

Bariatric surgery in children with obesity and type 2 diabetes

Childhood obesity has increased substantially over the last 30 years, with 8% (160 million) of children worldwide living with obesity in 2022. Obesity is associated with multiple health conditions, one of which is type 2 diabetes, and this is no different in children. The SEARCH Study has shown increasing prevalence of type 2 diabetes in children between 2002 and 2017, and predicted a 700% rise by 2060.¹ Type 2 diabetes in children has a more aggressive clinical course than adult-onset type 2 diabetes as well as type 1 diabetes in children. Diabetic retinopathy, neuropathy, and kidney disease can develop early in these patients.²

Treatment options for children with severe obesity and type 2 diabetes are limited compared with adults. One option available is metabolic bariatric surgery. A study by Ryder and colleagues showed more than 80% remission of type 2 diabetes within 1 year of surgery in adolescents treated with sleeve gastrectomy and Roux-en-Y gastric bypass, with more than 55% remission at 10 years after surgery.³ This study also showed an improvement of other obesity-related comorbidities such as hypertension and dyslipidaemia.³

The beneficial effect of surgery occurs via both weight-dependent and weight-independent mechanisms, although the exact mechanisms are unknown. Possible mechanisms of weight-independent control include reduced glucotoxicity, reduced islet cell inflammation, altered gut microbiota, and gastrointestinal hormonal responses leading to improved β -cell function. This improved β -cell function is aided by increased concentrations of GLP-1 and peptide YY, which in turn decrease hepatic glucose production and improve satiety as well as postprandial insulin secretion. During

sleeve gastrectomy, the gastric fundus is completely excised, leading to decreased ghrelin concentrations and therefore decreased appetite.⁴

Despite proven benefits, a 15-year analysis of the US National Inpatient Survey shows that metabolic bariatric surgery is underused, with only 0.04% of potentially eligible adolescents with severe obesity undergoing metabolic bariatric surgery each year.⁵ Males, Black and Hispanic adolescents, and adolescents in lower socioeconomic strata are affected more than others. Possible contributing factors are multifold. Costs of surgery and their lack of coverage by insurance companies could be a factor. There is also social and ethnic bias against weight loss surgery from both parents and health-care providers. Some ethnic groups do not consider obesity as a condition for which to seek medical attention. Bias from health-care providers can delay referrals from being made at appropriate times. This bias is due to many factors, such as simplistic ideas regarding the cause of obesity and complexity of the disease; presumptions regarding the character traits of children with obesity, such as lack of willpower; general weight bias in the community; and lack of specific training in obesity medicine.

There could also be concerns over the efficacy, safety, and long-term side-effects of surgery, which can include the risk of nutritional deficiencies and impaired bone growth, psychological vulnerability, and the risk of alcohol abuse. There is concern that if pre-existing psychiatric illness and substance abuse are not addressed before surgery, there is increased risk of suicidal attempts, suicidal ideation, depression, and anxiety.^{4,5}

Although the short-term and mid-term results show benefit, there is no consensus that metabolic bariatric surgery in children should be recommended in clinical practice. Hence, the benefits and risks of surgery in adolescents with type 2 diabetes

should be discussed and debated, not only with the general population but in wider forums of insurance companies, medical organisations, and national health services.

We declare no competing interests.

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