A rapid review on surgical approaches for diabetes reversal and remission

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ABSTRACT

Introduction: Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by hyperglycaemia due to insulin resistance and/or impaired insulin secretion. Diabetes remission refers to glycaemic levels below diagnostic thresholds (HbA1c <6.5% and fasting plasma glucose <7.0 mmol/L) for at least three months without pharmacological therapy as proposed by Riddle et al. and updated by the American Diabetes Association. Diabetes reversal is a broader term, often used interchangeably with remission, but may include partial improvements or temporary discontinuation of medication with sustained normoglycemia. Various bariatric and metabolic surgical procedures such as Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), and one-anastomosis gastric bypass (OAGB) have shown potential in inducing remission or reversal of T2DM. This rapid review aims to evaluate current evidence regarding the effectiveness of surgical interventions in promoting diabetes remission or reversal, and their impact on physiological, functional, and quality-of-life outcomes. **Materials and Methods:** A literature search was conducted using PubMed with the keywords such as diabetes, surgery, reverse, cure and remission. Inclusion criteria were i) studies evaluating diabetes remission or reversal, ii) clinical trials, observational studies, systematic reviews, and narrative reviews and iii) outcomes related to functional, physiological, or quality-of-life or ageing related improvements. Animal-only studies, case reports, or editorials not reporting remission outcomes were among the exclusion criteria. Three researchers: NFAF, GK and BV discussed and apprehended the suitable papers. **Results:** Among the articles, the most studied procedures were Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), and one-anastomosis gastric bypass (OAGB). Indications were primarily targeted toward individuals with obesity (BMI ≥35 kg/m²) and inadequately controlled Type 2 diabetes despite optimal medical therapy. However, emerging evidence suggests that surgery may benefit patients with BMI <35 kg/m² as well. Remission rates varied by procedure, with RYGB and OAGB consistently demonstrating higher rates of short-term remission in select populations, while SG showed more moderate outcomes. Common complications reported included nutritional deficiencies, surgical site infections, and gastrointestinal symptoms; serious morbidity and mortality were rare. Proposed mechanisms for diabetes remission include increased secretion of gut hormones such as GLP-1 and PYY, improved insulin sensitivity, decreased hepatic glucose production, and modulation of the gut microbiota. Procedures bypassing the proximal small intestine were particularly associated with rapid metabolic improvements independent of weight loss. When compared to medical therapy, surgery resulted in superior glycaemic control, higher remission rates, and greater reductions in medication use and quality of life. Several studies demonstrated that bariatric surgery was significantly more effective compared to lifestyle intervention or pharmacologic therapy. **Conclusion:** Surgical interventions, particularly RYGB and OAGB, are highly effective strategies for achieving remission or reversal of T2DM, especially in obese patients. These procedures offer significant physiological, functional, quality-of-life improvements with growing evidence of positive impacts on aging trajectories. While surgery carries inherent risks, its benefits over medical management in selected patients is well-supported by current evidence. Future research should aim to personalize surgical indications, refine prediction models, and optimize outcomes for aging populations.

Keywords: Diabetes surgery, bariatric surgery, reverse diabetes, diabetes remission, cure diabetes