

# Perforated Small Bowel Diverticulitis After Gastric Bypass

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## ABSTRACT

We report a rare case of complicated jejunal diverticulitis in a patient with previous bariatric surgery. Small bowel diverticulosis is generally considered an inoffensive disease. In this report we describe a case of small bowel perforation in an obese subject who had undergone laparoscopic Roux-en-Y gastric bypass.

**Key Words:** Small bowel diverticulosis, Gastric bypass, Perforation.

## INTRODUCTION

The morbid obesity prevalence in developed countries is constantly increasing. It is estimated that 1 in 3 persons in the United States is obese (body mass index [BMI]  $>30$  kg/m<sup>2</sup>), whereas 5.7% of the general population has a BMI higher than 40 kg/m<sup>2</sup>.<sup>1</sup> Bariatric surgery remains the most effective treatment for morbid obesity, and laparoscopic Roux-en-Y gastric bypass (LRYGBP) continues to be the preferred operation.<sup>2-4</sup> Acquired diverticular disease of the small bowel is a rare condition that is associated with complications in about 10% of cases. We report the case of a woman with perforated acute diverticulitis of the Roux loop 4 years after undergoing bariatric surgery.

## CASE REPORT

A 63-year-old female patient who previously had undergone LRYGBP in 2007 for morbid obesity (BMI, 42 kg/m<sup>2</sup>) came to the emergency department 4 years later with a 24-hour history of abdominal pain and low-grade fever. Physical examination showed a BMI of 34 kg/m<sup>2</sup> and focal left upper quadrant tenderness with peritoneal signs. Blood tests showed sepsis parameters, with a C-reactive protein level of 19 mg/L and 15,000 white cells/mm<sup>3</sup> with neutrophilia. A computed tomogram of the abdomen showed an increased-density area on the mesenteric fat close to the alimentary limb of the bypass, as well as several gas bubbles surrounding the jejunal loop (**Figure 1**).

A presumptive diagnosis of intestinal perforation was made, and the patient underwent a surgical intervention by a laparoscopic approach. On exploration, a thickening of the alimentary loop due to several inflamed jejunal diverticula was identified with localized peritonitis. Jejunal resection, of a segment about 15 cm long, and laterolateral anastomosis were performed. Pathologic evaluation of the resected jejunum was suggestive of various diverticula in the intestinal mesenteric border with signs of perforation and hematoma (**Figure 2**). The patient was successfully discharged on the sixth day after the operation. A barium swallow study after surgery confirmed the presence of multiple small bowel diverticula (**Figure 3**).

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**Figure 1.** Preoperative computed tomography scan showing increased density of the omentum mesenteric fat and pneumoperitoneum.



**Figure 3.** Upper gastrointestinal series with multiple jejunal diverticula present.



**a**



**b**

**Figure 2.** Surgical specimen. **a.** Multiple diverticular orifices. **b.** Perforated diverticulum (right arrow) and hemorrhagic diverticulum (left arrow).

## DISCUSSION

The incidence of small bowel diverticula in the general population is reportedly lower than 1%. Small bowel diverticulosis occurs more commonly in the duodenum (79%), whereas a jejunoileal location is found in 18% of cases. Only 3% of patients have small bowel diverticula in all intestinal segments.<sup>5</sup> According to Krishnamurthy et al.,<sup>6</sup> the pathogenesis of diverticula is associated with intestinal motility disorders, such as visceral myopathy or neuropathy, and systemic sclerosis. Abnormal bowel movements and increased intraluminal pressure would lead to the appearance of diverticula in “weak” areas, such as those at the level of intestinal vasa recta. Other authors mention the role of obesity, constipation, and venous stasis in the etiology of small bowel diverticula.<sup>7</sup> Aldoori et al.<sup>8</sup> suggest a relationship between the diverticula and a lack of physical activity, whereas Koch and Schoon<sup>9</sup> describe the existence of familial cases.

Although most small bowel diverticula are found incidentally during gastrointestinal examination, complications caused by small bowel diverticulosis requiring medical and/or surgical treatment have been reported in more than 10% of patients. It seems that the risk of acute complications is related to the length of the affected segment<sup>5,7</sup>; however, prophylactic small bowel resection does not appear to be justified.<sup>10–13</sup>

To our knowledge, this is the second reported case of complicated small bowel diverticulitis in a patient with previous bariatric surgery. Nevertheless, there are some differences between our case report and that published by Iannelli et al.<sup>14</sup> We describe a perforated small bowel diverticulitis 4 years after the LRYGBP operation, whereas the complication in the article by Iannelli et al. was noticed 2 months after the procedure. In both cases, the patients remained obese while complications were documented, and the literature suggests obesity as a major risk factor predisposing patients to formation of diverticula. Unfortunately, we do not order double-contrast small bowel series before LRYGBP and cannot speculate on the exact moment of development of diverticula.<sup>7</sup> Despite the patient's local peritonitis and mild obesity, we performed the reoperation by a laparoscopic approach. In the patient of Iannelli et al., emergency surgery was performed by laparotomy and the perforated diverticulum distal to the gastrojejunal anastomosis was removed. In relation to the surgical specimen, perforated and hemorrhagic diverticulitis was identified in our patient, suggesting an extensive small bowel diverticulosis, in contrast to Iannelli et al., who located a perforation in an isolated diverticulum.

Theoretically, a bariatric restrictive (or mixed) procedure would result in increased intraluminal pressure during the first postoperative months and a higher risk of small bowel diverticula developing. Besides, the acquired diverticula have a thin wall, which makes them more prone to perforation. Another hypothesis regarding the pathogenesis of perforation of the diverticula might be the increased exposure of the jejunal mucosa to acid. The association between acid exposure and the mucosal lesions has been shown in patients with anastomotic ulcers that appear after a gastric bypass and correlates significantly with increased gastric secretion and larger pouches.<sup>15,16</sup>

Laparoscopic sleeve gastrectomy (LSG), which is being increasingly performed, has emerged as a new bariatric surgical procedure because of its simplicity and safety, as well as short-term results similar to those of LRYGBP.<sup>17</sup> Consequently, LSG indications have been widely amplified.<sup>18</sup>

In the setting of small bowel diverticula, our suggestion is to change the preoperative strategy to an LSG. The lack of an intestinal anastomosis and the absence of gastrointestinal bypass should be the main advantages in this hypothetical scenario. Besides, after LSG, we dispose the possibility to endoscopically explore the entire gastrointestinal tract if required.

On the other side, laparoscopic intraoperative identification of diverticula can be extremely difficult in the

morbidly obese patient. The thickened mesentery fat and the location of the diverticula on the mesenteric margin are the factors associated with an intraoperative misdiagnosis.

Finally, a logical suggestion for the diagnostic workup when a small intestinal diverticulosis is suspected would be to obtain a double-contrast small bowel series. However, because of its rarity, routinely obtaining preoperative double-contrast small bowel series in bariatric patients seems not to be indicated because of concerns regarding its low cost-effectiveness.

## CONCLUSION

Small bowel diverticulosis is an uncommon clinical entity. Intraoperative laparoscopic detection of small bowel diverticula may be difficult in the morbidly obese patient. When detected, we recommend not performing LRYGBP to avoid possible complications associated with the Roux loop. Sleeve gastrectomy would be indicated in the case of a morbidly obese patient with small bowel diverticular disease who requires surgical treatment.

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