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INTRODUCTION

Obesity and associated metabolic syndrome are gradually increasing globally. Over 300 million adults worldwide are estimated to be obese (body mass index, [BMI]> 30 kg/m²). Obesity is a potent and independent risk factor for type 2 diabetes mellitus, coronary artery disease, stroke, and other metabolic diseases; besides, it is associated with increased mortality (1). The International Federation for the Surgery of Obesity and Metabolic Diseases reports that bariatric procedures performed for obesity reached 460,000 in 2013. The most commonly performed bariatric procedures are gastric bypass, sleeve gastrectomy, and

Acute abdomen due to jejunojejunostomy anastomosis leak after laparoscopic gastric bypass in the third month

Abstract

Today, obesity is observed with an increasing frequency. Laparoscopic Roux-en-Y gastric bypass (LRYGBP) is the gold standard for the treatment of obesity. With the technological advances in surgery and increasing laparoscopic surgical experience, LRYGBP is performed safely with very low morbidity and mortality rates. Still, the incidence rate of serious complications is 4% and the mortality rate is around 0.1%. Fistula and leaks are the leading complications associated with increased mortality and morbidity. The likelihood of a late leak at the jejunojejunal (JJ) anastomosis is below 0.5%. In our case report, we aimed to present a 27-year-old obese woman who developed an acute abdomen due to a leak at the JJ anastomosis in the third month (10th week) after LRYGBP. This is one of the rare case reports of a late JJ anastomotic leak in the literature. Although rare, this complication that may develop in the late period may be quite fatal and the early intervention will be lifesaving. While laparoscopic methods may be used for the treatment, open surgery may be used in patients with advanced peritonitis who were delayed. It may be suggested that physicians in obesity surgery units and emergency departments should keep in mind the development of potential late JJ anastomotic leaks after LRYGBP and act energetically about their diagnosis and treatment.

Keywords: Morbid obesity, laparoscopic gastric bypass, anastomosis leakage, acute abdomen

laparoscopic adjustable gastric banding. Laparoscopic Roux-en-Y gastric bypass (LRYGBP) is considered the gold standard treatment method, which is increasingly performed. During LRYGBP surgery, the stomach is divided into two separate sections, upper and lower, with the help of staples. The upper part is left smaller to decrease the volume and gastrojejunostomy is performed to ensure the passage of nutrients. Depending on the surgeon's preference, the stomach and duodenum are usually anastomosed to 50-150 cm of jejunum by JJ anastomosis, ensuring the bile flow (2). Although high success rates specific to the procedure performed in bariatric surgery are achieved, different

complications may develop depending on the procedure. These complications can be divided into early and late complications. Several late complications have been reported in the literature. Our patient also underwent LRYGBP. The patient who had an acute abdomen due to JJ anastomotic leak at Week 10 was presented.

CASE REPORT

A 27-year-old obese female patient presented to our emergency department with complaints of abdominal pain, nausea, and vomiting that have been existing for two days and have worsened progressively. It was learned from her medical history that she underwent laparoscopic sleeve gastrectomy (LSG) due to obesity when her body mass index (BMI) was 44 kg/m² 2 years ago. However, she had laparoscopic Roux-en-Y gastric bypass (LRYGBP) due to insufficient weight loss during the postoperative period 3 months ago. The patient denied using ulcerogenic drugs, alcohol, and tobacco. The patient had no comorbid disease. On her systemic examination, severe abdominal pain was observed, and abdominal pain, tenderness, abdominal guarding, and rebound tenderness were found in all four quadrants. In laboratory tests, Hb=11.3 g/dL, WBC: 9.9 K/uL, CRP: 228. Biochemical parameters were within normal limits. The patient underwent whole abdominal ultrasound (US) and erect abdominal x-ray (Erect AXR) with the preliminary diagnosis of the acute abdomen. Abdominal USG revealed free fluid in perihepatic, perisplenic, and pelvic areas, and edematous intestinal structures. Erect AXR showed air in the right subdiaphragmatic area (Figure 1A), so the patient underwent a complete abdominal computed tomography (CT). CT revealed free air in many areas, especially in the right subdiaphragmatic area. There was free fluid in the paracolic area (especially in the perihepatic, perisplenic, and pelvic areas) and between small intestine segments. (Figure 1B). There were air bubbles and intense fluid accumulation in the small intestine anastomosis

region where a stapler line was seen in the left lower quadrant of the abdomen (Figure 1C). Based on the current findings, the patient was diagnosed with acute abdomen due to gastrointestinal system perforation and was urgently operated on.

A laparotomy was performed on our patient due to delayed hollow organ perforation. The exploration showed widespread free fluid in the pelvis and area corresponding to the paraumbilical region. The intraabdominal fluid was compatible with infected intestinal contents. After taking a sample for culture antibiogram examination from intraperitoneal free fluid, bilious intestinal contents of around 500 cc were aspirated. Then, the intraperitoneal area was washed with 40°C saline and aspirated. Systemic exploration demonstrated no perforation of the gastric remnant and colon. Starting from the Treitz ligament, the entire jejunum and ileum were explored. It was observed that there was a 5-mm necrotic area with a central opening of 3 mm on the edge of the JJ anastomotic line, which was a side-to-side anastomosis, at 80 cm from the gastrojejunostomy (Figure 2A). It was understood that the blood supply of the anastomosis line was good and a large part of it was intact. There was no stenosis or intussusception proximal and distal to the anastomosis. The diameter of the anastomosis was about 3 cm, allowing the passage easily (Figure 2B). After the necrotic area was debrided, the opening was repaired with two layers of absorbable sutures inside and non-absorbable sutures outside; then, the abdomen was irrigated with 5 liters of saline. One silicone drain for each of the four quadrants was placed. Oral intake was started on postoperative day 3. The culture antibiogram yielded the growth of *E. Coli*. On postoperative day 6, oral intake tolerance was good, laboratory values were normal, the abdominal examination was unremarkable, and the patient was discharged after removing abdominal drains. The patient continued to be followed up on an outpatient basis. On postoperative day 15 and month 1, her outpatient follow-up was unremarkable.

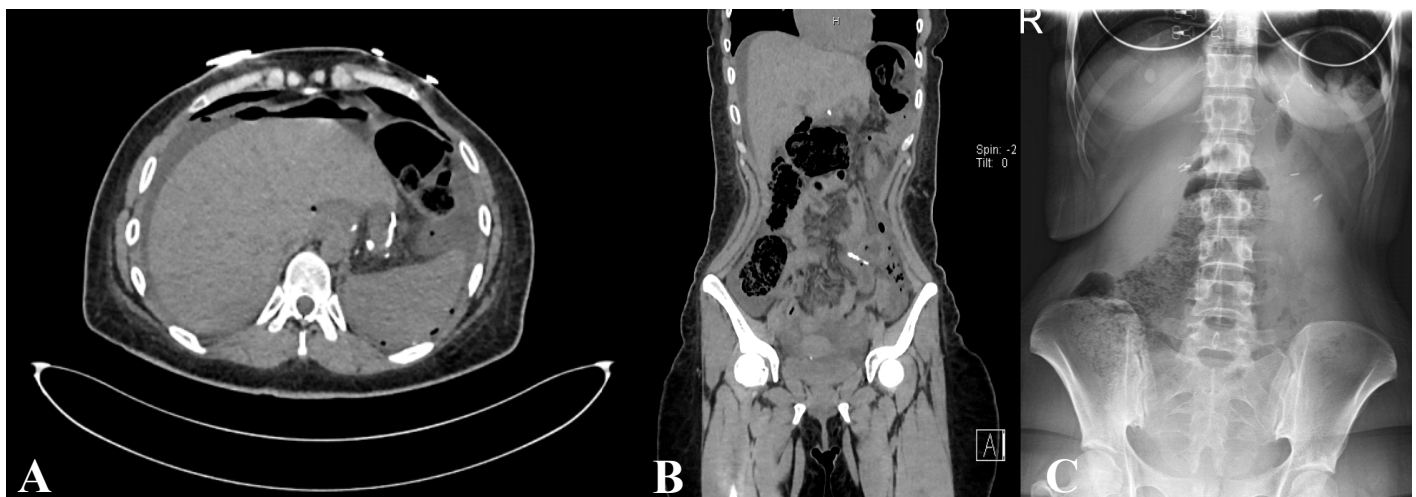


Figure 1A. Subdiaphragmatic free gas in the anterior hepatic space with erect abdominal x-ray. **1B.** Perihepatic, perisplenic free fluid and gas with contrast abdominal CT. **1C.** Stapler line at jejunojejunal anastomosis site and perforation side with contrast abdominal CT



Figure 2A. Perioperative view of necrosis and perforation region at jejunojejunal anastomosis. **2B.** View of perforation area at jejunojejunal anastomosis

DISCUSSION

Although laparoscopic gastric bypass is generally considered safe and effective, complications can occur, and one of them is a leak at the jejunojejunostomy anastomosis. This leak can lead to the development of an acute abdomen.

Today, bariatric surgery is performed widely due to obesity. After the operations, serious complications and mortality may occur by 4% and 0.1%, respectively. These low morbidity

and mortality rates are considered to be likely associated with recently increased experience in laparoscopic surgery and high technological advances in surgery.

In these patients with many comorbidities such as hypertension, diabetes, heart diseases, and many nutritional disorders, many intraoperative and postoperative complications may occur due to the operation. Postoperative complications are usually seen in the early period, and very rare complications may develop even in the late period. Gastrointestinal fistulas and leaks are the leading complications that significantly increase morbidity and mortality (3).

The incidence rate of early complications following bariatric surgery is between 10-30%. Current potential early complications include bleeding, anastomotic leak, obstruction, and gastric remnant dilatation. The main late complications may be listed as small bowel obstructions due to adhesions and internal herniations, anastomotic stenosis, cholelithiasis, insufficient weight loss, and nutritional deficiencies.

Surgical intervention is often necessary to manage the leak. The surgical approach depends on the severity and location of the leak, the patient's overall condition, and the surgeon's judgment. Options may include repairing the anastomosis, revising the anastomosis, or creating a new anastomosis if needed. In some cases, temporary diversion of intestinal contents through a stoma may be performed to allow the leak to heal.

Postoperative care involves close monitoring of vital signs, fluid balance, and laboratory parameters. Nutritional support, either through enteral or parenteral routes, may be initiated while the anastomosis heals. The patient's progress is closely monitored, and complications such as infection, abscess formation, or strictures are managed accordingly.

Gastrointestinal system leaks that develop following RYGB are also commonly seen in the early period and at the gastrojejunostomy line. However, the likelihood of a late leak at the JJ anastomotic line is very rare and the current potential complication has been reported to be only below 0.5 % in the literature. Goitein et al. first reported three cases of late JJ anastomotic leak in the 6-8 weeks after LRYGBP in 2005 (4,5). In the LRYGBP series of 717 cases, only 3 patients developed late JJ anastomotic leak and the patients were reoperated. While the cause of perforation was not found in 2 (two) patients, perforation was established to develop in the third patient due to undigested vegetables stuck to the anastomotic line. During relaparotomy, they performed JJ anastomosis again with the combination of the stapler and absorbable suture and underlined that the material in the anastomotic line was absorbed between 8-10 weeks and the tissue reached maximum tension only during this time (5).

In addition, Gonzalez-Pezzat et al. reported an anastomotic line leak and associated abscess formation 6 months after LRYGBP in 2009. This patient is the first case who developed an abdominal

abscess due to JJ anastomotic leak. They first used exploratory laparoscopy for the treatment, however, they converted to open surgery due to technical difficulties. In this case, after the abscess was drained, the resection and refashioning of JJ anastomosis were performed. Surgery and pathology results could not reveal a valid reason for the leak (6). Sammut et al. presented a case of JJ anastomosis perforation due to phytobezoar developing at 18 months after LRYGBP in a 49-year-old woman with type-2 diabetes. They preferred open surgery in their cases. After the removal of phytobezoar, the anastomotic line was repaired using a single-layer suture, and an omental patch was applied to it. In this patient, perforation may be considered to develop due to the patient's poor dietary habits and type-2 diabetes (7). When Kalaiselvan et al. retrospectively reviewed the literature in 2013, they found that a total of 1652 patients underwent LRYGBP between 2002 and 2012, and only 4 of these patients (patients previously reported by Goitein and Gonzalez-Pezzat) had late JJ anastomotic leak (8). In Kröll's case, perforation was detected at the JJ anastomotic line 11 months after LRYGBP, and no apparent reason was found for perforation.

In this case, however, a microbiological examination was performed from the region where there was an anastomotic leak and tissue samples yielded the growth of *Streptococcus gallolyticus*, *Klebsiella oxytoca*, and *Aeromonas hydrophila*. It was brought to the agenda that these cytotoxic bacteria may cause tissue damage and be the causative agent. Along with this case, the issue that in fact, late complications of JJ anastomosis leak may occur at higher rates, and not enough cases are reported, has been opened up for discussion (9). Tissue damage caused by bacteria may be a factor in late JJ anastomotic line leaks reported to date which have no clear cause. It can be concluded that the occurrence mechanism of these cases of potential late JJ anastomotic leaks after obtaining tissue cultures to be taken during surgery and the increase in case reports may be explained.

We also performed laparotomy and intestinal repair for the late perforation at the JJ anastomotic line due to leak development following LRYGBP performed 3 months ago in our patient. We had to prefer an open surgery option due to localized peritonitis with the delay in hospital admission and diagnosis of our patient. In case of early diagnosis of existing cases, minimally invasive options such as endoscopy and laparoscopic surgery may also be used for diagnosis and treatment.

CONCLUSION

In conclusion, in patients who presented to the emergency departments even weeks or months after LRYGBP surgery, this possible complication should be considered, and it should be acted more energetically about diagnosis and treatment.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethics committee approval was not required as the patient's identity information was not used.

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