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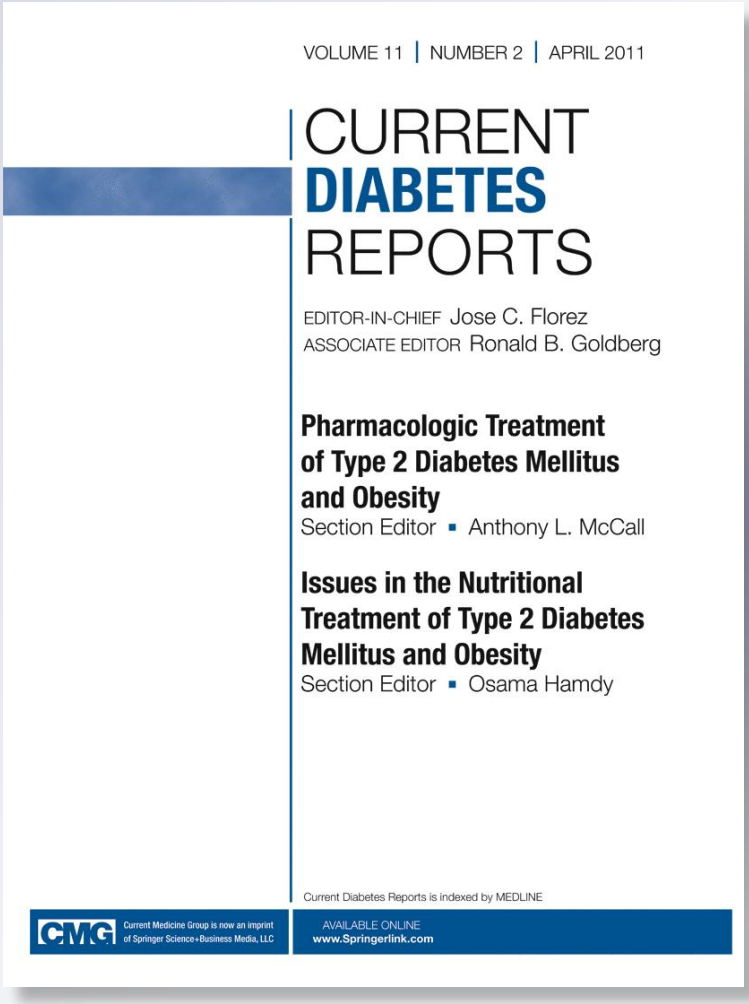

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INVITED COMMENTARY

Nonsurgical Diabetes Weight Management: Be Prepared for Sustainable and Practical Interventions

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Weight reduction through lifestyle modifications remains the cornerstone in preventing and managing type 2 diabetes among overweight and obese individuals [1, 2]. For a long time, physicians have been skeptical about the long-term maintenance of weight reduction—claiming that nonsurgical weight reduction is always temporary and is frequently followed by gradual weight regain to the starting baseline. Over the last 2 years, this view has been gradually changing. Recent clinical trials and novel clinical practice models showed that long-term maintenance of weight loss is not only possible but is also associated with significant long-term improvement in many of the metabolic and vascular abnormities seen in patients with type 2 diabetes. The long-awaited Look AHEAD (Action for Health in Diabetes) trial was the first to light the way. Recently, the still ongoing study published its 4-year follow-up results, which showed that the average weight loss across 4 years among participants in the intensive lifestyle intervention (ILI) arm of the study had been significantly higher than that observed in the control arm of diabetes support and education (−6.15% vs −0.88%; $P<0.001$) [3]. Not only did participants in the ILI arm lose more weight, but their fitness significantly improved and their hemoglobin A_{1c} (HbA_{1c}) remained significantly lower after 4 years (−0.36% vs −0.09%; $P<0.001$). This weight reduction was also associated with significant improvement in blood pressure, high-density lipoprotein (HDL) cholesterol, and triglycerides. The study is the first to show, in a large cohort, that ILI can produce sustained weight loss. We eagerly wait for the final results of this important study to know if this sustained improvement in body weight and cardiovascular risk factors will translate into reduction in cardiovascular events.

Another important trial was recently published by Foster et al. [4] that compared 2 years of lifestyle modification in association with either a low-carbohydrate or a low-fat diet. The study showed a weight loss of approximately 11 kg (11%) at 1 year and 7 kg (7%) at 2 years with no major difference between the two methods except in HDL cholesterol, which was significantly higher in the low-carbohydrate group. The study concluded that successful long-term weight loss can be achieved with either a low-fat or low-carbohydrate diet when coupled with behavioral treatment, and that low-carbohydrate diet is associated with favorable changes in cardiovascular disease risk factors at 2 years.

Another recent trial by Larsen et al. [5] confirmed that the diet that is high in protein content and lower is glycemic index was the best in achieving a long-term weight maintenance and adherence after initial weight loss. The study, which was recently published in the *New England of Medicine*, enrolled 773 overweight adults from eight European countries who had lost at least 8% of their initial body weight with low-calorie diet then were randomly assigned, in a two-by-two factorial design, to one of five ad libitum diets to prevent weight regain over a 26-week period: a low-protein and low-glycemic-index diet, a low-protein and high-glycemic-index diet, a high-protein and low-glycemic-index diet, a high-protein and high-glycemic-index diet, or a control diet. The study found that only the low-protein–high-glycemic-index diet was associated with subsequent significant weight regain. The study concluded

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that a modest increase in protein content and a modest reduction in the glycemic index led to maintenance of weight loss and less drop out.

Over the past 5 years, the introduction of several diabetes medications that induce satiety and reduce food intake (eg, glucagon-like peptide 1 analogues and amylin analogues) together with several weight-neutral medications (eg, dipeptidyl peptidase-4 inhibitors and metformin) gave clinicians several additional tools that allow them to help their patients in achieving better diabetes control without compromising their body weight that used to occur with the traditional use of sulfonylureas, thiazolidinediones, and insulin. Use of these medications in proper combinations can help patients with type 2 diabetes not only to lose weight but also to maintain the weight loss [6]. In addition, several meal replacements are currently available for patients with diabetes that allows them to easily structure their meal and jump start their weight loss pathway [7].

In clinical practice we applied all these recent advances into a diabetes weight management program. The Why WAIT (Weight Achievement and Intensive Treatment) program is a 12-week multidisciplinary program for weight control and intensive diabetes management specifically designed for application in routine diabetes practice [8]. The program, which is generally covered by insurance, is followed by continuous support aimed at long-term maintenance of weight loss and diabetes control. The program included the use of low carbohydrates (~40%), lower-glycemic index, higher protein (20%–30%), and high fiber dietary intervention together with meal replacement and frequent adjustment of diabetes medications to enhance weight reduction and prevent hypoglycemia. After 12 weeks, participants in the Why WAIT programs were able to reduce their initial weight by an average of 24.6± 1.2 lb (−10.3%; $P<0.001$), and their waist by 3.6± 0.24 inches ($P<0.001$). Most of the achieved weight reduction was maintained for an additional 3 years (−7.6% of initial weight). This model of intervention was effective in improving key metabolic abnormalities observed in diabetic patients including HbA_{1c}, lipid profile, blood pressure, and microalbuminuria. Eighty-two percent of participants achieved the target HbA_{1c} of less than 7% on less diabetes medications. Saving on diabetes medications was on average $561 per year with a projected 27% saving on total health care cost and 44% on diabetes-related cost in 1 year. Future dissemination of this intervention model in routine clinical practice may require wider endorsement by third-party payers and support of governmental health care agencies to halt the progression of the epidemic of obesity and diabetes in the United States. Currently, we are comparing the Why WAIT program versus bariatric surgeries (laparoscopic adjustable gastric banding and gastric bypass surgery). The results of this trial are expected in 2 years.

In conclusion, multidisciplinary weight management approaches are emerging as viable and potentially cost-effective solutions to overweight and obesity management in type 2 diabetes. Applying weight loss as a type 2 diabetes treatment can delay or reduce the need for medications, reduce cardiovascular risk, and improve quality of life. When resources are limited, important aspects of weight management can still be implemented (eg, diabetes medications can be adjusted to enhance weight reduction, glycemic index and carbohydrate load and can be lowered (to ~40%), soluble fiber and protein intake can be modestly increased (to ~20%–30%), meal replacement can be used, and patients can be referred to community-based behavior modification support groups).

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