

# Surgery achieves better long-term control of type 2 diabetes than standard therapy

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Metabolic or bariatric surgery may be more effective than standard medical treatments for the long-term control of type 2 diabetes in obese patients, according to a new study by King's College London and the Universita Cattolica in Rome, Italy. The study, published in the *Lancet*, is the first to provide data on five-year outcomes of surgery from a randomized clinical trial specifically designed to compare this new approach against standard medical therapy for the treatment of type 2 diabetes.

A number of studies have shown that bariatric or weight-loss surgery can result in dramatic improvement of [type-2 diabetes](#) in [obese patients](#), supporting the idea that surgery could be used to treat this disease. Randomised controlled trials have shown that metabolic surgery is more effective than conventional treatment for the short-term control of type-2 diabetes. However, no trials have yet provided information on longer-term outcomes.

The new study followed a group of diabetic [patients](#) from Italy aged 30-60 with a body-mass index (BMI) of 35 kg/m<sup>2</sup> or more who were randomly assigned to receive either conventional medical treatment for type-2 diabetes (20 patients) or surgery by gastric bypass (20) or biliopancreatic diversion (20). Gastric bypass involves shrinking the size of the stomach and rerouting the upper part of the small intestine, whilst biliopancreatic diversion involves a more extensive bypassing of the intestine.

Of the 60 patients enrolled on the trial, 53 completed the five-year follow-up which looked at the durability of diabetes remission, defined as achievement of a glycated haemoglobin A1c (HbA1c) concentration of 6.5% or less without the need for drugs for at least one year.

Additional outcome measures included relapse of hyperglycaemia (high blood sugar); use of anti-diabetic medication (glucose-lowering drugs and insulin) and cardiovascular medication (blood pressure and lipid-lowering drugs); changes in body weight, BMI and waist circumference; blood pressure; cholesterol; cardiovascular risk; quality of life, diabetes-related complications and long-term surgical complications.

Overall, 19 (50%) of the 38 [surgical patients](#) maintained diabetes remission at five years, compared with none of the 15 medically treated patients. Regardless of remission, surgical patients had generally lower levels of blood glucose than medically treated ones. Throughout the study period, surgical patients also used significantly less anti-diabetic and cardiovascular medication. The estimated cardiovascular risk at Year 5 for surgical patients was roughly half that of patients receiving conventional treatment. Surgery was also associated with better quality-of-life scores.

There was no mortality and no major long-term complications after surgery. Biliopancreatic diversion resulted in greater remission rates of diabetes compared to gastric bypass at Year 5 (67% vs 37%); however, gastric bypass was associated with fewer significant nutritional side effects and better quality of life scores, suggesting that [gastric bypass](#) may have a better risk-to-benefit profile in patients with diabetes.

Half of the patients who had initial diabetes remission experienced relapse of mild hyperglycaemia five year after surgery. For this reason, the authors caution that monitoring of glycaemia should continue in all patients who experience disease remission after [bariatric surgery](#).

However, the patients who experienced relapse of hyperglycemia maintained a mean HbA1c of 6.7% (indicating adequate control of diabetes) with just diet and either metformin or no medication, whereas before surgery the same patients had HbA1c greater than 7.0% (indicating inadequate control) despite taking multiple glucose-lowering drugs and/or insulin. Overall, more than 80% of surgically-treated patients maintained the American Diabetes Association's treatment goal of a glycated haemoglobin A1c concentration below 7.0%, with little or no need for anti-diabetic drugs.

'The ability of surgery to greatly reduce the need for insulin and other drugs suggests that surgical therapy is a cost-effective approach to treating type-2 diabetes', says Professor Francesco Rubino, senior author of this study and Chair of Bariatric and Metabolic Surgery at King's College London and a Consultant Surgeon at King's College Hospital in London, UK.

Fewer diabetes-related complications were also observed in surgical patients in this study; however, the authors caution that the limitations of this trial, especially its relatively small sample size, do not allow definitive conclusions about the ability of surgery to reduce diabetes complications (e.g. heart attacks, strokes, kidney disease).

Professor Geltrude Mingrone, first author of the study who is a Professor of Internal Medicine at the Universita Cattolica in Rome and a Professor of Diabetes and Nutrition at King's College London, says: 'The lower incidence of typical diabetes complications in this study is in line with previous findings from long-term non-randomized studies; however, larger and ideally multicentre randomized trials are needed to definitively confirm that surgery can reduce diabetes morbidity and mortality compared to standard medical treatment. Nevertheless, surgery appears to dramatically reduce risk factors of cardiovascular disease.'

Surgical patients in this study lost more weight than medically treated patients; however, weight changes did not predict remission of hyperglycemia or relapse after surgery, suggesting that mechanisms other than weight loss are implicated in the effects of surgery on diabetes.

Professor Rubino's earlier experimental studies in rodents provided initial evidence that modifications of gastric and intestinal anatomy can exert direct effects on the regulation of glucose metabolism. He says: 'The results of this study add to a growing body of evidence showing that the gastrointestinal tract is a rational biological target for antidiabetic interventions and support implementation of [surgery](#) as a standard option in the treatment of type 2 [diabetes](#).'

Provided by King's College London

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