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Bariatric Surgery versus Intensive Medical Weight Management for Type 2 Diabetes

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Keywords

• Diabetes • Obesity • Bariatric surgery • Metabolic surgery
• Medical weight management

Key points

- Medical weight management (MWM) trials in obese patients with type 2 diabetes mellitus (T2DM) show that weight loss is modest, is infrequently sustained beyond 1 year, and leads to limited improvement in glycemic control, with hemoglobin A_{1c} (HbA_{1c}) rarely dropping below 7%.
- Surgery leads to significant weight loss and better glycemic control and T2DM remission rates compared with MWM.
- Bariatric surgery can improve insulin resistance by mechanisms independent of weight loss, including altering the gastrointestinal hormonal milieu (enhanced glucagon-like peptide-1 [GLP-1] and decreased ghrelin levels).
- For patients with T2DM who are eligible for bariatric surgery, surgery is the ideal treatment.

INTRODUCTION

T2DM is a chronic and debilitating metabolic disorder associated with significant long-term morbidity including heart disease, stroke, blindness, renal failure, and lower extremity amputation. According to the 2014 National Diabetes Statistics Report, 29.1 million people, or 9.3% of the US population,

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have diabetes [1]. The vast majority of these patients have T2DM. Hispanic Americans and non-Hispanic African Americans are disproportionately affected by diabetes and diabetes-related complications [1].

Nearly 2 million new cases of diabetes are diagnosed in US adults each year. The incidence is likely to increase, because nearly 86 million Americans aged 20 years or older met criteria for prediabetes in 2012 [1]. This increase has closely paralleled the obesity epidemic. Obesity is associated with multiple medical comorbidities, including T2DM, heart disease, sleep apnea, stroke, gallbladder disease, liver disease, cancer, musculoskeletal disease, and infertility. Between 1988 and 2008, the prevalence of obesity increased in adults at all income and education levels [2]. At present, more than one-third of adults and 17% of youth in the United States are obese [3].

The connection between obesity and diabetes has been well established. Among all patients with T2DM, 46% have a body mass index (BMI; calculated as the weight in kilograms divided by the height in meters square) of at least 30 [4]. Obesity is a central feature in the pathophysiologic development of diabetes, because visceral adiposity induces insulin resistance, hyperinsulinemia, and glucose intolerance, leading to significant metabolic complications. The risk of developing diabetes increases dramatically as the degree of obesity increases [4].

Intensive weight management, including diet, behavioral therapies, exercise, and pharmacologic agents, has been the cornerstone of T2DM treatment; however, management has been evolving, especially in obese patients, as multiple studies have demonstrated that surgical treatment of obesity may result in remission of T2DM. Evidence exists that bariatric procedures can improve insulin resistance independent of weight loss, by altering the gastrointestinal hormonal milieu. This article reviews the current literature regarding medical and surgical treatment of T2DM.

DIAGNOSIS AND TREATMENT OF TYPE 2 DIABETES MELLITUS

Diagnosis is based on either of the following [5]:

1. Plasma glucose levels
   a. Fasting plasma glucose (FPG) level of 126 mg/dL or more
   b. Two-hour plasma glucose value of 200 mg/dL or more after a 75-g oral glucose tolerance test
2. HbA_{1c} value of 6.5% or more

Treatment has traditionally consisted of diet and exercise, as well as tight glycemic control. The pharmacologic agents used to achieve glycemic control are usually oral and/or injectable medications, including

- Metformin and thiazolidinediones: these target insulin resistance
- Sulfonylureas and thiazolidinediones: these target β-cell function
- GLP-1 agonists: incretin hormones
- Insulin