

Bariatric Surgery Offers Hope as a Treatment for Some People with Type 2 Diabetes

Several years ago, when Karen Voll learned that she had been accepted as a participant in the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)-funded Triabetes research study and would receive bariatric surgery, she was ecstatic. “That was the happiest day,” she laughs, “I can still remember that day!” The Triabetes clinical trial aims to understand the health benefits and risks of bariatric surgery in people who have mild or moderate obesity along with type 2 diabetes that has been particularly difficult to control by other means. Soon after an evaluation showed that it could be an appropriate treatment option for Karen, she underwent Roux-en-Y gastric bypass surgery, and the health improvements that she experienced were immediate and dramatic. Her previously uncontrolled type 2 diabetes was completely reversed, even without any medications.

A Difficult Diagnosis

The relief and hope that Karen felt when she first joined the Triabetes study were so strong because she was no stranger to type 2 diabetes and its health consequences. Several members of her family are either living with the disease, or have succumbed to its complications. That’s why, in

2005, when she was diagnosed with the disease in her late forties, she had a clear idea of what this difficult news meant. Following her diagnosis, she began taking the type 2 diabetes medication metformin and tried unsuccessfully to lose weight, as she was mildly obese. Despite her best efforts to control her blood (glucose) sugar levels, her health deteriorated. “I just felt sick all the time,” she remembers, “some days I didn’t even feel like crawling out of bed.” This was a challenging time, considering Karen worked a full-time job in addition to helping with her husband’s electrical contractor business. As she describes it, she “constantly just didn’t feel right at all. Just felt off.”

Over the years following her diagnosis, Karen’s health continued to decline. During that time, she remembered witnessing the progressive deterioration in health of her mother-in-law and her own father, both of whom died as a result of type 2 diabetes. It “just scared me to death,” Karen recalls. These memories filled her with a determination to find a way to manage her diabetes.

Karen knew about bariatric surgery as a weight-loss treatment; her husband, who had more severe obesity and also suffered from type 2 diabetes, had bariatric surgery 10 years earlier. However,

PATIENT PROFILE

her BMI (body mass index, a measure of weight relative to height) was in a range that is considered mildly obese. By contrast, guidelines generally recommend bariatric surgery only for patients with higher levels of obesity, and particularly for patients with severe obesity. Through her own research on the Internet, she learned of a study, called “The Triabetes Study: A Trial to Compare Surgical and Medical Treatments for Type 2 Diabetes,”

that was being conducted in nearby Pittsburgh, Pennsylvania, by a group led by Dr. Anita Courcoulas, a bariatric surgeon. The Triabetes study was enrolling participants

with BMIs in the range of mild obesity whose type 2 diabetes was particularly difficult to control. Karen felt she might be a good candidate, so she contacted Dr. Courcoulas' office to see if she was eligible to participate in the clinical trial. After consultations with staff associated with the research study (including a dietician, psychologist, and physician), she learned the great news that she was a good fit.

Roux-en-Y Gastric Bypass Surgery and the Triabetes Study

Previous research had shown that, in people with severe obesity (a BMI of 40 or higher), bariatric

surgical procedures can have dramatic benefits, such as significant and sustained weight loss, improved control of blood sugar levels, and even reversal (remission) of type 2 diabetes. However, there has been little scientific evidence to define the risks and benefits of bariatric surgery for people with lower levels of obesity, and particularly for people with mild obesity, who suffer from uncontrolled type 2 diabetes. (For a

woman of average height, about 5 feet 4 inches tall, a BMI of 30, or mild obesity, would correspond to a body weight of 175 pounds; and a BMI of 40, severe obesity, would correspond

to a weight of 233 pounds.) Among individuals with severe obesity who experience remission of their type 2 diabetes after bariatric surgery, some find that their diabetes subsequently recurs. However, the longer-term health effects of bariatric surgery have not been well studied, and for people with milder levels of obesity, there was limited data even on shorter-term outcomes.

To begin addressing the important question of the effects of bariatric surgery in people with type 2 diabetes and lower levels of obesity, like Karen, the Triabetes clinical trial compared two different bariatric surgery procedures—Roux-en-Y gastric bypass (RYGB) and laparoscopic

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PATIENT PROFILE

adjustable gastric band (LAGB)—with an intensive lifestyle weight loss intervention. The goal was to determine each intervention’s relative effectiveness at reducing weight and improving blood sugar levels. Karen and the other volunteers were randomly assigned to receive one of these three treatments, and the researchers then evaluated their health outcomes.

In 2011, Karen was randomly assigned to receive RYGB surgery. The most commonly performed procedure at this time, RYGB reduces the size of the stomach and connects the upper part of the stomach to the lower part of the small intestine, so that food bypasses a large portion of the gastrointestinal tract in which digestion and nutrient absorption normally take place.

Maintaining Health Benefits Through Lifestyle Changes

Karen began feeling health benefits soon after the RYGB procedure. Remarkably, her diabetes was completely reversed within weeks after surgery. She no longer required insulin or metformin to manage her blood sugar levels. “Three weeks after I had the surgery,” she remembers, “I was no longer on the insulin. My numbers were perfect. I no longer had high cholesterol. I no longer had high blood pressure. I was off all that medication.

Within 3 weeks!” Within 6 months, her weight fell dramatically, and continued to drop for the following 6 months. Her weight then increased slightly and stabilized at a level well within the healthy range for her height.

The first weeks and months following surgery were challenging nonetheless. “The first few weeks, you’re on pure liquids,” she recalls about her initial diet, “then you start slowly introducing solids.”

Dieticians associated with the Triabetes trial

provided clear recommendations for her diet moving forward (e.g., lean proteins, vegetables, fiber), which she

has been following quite closely over the years. Unexpectedly, Karen’s taste preferences seemed to change after the surgery. She no longer craves certain foods that were a regular part of her diet. “I’m Italian, so pasta was a big thing for us, that we grew up on,” Karen reminisces. But now, she doesn’t have the desire for pasta that she once had. “My taste buds have completely changed. I don’t even think about it now.” A few staple dishes now constitute the bulk of her daily dietary routine, such as salads, homemade chicken soup (without noodles), and tuna fish, and she eats only small quantities at a time.

In addition to diet, Triabetes staff recommended at least 200 minutes of exercise per week, working up to 300 minutes. Due to a back problem,

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Karen has not been able to engage in strenuous physical activity, but she walks “at a pretty good pace” for 30 to 45 minutes, 5 days a week. In addition to walking, she is very active in various other aspects of her life, including mowing her lawn and gardening. “I love doing my gardening...babying my tomatoes right now!”

The health benefits and weight loss associated with bariatric surgery have given Karen a level of energy that she simply did not have before. “I know I’m a lot happier now, I’m a lot healthier. I feel better. I have more energy to do things. Before, I could hardly walk up and down steps; now I can run up...to my second floor. I can run up those steps with no problem at all.”

Like Karen, many other participants in the Triabetes study also experienced health benefits. Evaluating outcomes 12 months post-surgery, the researchers found that RYGB was more effective than LAGB for weight loss and improved control of type 2 diabetes. Both of these surgical treatments were significantly more effective than lifestyle interventions alone for this group of individuals. Importantly, however, only a few of the participants who received RYGB surgery experienced complete remission of type 2 diabetes, as Karen did. Those with complete remission of type 2 diabetes had normal

blood sugar levels without need for diabetes medications. Half of the participants who received RYGB experienced partial remission: their blood sugar levels, although above normal, were no longer in the range of diabetes, and they were able to discontinue their diabetes medications. None of the participants in the original lifestyle treatment group experienced complete or partial diabetes remission.

Karen and others continued participating in the study, so that the researchers could gather

data on their health outcomes several years after surgery. All of the participants, including those who originally

received surgery, were given lifestyle instruction on weight-control behaviors, with the hope that it would help them maintain their weight loss. Among those who had received RYGB, the overall rate of diabetes remission (partial or complete) was 60 percent 1 year after surgery, but by 3 years after surgery, fewer people (40 percent of the participants) had the benefit of diabetes remission. In the LAGB group, the rate of complete or partial diabetes remission remained stable at 29 percent at the two time periods. A few individuals in the surgical groups experienced complications (such as needing another surgery, ulcers, kidney stones, or hospitalization for dehydration), but Karen did not.

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PATIENT PROFILE

The Triabetes study was relatively small, with only about 20 participants in each group. Nonetheless, the study yielded important knowledge about the health outcomes from bariatric surgery, and useful information to help researchers plan future studies on longer-term risks and benefits. For example, based on the study's findings of

differences among the participants in diabetes remission and surgical complications, future research could begin to

provide important insights about which people are likely to benefit from bariatric surgery, like Karen did, and which potential patients might not achieve remission of their diabetes, or might experience complications. This research could help inform treatment decisions. Longer-term studies are also necessary because type 2 diabetes can recur even after surgery. Type 2 diabetes is a disease that progresses over decades, and it remains unclear how long the effects of bariatric surgery will last for different individuals. Additionally, people who have undergone gastric bypass surgery need lifetime health monitoring to help avoid nutritional deficiencies. Because only a few of the participants, like Karen, experienced complete diabetes remission, future research could also yield insights that might further increase benefits for people who choose surgery.

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Life After Bariatric Surgery—Continuing Health Benefits Four Years Later

Now, 4 years after her bariatric surgery, Karen remains at a healthy weight and free from diabetes and high blood pressure. She is grateful for the support of her family, which has been

helpful in her adherence to a healthful lifestyle. Because her husband previously had RYGB surgery, she was well aware of the associated

challenges and lifestyle changes. Unlike Karen, he did experience some complications, but overall he has been able to maintain his healthier weight. "My husband...was my number one cheerleader," she says.

Karen continues to have monthly follow-up phone calls with Triabetes study staff, and annual visits to Dr. Courcoulas' office. In addition to providing valuable longer-term data for the study, these communications and interactions ensure that she can receive regular guidance should any problems arise. But thankfully, the lifestyle changes that she adopted following her surgery have successfully led to sustained health.

Despite the fact that Karen was only mildly obese prior to her surgery, her uncontrolled type 2 diabetes forced her to consider all

PATIENT PROFILE

treatment options. Based on the Triabetes and other studies, bariatric surgery appears promising as a treatment for some people with type 2 diabetes and milder levels of obesity, along with those who have severe obesity. Dr. Courcoulas and other scientists caution that it is important to build on these results and evaluate

longer-term outcomes in more people. Bariatric surgery is more invasive than other intervention strategies and thus comes with some inherent risk—but in Karen's case, it has been very effective while other strategies were unsuccessful. She says, "I've been asked, 'Would I do it again?' And I've said, 'in a heartbeat I would.'"