Bariatric Surgery — From Treatment of Disease to Prevention?

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Bariatric surgery to treat morbid obesity has improved dramatically over the past 60 years — especially over the past several decades. Today’s methods are far safer than the hazardous intestinal bypass procedures that were introduced in the 1950s. Bariatric-surgery techniques have progressed through various iterations of horizontal and vertical stapling of the stomach with or without banding (e.g., vertical banded gastroplasty) to vertical gastric partitioning or creation of a gastric pouch with proximal bypass into a jejunal loop (i.e., the gastric bypass), which is considered to be a reference standard. Currently, inflatable bands that can be placed laparoscopically are an accepted method by which to restrict the size of a patient’s stomach and restrict oral intake. Partial gastric resection with distal diversion of biliopancreatic secretions relative to the orally ingested nutrients (e.g., the biliopancreatic diversion procedure) has also been proved to be efficacious. There is now good evidence that operations such as Roux-en-Y gastric bypass, laparoscopic gastric banding, and biliopancreatic diversion are associated with low mortality and with rates of complications that are similar to those with other major surgical procedures.1

In each instance, the original goals of these operative procedures were to facilitate weight loss and, thereby, to improve the health of the patients. Bariatric surgery was recommended for patients who did not lose an adequate amount of weight with lifestyle changes or pharmacotherapy and who met the National Institutes of Health (NIH) consensus criteria for candidacy, which was a body-mass index (BMI, the weight in kilograms divided by the square of the height in meters) of at least 40.2,3 Patients who had a BMI of at least 35 and serious coexisting medical conditions could also be considered for bariatric surgery. These criteria were established in recognition of the relationship between obesity and the risk of coronary artery disease, type 2 diabetes, and sleep apnea, among other risks.

In the two decades since the publication of these NIH consensus criteria, the results from an ever-increasing number of clinical trials indicate that bariatric surgery can result in durable weight loss in many patients and may also ameliorate obesity-associated coexisting conditions. These observations, and especially the finding of a dramatic effect of bariatric surgery on glycemic control in patients with type 2 diabetes — such that the need for medical therapy was decreased or eliminated in many patients — has garnered significant attention. For example, Sjöström and colleagues, in the Swedish Obese Subjects (SOS) study, provided evidence that many patients who underwent bariatric surgery could have prolonged improvement in blood-sugar control in addition to a lower risk of cardiovascular complications.4 Two randomized, controlled trials published in the Journal in 2012 provided additional strong evidence that bariatric surgery could be more effective than either standard or intensive medical treatment.5,6 The findings of these studies led to speculation about whether surgery might be considered earlier in the course of disease in patients with adult-onset diabetes.7

In this issue of the Journal, Carlsson and colleagues describe the long-term effects of bariatric surgery on the prevention of type 2 diabetes in obese patients.8 In this nonrandomized, but case-matched, prospective study, which was initiated

An interactive illustration of four current bariatric surgical procedures is available at NEJM.org
in 1987, the participants were followed for up to 15 years. Type 2 diabetes was significantly less likely to develop in participants who underwent a bariatric procedure that was current in that era (banding, vertical banded gastroplasty, or gastric bypass) than in controls. Two additional observations are also worth highlighting: baseline BMI did not appear to influence the effect of bariatric surgery, and the various surgical procedures that were performed appeared to be equally effective, although the study was not statistically powered to detect differences among the procedures.

The long-term findings of the SOS study are both provocative and exciting — especially the findings that suggest that bariatric surgery may prevent the conversion of abnormalities in glucose metabolism to frank diabetes. However, it remains impractical and unjustified to contemplate the performance of bariatric surgery in the millions of eligible obese adults. And to be certain, the authors do not suggest such an approach. Rather, the current study should provide an impetus to develop a more complete understanding of the mechanisms by which the various bariatric procedures exert their beneficial effects. Such understanding will be important because it will enable the identification of the persons who are the most appropriate candidates for surgery. The cause of type 2 diabetes is multifactorial, and this long-term study shows that surgery did not prevent the development of diabetes in all patients. Furthermore, it is possible that interventions that are even less invasive may accomplish the very desirable goal of decreasing the incidence of type 2 diabetes and its attendant complications.

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Minimizing Unnecessary Surgery for Thyroid Nodules
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Thyroid follicles remodel continuously, responding to stimuli such as thyrotropin, growth factors, cytokines, and iodine. Nodules develop when these growth signals drive hyperplasia or when a follicular cell acquires a genetic mutation that confers autonomous growth. Thyroid nodules are commonly seen in clinical practice. With the use of ultrasonography, nodules can be detected in at least 25 to 50% of adults and are more common in women and with increasing age.

When a patient presents with a thyroid nodule, the primary concern is whether it is benign or malignant. Findings on fine-needle aspiration, ideally performed with ultrasonographic guidance, are the mainstay of clinical decision making.1 When the diagnosis is in doubt, most physicians and patients opt for hemithyroidectomy or total thyroidectomy, hedging against the risk of a potential cancer and allowing a thorough pathological examination.

The quest for better diagnostic tests for patients with thyroid nodules has been a long but successful journey. In addition to fine-needle aspiration, valuable tests have included radionuclide scanning with iodine-123 or technetium-99m, ultrasonography, and positron-emission tomography. In recent years, genetic abnormalities associated with thyroid cancer have offered promise as a more definitive means of distinguishing benign and malignant lesions.2 Unfortunately, most thyroid nodules do not contain one of these high-risk mutations, necessitating lobectomy or thy-