

# Effectiveness of Sleeve Gastrectomy for Metabolic Surgery in Korea

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The National Health Insurance Service (NHIS) in South Korea recognizes obesity as a disease and will start reimbursing the costs associated with bariatric surgery at the end of this year. Prior to this, metabolic surgery was adopted as a “new medical technology” by the Ministry of Health and Welfare, South Korea, and from July 2018 all medical practices related to perioperative management, with the exception of operation fees, have been covered by NHIS. Metabolic surgery is indicated in Korea for obese patients with a body mass index (BMI)  $\geq 27.5$  kg/m<sup>2</sup> and medically uncontrolled type 2 diabetes mellitus (T2DM). However, there is currently not a standard definition for “uncontrolled” T2DM, and a consensus between endocrinologists and surgeons is needed.

Metabolic surgery does not differ from bariatric surgery in terms of procedures and types of surgery. The procedure can be regarded as bariatric surgery or metabolic surgery, depending on whether the aim of surgery is weight loss or control of diabetes. Representative types of metabolic surgery include sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB). Adjustable gastric banding is insufficient for metabolic surgery, and is rarely performed as bariatric surgery because of long-term complications such as erosion and a high incidence of reoperation.<sup>1,2</sup>

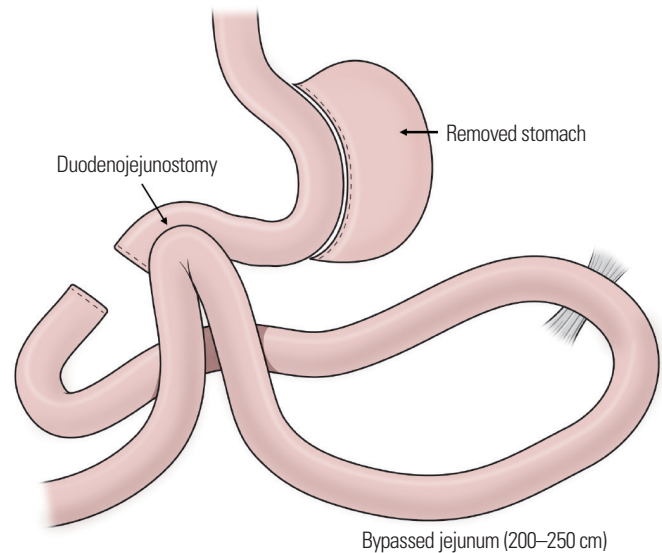
RYGB is a standard bariatric/metabolic procedure in the West. However, many Korean bariatric and metabolic surgeons are hesitant to perform RYGB because of the high incidence of gastric cancer in South Korea. Effective gastric cancer screening by endoscopy becomes nearly impossible after surgery because the passage route of the foregut changes after RYGB. Because patients that undergo bariatric/metabolic surgery can be as young as 30–40 years, the risk of developing gastric cancer in the remnant stomach after RYGB should be considered.<sup>3</sup> There have been no reports on the occurrence of gastric cancer after RYGB in East Asia (Korea, China, and Japan), likely because of the relatively limited history of bariatric/metabolic surgery and because SG is more commonly performed than RYGB in East Asia.<sup>4</sup> Resectional RYGB (RYGB in addition to remnant stomach removal) can be an alternative to RYGB because it eliminates the possibility of future problems. However, rare but serious complications such as severe weight loss, malnutrition, and severe dumping syndrome can occur after RYGB, and reversal surgery (returning to normal anatomy) is an important treatment option. However, reversal is impossible after resectional RYGB, which is the primary drawback. Therefore, resectional RYGB can typically be recommended to patients with

gastric lesions such as gastric cancer, neuroendocrine tumors, or high-grade adenomas.

SG is the most popular bariatric procedure in Asia<sup>4</sup> because of its technical simplicity and relatively low morbidity, including postoperative complications and nutrient deficiencies. However, there is currently a debate as to whether SG can allow as much weight loss as RYGB in the long-term.<sup>5</sup> Another disadvantage of SG is newly developed or aggravated gastroesophageal reflux disease (GERD) after surgery.<sup>6,7</sup> Some surgeons insist that SG should not be performed in patients with severe GERD.<sup>8</sup> However, the incidence of GERD in Asia is not as high as in the West although the cause is unclear.<sup>9</sup> The mean preoperative BMI of Korean patients who undergo bariatric surgery is not as high as in the West.<sup>3</sup> Therefore, SG is a very suitable bariatric surgery approach for Koreans.

It is currently unclear whether SG will be effective as a metabolic surgery to treat T2DM in Korea. There is enough evidence that the effect of SG in diabetic patients with high BMI ( $\geq 35$  kg/m<sup>2</sup>) is not different from that of RYGB.<sup>6,7</sup> Two randomized prospective trials showed no differences in remission rates of T2DM between SG and RYGB; however, the mean preoperative BMI of the participants was higher than 40 kg/m<sup>2</sup>. Patients with a BMI  $\geq 27$  kg/m<sup>2</sup> were enrolled in the Surgical Treatment and Medications Potentially Eradicate Diabetes Efficiently trial.<sup>10</sup> However, the mean preoperative BMI was still higher than 35 kg/m<sup>2</sup> in this trial, and there were not differences between the two procedures for T2DM resolution. It is doubtful whether SG will be as effective as RYGB in diabetic patients with low BMI. Because of this, some surgeons may be reluctant to perform SG as a metabolic surgery for low BMI diabetic patients and may believe that RYGB is more effective, although there is currently no evidence to support this. One recent systematic review article supports this assumption; however, in this review of metabolic surgery in patients with a BMI  $< 30$  kg/m<sup>2</sup>, none of the articles that discussed SG were searched for or included.<sup>11</sup> One retrospective study also showed a 10.0% remission of T2DM after SG in patients with low BMIs, which was less than expected.<sup>12</sup>

Therefore, surgical options for Korean diabetic patients with a BMI that ranges 27.5–35 kg/m<sup>2</sup> should be evaluated and optimized. A “sleeve plus” procedure can be an important alternative metabolic surgery for patients with low BMIs. The sleeve plus concept indicates that a procedure has been added, such as foregut by-



**Figure 1.** Sleeve gastrectomy with duodenojejunal bypass.

pass to the SG, and an SG with duodenojejunal bypass (SG DJB) (Fig. 1) is a typical sleeve plus procedure. Although the mechanism of the contribution of foregut bypass to glycemic control has not been clearly elucidated, beneficial alterations in bile acids and changes in intestinal microbiota have been associated with a bypassed jejunal limb.<sup>13</sup> Therefore, SG DJB is a procedure that has both SG approach advantages, including possible surveillance of the remnant stomach, and RYGB benefits such as foregut bypass. Furthermore, SG DJB could cause fewer nutritional problems because it does not bypass the long small bowel as a biliopancreatic diversion. Some studies have even reported that SG DJB was superior to SG and comparable to RYGB as a metabolic surgery in diabetic patients with low BMI.<sup>14,15</sup>

Metabolic surgery is a new medical technology recognized by the government and is based on scientific approaches. Surgeons are currently seeking improved surgical procedures for better treatment outcomes, and metabolic surgery is an approach that has been developed and continues to be optimized. Although it has not yet been determined, the sleeve plus approach could be a beneficial and ethnically appropriate metabolic surgery for Asian patients.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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