

Small Bowel Obstruction After Laparoscopic Gastric Bypass with Nonclosure of Mesenteric Defects

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ABSTRACT

Background and Objectives: There is a wide variation of reported incidence of small bowel obstruction (SBO) after laparoscopic Roux-en-Y gastric bypass (LGB). There is also wide variation in technique, not only in placement of the Roux limb, but also regarding closure or nonclosure of the mesenteric defects. The objective of this study was to examine the incidence and characteristics of SBO after antecolic antegastric bypass with nonclosure of the mesenteric defect of the jejunojunal anastomosis.

Methods: This is a retrospective review of a series of consecutive LGBs over a 3-year period. All procedures were performed by the same surgeon using the same technique. In no case was the mesenteric defect closed. A prospectively maintained database was used for data collection. Patients who returned with an SBO were the study group, and those who underwent revisional bariatric surgery or conversion to open operation were excluded.

Results: There were 249 primary LGBs performed during the study period; 15 of the operations were followed by SBO, for an incidence of 6.0%. Four cases were caused by an internal hernia (IH), for an incidence of 1.6%, and 11 were caused by adhesions, which accounted for 73% of the SBOs.

Conclusions: SBO after LGB is a relatively common complication. The incidence of SBO from IH with nonclosure of the mesenteric defect is similar to that in other series where the defect is closed. Regardless of the cause of the SBO, operative treatment of the patient who has a gastric bypass remains the definitive standard and should not be delayed.

Key Words: Mesenteric defect, Roux-en-Y gastric bypass, Small bowel obstruction.

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The author reports no conflicts of interest.

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INTRODUCTION

Small bowel obstruction (SBO) is one of the most feared complications after a gastric bypass. It can be chronic or acute and can range from a nuisance to the patient to a life-threatening emergency. It can be due to adhesions or an internal hernia (IH). Less common causes include intussusception and intraluminal clots and strictures, among others. SBOs related to adhesions occur after laparoscopic Roux-en-Y gastric bypass (LGB), but IH formation, secondary to the reconstruction of the small intestine, is also of concern to bariatric surgeons. Multiple defects in the mesentery of the bowel can occur and may lead to IH and, in an antecolic bypass, a defect is associated with the Roux limb passing over the transverse colon. The reported incidence of SBO after LGB varies widely, perhaps because the technique used in the operation also varies widely, not only in placement of the Roux limb, but regarding closure or nonclosure of the mesenteric defects. The disparity in reports leads to confusion regarding the true incidence and even the causes of SBO after LGB. In addition, the closure of mesenteric defects is questioned in a substantial body of literature.

The objective of this study was to examine the incidence and characteristics of SBO after antecolic antegastric bypass with nonclosure of the mesenteric defect of the jejunojunal (JJ) anastomosis.

METHODS

Following Health Insurance Portability and Accountability Act guidelines, the author performed a retrospective chart review of a series of consecutive LGBs performed over a 3-year period and recorded in a prospectively maintained database. This study was approved by the local IRB. All patients met the National Institutes of Health guidelines for bariatric surgery. The follow up of the patients included office visits at 1 week, 1 month, 3 months, 6 months, and then, yearly. All procedures were performed by the same surgeon using the antecolic antegastric technique. In no case was the mesenteric defect closed. Patients who returned with an SBO were the study group. Any patients presenting with signs and symptoms of an SBO were emergently taken to the operating room. The

policy of our bariatric program has always been to explore aggressively any patient with suspicion of an SBO, whether based on physical examination, radiographic studies, or history. A negative laparoscopy is considered to indicate a perfectly acceptable outcome in our program. Patients with an SBO were usually taken to the operating room from the emergency department. Those who underwent revisional bariatric surgery or conversion to open operation during the primary surgery were excluded. Revisional procedures were not included because adhesions may have formed from the previous bariatric surgery that could have confounded the results. All patients had given informed consent prior to surgery for their deidentified data to be used for study purposes.

Surgical Technique

The LGB was performed through a 6-port technique with the patient supine. All patients received preoperative antibiotic prophylaxis and enoxaparin. The gastric pouch was sized to 20 mL with an orogastric balloon with 4 to 5 staple loads with Seamguard (W. L. Gore, Flagstaff, Arizona) staple-line reinforcement (SLR) and the Echelon 60-mm stapler (Ethicon Endo-surgery, Cincinnati, Ohio). The small bowel was divided 40 cm from the ligament of Treitz, and the mesentery had minimal division. The only division of the mesentery was from the same staple load that divided the small bowel. The omentum was not routinely divided. The Roux limb was measured to 100 to 120 cm, depending on the body mass index (BMI) of the patient. The Roux limb was antecolic. The gastrojejunal anastomosis was hand sewn in 2 layers with absorbable sutures over a 34 French bougie. The jejunojunostomy was formed with a single firing of the same stapler, and the enteroenterostomy was closed with the stapler. In all cases, an intraoperative endoscopy was used to check the gastrojejunal anastomosis, and drains were used in all male patients because of higher technical difficulty and higher rates of mortality and morbidity; in patients with a BMI over 50, for the same reasons; and in selected cases. There was one conversion to an open operation for an incomplete malrotation; there was no mortality.

RESULTS

There were 249 primary LGBs performed in the study period (January 1, 2011, through December 31, 2013). There were 15 cases of SBO, an incidence of 6.0%. SBO in 4 cases was caused by IH (incidence of 1.6%) and by adhesions in 11 (73%) (**Figure 1**). In the cases with IH, all formed at the mesenteric defect. In the SBOs caused by

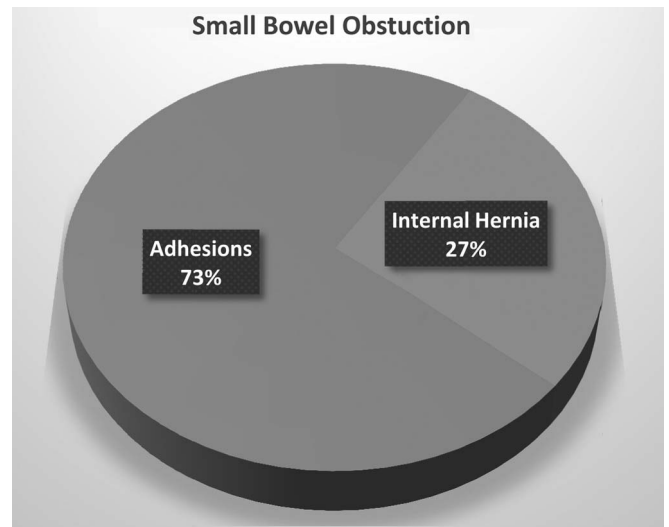


Figure 1. Causes of small bowel obstruction.

adhesions, the most common locations were from the JJ to the Roux limb ($n = 5$), followed by those forming from the JJ to the abdominal wall ($n = 3$), and 1 each from the JJ to the colon and from the JJ to the common channel (**Figure 2**). In all cases, the adhesions were treated with laparoscopic lysis. The average time to SBO was 8.1 months (range, 1–21) from the initial surgery.

DISCUSSION

SBO is common after LGB and can be easily managed or can just as easily lead to disaster if not recognized and treated promptly. The surgical literature has many articles that discuss IH formation, and an area of contention has been closure versus nonclosure of the mesenteric defects. Most authors seem to agree that if a retrocolic gastric bypass is performed, the mesocolic defect must be closed, which can lead to a 0% rate of IH formation,¹ although that number can climb as high as 15%. Antecolic gastric bypasses seem to behave differently. Elms et al² showed that, in almost 2 400 patients who underwent antecolic antegastric bypass, IH formed in only 1.1%, primarily at the mesenteric defect. In those cases the defects had all been closed. Forty-seven percent of the SBOs were from adhesions. Cho et al³ had a 0.2% IH formation rate in 1 400 patients who underwent antecolic antegastric bypasses with no mesenteric closure and no division of the mesentery.³ Rodriguez et al⁴ also reported that minimal division of the mesentery could lead to a decrease in IH formation. They showed that, with closure of the defect but with wide opening of the mesentery, there was a 14.4% IH rate; if the defect was closed and the mesentery was not widely

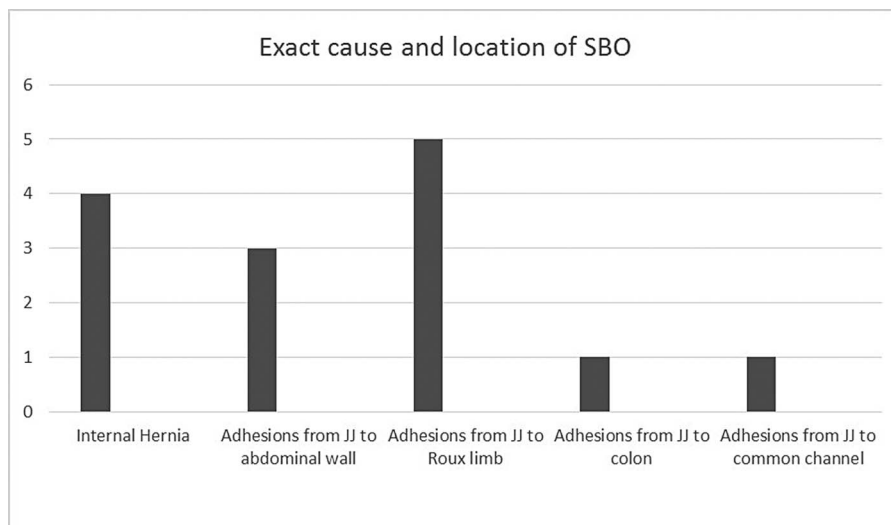


Figure 2. Cause and location of SBOs.

opened, the IH rate dropped to 1.1%. Abasbassi et al⁵ showed a lower IH formation rate with no division of the mesentery, but also no closure of the mesentery. Their rate was 9.6% in 652 patients with a 7-year follow-up. Adhesions were responsible for 22% of the total SBOs. This cumulative experience could indicate that a way to decrease IH formation is to perform a minimal division of the mesentery. Obeid et al⁶ used mixed techniques in both retro- and antecolic bypasses, some with closure of defects, some without. In 679 patients with an antecolic roux limb, the majority of all the defects closed. In the retrocolic group, none of the 235 patients had closure of the defects. Overall, they had a 5% IH formation rate. Almost 4% of these had closure of the mesenteric defect, 8.4% had nonclosure; 3.8% were in antecolic and 8.5% in retrocolic bypasses.⁶

This wide range of techniques makes an overall analysis of the literature difficult. In 2010 in *JLS*, Hope and colleagues⁷ examined the incidence of IH formation after documented closure of mesenteric defects. Permanent sutures were used to close these defects, but 15 of 18 patients in the series presented with open defects, causing IH. These outcomes indicate that closure of the defects may not be as permanent as surgeons would like to believe, and indeed this very situation was the catalyst for this paper. In our LGBs, we were closing all defects, but our IH formation rate seemed to be climbing. We noticed most of the mesenteric defects were open at reoperation, and so we switched to nonclosure. As demonstrated here, the published papers on the subject have reported a wide range of IH incidence, from 0% to 15.5%.²⁻⁷ The data

encompass a spectrum of techniques, surgeons, and experience. Another complicating factor may be that many of the papers published in this area are from surgical programs training fellows, and the association of postsurgical complications with performance of operations by fellows is not known.

In this study, the author specifically examined the incidence and cause of SBO in antecolic antegastric bypasses. In no case was either the mesenteric or antecolic defect closed. The interesting finding was that, of an overall incidence of SBO of 6%, only 1.6% of the total was caused by IH formation, all at the JJ mesenteric defect. This outcome compares favorably with the IH formation rate reported by other authors who did or did not close the defects. Also, the incidence of SBO caused by adhesions is higher in the current study than in some others. Elms et al² reported that 47.6% of the SBOs in their series were secondary to adhesions, mostly at the JJ, compared with our rate of 73%. The adhesions were invariably associated with the staple line. The opposing end of the adhesion had multiple locations, but the staple line of the JJ was always at one end, perhaps because of the intense inflammatory reaction that it generates. This complication is obviously unavoidable, as staplers must continue to be used. A hand-sewn technique could be used to close the common enterotomy and might reduce the incidence of SBO slightly, but the cut end of the biliopancreatic limb still has an exposed staple line.

The strength of this study is in the homogeneity of the technique used, as this was a single-surgeon series.

However, its strength is also its chief weakness, as the results may not be reproducible by others. The number of SBOs is also small enough to raise the possibility of a type II error. The author lives in a geographically isolated part of the country, with no other surgeons who are willing to care for bariatric patients, and so it was more likely that all the SBOs would be treated by the same bariatric surgeon. The brand of stapler was also a constant. Another limitation of the study is that it was a small series with a short follow-up. Although only the years of 2011 through 2013 were examined, and the average time to SBO was 8.1 months, it is possible that the SBO rate will climb in these same patients as time passes, and some of the patients are likely to be lost to follow-up. Another confounding factor is that an SLR was used early in the series at the JJ, but not in later operations. There may be an association of SLR with adhesion formation, but the connection is not clear. The most common location of adhesions was at the JJ, where SLR was used, but about half of the SBOs caused solely by adhesions to the JJ occurred after the use of SLR was abandoned, so there are probably not enough cases to tell if the use of SLR increases SBO. The usual weaknesses of a retrospective study apply to this paper as they do to all other studies about IH formation.

Surgeons should remember that the mainstay of treatment of SBO after LGB is an operation. Nasogastric tube (NGT) decompression has limited to no efficacy at all. An isolated Roux limb obstruction can be decompressed by vomiting, and the placement of an NGT involves risk of a perforation. The surgeon should move the patient quickly to the operating room once an SBO is diagnosed or even suspected, as bowel ischemia can lead to extensive bowel resection and nutritional debility or even death. These operations can often be performed laparoscopically, but laparotomy is also safe and effective.

CONCLUSIONS

SBO is a relatively common complication after LGB. The incidence of SBO caused by IH with nonclosure of the mesenteric defect is similar to that in other series where the defect was closed. Regardless of the cause of the SBO, operation remains the definitive treatment and should not be delayed in the gastric bypass patient.

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