OBSERVATIONS

Bariatric Surgery Does Not Exacerbate and May Be Beneficial for the Microvascular Complications of Type 2 Diabetes

The effects of bariatric surgery on microvascular complications remain underexplored despite more than 40 years of surgery on patients with type 2 diabetes. The literature has focused predominantly on glycemic control and very little on diabetes-related complications, which confer high rates of morbidity and mortality. Our aim was to assess whether the gastric bypass, sleeve gastrectomy, and gastric banding procedures are safe for the retinal and renal complications of type 2 diabetes, especially as they lead to rapid improvements in glycemia, which may paradoxically cause or exacerbate microvascular complications.

Prospectively collected retinal photographs (two-field) and urine albumin creatinine ratios (ACRs) were analyzed retrospectively in 84 consecutive patients with type 2 diabetes before and 12–18 months after surgery. The results were confirmed by an independent ophthalmologist who was blinded to clinical information. Improvement or deterioration was defined as a decrease or increase of at least two grading steps, respectively. Each patient was assigned a numerical retinopathy score based on retinal disease severity to allow noncategorical statistical analysis (1). Metformin and/or long-acting insulin analogs were used for glycemic control after gastric bypass or sleeve gastrectomy, and gastric banding patients had preoperative glucose-lowering medication doses adjusted. Antihypertensives and lipid-lowering medications were continued if tolerated.

Data are expressed as mean ± SEM, median (interquartile range), or percentage. Eighty-four patients (67% female) 50.2 ± 1.1 years of age with BMI = 47.5 ± 0.8 kg/m^2 were studied. There were 59 gastric bypass patients (70.2%), 19 sleeve gastrectomy (22.6%), and 6 gastric banding (7.1%). Of the 67 patients with complete retinal data, 5 (7.5%) had an improvement in retinal disease, 1 (1.5%) had deterioration, and 61 (91.0%) had no change. In the subgroup of 28 patients with diabetic retinopathy preoperatively, 5 (17.8%) improved, 1 (3.6%) deteriorated, 22 (78.6%) had no change, and no one normalized after bariatric surgery. In the subgroup with preoperative disease, mean retinopathy scores decreased significantly from 4.7 ± 0.6 to 3.3 ± 0.5 (P = 0.004). Thirty-two patients (42.7%) had preoperative albuminuria, and their ACRs improved from 7.6 (4.7–24.5) to 2.2 (1.0–17.3) mg/mmol ($P < 0.001$). The total coefficient of variation for ACR was 30.2%. These changes did not correlate with reductions in weight, glycemia, or blood pressure. The stabilization and improvements in microvascular complications were observed in the context of a reduction in medication usage in all three groups.

Bariatric surgery does not exacerbate and may also be beneficial for the retinal and renal complications of type 2 diabetes. Considering that diabetes-related complications progressively deteriorate over time (2), the effects of surgery to halt and in some cases reverse retinopathy were encouraging. Improvement of retinopathy is rarely encountered, and the rates of deterioration observed after surgery, albeit in a small number of patients, did not exceed the rates reported in the literature (3). Our results should be confirmed in larger, randomized, controlled clinical trials. Further elucidation of the physiological mechanisms at play, such as reductions in systemic or local inflammation (4) and direct effects of gut hormones (5), could eventually lead to the development of more effective and safe pharmacotherapy for both type 2 diabetes and obesity.

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