

Concomitant Laparoscopic Adjustable Gastric Banding and Hiatal Hernia Repair, A Retrospective Cohort Study

Keywords: LAGB; Hiatal hernia; Surgical repair LAGB; Hiatal hernia; Surgical repair

Abstract

Background: The recognition and management of diaphragmatic hernias during bariatric surgery remains a challenge and the need for its repair has changed during the last decade. The aim of the current study was to evaluate whether Laparoscopic Adjustable Gastric Banding (LAGB) is a viable solution for patients with a concomitant hiatal hernia discovered during surgery.

Methods: A retrospective cohort study, which included the exposed group composed of patients who underwent LAGB between 2000 and 2016, with a concomitant hiatal hernia discovered during surgery. A control group was randomly chosen from a group of patients who underwent a primary LAGB between these years. The two groups were matched regarding basic demographic variables.

Results: The study included 59 patients, 12 in the exposed group and 47 in the non-exposed (no hernia repair) group. In both groups, BMI decreased after the procedure without significant statistical differences. There was no significant difference in the BAROS score between the two groups. No pronounced difference was found in the general amount of post-surgical complications in the study group compared to the control group. Operating time was longer in the study group.

Conclusion: Hiatal hernia repair during LAGB is as effective as primary LAGB without hiatal hernia.

Introduction

In 1541, Sennertus first detailed the post-mortem finding of a strangulated stomach associated with a diaphragmatic hernia. Four centuries later, recognition and management of diaphragmatic hernias remains much of a challenge to surgeons as it was to Pare. Why operate upon hiatal hernia is still controversial. The Society of American Gastrointestinal and Endoscopic Surgeons has published their Guidelines for the Management of Hiatal Hernia. They advocated that all symptomatic paraesophageal hiatal hernias should be repaired, particularly those with acute obstructive symptoms or which have undergone volvulus. They also stated that routine elective repair of completely asymptomatic paraesophageal hernias may not always be indicated. But what if the patient does not come due to hiatal hernia symptoms? What if it is an accidental finding? This is the case in gastric banding in which we have an excellent view of the diaphragm. What should be done with a hiatal hernia accidentally discovered during a band placement? Should we refrain from operating on it? Hiatal hernia is present in up to 50% of patients undergoing bariatric surgery [1]. The guidelines mentioned above did consider this situation and stated that during operations for Roux-en-Y gastric

bypass, sleeve gastrectomy, and the placement of adjustable gastric bands, all detected hiatal hernias should be repaired. But the level of evidence for these guidelines are considered not evidence based. We have shown in a previous study that the decision not to close a hiatal hernia discovered accidentally during LAGB, could have grave consequences [2]. The Society of American Gastrointestinal and Endoscopic Surgeons has also stated that laparoscopic hiatal hernia repair is as effective as open transabdominal repair, with a reduced rate of perioperative morbidity and with shorter hospital stays. It is the preferred approach for the majority of hiatal hernias, again with no real evidence for this. It seems that there is inadequate long-term data on which to base a recommendation either for or against the use of mesh at the hiatus.

The ideal mesh, or way of hiatal closure, and technique are unknown at this point. The aim of the current study was to evaluate whether hiatal hernia repair during a laparoscopic gastric band placement is a viable solution for patients with a concomitant hiatal hernia discovered during surgery.

Methods

The research question that led us to this study was whether concomitant hiatal hernia discovered during surgery leads to similar post-operative outcomes as seen with normal LAGB patients.

A retrospective cohort study, which included an exposure group composed of patients who underwent LAGB between 2000 and 2016 at our department, with a concomitant hiatal hernia discovered during surgery, and an unexposed group of patients who underwent LAGB without hiatal hernia repair. The study encompassed patients between the ages of 18 and 65 who underwent LAGB (ICD-9 code 44.95) by a single surgical team. All patients fulfilled the inclusion criteria for bariatric surgery (BMI \geq 40 kg/m², or a BMI \geq 35 kg/m² with obesity-related comorbidities) prior to their operation. Detailed explanation of our LAGB procedure and its application has been presented before [3].



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As for the hiatal hernia repair, it was repaired using single 2.0 Ethybond stitches. The number of stitches varied according to the hernia size, but most of the hernias were less than 3 cm, which necessitated no more than 2-3 stitches.

The study was conducted at our Medical Center, under the authorization of the local IRB (SOR0100-11-). The patient list was taken from the OR database and from the personal databases of the surgeons who followed the exposed group. Data was additionally gathered from the computerized records and verified by telephone interviews with the patients. Phone interview was conducted between the years 2013-16. Surgical outcome was assessed according to questionnaire Bariatric Analysis and Reporting Outcome System (BAROS), which is the standardized questionnaire for assessing weight loss and quality of life [4-6] post-bariatric surgery. It presents results of bariatric surgery in a simple, objective, and non-biased way. The BAROS questionnaire consists of five main sections (see also Appendix 1):

Weight loss: calculated as the percentage of decrease in relation to the excess weight of the ideal weight. Maximum score can be given to the overweight drop between 75-100%.

Improvement in obesity: Related morbidity - hypertension, dyslipidemia, cardiac problems, diabetes, obstructive sleep apnea, menstrual disorders, osteoarthritis, and incontinence. Score is given according to improvement in the severity of the problem or its elimination.

Quality of Life (QOL) Indices: 6 sections: a) Self-esteem. B) Physical ability. C) Social ability. D) Functioning at work. E) Sexual function. F) Attitude towards food. Each section is scored on a scale from significant aggravation to significant improvement.

Complications: Early: conversion to laparotomy, infection, suture leakage, bleeding. Late: sleeve stenosis, difficulty drinking and eating (no stenosis). Score is reduced according to the complication.

Recurrent Surgery: points reduced for each surgery.

The work has been reported in line with the STROCSS criteria.

The non-exposed group was randomly chosen among a group of patients who underwent a primary LAGB between 2000 and 2016. The two groups were matched regarding demographic variables.

Power Analysis – the power of the study was calculated using WINPEPI software, by comparing total BAROS score values between groups. Sample size included 12 patients that underwent surgery with hiatal hernia repair (exposed group) and 47 patients that didn't undergo hiatal hernia repair (non-exposed group). In the examination of the power after the experiment, it was found that assuming $\alpha = 0.05$, difference of 1.5 in the BAROS score obtained power of 83.3%.

Statistical analysis

The information was coded and stored in a Microsoft Office Excel file, and then converted to SPSS 23.0 program. Data was analysed first using descriptive statistics. Mean values and standard deviations were used to describe the baseline characteristics of the two study groups. Comparison between groups was done using Pearson Chi square test for qualitative variables, and Fisher's exact test for dichotomous variables.

Comparison of quantitative variables was performed using parametric tests: T-Test and we tested variables that violated the normality assumption with the Mann-Whitney test for non-parametric variables. The level of significance was defined as $p < 0.05$.

Results

Seventy-five patients were enrolled into the study. Of these, 59 patients had all the data gathered: statistical analysis included 12 patients who had hiatal hernia repair during LAGB and 47 in the control group without hernia.

Most of the patients were females (47, 80%) with an average age at operation of 48 years, and the average weight before surgery was 126 kg, that decreased to an average of 91.5 kg during the follow-up period.

The mean BMI during the study decreased by 11.9 kg/m² during the mean follow-up of 84.5 months. Excess BMI Loss Percentage (when ideal BMI is set to 25) on average was 63.7 (± 32.4). The median satisfaction level of patients was 2 (good, ranging from 0 – failure, to 4 – excellent). The average BAROS score was 3.25 (± 2.4).

There was no difference in demographics between groups (Table 1). Comparison of surgical outcomes is presented in Table 2. BMI decreased after the procedure without any significant statistical differences between the groups, and this was also seen in weight at interview, and current BMI and Excess BMI Loss percentage (Table 3). No pronounced difference was found in the general amount of post-surgical complications in the study group compared to the control group. There was no difference in slippage occurrence which is the most frequent severe complication seen in LAGB [7]. There was no significant difference in the BAROS sub-scores between the two groups, except for the medical condition, which was in favor of the hernia repair patients ($p < 0.001$). This caused a shift for the total BAROS score in favor of the hernia repair patients ($p = 0.02$).

Table 1: Patient socio-demographics.

Demographic	No hernia repair (n=47)	With hernia repair (n=12)	p value
Gender (% Female)	81	75	0.695*
Weight before surgery (kg)	128 (± 27)	117 (± 18)	0.184**
Height (cm)	170 (± 11)	166 (± 11)	0.322**
BMI before surgery	44 (± 6)	42 (± 4)	0.162**
Age (years)	49 (± 11)	46 (± 13)	0.581**

* Chi Square test

** Student t-test

Table 2: Surgical outcomes.

Variable	No hernia repair (n=47)	With hernia repair (n=12)	p value
Complications (% with no minor or major complication)	64	49	0.380*
Weight at interview (kg)	93 (± 23)	87 (± 13)	0.414**
Minimal weight attained (kg)	81 (± 23)	82 (± 16)	0.322**
BMI at interview	32 (± 7)	32 (± 5)	0.861**
Delta BMI	12 (± 7)	11 (± 4)	0.325**
Excess BMI Loss (%)	63.6 (34.2)	63.8 (25.1)	0.992**
Slippage rate (%)	36.2	16.7	0.303*

* Chi Square test

** Student t-test

Table 3: BAROS results.

Demographic	No hernia repair (n=47)	With hernia repair (n=12)	p value
Quality of life (mean rank)	31.4	21.5	0.215*
Weight loss excess (mean rank)	29.5	32.1	0.616*
Medical conditions (mean rank)	25.8	46.5	<0.001*
Complication's score (mean rank)	28.3	36.5	0.101*
Total BAROS	3.3 (±2.4)	5 (±1.3)	0.02**

* Mann-Whitney test

** Student t-test

We attribute this change to the fact that most hernia repair patients have stopped suffering from reflux symptoms (78%), whereas in the normal LAGB patients GERD symptoms might even increase.

Discussion

Hiatal hernia can be recognized during elective bariatric procedure. Hiatal exploration is necessary to find and repair hernia of diaphragmatic hiatus. A PUBMED search identified.

20 papers addressing this issue concerning band patients. In the early 1990s, the presence of a hiatal hernia was generally considered a contraindication for gastric banding. In the next few years, reports indicating favourable outcomes following simultaneous repair of hiatal hernias and laparoscopic adjustable gastric banding (LAGB) were seen more and more [1].

Thus, [8] found there is no consensus as to the optimal procedure for patients requiring revision after LAGB. They inquired about the results of revisional operations of the band. They found that reoperation for pouch-related (including hiatal hernia repair) problems after LAGB is safe and effective, and that weight loss is maintained after reoperation. [9] have advocated hiatal hernia repair during laparoscopic adjustable gastric banding (LAGB), declaring that it decreases the rate of reoperation. They have shown in their study that the technical aspects of hiatal hernia repair did not appear to be associated with readmission or reoperation, and therefore a standardized approach may not be necessary. [10] believe that limited evidence exists regarding the outcomes of patients undergoing LAGB with hiatal hernia and concomitant hiatal hernia repair. They studied this group of patients and found that the crural repair is both effective and safe in patients with hiatal hernia that is repaired during primary LAGB, and this lowers the need for revisions later. Our study echoes their results, and we have seen that hiatal hernia repair during LAGB procedures is both as safe and as efficient as normal LAGB operations, with an added bonus of taking care of reflux symptoms. On the other hand, others have seen devastating results when not attending to the hiatal hernia during the LAGB procedure, like [11] who, like our surgical team, needed to revert a patient to sleeve gastrectomy due to necrosis of the stomach. A similar occurrence was seen by [12], who reverted to gastrectomy due to necrosis of the fundus, which resulted in left pleural empyema, just as we have seen with one of our patients [2].

Thus, we have seen in our study that hiatal hernia repair is both feasible and safe during LAGB. But can we avoid this? Can we know before surgery about this pathology and decide to fix it before hand?

[13] have addressed this issue and advocated that preoperative patient evaluation includes an upper endoscopy to assess the baseline integrity of the stomach and rule out pathology.

But upper endoscopy fails to demonstrate the majority of small hiatal hernias in these patients preoperatively. [14] found in their study that endoscopy and pH monitoring do not predict outcome for gastric banding, and therefore stated that these have no relevance in the selection of patients for gastric banding. They felt that hiatal hernias are grossly underappreciated in patients with morbid obesity, due to the presence of a large distal oesophageal fat pad. [13] believe that with post-operative internal weight loss, a small crural defect can become relatively large in a short time. Thus, they believe that performing gastric banding without dissecting and repairing the hiatal hernia can lead to incorrect positioning of the gastric band, which is associated with poor weight loss, chronic reflux, and increased complications. Concomitant hiatal hernia repair is felt by [13] to be a necessary component for the correct placement of the gastric band device, which in turn provides excellent long-term results for these patients. We believe that our study gives the evidence needed for doing so on a regular basis [15] have addressed this and found in their study that adding a hiatal hernia repair to LAGB were indicated significantly reduces reoperation rate. They stated that every effort should be made to detect and repair hiatal hernia during placement of a gastric band, as it will decrease future need for reoperation. Thus, we call upon all bariatric surgeons who use LAGB to be familiar and proficient in this area, and not to hesitate when finding during operation for morbid obesity that once dreaded hiatal hernia, which with today's laparoscopic technique could be easily amended, safely and with no great effort.

Study limitations: As with any study, ours is not flawless and we find 3 areas that limit our study's results. First, it is a single-centre study, which means that we are not sure that our results can be generalized to all surgical facilities. But we believe that we are comparable to other bariatric centres of excellence and thus that our results are at least generalizable to these facilities.

Second is the retrospective nature of our study, which raises the concern of a recall bias. But, due to the fact that a great deal of our data relies on computerized data bases we believe this bias does not prevent us from using our results and interpretations of them. Last but not least is the issue of the sample size, which although it enables us to reject the null hypothesis, is not very big. The answer to all these limitations is conducting a larger, multi-centre prospective study.

Conclusions

Our study has shown that hiatal hernia repair as concomitant operation during LAGB might be effective with LAGB as a primary procedure. Operation results are equal, and the subjective evaluation has shown even superior results in comparison to patients who had no hiatal hernia repair. We may safely advise patients to undergo a hernia repair even if one was not detected before surgery. Several studies [10,13,15] have shown that hiatal hernia repair during LAGB (be it primary or revisional) is safe and effective. They have also shown a decrease in post-operative complication. Our study has added more evidence for doing so. But, not doing so seems to us extremely dangerous to a bariatric patient. This has been seen by others [11,12],

and thus is not incidental. From these stems only one conclusion: If one encounters a hiatal hernia during an LAGB procedure, be it a primary or revisional one, one has to fix this defect or else endanger his patient unnecessarily. The way of fixing it and the management afterwards necessitates further research.

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