Is the Use of Prosthetic Mesh Recommended in Severely Obese Patients Undergoing Concomitant Abdominal Wall Hernia Repair and Sleeve Gastrectomy?

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BACKGROUND: The concomitant use of nonabsorbable mesh during stapled bariatric surgery has been discouraged due to potential contamination. The aim of our study was to compare and quantify the extent of bacterial load and gross contamination of the peritoneal cavity in patients undergoing laparoscopic sleeve gastrectomy (LSG) vs those undergoing laparoscopic Roux-en-Y gastric bypass (LRYGB).

STUDY DESIGN: We prospectively enrolled all patients undergoing LSG and LRYGB. Peritoneal fluid aspirate samples were collected from each subject. Sample A was obtained at the beginning of the procedure, and sample B was obtained at the end of the procedure either from the staple line wash of the LSG or the gastrojejunostomy in the LRYGB.

RESULTS: A total of 77 patients (51 LSG and 26 LRYGB) and 154 samples (102 from LSG and 52 from LRYGB) were included in this study. All samples obtained at the beginning of each procedure (sample A) were culture negative. Samples of peritoneal fluid obtained at the end of the procedure (sample B) in sleeve gastrectomy procedures were all negative (0%) after a minimum of 72 hours for aerobic and anaerobic cultures. Those obtained for LRYGB (sample B) were culture positive in 4 of 26 (15%). The latter results are statistically significant ($p < 0.05$).

CONCLUSIONS: Intraperitoneal bacterial cultures in patients undergoing LSG are negative, contrary to those in patients undergoing LRYGB. The concomitant use of prosthetic material to repair ventral hernias in patients undergoing an LSG procedure should be safe and feasible. (J Am Coll Surg 2014;218:358−362. © 2014 by the American College of Surgeons)

Severe obesity represents a well-known predisposing factor for development of abdominal wall herniation, as well as a predictor of failure of its surgical treatment. Increased intra-abdominal pressure and poor wound healing as well as increased rate of infection are considered the main factors for poor results. In fact, obesity alone may represent a greater risk factor for incisional hernia than the chronic use of steroids.[1] As we continue to witness a constant increment in the prevalence of obesity, a rise in abdominal wall hernias that might require surgical repair should be anticipated.

Laparoscopic sleeve gastrectomy has been recognized by the American Society for Metabolic and Bariatric Surgery (ASMBS) as an acceptable primary bariatric procedure, and it is expected to become the most popular procedure in the near future. Based on these 2 trends, bariatric surgeons will more frequently encounter a subgroup of patients with abdominal wall hernias presenting for LSG, posing a therapeutic dilemma.[2]

The purpose of this study was to assess the presence of intraperitoneal bacterial contamination in patients undergoing LSG, in order to establish the safety of using synthetic prosthetic meshes for concomitant ventral hernia repairs. To our knowledge, this is the first literature report on the subject.

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Abbreviations and Acronyms
CFU = colony forming units
LRYGB = laparoscopic Roux-en-Y gastric bypass
LSG = laparoscopic sleeve gastrectomy

METHODS

This study was conducted under an institutional review board-approved protocol, and in accordance with the Health Insurance Portability and Accountability Act (HIPAA) regulations relating to human research subjects. After informed consent was obtained, consecutive patients undergoing primary LSG and LRYGB, the latter serving as a control group, were prospectively enrolled. All patients received a preoperative dose of prophylactic antibiotics, usually a first generation cephalosporin (cefazolin 2g IV), or, in cases of documented allergy, 900 mg clindamycin, within 1 hour before incision.

The detailed techniques of LRYGB and LSG used by our institute have been previously reported.[3,4] For the LRYGB, the posterior aspect of the gastrojejunostomy anastomosis was performed using a linear stapler device, and the anterior part was sutured closed using a double layer of 2-0 absorbable suture. The jejunojejunostomy was created using a triple stapling technique. For the LSG, the staple line was created with a linear stapler and completely imbricated using absorbable sutures.[3,4]

Sampling techniques

Two aspirate samples were collected from each patient. The first sample (sample A) consisted of a 5-mL wash of the peritoneal cavity, obtained at the beginning of the procedure, after full access was gained to the abdomen and all trocars were in place. The second sample (sample B) was a 5-mL wash of the staple line of either the sleeve gastrectomy or the gastrojejunostomy performed during the gastric bypass. Sample B was obtained at the end of the procedure, just before exit and desufflation of the abdominal cavity.

After complete trocar placement and identification of abdominal structures, a suction/irrigator device was inserted through a 5-mm port and saline solution was injected in the left upper part of the peritoneal cavity. This fluid was allowed to lie on the stomach for several seconds before sampling (sample A). The fluid was collected in a 20-mL specimen container (Lukens trap), sealed, labeled, and taken to the microbiology laboratory. In order to obtain sample B, at the end of the procedure, the suction/irrigator device was once again introduced via a 5-mm port. Five mL of saline solution was infused over the imbricated staple lines or oversewn gastrojejunostomy and suctioned into the Lukens trap. The container was then sealed, labeled, and transferred to the clinical microbiology laboratory.

Clinical microbiology analysis

Once samples were collected, aerobic and anaerobic cultures were inoculated using colony count technology. Aerobic cultures were performed on trypticase soy agar with 5% sheep blood plates (TSA) and incubated at 37° degrees Celsius for no less than 72 hours. Anaerobic cultures were performed on CDC 5% sheep blood agar and incubated at 37° degrees Celsius for no less than 3 days under anaerobic conditions using the BD Gas Pak EZ Pouch System (BD Diagnostics). The initial inoculation was made using a sterile loop of 0.01 mL and full plate streaking was performed. Plates were then removed and colonies were counted. Each colony represented 100 colony forming units per milliliter (CFU/mL).

For statistical analysis of the results, a 2-tailed Fisher's exact test of a 2 × 2 contingency table was performed.

RESULTS

A total of 77 patients (51 LSG, 26 LRYGB) were enrolled in the study. Forty-two were women and 26 were men, with a mean age of 49.2 years (range 22 to 51 years). There were no demographic differences between the 2 groups of patients (Table 1).

There was no morbidity or mortality in this series. Also, all longitudinal gastric staplings used to create the sleeve were completed with 100% success. No staple line disruption occurred, either due to technical error or device malfunction.

All 77 samples taken at the beginning of each procedure (samples A) showed, as expected, no bacterial growth, indicating a sterile peritoneal cavity (Table 2). None of the 51 samples taken from LSG patients at the end of the procedure (samples B) had a positive bacterial culture after a minimum of 72 hours of incubation at 37°C in aerobic and anaerobic conditions. In the LRYGB group, 4 of the 26 (15%) samples taken at the end of the procedure (sample B) were positive for bacterial colony

Table 1. Demographics of the Study Population

Patient data, mean	LSG	LRYGB	Total	p Value
n	51	26	77	-
Female: male ratio	31:20	19:7	50:27	-
Age, y	48.3	51.4	49.2	0.39
Weight, lb	264.9	284.4	270.9	0.21
Body mass index, kg/m^2	44.8	43.5	44.4	0.63

LRYGB, laparoscopic Roux-en-Y gastric bypass; LSG, laparoscopic sleeve gastrectomy.