Evaluating the Effect of Drain Site on Abdominal Pain after Laparoscopic Gastric Bypass Surgery for Morbid Obesity: A Randomized Controlled Trial

Mohammad Eidy, MD,^{1,2} Fatemeh Jesmi, MD,² Fahimeh Raygan, MD,³
Mohadeseh Pishgahroudsari, BS,² and Abdolreza Pazouki, MD²

Background: Most morbidly obese patients complain of abdominal pain after laparoscopic gastric bypass (LGBP) surgery. In this study, the relationship between the prevalence and severity of pain and the drain site was assessed.

Methods: Fifty morbidly obese patients undergoing LGBP surgery were selected, and a drain was randomly inserted postoperatively to the left 5 mm port in 25 cases and to the right in the other 25. All patients filled out a questionnaire, including a visual analog scale for the quality and quantity of pain, exacerbating and alleviating factors and its relation to patient's positioning, in the first 24 hours, first week, and first month after the operation.

Result: In both groups, all patients had abdominal pain 24 hours after the operation. However, in the right-sided drain group, most patients (52%) experienced mild pain, whereas most patients (56%) in the left-sided drain group had severe pain ($p=0.028$). At weeks 1 and 4, there was no significant difference between the two groups in terms of severity of pain ($p=0.068$ and 0.875 , respectively, for both times). After the first 24 hours and first week, the mean pain score was significantly lower in the right-sided drain group compared to the left-sided drain group ($p=0.012$ and 0.006).

Conclusion: Early abdominal pain after LGBP surgery is significantly reduced in the right-sided drain group.

Introduction

THE NUMBER OF REQUESTS for gastric bypass surgery is critically increasing each year. The number of surgeries being performed annually in the United States for morbid obesity is about 20,000.¹ Roux-en-Y gastric bypass has been proven to be the gold standard operation for morbid obesity.¹ Although minimally invasive surgery is considered as less intrusive surgery, abdominal pain is still one of the most common complaints after this operation.^{2,3} Many causes have been suggested for this syndrome. However, none of them has been proven to be the main factor, and investigation is still continuing.

Different complications occur after laparoscopic gastric bypass (LGBP) surgery, with bleeding and anastomotic leakage reported as among the most significant.⁴ Early detection of these complications is of great importance, as it may reduce patients mortality and morbidity rates.⁵⁻⁷ Different surgeons use different methods during operations, one of which is the use of a drain and its management. Although

there are no evidence-based study supporting the use of a postoperative drain, most surgeons agree with inserting a drain after surgery.⁸

Drain usage is verified in laparoscopic cholecystectomy, and studies have shown that it is associated with postoperative pain.⁹ Most surgeons recommend the use of a drain for all morbidly obese patients after gastric bypass surgery.⁸

This study evaluated the possible association between the position of the drain site and postoperative pain, measuring its prevalence and severity after LGBP surgery.

Method

In this study, 50 morbidly obese patients were selected, including patients with a body mass index (BMI) $>40 \text{ kg/m}^2$ or those with a BMI $>35 \text{ kg/m}^2$ with concomitant diseases (such as hypermetabolic conditions, diabetes mellitus, hypertension, hyperlipidemia, pulmonary diseases, nonalcoholic steatosis, stress incontinency, venous stasis, hyperventilation syndrome, and gastroesophageal reflux disease) from the

¹Fellowship of Laparoscopy, Kashan University of Medical Sciences, Kashan, Iran.

²Minimally Invasive Surgery Research Center, Iran University of Medical Sciences, Tehran, Iran.

³Rajaie Cardiovascular Medical and Research Center; Iran University of Medical Sciences, Tehran, Iran.

TABLE 1. THE PREVALENCE OF PAIN SEVERITY AFTER LAPAROSCOPIC RYGB IN TWO GROUPS

Time	Group and severity of pain					
	R group			L group		
	Mild	Moderate	Severe	Mild	Moderate	Severe
Day 1	13 (52%)	7 (28%)	5 (20%)	6 (24%)	5 (20%)	14 (56%)
Week 1	12 (85.7%)	2 (14.3%)	0 (0%)	8 (53.3%)	7 (46.7%)	0 (0%)
Week 4	3 (37.5%)	2 (25%)	3 (37.5%)	3 (42.9%)	1 (14.3%)	3 (42.9%)

RYGB, Roux-en-Y gastric bypass; R group, right-sided drain; L group, left-sided drain.

obesity clinic at Hazrat Rasoul Akram Hospital from February 2012 to August 2013.

Before the operation, all of the patients took 5,000 IU unfractionated heparin subcutaneously and 2 g keflin intravenously for prophylaxis. All patients were operated on by one surgical team, and an optical port was used to access the abdomen and to insufflate. Five ports were entered in each operation to the abdomen (an 11 mm port for the camera, 14–18 cm away from the xiphoid process in the midline, based on each patient's height; a 12 mm port in the left midclavicular line at camera level; a 5 mm port in the anterior axillary and subcostal line; a 5 mm port in the right midclavicular line; and a 5 mm port at subxiphoid level.) Patients were divided in two groups—a right-sided drain (R) group and a left-sided drain (L) group—according to a randomization code developed by a computerized random number generator. Hence, the 5 mm port was randomly inserted from the right abdominal side for 25 patients and from the left side for 25 patients.

Gastric bypass was performed with a double technique in an antecolic antigastric pattern for all patients. Staples were used for all anastomoses, and the handsewn technique was used to close the staple insertion site. The mesenteric and fascial defect was left open, and no intervention was made to repair it. A leak test using air was done at the end of operation for all cases. At the end of the operation, the Penrose drain was inserted. One day after the operation, a Gastrografin test was done, and the drain was removed if the test was negative.

Patients were excluded from the study if any complication occurred during the operation, if a leak was detected any time after the operation, or if the operation was converted to open surgery.

A questionnaire, including a visual analog scale (VAS) score, quality and quantity of pain, exacerbating and alleviating factors, and its association with the patient's position, was filled by all patients 24 hours, 1 week, and 1 month after the operation.

Statistical analysis was performed using SPSS Statistics for Windows v11.5 (SPSS, Inc., Chicago, IL). Mean and standard deviations for quantitative variables and frequency (percent) for qualitative variables were calculated. Analysis of the data distribution was assessed by the Kolmogorov–Smirnov test. For normally distributed data, an independent samples *t*-test was used, and for non-normally distributed data, Mann–Whitney's *U*-test was used to compare the two groups. For qualitative data, chi square or Fisher's exact test was used. A *p*-value of <0.05 was accepted as indicating statistical significance. The quantitative data were expressed

as mean $\pm$ standard deviation (SD), and frequency was used for the qualitative data.

Results

Fifty morbidly obese patients who were candidates of LGBP surgery were studied. The patients were randomized based on drain site into two groups: a right-sided drain group (R group) and a left-sided drain group (L group). There was no significant differences in mean age (35.20 ± 6.20 years vs. 37.80 ± 8.86 years; $p = 0.225$), mean BMI (41.24 ± 5.19 kg/m² vs. 41.92 ± 6.30 kg/m²; $p = 0.679$), or gender (21/84% vs. 20/80% females; $p > 0.05$) between the two groups.

While all patients had abdominal pain 24 hours after the operation, analysis revealed that there was significant difference in the severity of pain at the drain site (mild, moderate, and severe) between the two groups ($p = 0.028$). In the R group, most patients (13/52%) reported mild pain, whereas most patients in the L group (14/56%) reported severe pain at the drain site. Table 1 shows the severity of pain at all intervals. The mean pain score (VAS) was also significantly lower in the R group compared with the L group ($p = 0.012$). Table 2 illustrates the VAS scores at all intervals. After 1 week, the mean pain score was significantly lower in the R group compared to the L group ($p = 0.006$).

At week 1, there was no significant difference between the two groups with respect to pain: 14 (56%) patients in the R group and 15 (60%) in the L group experienced pain at week 1 ($p = 0.774$). At week 4, 8 (32%) patients in the R group and 7 (28%) in the L group had pain at the drain site ($p = 0.758$). There was also no significant differences in the severity of the pain ($p > 0.05$) at these time points. As shown in Table 1, at week 1, most patients had mild pain (85.7% in the R group vs. 53.3% in the L group; $p = 0.068$), and no one had severe pain. The mean pain score was, however, significantly lower in the R group ($p = 0.006$).

At week 4, there were no significant differences in the severity of pain ($p = 0.875$) or in the mean pain score (4.25 ± 2.87 vs. 4.86 ± 2.19 ; $p = 0.589$) between the two groups, as the

TABLE 2. MEAN PAIN SCORES (VISUAL ANALOG SCALE) IN THE TWO GROUPS

Postoperative period	R group	L group	p-Value
After 24 hours	4.12 $\pm$ 2.45	5.92 $\pm$ 2.41	0.012
Week 1	2.07 $\pm$ 1.14	3.53 $\pm$ 1.35	0.006
Week 4	4.25 $\pm$ 2.87	4.86 $\pm$ 2.19	0.589

frequency of patients who had experienced mild and severe pain were the same in both groups (Table 1).

Discussion

As shown in the results, the R group had significantly less pain at the drain site after 24 hours and 1 week ($p=0.012$ and 0.006), which mostly included mild pain (85.7%) by week 1. Although this difference was not statistically significant after 1 day or 4 weeks, the mean VAS score was less at all time intervals. Also 52% of pain after 24 hours was mild in the R group, but 56% of pain at the drain site was severe in the L group, which shows the priority for using a right-sided drain.

The use of a drain after an abdominal operation is one of the most problematic issues for surgeons.^{8,9} There is controversy for prophylactic drain insertion after bariatric surgery, and some surgeons do not recommend it. However, most surgeons use a drain at the end of the operation for early diagnosis and treatment of complications, especially leakage or bleeding.¹⁰

LGBP surgery techniques have changed over the last few years, and much progress has been made to improve treatment for morbid obesity.¹ One of the most important complaints by patients after LGBP surgery is abdominal pain. About 13–30% of patients who come to the emergency room during the first 3 years after their operation have abdominal pain. Researchers have demonstrated that abdominal pain exists in more than half of patients after the surgery.^{2,3,11}

Tzovaras *et al.* and Monsoon *et al.* found that in elective laparoscopic cholecystectomy, abdominal pain is more prevalent in patients with a drain.^{12,13} In the present study, on postoperative day 1, all patients had abdominal pain, and in both groups, the most prevalent site for the pain was the drain site, which is similar to results to obtained for cholecystectomy procedures. However, the difference between the right- and left-sided drain have been proven: the right-sided group experience less pain in the first week after the surgery. In other studies, authors have found that the most prevalent site for abdominal pain after LGBP is the left upper quadrant, which does not seem to be related to the drain site.¹⁴

In laparoscopic Roux-en-Y gastric bypass surgery, the authors state that the postsurgical abdominal pain might be related not only to the drain site but also to other etiologies, as different etiologies have been proposed to contribute to postsurgical abdominal pain, including rapid abdominal distension due to fast eating,¹³ food intolerance and nutritional deficiency,¹⁵ gastrointestinal dysfunction,^{16,17} or changes in Oddi sphincter function due to gallbladder stones.¹⁸ Gastric ulcer,^{19,20} gastroesophageal reflux disease,^{1,21,22} and stenosis in the anastomotic site may cause pain in 5–10% of patients,^{23,24} trocar site hernia in 0–1%, adhesion band in 1–2%,^{25,26} incisional hernia in 1–9%,^{23,24} and intussusception in 1%.²⁶ Omental torsion, infarction,^{27,28} and bezoar obstruction^{29,30} are other suggested causes.

Among various etiologies suggested, none has been documented until now. By using a drain on the right side of the abdomen, early pain may be reduced, but for later abdominal pain further studies with a greater sample size and in different ethnicities are needed to establish the true statistics.

Acknowledgments

This research has been supported by Iran University of Medical Sciences and Health Services, Tehran, Iran, by grant No. 90-04-140-16157.

Author Disclosure Statement

No competing financial interests exist.

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Address correspondence to:

Abdolreza Pazouki, MD
Hazrat Rasool Akram Hospital
Niayesh Avenue, Sattarkhan Street
Tehran
Iran

E-mail: apazouki@yahoo.com