Perforated Duodenal Ulcer after Laparoscopic Roux-en-Y Gastric Bypass for Morbid Obesity

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ABSTRACT

Objective: Duodenal ulcer perforation after laparoscopic Roux-ex-Y gastric bypass (LRYGB) for morbidly obese patient is uncommon. However, the morbidity and mortality rate will be increased if the diagnosis is delayed. We reported clinical presentations, surgical approach as well as outcome of first perforated duodenal ulcer after LRYGB in E-Da hospital.

Case presentation: A 34 years old morbidly obese female who underwent successful LRYGB in 2006. Five years later, she developed severe epigastric pain and marked tenderness at this area. No pneumoperitoneum was demonstrated on abdominal CT scan. First diagnostic laparoscopy was done and showed unexplained hemoperitoneum at subhepatic area without definite cause of abdominal pain. Unfortunately, she had to undergo re-diagnostic laparoscopy on postoperative day 2 because bile content was present in abdominal drain. Luckily, the perforated duodenal ulcer was detected at 1st part of duodenum and closed properly by simple suture techniques. Postoperatively, there was no complication and she was discharged home uneventfully. Helicobacter pylori and life-long proton pump inhibitor were prescribed. Upon 3-month follow-up, she had no abdominal pain or other complications.

Conclusion: The diagnosis of perforated duodenal ulcer after LRYGB for morbidly obese patients is challenging. Although laparoscopic simple suture is safe and feasible in acute perforated scenario, this might carry high recurrent rate due to the remaining parietal cells in gastric remnant. Nevertheless, the role and timing of definitive acid-reducing surgery need to be addressed by having well-designed studies in future.

Keywords: Perforated duodenal ulcer after laparoscopic Roux-en-Y gastric bypass; laparoscopic simple suture with omental patch (Siriraj Med J 2018;70: 178-181)

INTRODUCTION

Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) which combines restriction and malabsorption mechanism, has been known as one of the most popular bariatric surgeries with significant excess weight loss.1-3 With an increasing of bariatric surgeries performed nowadays, we should be aware of the changes in gastrointestinal pathophysiology. It is inevitable that we must face these uncommon complications after bariatric surgery in the future. Diagnosis of peptic ulcer disease (duodenal and gastric ulcer) in the bypassed segment is usually more complicated and results in delayed treatment. The common complications of peptic ulcer are bleeding and perforation. Although incidence of perforated peptic ulcer in bypassed segment is rarely reported, it is usually a fatal complication when happened.4 We reported first perforated duodenal ulcer after LRYGB in our hospital (E-Da hospital, Taiwan).

CASE PRESENTATION

This is a 34-year-old female with a body mass index (BMI) of 35.4 kg/m² and Type 2 diabetes mellitus who underwent successful antecolic and antegastric LRYGB in 2006. Preoperative endoscopic finding was unremarkable...
and no H. Pylori was detected. The operation went well without any perioperative complications and she was discharged home on postoperative day 3. Unfortunately, 5 years later, she came to our hospital with severe epigastric pain which was not ameliorated by medications. Her BMI was 26.5 kg/m$^2$ and blood pressure as well as pulse rate were normal. Abdominal exam showed marked tenderness without definite peritonitis at epigastric area. Significant Laboratory revealed hematocrit was 30% and white blood cell was 15,000 cell/ml. An abdominal computed tomography scan (abdominal CT scan) was performed and showed only generalized dilated small bowel loop and pneumoperitoneum was not detected. However, her clinical was not improved after we admitted her in the hospital. Few hours after admission, diagnostic laparoscopy was performed in order to identify cause of severe abdominal pain.

Upon diagnostic laparoscopy, we found unexplained hemoperitoneum and blood clot with at hepatic hilum and around gallbladder area. No source of bleeding could be identified at that moment. Therefore, all the hemoperitoneum and blood clot were removed and a 10 mm. Jackson-Pratt (JP) drain was placed at this subhepatic area. Unfortunately, she still developed persistent epigastric pain and 100 ml of bile content was present in JP drain on postoperative day 2. Therefore, re-diagnostic laparoscopy was performed and demonstrated bile contamination around subhepatic area as well as perforated acute ulcer at first part of duodenum. The perforated site was closed by laparoscopic simple suture with 2-0 Monocryl interrupted stitches. Also, a 10 mm. JP drain was placed at subhepatic area. Postoperatively, her clinical was improved and she was able to resume full liquid diet on postoperative day 4 (started sipping water on postoperative day 2 then we advanced to full liquid diet on postoperative day 4). The JP drain showed no more bile content and it was removed on postoperative day 4. She was discharged home uneventfully on postoperative day 5. Helicobacter pylori (H. pylori) eradication and life-long proton pump inhibitor were prescribed. On the 3-month follow-up, she was doing well without any abdominal pain or other complications.

**DISCUSSION**

Perforated peptic ulcer in bypassed segment are unusual complication after gastric bypass. Some publications have been reported in the past (Table 1). Macgregor et al. reported 11 cases (0.25%) out of 4,300 cases of perforated peptic ulcer after open gastric bypass. Among them, 9 patients had duodenal ulcer perforation, 1 patient had gastric ulcer perforation and 1 patient had both. This was the largest series of perforated peptic ulcer after gastric bypass. The pathophysiology of this perforation is not clear. The bypassed segment has proven to have acidity with a mean pH of 2-3. Remnant stomach is able to react to normal stimuli from vagal nerves. Bjorkman et al. claimed that duodenal ulcer formation might cause by unbuffered acid in bypassed segment. This could occur because there was no contact between acid production in remnant stomach and ingested food. Beside that, pancreas' bicarbonate secretion in response to food stimuli is absent after gastric bypass. Another possibility, bile reflux in bypassed segment caused mucosal disintegration in the remnant stomach.

This lady was the first case of perforated duodenal ulcer after LRYGB in our bariatric center. Her preoperative upper endoscopy for LRYGB in 2006 showed unremarkable finding and H. pylori was not detected. Also, she denied any risk factor of peptic ulcer disease such as smoking, alcohol, NSAIDs, other ulcerogenic usage and physical-psychological stress. In 2011, she presented with sudden onset of epigastric pain without definite sign of peritonitis 2 days before admission. Abdominal CT scan was done in order to identify cause of abdominal pain. However, we could see any free air and no definite cause of abdominal pain.

**TABLE 1. Some previous publications about perforation in bypassed segment after RYGB.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Journal</th>
<th>Total Cases</th>
<th>Perforated</th>
<th>Duodenal</th>
<th>Gastric</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bjorkman et al(^a) (1989)</td>
<td>NA</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Macgregor et al(^b) (1999)</td>
<td>4300</td>
<td>11</td>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Papasavas et al(^c) (2003)</td>
<td>NA</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Mittermair et al(^d) (2007)</td>
<td>NA</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Snyder(^e) (2007)</td>
<td>477(360)</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Gypen et al(^f) (2008)</td>
<td>NA</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
pain could be detected on the CT scan. Basically, abdominal CT scan carries high sensitivity in pneumoperitoneum detection but it might not be identified in perforated peptic ulcer after RYGB because air in remnant stomach is usually absorbed after RYGB. We must note that radiological sign of perforation in RYGB is different from normal patients.

Fundamentally, management of perforated duodenal ulcers including closure of the defect, wide drainage, proton pump inhibitors, broad spectrum antibiotics, and eradication of H. pylori. However, few studies stated that there was high recurrent peptic ulcer rate which required re-operation after primary closure. Macgregor et al. reported nine from eleven cases of perforation require subsequent surgery. However, our patient was eventually successful managed by only laparoscopic simple suture without any perioperative complications. Life-time proton pump inhibitor use was advised to reduce possibility of recurrent perforated duodenal ulcer in the future.

Definitive surgery for perforation in bypassed segment after LRYGB are resection of bypassed segment as well as concomitant truncal vagotomy. This procedure is purposed to eliminate the source of acidic environment. The ideal time for definitive surgery remains inconclusive. Definitive surgery during perforation may cause duodenal stump leak since there are a lot of edema and inflammation process in the perforation area. On the other hand, definitive surgery at later time needs another next operation and there will be adhesion and scar tissue in this area. Further well-designed studies are required in order to clarify role and best timing for definitive surgery in these perforated peptic ulcer patients.

Regarding postoperative surveillance for the perforated peptic ulcer, it is very challenging to reach peptic ulcer in bypassed segment by conventional upper endoscopy due to new anatomical reconstruction after RYGB. Fobi et al. described utilization of a temporary gastrostomy tube with radio-opaque marker in the remnant stomach during gastric bypass to facilitate access for feeding, decompression and endoscopy access when needed. Percutaneous access to gastric remnant using CT or ultrasound guidance also has been studied. This technique allows endoscope could be introduced through gastric remnant and peptic ulcer easily. However, it requires a good endoscopist and radiologist because of difficulty in technique. Moreover, some authors claimed success rate of 68% cases using long pediatric enteroscope to reach bypassed segment. Another noninvasive diagnostic examination is a CT or MRI virtual gastroduodenoscopy but the limitation of this procedure is lack of tissue sampling for histological examination. Furthermore, there is a new approach to the remnant stomach and duodenum by double balloon enteroscopy which is recently described.

Helicobacter pylori infection has been recognized as one of the significant causes of peptic ulcer disease. Many modalities have been described to identify H. pylori including noninvasive and invasive procedures. Urea breath test is the most common noninvasive procedure. Unluckily, the result is usually negative because urea swallowed by patient could not reach the bypassed segment. Stool antigen detection has been proven as the best non-invasive test for confirming the presence of H. pylori. Measurement of serum anti-H. pylori antibody titers can also be used for detection of H. pylori infection. However, it needs multiple sampling for longer than 12 months since resolution from infection takes time after eradication therapy. The most reliable method is a tissue biopsy by endoscopy for a rapid urease test, histological examination, and microbial culture. Nevertheless, it is technically difficult to obtain the tissue by endoscopic approach due to anatomical problems as we described previously. Therefore, we decided to eradicate H. pylori by classical triple therapy in our patient without any tissue confirmation. Upon 3-month follow-up, she denied any abdominal pain and other complication.

CONCLUSION

The perforated duodenal ulcer after LRYGB is rare but the way how to diagnose this condition is very challenging. The delay diagnosis and treatment could result in high morbidity and mortality rate. Although laparoscopic simple suture is safe and feasible for this patient in acute perforated setting, it might carry high re-operative rate. The role and ideal timing of definitive acid-reducing procedure are still inconclusive. More well-designed studies are required to clarify its benefit.


