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Review article

Long-term complications requiring reoperations after laparoscopic adjustable gastric banding: a systematic review

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Abstract At present, bariatric surgery is the most effective option for morbidly obese patients. Among all of the surgical procedures, laparoscopic adjustable gastric banding (LAGB) is characterized by superior safety, a stable weight loss effect, and unique reversibility. However, the worldwide popularity of LAGB is challenged and overshadowed by a number of adverse events. This systematic review examined the incidence and outcomes of the long-term complications that require reoperations after LAGB. A PubMed search was conducted through October 31, 2014, for relevant studies that included minimal 10-year follow-up data for LAGB patients. The defined outcomes of interest were weight loss outcomes, long-term complications, and reoperations. Seventeen studies, including 2 randomized controlled trials and 15 observational studies, were identified involving a total of 9706 LAGB patients, of which 8215 patients (84.6%) were followed up and 1974 patients (20.3%) were available 10 years after LAGB. The follow-up data indicated that the mean percentage of excess weight loss at 10 years after LAGB was 49.1% ± 13.1% and the median long-term complication rate and reoperation rate for the LAGB patients were 42.7% (5.9%–52.9%) and 36.5% (7.2%–66.1%), respectively. At the end of long-term follow-up, approximately 22.9% (5.4%–54.0%) of the LAGB patients had their bands removed and the commonest reason was complications. In conclusion, long-term adverse events are important and remarkable for LAGB patients. The role of LAGB in bariatric surgery is worthy of further appraisal, by comparing with other types of bariatric procedures, because of the limited high-quality evidence. (Surg Obes Relat Dis 2014;▮:00–00.)

Keywords: Laparoscopic adjustable gastric banding; Bariatric surgery; Outcomes

Morbid obesity is a chronic disease, which has continued to increase and become one of the major epidemics of the present generation. As the most efficacious and durable therapy, bariatric surgery has evolved into a variety of surgical procedures that are predominantly based on pure gastric restrictions, as well as gastric restriction with some or significant intestinal malabsorption, since the jejunoileal bypass was introduced in 1954 [1]. With the goal of uncompromising safety, efficiency, and durability, bariatric surgeons currently perform these 3 options most often: laparoscopic Roux-en-Y gastric bypass (LRYGB), laparoscopic sleeve gastrectomy (LSG), and laparoscopic adjustable gastric banding (LAGB) [2–5]. Since its introduction in 1993, LAGB has gained popularity due to durable weight loss results, very low operative morbidity, and almost no mortality [6–9]. In a previous systematic review regarding midterm bariatric operations, although LAGB showed poor weight loss

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results compared with LRYGB at years 1 and 2, the differences subsided after 3 years [6]. A recent study also found durable weight loss with 47% of excess weight loss (EWL) that was maintained 15 years after LAGB [7]. The appeal of LAGB also stems from device adjustability, less invasiveness with anatomy preservation and reversibility, relative simplicity, and low costs [8–9]. Obviously, LAGB contributed significantly to the boom of minimally invasive procedures for morbid obesity and was ever considered the first-choice procedure in treating morbidly obese patients [10].

However, the global trends in LAGB prevalence steeply declined from 2008 (42.3 %) to 2011 (17.8%) [11]. This phenomenon paralleled the substantial evidence that confirmed the superiority of LRYGB, and even the newer LSG, to LAGB and the higher weight loss failure rate of LAGB compared with other procedures [2–5]. Furthermore, after the enthusiasm regarding the apparent simplicity and good early results of the simple restrictive procedure, bariatric surgeons have to be concerned about high device-related complications and reoperations for insufficient weight loss, because the complication rates for LAGB have been reported to be as high as 40%–50% and reoperation rates up to 30% [6–9]. Importantly, there is no doubt that the actual incidence of these adverse events may be underestimated in consideration of nonreporting of negative results and a statistical dilution effect due to shorter follow-ups.

Because the duration and completeness of follow-ups are very important to lower the bias in the literature, the long-term complication and reoperation results after LAGB are keys to understand and reevaluate the role of LAGB in the modern management of morbid obesity. The aim of the present systematic review was to examine the incidence and outcomes of long-term complications requiring reoperations using up-to-date and long-term LAGB data.

Methods

Search strategy

A PubMed search was performed independently by 2 reviewers from inception to October 31, 2014, using the search terms “gastroplasty,” “gastric band,” “gastric banding,” “Swedish band,” “laparoscopic adjustable gastric banding,” “AGB,” “LAGB,” and “SAGB.” Furthermore, the terms “long term,” “long-term follow-up,” “long-term outcomes,” “long-term results,” and “10 years” were combined with each of the main search terms to ascertain the most relevant articles for the purposes of this study. Additionally, the journals *Obesity Surgery* and *Surgery for Obesity and Related Disorders* were hand searched directly.

Study inclusion and exclusion criteria

A review protocol was followed throughout, and the studies were evaluated for quality. Criteria for exclusion included nonhuman studies, nonsurgical interventions, open bariatric surgery procedure studies, duplicate studies, publication of abstracts only, discussion papers, reviews, meta-analyses, comments, case reports, and lack of outcomes of interest (e.g., weight change, late complications, and reoperations). Only full-text articles published in English were included. Furthermore, eligible studies had to include (1) adult populations only (aged >18 years), body mass index (BMI) ≥ 35, and consecutive patient series; (2) randomized controlled trials (RCTs) and observational studies (OBSs); and (3) data on long-term weight loss outcomes, late complications, and reoperations at 10 years or more after the primary LAGB. For multiple publications with the same data, only the most recent report was included.

Quality assessment of the included studies

The methodological quality of all of the studies included was systematically assessed according to the established guidelines [12–13]. The key points of the current checklist include the following: (1) a clear definition of the study population, design, and origin of country; (2) a sufficient period of a minimum of 10 years of follow-up; (3) a clear definition of weight loss outcomes; (4) a clear definition of late complications with LAGB; and (5) a clear definition of revisional surgery after LAGB. If a study did not mention all 5 points, it was excluded so as not to compromise the quality of the systematic review. A flow diagram of the study selection process is presented in Fig. 1.

Data collection and analysis of the outcomes of interest

The characteristics of each study were recorded, including age, sex, BMI, the design of each study (RCTs and OBSs), the LAGB performance period, the initial population size, the follow-up duration, and the number of patients

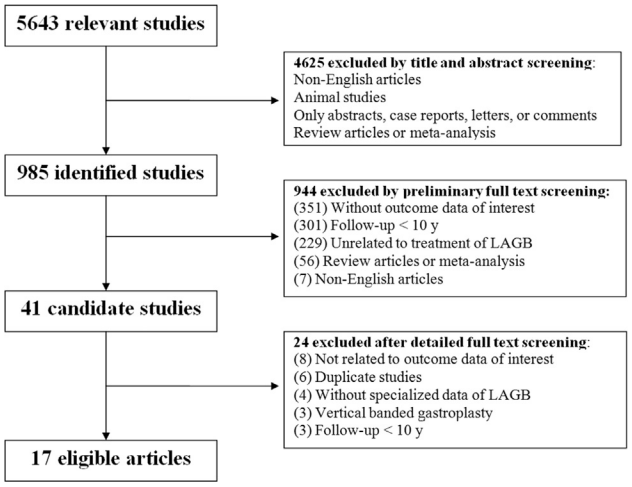

Fig. 1. Flow chart of study selection.