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Review

Laparoscopic sleeve gastrectomy for morbid obesity: a review

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Laparoscopic sleeve gastrectomy (LSG), a restrictive bariatric operation, has not been commonly used as a primary bariatric operation. It has been used as a part of biliopancreatic diversion with duodenal switch (BPD-DS) and as the first stage of a staged operation for super-obese patients [1,2]. It is also done for high-risk patients, because it is a simpler and safer operation. Recent published reports have seemed to indicate that LSG is an effective bariatric operation and may be a promising alternative to more complex operations such as Roux-en-Y gastric bypass (LRYGB) and BPD-DS. These interesting observations prompted us to undertake this review [3–7].

Morbid obesity affects an estimated 15 million people in the United States. Surgery is the most effective and only durable treatment for morbidly obese patients. It ensures long-term weight loss, with acceptable morbidity and mortality. It also favorably affects the comorbidities associated with obesity. The bariatric procedures can be classified into 3 main categories: restrictive, malabsorptive, and a combination of both. The restrictive procedures include laparoscopic adjustable gastric banding (LAGB), LSG, vertical banded gastroplasty (VBG), and endoscopic intragastric balloon (BioEnterics Intragastric Balloon [BIB], Allergan, Irvine, CA) placement. The purely restrictive procedures induce a lesser degree of weight loss than the malabsorptive procedures, such as BPD-DS, or the mixed procedures, such as LRYGB.

Of the restrictive operations, LAGB is the most popular. LAGB results in an average excess weight loss (EWL) of 50–60% at 3–5 years postoperatively [8–10]. It is the least invasive and is a low-risk procedure in experienced hands. The operative morbidity and mortality rate with this procedure has been 5% and 0.1%, respectively. Moreover, the band can be removed in the case of problems or insufficient weight loss. Complications unique to LAGB include band slippage, pouch dilation, gastric erosion and necrosis, stomal obstruction, gastric prolapse, and port complications.

VBG is a nonadjustable restrictive procedure. Since its introduction in the 1970s, this procedure is losing popularity, because of unsatisfactory weight loss and a reduction in the success rate with time. In an analysis of restrictive procedures in a series of 1011 patients, the overall reintervention rate for long-term complications for the VBG group was 15.6% versus 7% for the LAGB group [11]. A randomized trial comparing VBG and LSG reported better mean EWL (56% versus 36%) with LSG [12].

BIB placement has been used as a first-stage procedure to induce initial weight loss before more definitive surgery [13]. This involves placement of a saline-filled balloon (BIB) using an endoscopic approach. The volume of this radiopaque spherical device can range from 400 to 700 mL. The balloon results in reduction of the gastric lumen, thus providing a restrictive effect. The main problems with the device are patient discomfort, balloon dysfunction, and abdominal pain. This results in decreased patient compliance. The overall complication rate in a series of 2515 patients undergoing BIB placement was 2.8%. The mean reported %EWL at 6 months in that series was 33.9% ± 18.7% [14].

Sleeve gastrectomy was first described as a part of the duodenal switch operation [15,16]. Gagner and Patterson [17] reported the first totally laparoscopic duodenal switch operation. It was Chu et al. [2] who developed and described the use of LSG as the first stage of surgery for the staged approach to super-super-obesity. However, the concept of creating a narrow gastric tube using staplers against

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