



A 5-Year History of Laparoscopic Gastric Band Removals: an Analysis of Complications and Associated Comorbidities

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Published online: 16 January 2019
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Abstract

Objective This study was undertaken to examine the factors contributing to laparoscopic adjustable gastric band (LAGB) removals among adults > 18 years of age. We hypothesized that female patients with multiple comorbidities would have increased removals.

Design This retrospective exploratory study uses internal records and standard statistical methods of analysis.

Results Eighty-five bands were removed (11.8% males, 88.2% females). The average BMI was 40.7 ($n = 83$). 2.4% of patients had removals between 0 and 12 months, 18.8% between 39 and 51 months, and 35.3% between 39 and 64 months. 8.2% of treatment times were unknown. The average treatment time was 67.9 months. 48.2% of patients had ≥ 2 comorbidities, GERD (44.2%) being the most frequent. 49.4% of patients reported dysphagia as the reason for band removal. 22.4% of removals were associated with band failures, none with port complications. The reason for band removal was unknown in 21.2% of patients. 67.1%, 32.9%, and 23.5% attended 30-, 60-, and 90-day follow-up appointments, respectively. Weight post-band removal surgery at 30, 60, and 90 days was noted to be -0.4% , 0.9% , and 0.4% , respectively.

Conclusion This study supports current literature suggesting LAGB may not be an effective long-term surgical intervention for obesity. Patients with > 2 comorbidities had increased rates of removal. Dysphagia was noted to be the primary reason cited for LAGB removal. Postoperative follow-up was found to be a significant challenge for LAGB removal patients. Further study is warranted to explore if these poor follow-up rates should be considered when risk stratifying LAGB patients for revisional surgery.

Keywords Gastric band · Removals

Introduction

Currently, 34% of US adults are considered obese based on calculated body mass index (BMI) greater than 30 [1]. Obesity trends correlate with growing chronic disease burdens, higher costs of medical care, and a troubled healthcare infrastructure [1–4]. In light of this trend, surgery for weight loss has steadily gained popularity in the USA, and laparoscopic surgical techniques have become the cornerstone of bariatric surgical interventions [5, 6]. Among the choices for patients and surgeons is the laparoscopic adjustable gastric band (LAGB). LAGB was heavily advertised to the public, and due to its adjustability, safe placement, and supposed reversibility, it became the number one procedure for obesity, accounting for 42% of bariatric procedures performed in 2008 [7]. In recent years, LAGB has fallen out of favor in most institutions and

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has been replaced by other procedures including laparoscopic Roux-en-Y gastric bypass (LRYGB) and the newer vertical sleeve gastrectomy (VSG) [5, 6]. As of 2016, LAGB accounted for only 3.4% of all bariatric surgical interventions [5]. Unacceptable weight loss, weight regain, dysphagia, chronic emesis, band slippage, erosion, and high rates of revisional surgery have all contributed to the decline of LAGB, with some studies showing failure rates of greater than 65% and removals of over 25% [8–12]. More recent studies comparing LAGB with LRYGB have shown better long-term weight loss, lower rates of late reoperation, and improved remission of comorbidities associated with LRYGB procedures [13, 14]. Although LAGB only accounts for a small portion of the total bariatric procedures of today, patients continue to present for band removals. In this retrospective chart review, the factors contributing to LAGB removal among adults over 18 years of age is explored in order to identify a subset of variables that may be driving continued LAGB removal. The objective of this study is to explore the possible associations of LAGB removal with comorbid conditions, and objectively quantify and describe the reported reasons for LAGB removal. We hypothesize that female patients with multiple comorbidities will have increased rates of removal.

Materials and Methods

In this retrospective chart review, data from 85 patients who underwent gastric band removal surgery at Banner Gateway and Estrella Hospital Bariatric Center in Gilbert, Arizona from 2011 to 2015 was compiled from internal records of clinical notes and operative reports. Variables examined included gender, age, height, initial (pre-surgical) body weight (IBW), and post-surgical body weight (BW). Patient follow-up and BW at 1, 2, and 3 months post-removal were also noted. IBW and BW was then compared at each of the follow-up times and net percent change was calculated. Average BMI was calculated using standard methods. The total treatment time was defined as the number of months since the gastric band was placed with respect to the removal date. Treatment times were then separated into 12-month intervals and removals were then examined as a function of time, with unknown treatment times grouped separately. Reasons for band removal were categorically compiled into failure, slippage, dysphagia, erosion, port complications, and unknown. The comorbidities explored were also categorically disseminated and include diabetes mellitus (DM), hypertension (HTN), polycystic ovary syndrome (PCOS), coronary artery disease (CAD), back pain, obstructive sleep apnea (OSA), gastroesophageal reflux disease (GERD), and ≥ 2 comorbidities. All reasons for band removal and comorbidities were compiled based on clinical documentation. All data was analyzed using standard statistical methods.

Results

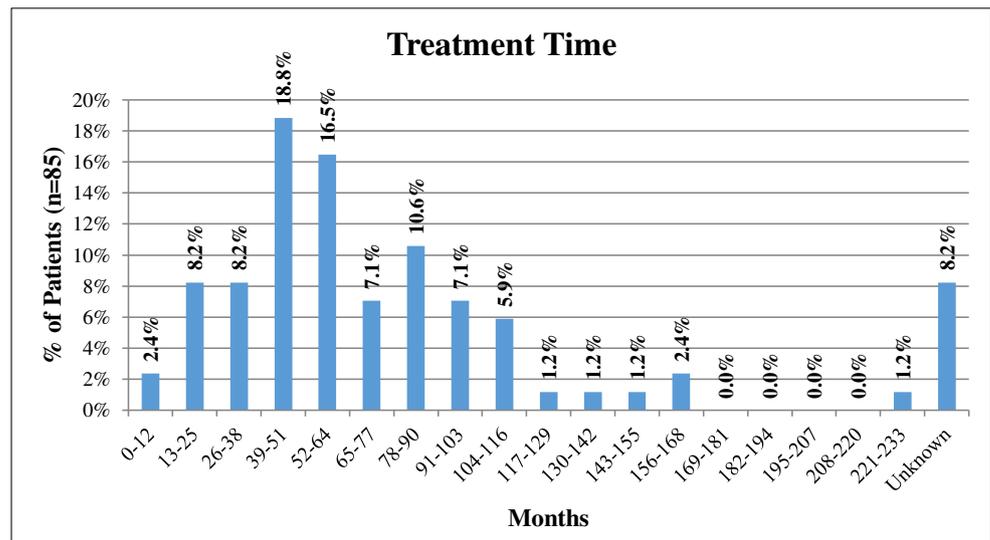
Of the 85 patients, 11.8% were male with an average age of 50 years and 88.2% were female with an average age of 48 years. The average BMI of the patient population at time of band removal was calculated to be 40.7 ($n = 83$). The average treatment time was observed to be 67.9 months. Treatment times varied from 0 to 223 months, with the greatest amount of band removals (35.3%) occurring between 39 and 64 months. The most common 12-month interval of removal, accounting for 18.8% of surgeries, occurred between 39 and 51 months. Only 2.4% of bands were removed between 0 and 12 months, and 8.2% of treatment times were unknown (Fig. 1). Near half (48.2%) of patients presented with ≥ 2 comorbidities. GERD (44.2%), HTN (38.8%), back pain (29.4%), and OSA (23.5%) were among the most frequent associated comorbidities (Fig. 2). The most common reason for band removal was dysphagia, reported by 49.4% of patients, and 22.4% of removals were associated with band failures. However, 0% of removals corresponded with port complications. The reason for band removal was unknown in 21.2% of patients (Fig. 3). Post-surgical follow-up was noted to decrease significantly over time. Of the 85 surgical patients, 67.1%, 32.9%, and 23.5% attended 30-, 60-, and 90-day follow-up appointments, respectively (Fig. 4). Weight after band removal surgery was noted to decrease during the first 30 days by 0.4%. However, 60-day follow-up showed a net increase in body weight of 0.9% and subsequent 90-day follow-up showed an increase of 0.4% (Table 1).

Conclusion

As the era of evidence-based practice continues to drive patient care and surgical interventions, it is critical that studies exploring the efficacy of treatments are undertaken. In this way, established literature drives standard of care. This retrospective chart review is a descriptive study that impacts patient management, subsequent allocation of healthcare resources, and adds to the current body of knowledge on LAGB removal. As hypothesized, females accounted for the majority of the LAGB removals (88.2%). This is likely related to the proportionally higher placements of LAGB in females, although this study did not directly explore the relationship between gender and specific comorbidities, or associated rates of removal.

The data suggests that the band is well tolerated in the first 12 months, with removal of only 2.4% during this time period. There is a sharp increase in band removals (16.4%) between 13 and 38 months. Interestingly, more than 80% of patients tolerated the band for up to 38 months. This further suggests that the LAGB is well tolerated and that many patients presenting for LAGB complications before 38 months may not

Fig. 1 Percentage of removals as a function of time



require band removal. The highest proportion of band removals occurred between 39 and 51 months of treatment (18.8%). Furthermore, the vast majority of removals occurred between 13 and 90 months. This time course is congruent with current literature and may represent a possible therapeutic window [12].

Of the reasons cited for LAGB removal, dysphagia was by far the most frequently reported. Delineating the cause and/or aggravating elements associated with the dysphagia may provide for a means of therapeutic intervention. Band failure, defined as unacceptable weight loss, accounted for 22.4% of removals, and another 21.4% were due to unknown/undocumented causes. It is possible that a portion of these removals were due to failures, and as such, the true failure rate is not fully represented here. Slippage was observed to be the

most frequent postoperative complication, but band erosion was seen infrequently in this cohort (1.2%), and port complications were not seen. As expected, many patients who presented for LAGB removal had significant comorbidities, 48.2% with two or more, the most frequent of which was GERD. Since dysphagia appears to be a significant driver of LAGB removals we postulate that GERD may be a comorbidity that is contributing largely to LAGB removal and further study into this relationship may be necessary to establish a causal effect.

Post-removal weight changes at the 30-, 60-, and 90-day follow-up appointments was also noted. Patients lost an average of 0.4% of their total body weight by the 30-day follow-up, which likely represents postoperative weight loss secondary to intake restriction. At the 60 and 90-day follow-up

Fig. 2 Percentage of patients with comorbidities

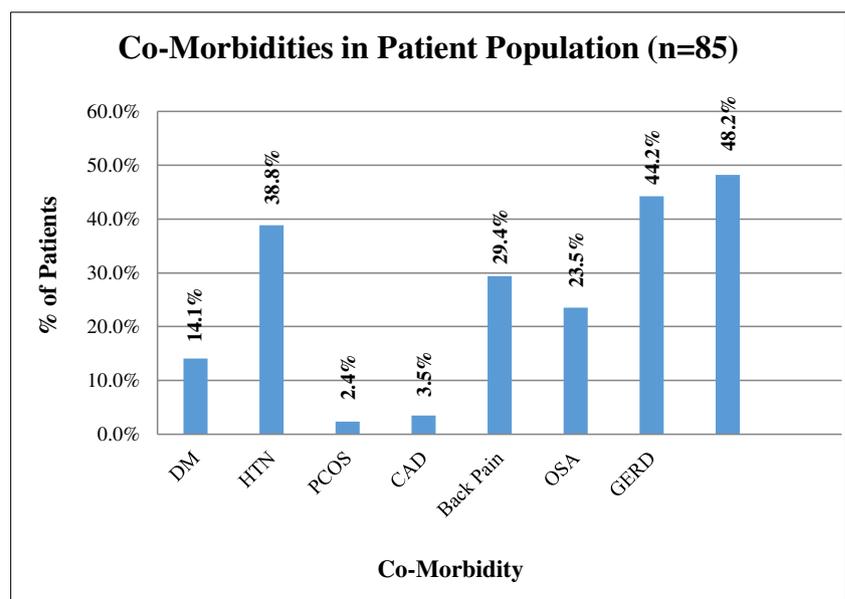
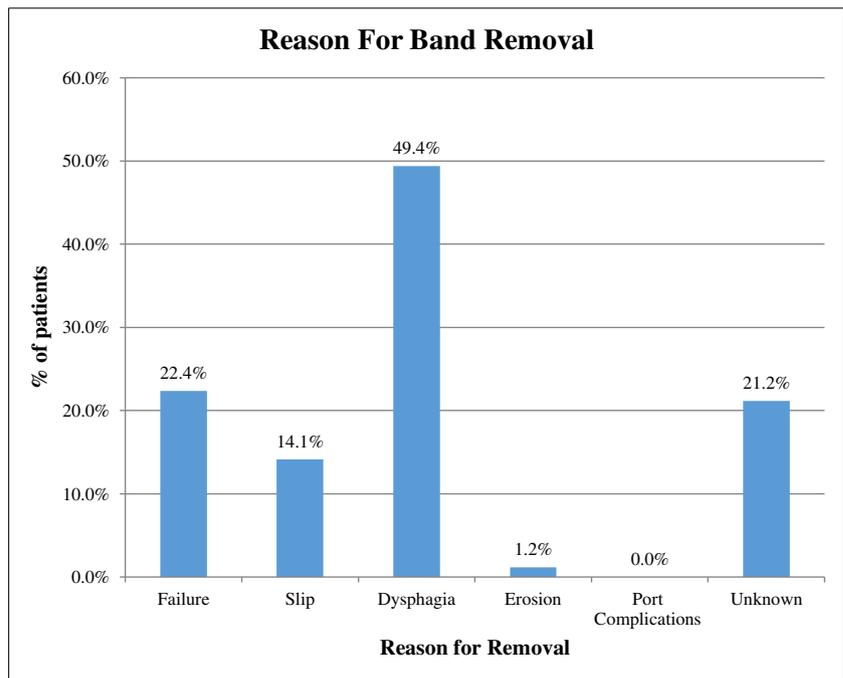


Fig. 3 Reason for LAGB removal



appointments patient weights increased by 0.9% and 0.4%, respectively. These findings suggest that LAGB removal patients quickly begin gaining weight following removal of the band. It is important to note however, that follow-up for this cohort was poor, with over 30% of patients failing to return for evaluation. Figure 4 demonstrates that the percentage of patients presenting for 30-, 60-, and 90-day follow-up appointments progressively dropped and by 90 days, only 23.5% of patients came to their appointment. This low percentage of postoperative follow-ups is troubling. It is possible that poor

pre-removal follow-up and/or compliance may have placed these patients at a higher risk for removal to begin with. It is also possible that some LAGBs may have been spared with proper follow-up by addressing overfill related dysphagia or band failure associated with improper nutritional habits. Furthermore, since conversion surgeries such as the LRYGB and VSG are commonly offered to patients undergoing LAGB removal, postoperative follow-up is of particular importance. Further study is necessary in order to explore outcomes and follow-up rates in patients who undergo conversion surgeries.

Fig. 4 Percentage of patients presenting for follow-up at 30, 60, and 90 days post-op

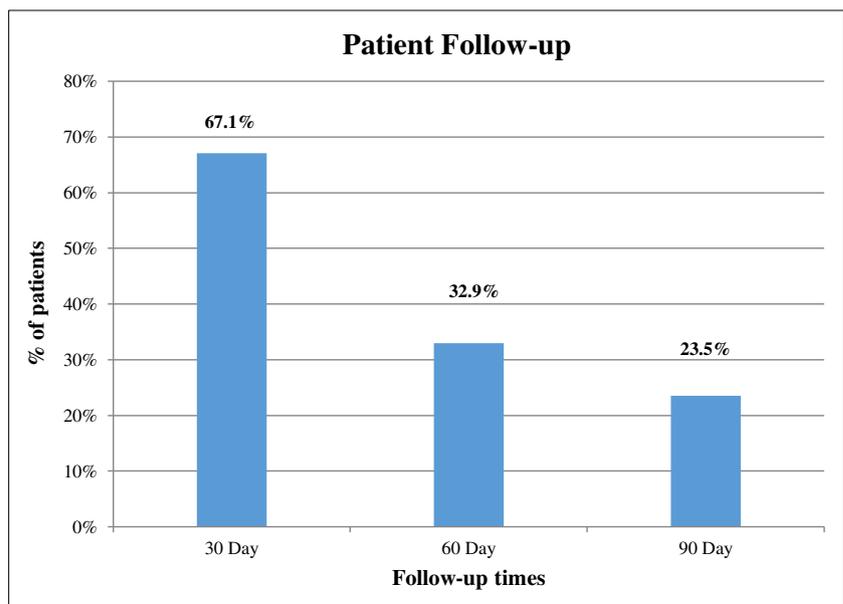


Table 1 Average weights at 30, 60, and 90 days after band removal

Follow-up	30 day	60 day	90 day
Average weight (lb)	251.2	260.3	262.6
% change	−0.4%	0.9%	0.4%

It is possible that LAGB removal patients are at a higher risk for poor post-revisional surgery follow-up rates and increased complications may be seen in this cohort.

Our study suffered from poor capture of various data points often considered mainstays of weight loss literature. After rigorous retrospective data collection it was observed that details such as the reason for band removal, treatment time, band placement dates, and placement locations were often omitted or unknown. With only 85 patients, this study is also limited in power and in scope. Large cohort studies centered on comparing various revisional bariatric interventions for patients who present for LAGB removal may be helpful in understanding how postoperative follow-up and comorbidities affect patient outcomes.

This study supports the current body of literature suggesting that LAGB may not be an effective long-term surgical intervention for patients suffering from obesity. GERD was identified as the most common comorbidity in patients presenting for band removal and patients with greater than two comorbidities where demonstrated to have increased rates of removal. Dysphagia was noted to be the primary reason cited for LAGB removal. Post-op follow-up was a significant challenge for LAGB removal patients and further study is warranted to explore if these poor follow-up rates should be considered when risk stratifying LAGB patients for revisional surgery.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval For this type of study, formal consent was not required.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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