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Original article

Selective approach to use of upper gastroesophageal imaging study after laparoscopic Roux-en-Y gastric bypass

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Abstract

Background: Many institutions routinely perform upper gastroesophageal imaging (UGI) studies on their laparoscopic Roux-en-Y gastric bypass (LRYGB) patients after surgery. We had routinely studied our patients with UGI on postoperative day 1 to rule out an anastomotic leak or obstruction, until recently when we abandoned this practice. As previously reported, we found that routine UGI did not contribute significantly to patient care. The purpose of this study was to determine whether patient outcomes were affected by this change in protocol.

Methods: From March 2004 to September 2005, 508 LRYGB cases were performed at our institution. Linear cutting staplers were used to create both the gastrojejunostomy and the jejunojejunostomy. In each case, the Roux limb was brought up in an antecolic, antegastric configuration. Before changing our protocol, 194 LRYGB cases were performed, and each patient underwent a routine UGI study (group 1). After abandoning this practice, 314 LRYGB cases were performed (group 2), and an UGI study was obtained only if clinical indicators (e.g., tachypnea, tachycardia, nausea, vomiting, low urine output, and/or abdominal pain) were present. The patient demographics, including gender, age, body mass index, length of hospital stay, and complications were recorded in our bariatric database and reviewed retrospectively.

Results: A postoperative UGI study was obtained in 204 patients—in 194 patients routinely (group 1) and in 10 patients because of clinical indications (group 2). No obstructions or leaks were found in any of these 204 patients. In group 2, 304 patients were discharged without an UGI series and did well without any leak or obstruction, except for 1 patient who returned 3 months postoperatively with a stricture at his jejunojejunostomy. No statistically significant differences were found between the 2 groups.

Conclusion: The results of our study have shown that routine UGI studies after LRYGB do not contribute significantly to postoperative patient care at our institution. We now perform them selectively according to clinical indications, without this change adversely affecting our clinical outcomes. (Surg Obes Relat Dis 2008;4:122–125.) © 2008 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords: Laparoscopic Roux-en-Y gastric bypass; Upper gastroesophageal imaging; Anastomotic leak

Obesity is a growing epidemic in the United States that plagues >44.3 million Americans [1]. Surgical therapy for morbid obesity, known as bariatric surgery, has changed significantly since the first account by Mason and Ito [2] of a gastric bypass in 1967. Following the 1991 National Institutes of Health consensus statement, bariatric surgery has gained increasing acceptance, and Roux-en-Y gastric bypass has become the reference standard for bariatric surgery [3].

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The description of laparoscopic Roux-en-Y gastric bypass (LRYGB) in 1994 by Wittgrove et al. [4] ushered in the era of minimally invasive surgical techniques for bariatric surgery. Since 1994, the laparoscopic approach has evolved considerably; however, it remains a technically demanding procedure with a significant learning curve. Compared with the open procedure, LRYGB reduces the hospital stay, postoperative pain, the incidence of pulmonary dysfunction, the incisional hernia rate, and wound complications, while maintaining similar weight loss results [5,6].

Despite the effectiveness of the laparoscopic approach, it is associated with significant morbidity, with complication rates of 20–25% and anastomotic leak rates of 1–6% [7–9]. Therefore, most groups have advocated the routine use of postoperative upper gastroesophageal imaging (UGI) studies to rule out early complications before initiating a liquid diet [10–12]. Recently, this approach has come under considerable scrutiny. The use of routine UGI studies is controversial because of the cost ($750 charge per UGI study with a radiologist's interpretation at our hospital), difficulty in performing an adequate study, patient discomfort, delay in the resumption of a liquid diet, and questionable sensitivity in detecting complications. A handful of groups have transitioned to the selective use of UGI studies as determined by clinical criteria [10,13,14]. In a previous study at the University of California, Los Angeles, we retrospectively reviewed 322 LRYGB cases performed from January 2003 to November 2004 [15]. All these patients had undergone routine UGI studies postoperatively. We found that routine imaging did not contribute significantly to patient care. As a result, we changed our protocol to study only those patients with clinical indicators concerning for an early leak or obstruction. The goal of this follow-up study was to determine whether the patient outcomes were affected by this change in protocol.

Methods

From March 2004 to September 2005, the University of California, Los Angeles laparoscopic bariatric surgery program performed 508 LRYGBs. The patient selection criteria followed the National Institutes of Health consensus statement 1991 guidelines for surgical management of morbid obesity [3]. This included a multidisciplinary approach focused on patient screening, preoperative patient education and preparation, control of co-morbidities, clinical pathways for the inpatient hospital course, and postoperative follow-up. All procedures were performed by 3 experienced bariatric surgeons who had completed laparoscopic surgery fellowships and performed >100 minimally invasive bariatric operations. The steps to each procedure included the formation of a 30-cm^3 gastric pouch, linear totally stapled gastrojejunostomy, 80-cm Roux limb length, and side-side linear stapled jejunojejunostomy. The linear stapled gastrojejunostomy was performed over a 32F Inamed gastric lavage tube with a balloon tip to prevent narrowing of the anastomosis. In addition, this tube was used to rapidly instill 60–120 mL of diluted methylene blue to test for leaking. All intraoperative leaks were repaired with interrupted 2-0 absorbable suture, and the methylene blue test was repeated to confirm anastomotic integrity. In each case, the Roux limb was brought up in an antecolic, antegastric configuration. This differed from the technique used in our previous study in which more than one third of the patients underwent reconstruction with a retrocolic gastrojejunal anastomosis [15]. We adopted the antecolic, antegastric approach in March 2004.

Before changing our protocol regarding postoperative contrast studies, 194 LRYGB cases were performed, and each patient routinely underwent Gastrografin UGI series on postoperative day 1. The patients were evaluated in the standing position. The radiographic examination began with a baseline anteroposterior film of the upper abdomen. The patients were asked to swallow approximately 60 mL of Gastrografin. A series of spot films were taken immediately after the patient began swallowing the contrast. Fluoroscopy was used to follow the course of the contrast. Multiple views were obtained to allow for adequate visualization. A delayed film was taken approximately 30 minutes later to evaluate the progress through the bowel. Occasionally, repeat delayed films were taken to rule out obstruction or ileus. The surgeons reviewed all films with an attending gastrointestinal radiologist. If no evidence of leak or obstruction was found, the patients were started on a liquid diet.

Since abandoning this practice in November 2004, 314 LRYGB cases were performed (group 2). These patients were initially observed. A clear liquid trial was then initiated on postoperative day 1 and advanced as tolerated. Postoperative UGI studies were performed only if clinically indicated. The decision to evaluate these patients with a contrast study was dictated by clinical indicators suspicious for a leak or obstruction, including tachypnea, unexplained tachycardia, nausea, vomiting, low urine output, and abdominal pain.

Our institutional review board approved the study, and the data for all patients were entered into a prospective database. The patients were followed up postoperatively at 2 weeks, 3, 6, 9, and 12 months, and annually thereafter. Demographic information, including age, gender, body mass index, length of hospital stay, and complications, were recorded in our bariatric database and reviewed retrospectively. Student's t test was used to compare the parametric values (age, body mass index), and the chi-square test was used to compare the dichotomous variables (complication rates). The Wilcoxon rank sum test was used to compare nonparametric data (length of hospital stay). All differences were considered significant at $P < .05$.

Results

A total of 508 patients underwent successful LRYGB procedures at our institution from March 2004 to September 2005. Of these, 204 patients were evaluated postoperatively with an UGI series—194 routinely before changing our protocol and 10 after our new protocol had been implemented. These 10 patients had clinical indications concerning for a leak or obstruction; they exhibited a combination of clinical indicators, including tachypnea, tachycardia, nausea, vomiting, low urine output, and abdominal pain. No obstructions or leaks were found in the overall group of patients who underwent UGI studies during their hospital course. Of the 194 patients in group 1 (routine UGI), 5 were readmitted: 3 for nausea, vomiting, and dehydration that resolved with nonoperative management, 1 for pneumonia, and 1 for a pulmonary embolus. These patients recovered with medical management and had no further sequelae. No deaths occurred in group 1.

A total of 304 patients were discharged from the hospital without having undergoing an UGI series (group 2; selective UGI). Of these 304 patients, 6 were readmitted: 1 with closed loop bowel obstruction due to a stricture at his jejunojejunostomy at 3 months postoperatively, 1 for pancreatitis, 3 with nausea, vomiting, and dehydration, and 1 with an acute gastric remnant dilation requiring emergency gastrostomy decompression. All these patients convalesced well and were discharged home in good condition. No deaths occurred in group 2.

All patients were followed up for a minimum of 2 months. Table 1 shows the comparisons between the 2 patient groups in terms of demographics, length of hospital stay, and complication rates. The complication profile for the entire study population is detailed in Table 2. No statistically significant differences were found between groups 1 and 2 with regard to their demographics, lengths of hospital stay, or complication rates.

Table 1
Comparison of demographics, length of hospital stay, and complication rates

Variable	Routine UGI	Selective UGI	*P* value
Average age (y)	43.9 ± 9.83	44.0 ± 10.19	.25
Average initial BMI (kg/m^2)	50.5 ± 5.99	50.8 ± 7.57	.65
Average LOS (d)	2.60 ± 0.66	2.55 ± 0.67	.40
Complication rate (%)	13	10	.37

UGI = upper gastroesophageal imaging; BMI = body mass index; LOS = length of stay.

Data presented as mean ± standard deviation.

Table 2
Complication profile

Complication	%
Overall	11.1
Readmission	2.2
Reoperation	1.2
Anastomotic leak	0
Death	0

Discussion

Routine UGI after LRYGB did not contribute significantly to the postoperative care at our institution, and the present review of our series has demonstrated that performing them selectively has not adversely affected our clinical outcomes. Our results indicate that routine postoperative UGI studies added little information and, therefore, did not alter the care of our patients. In addition, these examinations are not without their disadvantages, including the associated cost of the study, patient discomfort, and a delay in the resumption of a liquid diet. In addition, multiple reports have cited the questionable sensitivity for leak when done routinely [10,11,14]. The sensitivity of the UGI studies can be increased to 100% when selectively performed in patients who exhibit clinical signs suspicious for a leak [13]. The proponents of routine postoperative UGI studies cite the potential for early detection of anastomotic leaks and the ability to treat these conservatively with bowel rest, antibiotics, and closed-suction drainage. We believe that intraoperative methylene blue dye testing and selective UGI according to a clinical protocol are sufficient to identify the leaks in our patient population.

Our results compared favorably with previous reports by Sims et al. [10] and Ganci-Cerrud and Herrera [11] of their experience with routine postoperative UGI studies, although only a small percentage of the procedures by Ganci-Cerrud and Herrera [11] were LRYGB. Both groups reviewed their results from the inception of their programs, and both believed that routine postoperative UGIs had questionable sensitivity in detecting anastomotic leaks and questioned their utility. In a follow-up report to that of Sims et al. [10], Hamilton et al. [16] retrospectively reviewed the same group of patients who had undergone LRYGB. They reported a low sensitivity for UGI (22%) in detecting leaks and suggested that clinical parameters such as tachypnea ≥22 breaths/min and/or tachycardia ≥120 beats/min recorded during the postoperative period were the most useful indicators of a leak. In contrast to these study results, Serafini et al. [17] reported a high sensitivity for routine postoperative UGI studies to detect leaks. This group reviewed the results of 100 consecutive gastric bypass procedures performed at their institution with routine postoperative UGI studies. The postoperative UGI study was able to detect all their anastomotic leaks, and 3 of 4 were treated successfully with conservative management. For the fourth patient, the UGI study was misread, and the patient required operative intervention for the leak. However, only 25 of their patients underwent a laparoscopic procedure, and all leaks occurred in the open cohort.

One weakness of our study was that it was retrospective. Also, LRYGB is a technically challenging operation with an observable learning curve [18,19]. Thus, another weakness was that our patients who underwent routine UGI studies had undergone LRYGB early in our learning curve, in contrast to those from group 2 (UGI studies performed selectively) who had undergone LRYGB late in our learning curve. Finally, although the rationale for performing the Gastrografin UGI study is that the morbidity and mortality of anastomotic leaks will be reduced by early detection, this hypothesis could not be tested in a series in which no leaks occurred.

Conclusion

Our retrospective analysis of the 2 patient groups (routine UGI versus selective UGI) revealed that routine UGI studies did not contribute significantly to postoperative care after LRYGB. We believe that in the hands of experienced LRYGB surgeons, the selective approach to the use of the UGI study is safe. This selective approach will help reduce costs, increase the sensitivity and positive predictive value of the study, and prevent unnecessary patient discomfort and delay in the resumption of an oral diet.

A randomized controlled trial of routine versus selective use of UGI studies, examining the length of stay, total hospital charges, and clinical decision changes made within the first year of follow-up, would provide more objective data to support or reject the claim that selective use of UGI after LRYGB is safe.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

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