplied to the patients free of charge. These consisted of an average of 1450 to 1550 cal/day for men and 1200 to 1250 cal/day for women. The plan included breakfast, lunch, and dinner, and two snacks for men and one for women. These diets consisted of 45-55% carbohydrate, 20-30% protein, and less than 30% fat as calories. Both frozen and fresh meals were mailed to the patients monthly. We called the patients once per week to review their glucose measurements and weight changes.

Results: Eleven patients completed the first three months and seven the entire six months. The patients were relatively compliant with the diet as indicated by a 1-10 scoring system. The average level of compliance was 8.25 (range 7.66 to 8.85). Statistically significant weight loss was achieved. In the 11 patients evaluated at three months, body weights dropped 7.1% from 271±15 pounds to 252±11 pounds (SEM) (P equals 0.002). This weight loss persisted in the seven patients completing the study who weighed 245±20 pounds at the six-month follow-up. Insulin doses dropped substantially from 221±41 units at baseline to 129±23 (SEM) units daily (P equals 0.004 at three months) and persisted at six months.

Over the first three months, the hemoglobin A1c levels decreased from 9.85±0.33% to 7.93±0.31% (SEM) (P equals 0.004). In those completing the entire six months, the levels dropped from 9.60±0.49% at baseline to 7.77±0.47% (SEM) (P equals 0.004). As detected by Dexcom, hypoglycemia occurred in no patients over three months, and low values occurred in only one patient in 0.1% of measurements. Lipid levels did not change significantly when comparing baseline with six months.

Discussion: Patients in rural, financially challenged, underserved areas generally find it difficult to diet and have a deficient understanding of calorie counting and the detrimental value of high-density calorie food. They commonly eat out and carry home fast food. With routine diet instruction, we could not demonstrate significant weight loss in the 139 patients in our first study. This led to a review of the literature in which several studies have shown the value of meal replacements for weight loss and for patients with diabetes. We reasoned that our patients would not stay on meal replacements long-term. However, this would be an ideal educational tool to demonstrate to them the value of caloric reduction to reduce hemoglobin A1c levels and insulin levels. The Nutrisystem diabetes meals are designed to be quite simple to utilize. Notably, my wife and I found them delicious and easy to choose from a menu supplied by the company.

A recent debate at the Endocrine Society of the United States discussed whether it is more important to control blood sugar in patients with type 2 diabetes or to reduce body weight.

The conclusion was that both are pretty important, but reducing body weight should be a significant emphasis of treatment. With this as a background, considering meal replacements as a temporary measure for patients who cannot lose weight is reasonable.

What are the complementary medications to use with meal replacements?

Recent guidelines by the American Association of Clinical Endocrinology (AACE) emphasize using GLP-1 agonists to reduce appetite and decrease body weight effectively. In the US, these medications are expensive and not always available to patients living in these rural, underserved areas. In the future, we anticipate that the cost of these medications will decrease as the volume of use increases. This should benefit patients with type 2 diabetes living in these financially challenged areas. The SGLT2 inhibitors are also associated with some degree of weight loss and can be helpful.

A limitation of this and other studies has been demonstrating the long-term benefit of a temporary period of meal replacements followed by observation over time with regular meals. Further studies will be necessary to demonstrate this long-term effect. Notably, our previous studies found that hemoglobin A1c levels remained stable six to 18 months after cessation of the self-management program.

Consideration of meal replacements is reasonable in rural, financially challenged, underserved patients. These can serve as an important educational tool regarding diet and demonstrate directly to the patients that these approaches reduce hemoglobin A1c levels and insulin requirements.

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