Bariatric surgery for diabetes treatment:
why should we go rapidly to surgery

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Abstract
Surgical treatment of morbid obesity has been shown to be efficient for long-term weight loss and to improve obesity-related complications. The improvement of type 2 diabetes (T2DM) is dependent of the type of surgery, and is more frequent with gastric bypass than with gastric band. Normalization of glucose metabolism is rapid, often occurring before weight loss, and shown to be related to both a decrease in insulin resistance and an increase in insulin secretion. Some factors limiting the efficiency of gastric bypass on T2DM is the duration of diabetes and the residual beta-cell mass. However, a decrease in diabetes-related death has been found in a large series of surgical cases. These data constitute a good argument for proposing surgery in T2DM obese patients as soon as possible. Nevertheless, whether or not this suggests changing the usual indications for bariatric surgery on T2DM patients, such as a body mass index (BMI) score of < 35 kg/m², remains controversial.

Keywords: Bariatric surgery; Gastric bypass; Type 2 diabetes mellitus; GLP-1; Review

Résumé
Chirurgie bariatrique pour traiter le diabète: pourquoi devrions-nous envisager le recours rapide à la chirurgie ?
La chirurgie de l’obésité morbide a fait la preuve de son efficacité sur la perte de poids à long terme et la réduction des complications induites par l’obésité. L’amélioration du diabète de type 2 dépend du type de chirurgie et est plus fréquente avec le bypass gastrique qu’avec l’anneau gastrique. La normalisation de l’équilibre glycémique est rapide et survient souvent avant la perte de poids. Cette amélioration est due à une réduction de l’insulinorésistance et à une amélioration de l’insulinosécrétion. La limite à l’efficacité sur le diabète du bypass gastrique est l’ancienneté du diabète et l’insulinosécrétion résiduelle. Une diminution de la mortalité liée au diabète a été montrée dans de larges séries de chirurgie bariatrique. Tout ceci plaide en faveur d’un recours rapide à la chirurgie chez les obèses diabétiques. Cependant un changement des recommandations en faveur d’un élargissement des indications à un indice de masse corporelle inférieur à 35 en cas de diabète demeure très discuté.
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Mots clés : Chirurgie bariatrique ; Bypass gastrique ; Diabète de type 2 GLP-1 ; Revue générale

Obesity is a chronic disease that is more and more being associated with complications such as type 2 diabetes (T2D), hypertension, cardiopulmonary failure, asthma, polycystic ovary disease syndrome and cancer. It also comes with a heavy burden of psychosocial consequences. In addition, there is usually a general resistance of obesity to conventional treatments that rely mostly on lifestyle changes, and only few drug treatments are available. Epidemiological data have...
shown that obesity is largely found in populations living in poorer socioeconomic conditions. This suggests that these are individuals who are likely to find it particularly difficult to change their lifestyles, as following a healthier balanced diet, joining a fitness club or a weight-watcher group, or hiring a personal trainer or dietician. All come with a cost that most obese people cannot afford.

However, surgery proved efficiency on obesity and its complications, and the cost is reimbursed. Also, of all the complications of obesity, T2D appears to be the one most affected by the surgical procedure. Whereas the decrease in other complications can be directly linked to the surgery-induced weight loss, procedures such as the gastric bypass (GBP) appear to have a specific effect on T2D through actions not only on insulin resistance, but on insulin secretion as well.

In a series of 165 patients with T2D and 165 with impaired glucose tolerance (IGT), Pories [1] reported a long-lasting resolution of T2D, with normalization of HbA1c levels in 83% of the diabetics and 99% of the IGT patients at 1 year after GBP surgery. A meta-analysis of 136 reports on bariatric surgery-involving more than 22,000 individuals-confirmed a T2D remission rate of 84% after GBP [2]. In fact, the effect on T2D was so rapid and intense that their diabetic treatments had to be immediately reduced, and many of the patients were discharged with no further requirement for antidiabetic medications.

Two other major series have shown a decrease in mortality rates after bariatric surgery [3, 4]. Adams et al. [4] described a 92% decrease in diabetes-related deaths following GBP, while MacDonald et al. [5] showed that, in diabetics, mortality was reduced from 4.5% to 1% per year, based on a control-comparison group.

In the Swedish Obese Subjects (SOS) study, a multicentre trial of bariatric surgery vs medical care for obesity, it was found that, after 10 years, the risk of developing T2D was three times lower in patients who had received GBP surgery [6]. However, patients who had undergone the surgery, but who remained diabetic afterwards, had longer duration of the disease, suggesting that they lacked sufficient residual beta cells to recover normal glucose regulation [7].

This is the strongest argument for not waiting too long before proposing bariatric surgery in such patients. The natural evolution of T2D is towards persistent insulin resistance in association with decreased insulin secretion. Yet, the specific mechanisms behind the effects of GBP on T2D are still a subject of debate [8]. It is clear that insulin resistance, a major component of T2D, is improved by weight loss. However, the difference in T2D improvement between GBP and gastric bands—with 84% compared with only 48%, respectively, of cases going into remission [2]—clearly shows that weight loss is not the only factor involved in diabetes remission after GBP surgery. Indeed, an improvement in insulin secretion has been observed after GBP due to changes in incretin levels, especially glucagon-like peptide-1 (GLP-1) [9]. This ‘magical’ effect of GBP nevertheless requires the presence of sufficient residual beta cells.

Ultimately, the important question is whether or not bariatric surgery should continue to be reserved only for those patients who fill the classical indications—namely, a body mass index (BMI) score > 40 kg/m², or > 35 kg/m² if associated with significant co-morbid conditions—or to expand the indications, given the effects on T2D patients. Trials conducted in individuals with BMI scores < 35 kg/m² have reported similar, or even greater, remission rates than those seen in more obese subjects [10]. However, before reaching the conclusion that bariatric surgery is the best treatment for T2D, it may be advisable to first concentrate our efforts towards understanding the mechanisms involved in bariatric surgery to find clues to help in the development of novel pharmacological treatments that might serve as an alternative option to surgery.

Conflicts of interests

The authors have reported no conflict of interests.

References