Clinical Science

Routine upper gastrointestinal swallow studies after laparoscopic sleeve gastrectomy are unnecessary

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KEYWORDS:
Obesity; Bariatric surgery; Sleeve gastrectomy; Complications; UGI study

Abstract

BACKGROUND: Laparoscopic sleeve gastrectomy has gained popularity among bariatric surgeons. The purpose of this study was to evaluate the usefulness of early upper gastrointestinal (UGI) contrast studies in the detection of postoperative complications.

METHODS: Radiographic reports were reviewed from April 2006 to January 2013. During that time, 161 patients underwent laparoscopic sleeve gastrectomy. All patients were submitted to UGI examination on postoperative day (POD) 1.

RESULTS: Among the 161 patients who underwent UGI, no contrast leaks were found on POD 1. Three patients (1.9%) developed stapler line leaks near the gastroesophageal junction, which were diagnosed on PODs 3, 4, and 10. Gastroesophageal reflux in 5 patients (3.1%) and delayed gastroesophageal transit in 10 patients (6.2%) were detected.

CONCLUSIONS: The results of this study show that UGI series on POD 1 cannot assess the integrity of the gastric remnant. Early UGI series are not required as routine procedures in all operated patients. Computed tomographic swallow studies should be performed in patients who postoperatively develop clinical signs and symptoms of complications such as tachycardia, pain, or fever.

In recent years, laparoscopic sleeve gastrectomy (LSG) has been introduced into the armamentarium of bariatric procedures. Several publications have shown a percentage of excess weight loss approaching that attained with Roux-en-Y gastric bypass at short-term and midterm follow-up.1-7 The fact that LSG has been considered simple and easy has led to its adoption by a large number of surgeons. Compared with gastric bypass and bilipancreatic deviation, it may seem to involve less risk, yet its complications can be even more severe than those of other techniques. Because of the long staple line, LSG is associated with several complications.

One of the dreaded complications after LSG is a gastric leak, most commonly occurring at the upper staple line near the gastroesophageal junction. This staple line leak, if not identified and treated immediately and aggressively, may lead to abdominal sepsis, which might process either to chronic gastric fistula or to multiple-organ failure and potential death.8-11

Postoperative upper gastrointestinal (UGI) contrast studies after laparoscopic bariatric procedures are often

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performed routinely to evaluate for leaks or stenoses. The purpose of this retrospective study was to assess the usefulness of early UGI examination in the detection of postoperative complications.

Methods

A retrospective review of our prospectively collected database was used to evaluate all patients who underwent LSG between April 2006 and January 2013. LSG was performed laparoscopically using a 4-trocar technique as follows: A 14 mm Hg pneumoperitoneum with carbon dioxide is established. We use a 30° video laparoscope. Using a 5-mm LigaSure (Covidien, Dublin, Ireland) and a 5-mm flexible grasper, the greater curvature of the stomach is mobilized by dividing the gastric branches of the right and the left gastroepiploic vessels close to the stomach. Starting from 6 cm proximal to the pylorus, the gastrocolic and the gastrosplenic ligaments are divided up to the angle of His. The mobilized portion of the greater curvature of the stomach is then taken by a 5-mm flexible grasper and pulled to the right side in the direction of the lower surface of the left hepatic lobe. By lifting the stomach, the liver is automatically pulled up. This retraction of the liver facilitates further exposure of the angle of His. It is important to identify and mobilize the angle of His with exposure of the left crus of the diaphragm to enable the complete resection of the fundus. Retrogastric adhesions are taken down with the LigaSure to allow complete mobilization of the stomach, to achieve a symmetric design of the sleeve, and to exclude the fundus from the gastric sleeve. Once the stomach has been completely mobilized, a 36-Fr orogastric tube is inserted downward into the pylorus and placed parallel to the lesser curvature. This allows for calibration of the size of the gastric sleeve and prevents constriction at the gastroesophageal junction, enabling uniform diameter of the entire stomach. Gastric transection is started 6 cm proximal to the pylorus, leaving the antrum and preserving gastric emptying. A long laparoscopic reticulating 60-mm XL Endo-GIA stapler (Echelon Flex Endopath Stapler; Ethicon Endo-Surgery, Cincinnati, OH) is fired consecutively along the length of the 36-Fr orogastric tube until the angle of His was reached. Two sequential golden 1.8-mm cartridges are used to divide the antrum, followed by 3 or 4 sequential blue 1.5-mm cartridges for the remaining gastric corpus and fundus. The mentioned staple height of the cartridge is the closed height. Care must be taken not to narrow the stomach at the incisura angularis. It is important to inspect the stomach anteriorly and posteriorly to avoid redundant posterior stomach.

Approximately 80% of the stomach is separated. The entire staple line is inspected for bleeding. Bleeding necessitates the prompt placement of clips along the line of bleeding. No intraoperative leak test is used. One closed suction drain is used routinely. The resected stomach is extracted through the umbilical incision without a specimen endobag. The fascial defect is closed with 0/0 absorbable sutures.

A UGI contrast swallow study with water-soluble contrast media (50 mL Gastrografin; Bracco SpA, Milan, Italy) was performed on postoperative day (POD) 1 (Fig. 1), and if the results were negative, the patient was put on a liquid diet for 1 more day. Patients were discharged once they were able to maintain hydration and manage pain with oral analgesics. Patients were routinely placed on proton pump inhibitors (eg, pantoprazole 40 mg) once a day for 1 month. Routine follow-up with attention to electrolyte and vitamin levels was recommended every 6 months after surgery.

Definition and diagnosis of leakage

Determining the time of appearance, leaks were classified according to Csendes et al as being detected early (POD 1 to 3), intermediate (POD 4 to 7), or late (POD ≥ 8).

Clinical suspicion of leakage

Gastric staple line leak was suspected if the patient had postoperative clinical signs and symptoms such as tachycardia (heart rate ≥ 100 beats/min), pain (visual analogue scale score ≥ 5), or fever ≥ 38.5°C.

Results

A total of 161 patients (124 women, 37 men) underwent LSG at our institution. The mean age was 46 years (range,
19 to 73 years) and the mean preoperative body mass index was 44.6 kg/m² (range, 34.8 to 72.9 kg/m²). The mean operative time was 91 minutes (range, 48 to 140 min). Conversion to a conventional procedure was necessary in 1 patient (6.6%) because of severe arterial bleeding from the short gastric vessels. No intraoperative and postoperative deaths occurred. Median percentage excess weight loss was 57.2% at 18.4 months after surgery. The mean postoperative body mass index was 32.4 kg/m² (range, 19.7 to 56.1 kg/m²). The baseline data are presented in Table 1.

Postoperatively, there were 8 severe complications (5.0%). Five were postoperative hemorrhages, which were detected by clinical symptoms (heart rate ≥ 100 beats/min, blood pressure < 100/60 mm Hg, and decreased hemoglobin level) and were treated by repeat laparoscopy on POD 1. The further course was uneventful and these patients were discharged on POD 7.

Three patients developed stapler line leaks near the gastroesophageal junction, which were diagnosed on PODs 3, 4, and 10. Interestingly, the results of postoperative UGI series performed on PODs 1 and 4 with water-soluble contrast media were negative in all 3 patients. The leaks were diagnosed solely by clinical symptoms (heart rate ≥ 100 beats/min, pain [visual analogue scale score ≥ 5], and fever ≥ 38.5°C). The clinical diagnosis of staple line leak was confirmed by computed tomographic (CT) swallow studies (UGI immediately followed by CT scans) in all 3 patients. All these patients received broad-spectrum antibiotics.

One patient with leakage on POD 3 underwent repeat laparoscopy and abdominal lavage, and the area of the leak was mobilized and resected using a 1.8-mm golden cartridge (Echelon Flex Endopath Stapler). A silicon drain was placed close to the stapler line. Then, a covered self-expandable endoscopic stent (Niti-S Esophageal Covered Stent; TaeWoong Medical Co Ltd, Seoul, South Korea; length, 15 cm, Ø 20 mm) was placed. The further course was uneventful, and the patient was discharged on POD 19 without further complications. The stent was removed on POD 36.

One patient with leakage on POD 4 underwent repeat laparoscopy initially, with conversion to repeat laparotomy and abdominal lavage. The leak was oversewn with PDS 2.0 interrupted sutures, and 2 drains were positioned close to the leak. No endoscopic stent was placed. On POD 9, the leak recurred. A repeat laparotomy was performed with abdominal lavage, the leak was oversewn again with PDS 2.0 interrupted sutures, and a covered self-expandable endoscopic stent (Niti-S Esophageal Covered Stent) was placed. The further course was complicated, and the patient was discharged on POD 63. The stent was removed on POD 146. Retrospectively, the staple line might have included a small portion of esophagus. Therefore, this leak could be considered an esophageal leak.

Table 1 Patient data (n = 161)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>126.9 (91–239)</td>
<td>94.8 (51–154)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>44.6 (34.8–72.9)</td>
<td>32.4 (19.7–56.1)</td>
</tr>
<tr>
<td>EBW (kg)</td>
<td>57.2 (27–158)</td>
<td>32.4 (3–82)</td>
</tr>
<tr>
<td>Weight loss (kg)</td>
<td>34.5 (10–90)</td>
<td>57.2 (4.9–132.7)</td>
</tr>
<tr>
<td>EWL (%)</td>
<td>57.2 (4.9–132.7)</td>
<td>57.2 (4.9–132.7)</td>
</tr>
<tr>
<td>Operative time (min)</td>
<td>91 (48–140)</td>
<td>91 (48–140)</td>
</tr>
<tr>
<td>Complications</td>
<td>8 (5.0%)</td>
<td>8 (5.0%)</td>
</tr>
<tr>
<td>Leakage</td>
<td>3 (1.9%)</td>
<td>3 (1.9%)</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>5 (3.1%)</td>
<td>5 (3.1%)</td>
</tr>
<tr>
<td>Laparoscopy</td>
<td>161 (100%)</td>
<td>161 (100%)</td>
</tr>
<tr>
<td>Conversion to open</td>
<td>1 (6.7%)</td>
<td>1 (6.7%)</td>
</tr>
<tr>
<td>Repeat laparoscopy</td>
<td>7 (4.3%)</td>
<td>7 (4.3%)</td>
</tr>
<tr>
<td>Hospital stay (d)</td>
<td>5 (3–71)</td>
<td>5 (3–71)</td>
</tr>
<tr>
<td>Mortality</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Data are expressed as mean (range) or as number (percentage).

BMI = body mass index; EBW = excess body weight; EWL = excess weight loss.

Comments

The American Society for Metabolic and Bariatric Surgery Clinical Issues Committee statement quotes an overall complication rate for LSG of 0% to 24% and a mortality rate of 0.39%.15

Leaks after LSG are reported to occur in 1.4% to 5.3% of cases.8,16,17 Routine or selective use of postoperative diagnostic methods is controversial. Likewise, postoperative contrast swallow tests and placement of closed suction drains routinely have been advocated by several authors, whereas others claim that overtreatment is unnecessary and that good clinical judgment suffices.10–13,18

Bariatric surgeons often use drains for several reasons: (1) to be quickly alerted to the presence of a leak; (2) to...
possibly obviate the need for emergent reoperation by converting a leak into a controlled fistula; (3) to remove any excess irrigation fluid that may be contaminated and prone to abscess formation; and (4) to aid in the diagnosis of intra-abdominal bleeding. Drains may cause more harm than simply being an inconvenience and irritant to patients. Randomized studies after gastrectomy have found no benefit of surgically placed closed suction drains. Thus, normal drain output may give the managing team a false sense of safety and bias the leading differential diagnosis inappropriately away from intra-abdominal pathology. We have found that abdominal drains were not successful in diagnosing leaks or hemorrhages in our patients.

Many institutions complete routine UGI series to evaluate for leaks or stenosis on POD 1 or 2. The sensitivity for the detection of a leak is very low. All patients in this study who developed leaks had negative results on initial UGI series and required CT swallow studies (UGI immediately followed by CT scans) to identify the sources of the leaks. Not surprisingly, the most sensitive method for leak detection is a high index of suspicion. This is consistent with similar observations in numerous reports. Tachycardia, fever, and abdominal pain are the most consistent signs of leakage in the described patient population. In general, laboratory examinations are rarely contributory, and as hinted earlier, contrast swallow studies are notorious for showing “normal” results in the presence of leaks. CT scans had the highest rate of leak detection and confirmation of the clinical diagnosis. In our series, UGI series were performed in all 161 patients on POD 1. No leaks were diagnosed. This might be due to an inflammatory component around the leak and has been seen by others as well. It is logical to assume that leakage occurs later than POD 1. The potential benefit of early routine UGI seems very small considering the costs of the study and the low incidence of leakage after gastric sleeve resection. Therefore, we no longer use routine UGI series postoperatively. In patients with clinical suspicion for leakage, we selectively use a CT swallow study.

A recent systematic analysis showed that oversuturing or buttressing of the staple line does not have a clinically significant effect on leakage. However, Bellanger and Greenway used a 34-Fr bougie without buttressing or oversuturing of the staple line and saw a leak rate of 0% in 529 cases. A recent consensus statement by an international sleeve gastrectomy expert panel deemed the optimal bougie size to be 32 to 36 Fr. We used a 36-Fr bougie without buttressing or oversuturing of the staple line.

Gastric fistulas are secondary to an impaired normal acute healing process. Local risk factors include impaired suture line healing, poor blood flow, infection, and poor oxygenation with subsequent ischemia. Some authors suggest that most fistulas are not due to staple failure and, consequently, staple line dehiscence but are due to ischemia in the gastric wall next to the staple line that may be caused by dissection of the greater curvature when using the Ultracision or LigaSure systems. Baker et al suggested that fistulas of the staple line may have multiple causes, but these can be divided into 2 categories: mechanical or tissue-related causes and ischemic causes. In both situations, intraluminal pressure exceeds tissue and suture line resistance, thus causing the fistula. Classic ischemic fistulas tend to appear between 5 and 6 days after surgery, when the wall healing process is between the inflammation phase and fibrotic phase. When the cause is mechanical or tissue related, fistulas are usually discovered before this period, that is, within the first 2 days after surgery. We believe that 2 of our 3 leaks (on PODs 3 and 4) may have been caused by thermal injuries from these devices. The observed early functional disturbances (3.1% gastroesophageal reflux and 6.2% delayed gastroesophageal transit) are of a transient character and may be related to edema and reflex spasms of the tissues affected by the surgery.

However, technical details also play a role in the pathogenesis of a leak after gastric sleeve resection: the angle of His can be removed accidentally with the most proximal stapling, which can happen especially in patients with hiatal hernias. In the presence of a hiatal hernia, the angle of His is no longer a sharp angle, and the distal esophagus may be dilated. This pathologic condition at the esophagogastric junction might be misleading to the surgeon performing a gastric sleeve resection. Then, the staple line extends into the lower esophageal sphincter. This could influence lower esophageal sphincter function, but more important, it extends the staple line to a different pressure compartment, namely, the distal esophagus with its thin wall. While swallowing, the intraesophageal pressure reaches 69.5 ± 21.1 mm Hg in the distal esophagus. This normal pressure might be too much for a thin-walled esophagus, which is not suited to be stapled longitudinally.

Conclusions

UGI series on POD 1 cannot assess the integrity of the gastric remnant. It is our opinion that early UGI series are not required as routine procedures in all operated patients. CT swallow studies should be performed in patients who develop clinical signs and symptoms of complications such as tachycardia, pain, and fever.

References


