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Original article

Comparison of safety between 1-stage and 2-stage surgery: from laparoscopic adjustable gastric banding to laparoscopic sleeve gastrectomy

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Abstract

Background: Laparoscopic sleeve gastrectomy (LSG) is becoming increasingly popular. With significant failure rates for laparoscopic adjustable gastric banding (LAGB), conversion to LSG is an attractive consideration for maintenance of target percentage excess weight loss (%EWL). Conversions can be successfully achieved in either 1-stage (OS) or 2-stage (TS) surgery.

Objectives: We intend to examine safety between OS and TS surgery and determine features indicative for OS surgery.

Setting: Records were audited from the database of a private surgical practice located in Perth, Western Australia.

Methods: We analyzed 86 patients in a prospective observational study over a 3-year time frame (38 OS, 48 TS). The primary outcome was perioperative events, graded using the Clavien-Dindo classification system. Secondary outcomes included any preoperative, intraoperative, and postoperative events.

Results: Surgical complications were similar between OS and TS groups. Grades of complications were not significantly different. No difference was found in procedural normality between cohorts ($P = .95$). More adhesions were present in the TS group compared with the OS group after accounting for adjustments ($P = .05$). Patient demographic characteristics were not different between groups, with the exception of body mass index (BMI). There were no staple line leaks within the OS group; 2 leaks occurred in the TS group.

Conclusion: OS surgery appears as safe as TS surgery provided surgeons carefully assess patient eligibility. We recommend the following features for ideal OS candidacy: no previous band complications, minimal peritoneal adhesions under laparoscopy, minimal co-morbidities, and a lower BMI at entry into conversion. (Surg Obes Relat Dis 2016;▮:00–00.)

Keywords: Laparoscopic adjustable gastric banding; Laparoscopic sleeve gastrectomy; 1 stage; 2 stage; Conversion; Complications; Clavien-Dindo classification; Comparison; Indications; Adhesions; Procedural difficulty; Laparoscopic; Gastric banding; Sleeve gastrectomy; Partial gastrectomy; OS; TS

Weight loss surgery is becoming increasingly prevalent. In Australia the number of weight loss surgeries increased from 500 in 1998-99 to 17,000 in 2007-08 [1].

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Two of the more commonly performed bariatric procedures are laparoscopic adjustable gastric banding (LAGB) and laparoscopic sleeve gastrectomy (LSG) [2]. Independently both procedures have demonstrable efficacy in achieving target percentage excess weight loss (%EWL). Strict adherence to a multidisciplinary management plan is needed alongside either procedure [3].

Failure to achieve %EWL with LAGB arises from interplay of behavioral, psychological, and physical aspects [4]. These include noncompliance to dietary measures, discomfort, band migration, band erosion, and psychological effects [4,5]. Additionally, long-term rates of associated complications with LAGB increase every year [4]; at the 12-year mark, roughly 50% of individuals require band removal [5]. Hence, individuals who do not achieve their %EWL goals with LAGB may consider removal of their gastric band and subsequent conversion to LSG.

It has been shown that LSG is associated with %EWL comparable with Roux-en-Y gastric bypass [6-8]. Himpens et al. found that LSG can achieve a mean %EWL from baseline to 77.5% at 3 years and 53.3% at 7 years [9]. Despite an expected gain of weight between the third and sixth years post LSG, the procedure has been found to be acceptable as a bariatric solution [9].

Although the complications of both LAGB and LSG are well documented, there is a lack of evidence comparing the safety between types of conversions from LAGB to LSG [1,3-8]. Conversion typically occurs in one of 2 ways: firstly, band removal and LSG performed in the same procedure (1 stage), or secondly, in 2 separate interval procedures (2 stage) [10]. To date minimal evidence has compared the safety between 1 stage (OS) and 2 stage (TS) conversions [11-13].

Studies indicate that LSG is an acceptable revisional surgery for failed LAGB [11-13]. Several studies indicate single procedure conversion as feasible, yielding similar postoperative morbidity rates to primary LSG [11,14,15]. Conversely, Stroh et al. found that separate LAGB removal and LSG implementation in 2 procedures have lower rates of complications [10]. However, these studies mention the need for larger series [11]. Ideally our study would permit a randomized controlled trial to proceed.

The purpose of this research is to compare the safety between OS and TS surgery, and determine the features of an ideal candidate for OS surgery. We hypothesize similar safety profiles between groups. This study has been designed in collaboration with Western Surgical Health (WSH) in a West Australian cohort of bariatric patients.

Methods

We conducted a prospective cohort study collecting medical records from WSH's existing database. The database has been used for various LAGB to LSG conversions as well as other medical consultations and procedures since 2008. Ethical approval was received from the Human and Research Ethics Committee at The University of Western Australia (RA/4/1/6710) and permitted the utilization of the WSH database from June 2014 to June 2015.

Criteria

Participants underwent conversion from failed LAGB to LSG alongside WSH between January 2012 and December 2014. All eligible participants identified within this time frame were included. All individuals had at least 6 months of postoperative information available.

Cohort

A total of 86 individuals were identified, 38 (44%) in the OS group and 48 (56%) in the TS group. Indication for LAGB to LSG conversion was ratified after the approval of a multidisciplinary team comprising a surgeon, physician, anesthetist, dietician, and psychologist.

The mode of surgery was determined preoperatively alongside discussion with the above multidisciplinary team. Participants stayed within initial groups unless a perioperative decision changed conversion status. To account for associated implications individuals were assessed according to conversion status (OS or TS). Groups were then compared considering the removal of those whose conversion status changed perioperatively, in an attempt to reduce bias.

Data collection

Data collection occurred between June 2014 and June 2015. A data collection form was designed to ensure minimization of bias and was uniform between groups. Collection was performed by 2 investigators who routinely met and discussed the process. Variables considered included demographic parameters (age, gender, body mass index, co-morbidities), intraoperative data (procedural normality, complications) and postoperative data (complications, readmissions and intensive care unit admissions).

Body mass index (BMI) was rounded to the nearest whole number. BMI was then further stratified into cohorts of overweight (25-29.9), obese I (30-34.9), obese II (35-39.9), obese III (40-44.9) and obese IV (above 45).

Outcomes

To determine the primary outcome, surgical safety, the Clavien-Dindo classification system was used (Table 1) [16]. Procedural complications, both intraoperatively and postoperatively, were considered. Severity of complications was graded via consensus between investigators. Our final analysis of the primary outcome included data adjusted for the removal of participants who were planned to undergo OS surgeries but underwent TS conversions instead.

To assess the severity of postoperative complications and assist surgeons to distinguish safety, the primary outcome