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Management of Bariatric Complications for the General Surgeon

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Introduction

Obesity and obesity-related comorbidities have become prevalent across the globe among all age ranges. Currently, one-third of the US population is obese [1]. The increase in the prevalence of obesity and the extensive evidence proving the safety and efficacy of bariatric surgery have led to the increased acceptance of this as a surgical discipline worldwide. More surgeons are also completing fellowship training in bariatric and metabolic surgery which has resulted in widespread application of these procedures. All of these factors have led to increased number of bariatric and metabolic procedures performed worldwide. In the United States, approximately 200,000 bariatric procedures are performed annually [2].

Managing complications in this population can present some unique challenges. Changes in the gastrointestinal anatomy, particularly the Roux-en-Y reconstruction, can present challenges when access to the excluded stomach or biliary tree is needed. Foreign bodies such as the adjustable band can obstruct or erode and occasionally present acutely. And finally, a small bowel obstruction may need to be managed differently than it would in a non-bariatric surgery patient to avoid a catastrophic outcome. Understanding the anatomy unique to each procedure and recognizing the most serious or life-threatening complications after bariatric surgery are critical to successful management of the bariatric surgery patient. In this chapter, we aim to provide the general surgeon called to manage these patients with the information and management strategies to achieve a successful outcome.

Overview of Bariatric Procedures

Bariatric surgery is a well-established and durable treatment for obesity and its metabolic complications. The most commonly performed procedures in the United States are sleeve gastrectomy (SG) which represents about 60% of procedures currently and Roux-en-Y gastric bypass (RYGB) which represents about 35% of bariatric procedures performed. Adjustable gastric banding was widely performed a decade ago, but its utilization has decreased to about 5% of all bariatric operations due to the unpredictable outcomes and high reoperation rates seen with the band in the United States [2]. Despite the low number of bands currently being placed, there are many patients who still may present with a complication from a band place years ago.

Understanding the anatomy of different bariatric operations is essential to managing the complications after these procedures. Over 95% of

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primary bariatric procedures are now performed laparoscopically. In RYGB, the stomach is divided to form a small proximal gastric pouch about 30 cc in volume. The distal stomach is separated from the pouch but is not resected and is referred to as the gastric remnant by bariatric surgeons. Following that, the proximal jejunum is divided 50 cm distal to the ligament of Treitz and the distal end brought up (usually antecolic, occasionally retrocolic) and anastomosed to the gastric pouch. The other (proximal) end of the divided jejunum is referred to as the biliopancreatic limb and is anastomosed 150 cm downstream from the gastrojejunostomy. The biliopancreatic juices and food then travel distally in the common channel beyond the "Roux" anastomosis (Fig. 39.1).

During sleeve gastrectomy, the gastric fundus and body are vertically resected leaving 15–20% of the stomach behind along the lesser curvature. The final product resembles a tubular banana-shaped stomach that empties normally through the pylorus. It is important to note that there are no anastomoses created in sleeve gastrectomy (Fig. 39.2). Most surgeons reinforce the long vertical staple line with synthetic buttressing material or by oversewing or inverting the staple line.

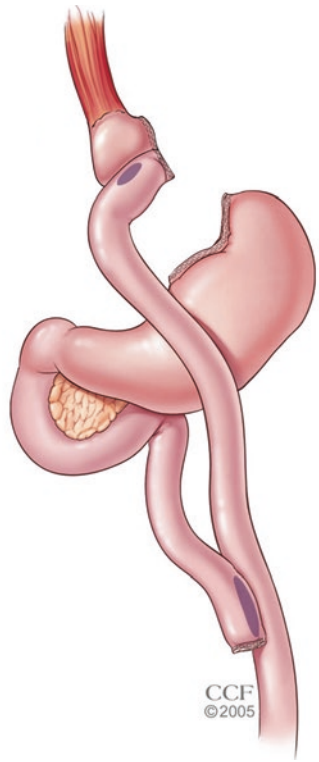

Fig. 39.1 Illustration of a Roux-en-Y gastric bypass

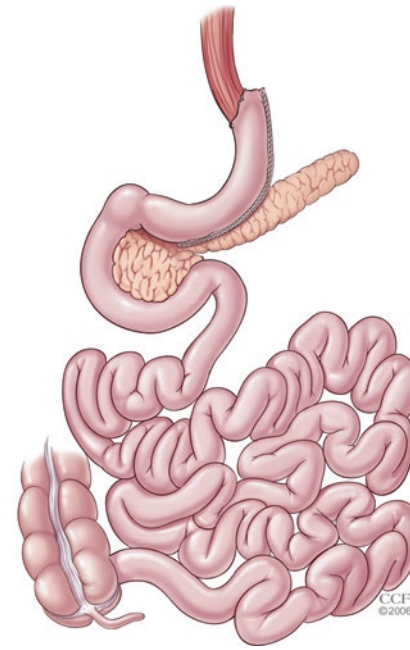

Fig. 39.2 Illustration of a sleeve gastrectomy

Laparoscopic adjustable gastric banding involves placement of a silicon band around the proximal stomach just below the gastroesophageal junction (Fig. 39.3). The gastric fundus is plicated over the band anteriorly with two or three interrupted sutures to help prevent prolapse of the stomach upward through the band. The inner circumference of the band is a circular balloon that is connected to tubing and a subcutaneous port. Typically, it takes several "adjustments" using saline injected into the subcutaneous port to tighten the circumference of the band enough to achieve the desired effect of decreased hunger and early satiety.

Diagnosis of Urgent Bariatric Complications

Roux-en-Y Gastric Bypass

RYGB is a safe operation in general; however a small percentage (1–2%) of patients may develop serious complications [3]. It is helpful

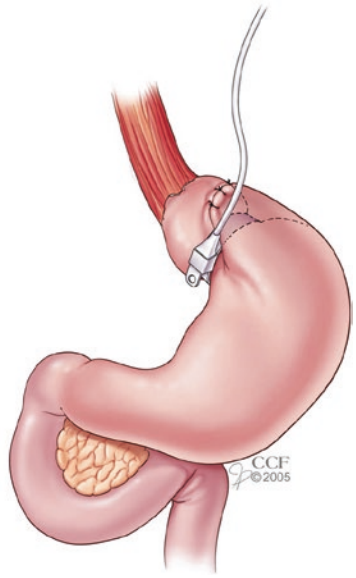

Fig. 39.3 Illustration of a laparoscopic adjustable gastric banding

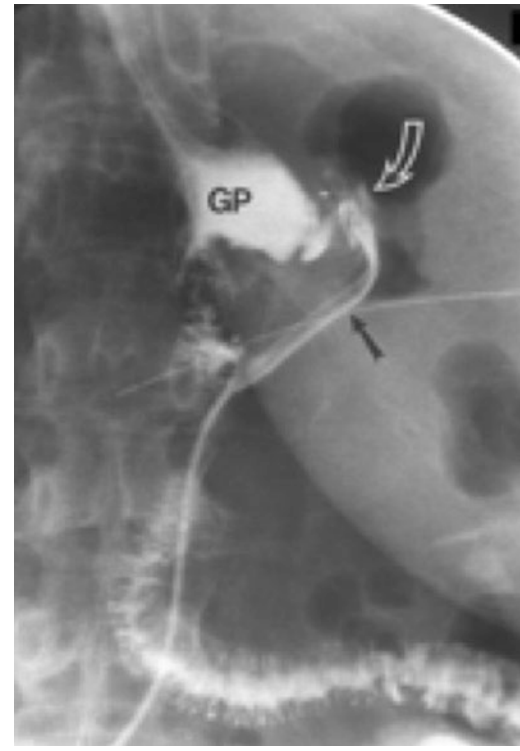

Fig. 39.4 Free extravasation of oral contrast from a leak at the gastrojejunostomy. Contrast is being picked up by the drain

to classify complications by the onset of presentation postoperatively: acute (<7 days), early (7 days–4 weeks), late (4–12 weeks), or chronic (>12 weeks). Major acute and early postoperative complications consist of anastomotic leaks, hemorrhage, and small bowel obstruction. Late and chronic complications consist of internal hernia, bowel obstruction, anastomotic ulcers and strictures, intussusception, and micronutrient deficiencies.

Anastomotic leaks after gastric bypass now occur less than 0.5% of the time but remain the second leading cause of death (after pulmonary embolism) following bariatric surgery [4]. Most early postoperative leaks occur at the gastrojejunostomy and present with early signs of sepsis. Resting tachycardia >120, tachypnea, fevers, and worsening abdominal pain, in a patient that is not progressing normally after surgery, are all concerning signs and symptoms of a leak. A high level of suspicion and early diagnosis are the keys to a favorable outcome. Any suspicion of a leak should be evaluated with imaging, either an upper GI or a CT with oral contrast (Fig. 39.4). The advantage of CT imaging is that it can also detect other complications such as an early bowel obstruction or distal leak that would not be detected with an upper GI contrast study and may mimic the signs of a leak. If the patient is becoming ill and hypoxic but the etiology is not clear, the optimal imaging is a chest, abdomen, and pelvis CT with intravenous contrast timed for the pulmonary artery anatomy with a small amount (one or two cups) of oral contrast given before the scan to help in detecting leaks.

Small bowel obstructions can occur anytime after RYGB, and it is important to remember that these patients cannot be managed like a typical adhesive bowel obstruction in a non-bariatric patient. Because the biliopancreatic limb and gastric remnant cannot be decompressed with a nasogastric tube, a distal obstruction can result in massive dilation and perforation of this anatomy if it is not surgically decompressed.

Early postoperative bowel obstructions are typically secondary to a mechanical problem (kinking or narrowing) at the jejunojejunostomy (Fig. 39.5), an intraluminal clot at the jejunojejunostomy (Fig. 39.6) or beyond, or distal adhesive

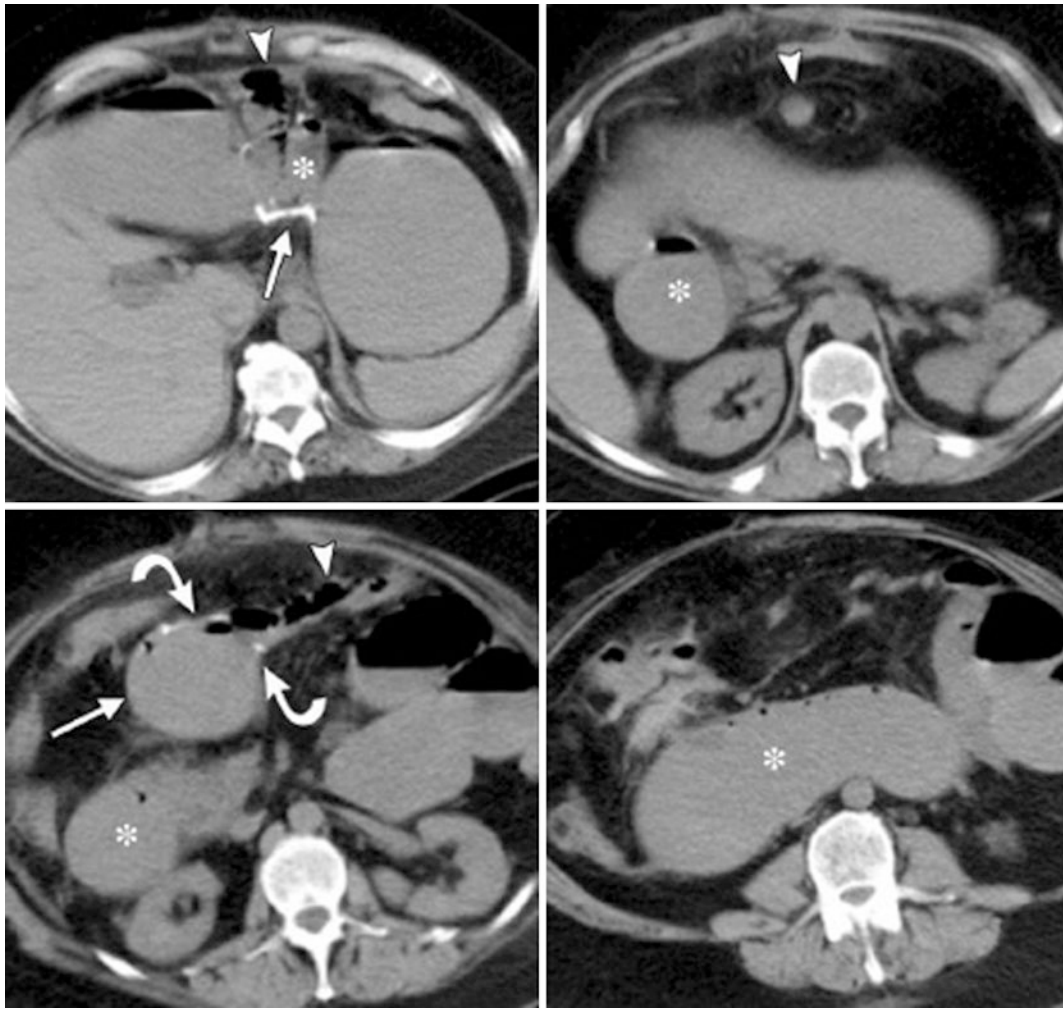

Fig. 39.5 Acute dilation of the gastric remnant and biliopancreatic limbs after gastric bypass due to an obstruction at the jejunojejunostomy (JJ) (curved arrows). This requires emergent surgical intervention with placement of a decompressive remnant gastrostomy tube and correction of the obstruction at the JJ anastomosis

disease from prior pelvic surgery [5]. Another cause of early postoperative bowel obstruction is a port site or abdominal wall hernia that entraps a loop of small bowel. These complications can be challenging to diagnose in patients with severe obesity, and CT imaging should be performed when concern arises. Patients with early postop bowel obstructions may look well initially but then fail to progress with their oral intake and develop worsening nausea and abdominal pain. Abdominal distension can be hard to elicit as well in this population so subjective finding of bloating, worsening nausea, pressure, and abdominal pain should prompt an evaluation. Plain film imaging can detect a distal obstruction but will often not alert the surgeon to a dilated, fluid-filled gastric remnant that needs decompression. Early postop bowel obstructions after RYGB require operative intervention and should not be managed nonoperatively. At a minimum, the gastric remnant should be decompressed with a surgical gastrostomy tube and, if possible in a stable patient, the source of the obstruction addressed.

Late bowel obstructions after RYGB most commonly result from adhesive disease or internal her-

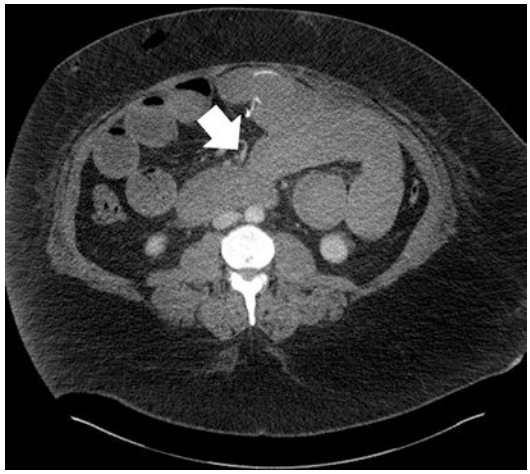

Fig. 39.6 Early postoperative small bowel obstruction secondary to intraluminal clot at the jejunojejunostomy

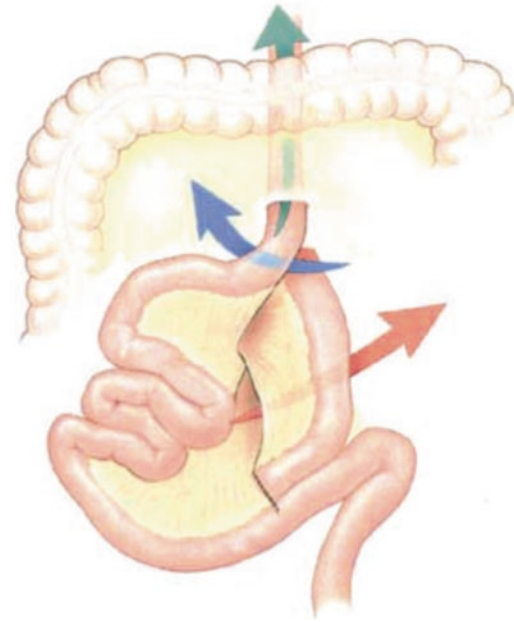

Fig. 39.7 Potential sites of internal hernia after RYGB. Most commonly, the small bowel herniates underneath the Roux limb mesentery or at the jejunojejunostomy mesenteric defect. If the Roux limb was placed retrocolic, the defect in the mesocolon is also a potential site of herniation

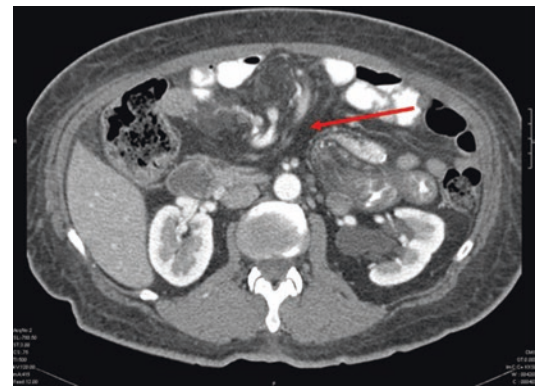

Fig. 39.8 Axial image of an internal hernia in a patient with a history of gastric bypass

nias. Roux-en-Y reconstruction results in two mesenteric defects that can reopen and cause an internal hernia with mesenteric volvulus, obstruction, and bowel ischemia. These defects are located at the jejunojejunostomy behind the mesentery of the Roux limb as it passes over the colon mesentery and transverse colon. If the Roux limb is in the retrocolic position, the mesenteric defect (Peterson's defect) and the mesocolic defect are potential sites of herniation. The majority of bariatric surgeons now close these defects with nonabsorbable suture at the primary operation, but they can reopen after massive weight loss (Fig. 39.7).

Gastric bypass patients who present with sudden onset, severe mid-abdominal pain (often with an antecedent history of intermittent pain) should have CT imaging done immediately to rule out an internal hernia, volvulus, or obstruction (Fig. 39.8). Delaying the diagnosis and treatment of this problem can result in the loss of the entire midgut and a catastrophic outcome for the patient (Fig. 39.9).

If clinical concern is high and imaging is equivocal or negative, a diagnostic laparoscopy is still appropriate to rule out an internal hernia or to identify another cause of the pain [6].

Bowel intussusception is a rare cause of obstruction and most commonly occurs at the jejunojejunal anastomosis which can become dilated and patulous years after the original surgery. Small incidental intussusceptions seen on imaging in an asymptomatic patient do not require surgery, but if the intussusception is causing pain or an obstruction, operative intervention should be carried out (Fig. 39.10). In some cases, this may require resection and reconstruction of a new Roux anastomosis.

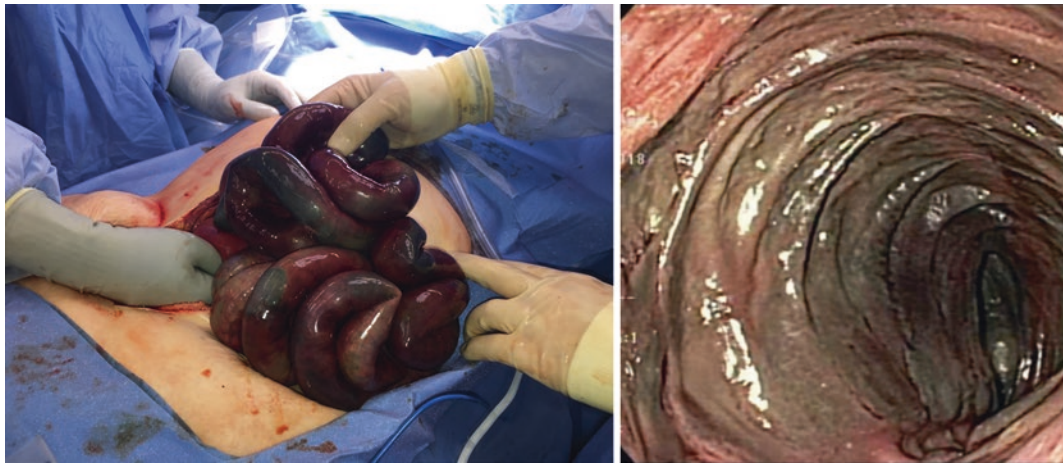

Fig. 39.9 Intraoperative findings of extensive bowel necrosis in a 56-year-old RYGB patient who presented three times to her local emergency department with severe abdominal pain prior to transfer. The entire small bowel had herniated underneath the Roux limb mesentery causing necrosis of the midgut and the Roux limb (endoscopy picture)

Fig. 39.10 Small bowel intussusception seen on CT imaging in a patient who presented with severe abdominal pain and obstructive symptoms

Marginal ulcers usually form chronically post-RYGB, usually on the small bowel side of the gastrojejunal anastomosis. Marginal ulcers are linked to smoking, nonsteroidal anti-inflammatory drug (NSAID) use, acid exposure from a large gastric pouch, and presence of foreign body at the anastomosis such as an eroded suture. Patients presenting with early marginal ulcers usually complain of epigastric pain after eating and nausea. The majority of ulcers after bypass can be managed medically, but patients will occasionally present with a perforation of a chronic marginal ulcer that requires emergent surgery. This problem presents as acute epigastric pain that worsens and progresses to peritonitis. Imaging will reveal free air and likely some free fluid. Management is surgical and should consist of repair if possible, omental patch, and wide drainage. There is no role for revising the anastomosis in the setting of an acute perforation. Placing a feeding gastrostomy tube in the gastric remnant should be considered depending on the condition of the patient.

Early postoperative bleeding after RYGB should be managed as with any other patient, but there are several unique circumstances in a gastric bypass patient that should be considered. Intra-abdominal bleeding most commonly occurs at one of the mesenteries that was divided during the procedure or from a staple line. Potential intraluminal bleeding sites include the pouch staple line, the gastrojejunostomy, the gastric remnant staple line, and the jejunojejunostomy staple line. While most of these events are self-limiting, they can occasionally require surgery if the intraluminal clot causes an obstruction at the jejunojejunostomy. Bleeding at the gastrojejunostomy is typically heralded by hematemesis and can be managed endoscopically.

Sleeve Gastrectomy

Sleeve gastrectomy has become the most commonly performed bariatric operation in the United States, largely because it eliminates the risk of anastomotic complications and is widely accepted by patients. The major morbidity rate is less than 2%, and adverse events mainly include staple line leaks, fistula formation, and sleeve stenosis and stricture resulting in an obstruction [7].

The most feared complication after sleeve gastrectomy is a staple line leak. Leaks after sleeve gastrectomy most often present in the first week after surgery but can occasionally present with a left upper quadrant abscess weeks later. The majority of leaks after sleeve gastrectomy occur proximally at the angle of His. Clinically, leaks will present as abdominal sepsis with fever and tachycardia. As with RYGB leaks, early detection and operative management of an early, uncontained leak are key to achieving a good outcome. In stable patients who present with a contained left upper quadrant abscess, percutaneous drainage is appropriate prior to referring the patient to a bariatric surgeon who can continue the management.

Patients with sleeve stenosis can present soon after surgery with failure to advance diet and or excessive vomiting. This can be a result of technical issues while creating the sleeve, and the most common site of narrowing is at the incisura. Twisting or kinking of the staple line can also result in a functional obstruction and severe GERD. This is not a complication that requires urgent surgical management, however, and these patients can be referred to a bariatric surgeon for further evaluation and management.

Laparoscopic Adjustable Gastric Banding

Complications after LAGB that might involve the general surgeon include acute perforation or bleeding shortly after band placement, gastric prolapse, obstruction at the band, and erosion. Mechanical problems with the tubing or port usually require operative repair, but these would not be emergent issues and can be referred to a bariatric surgeon.

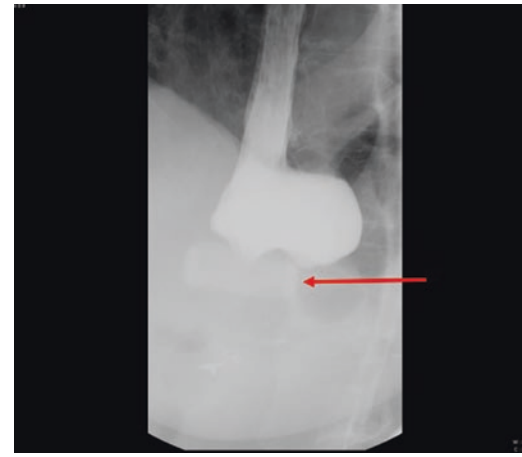

Fig. 39.11 Obstruction and pouch dilation due to an overtightened adjustable gastric band (arrow)

Placing the band involves creating a small retroesophageal tunnel above the lesser sac and passing an instrument through this space to pull the band into place. This maneuver can result in a perforation or injury to the esophagus or gastric fundus that may not be immediately recognized. Since most LAGB patients are discharged the same day as surgery, they may present with abdominal sepsis secondary to a perforation several days after the injury. Upper GI contrast studies or CT imaging will confirm the diagnosis and prompt emergent operative intervention that should include removal of the band, closure of the perforation if possible, and wide drainage (Fig. 39.11). Bleeding can occur from injury to the short gastric vessels or spleen that may not be evident until the patient returns to the emergency department with hypotension or syncope at home.

Algorithmic Approach to Abdominal Pain in Patients with History of Bariatric Surgery

The American Society for Metabolic and Bariatric Surgery and the American College of Emergency Physicians have developed a practice

guideline for Bariatric Examination, Assessment, and Management in the Emergency Department (BEAM-ED) to guide physicians on how to approach patients presenting to the emergency department with potential complications after bariatric surgery [8]. While this program was designed for use by ED physicians, it provides a structured, algorithmic approach to evaluating bariatric surgery patients that would be a helpful resource for the general surgeon called on to evaluate these problems.

In addition to routine history, the patient's surgical history should consist of information about the type of bariatric procedure performed, the surgeon who performed the procedure, and the center where the procedure took place. This information helps narrow down the etiology of the presenting symptom. Most complications post-bariatric procedures are unique to the procedures performed as described above. Identifying the surgeon and, if needed, contacting him/her would help provide necessary information and guide the management plan. Some surgeons work within bariatric surgery groups with associates on call round the clock. Locating the facility where the index procedure was performed can facilitate transfer of care if the patient presents with a non-emergent problem. Bariatric coverage or transfer is not always available, though, and treatment of emergent problems like perforations or internal hernias should not be delayed by transferring the patient as the additional time required may result in a worse outcome or death.

The presenting symptoms should be put into the context of the procedure performed and the timing since surgery. Gauging the duration of onset of symptoms can aid in determining the urgency of the presenting pathology; i.e., patients presenting with acute onset severe abdominal pain within the first 4 weeks postoperatively should be investigated for staple line or anastomotic leak after a sleeve gastrectomy or a gastric bypass, respectively. It is imperative to consider internal hernia and/or intestinal obstruction in patients presenting with obstructive symptoms within the same time frame. Patients with chronic abdominal pain presenting more than 4 weeks postoperatively are better managed by a bariatric surgery team as further investigation might be warranted.

Complications of bariatric surgery are not always evident. This highlights the importance of high clinical suspicion and experience dealing with bariatric surgery patients. The patient's overall status reflected in the vital signs and subjective symptomatology can help make the decision to either further investigate the patient noninvasively through imaging or invasively through a diagnostic laparoscopy or laparotomy. Signs such as fever, tachycardia, increased oxygen requirements, pain out of proportion to physcial examination or peritonitis in the setting of hemodynamic instability require prompt operative exploration after initial resuscitation.

It is important to emphasize that a general surgeon can manage all bariatric emergencies by following basic surgical principles and having some knowledge of the anatomy and potential management options. Generally speaking, damage control procedures in the deteriorating patient are appropriate, and no definitive reconstruction or repair is necessary at the initial operation. Controlling the immediate problem of contamination or bleeding, wide drainage, stabilizing the patient, and then making arrangements for transfer to a bariatric surgeon are appropriate care in this setting.

In a stable patient, there is more time to investigate the presenting symptoms. Diagnoses such as appendicitis, cholecystitis, diverticulitis, and nephrolithiasis should be considered when appropriate. In female patients, pregnancy status and other gynecological causes for abdominal symptoms should be assessed. Presence of a pulmonary embolism, deep venous thrombosis, or portomesenteric thrombus in patients presenting with concordant symptoms should be ruled out. D-dimer levels and CT angiography can be added to the work-up in these cases [9].

Management of Specific Complications

Scenario 1: Obstructing Adjustable Gastric Band

A 36-year-old female with a recent history of LAGB (8 months ago) presents with nausea, vomiting, and postprandial abdominal pain. She

describes her symptoms to have started a week ago after a band adjustment in her surgeon's office. The patient otherwise looks healthy and her vital signs are within normal limits, but she continues to have dry heaves with any oral intake. She called her bariatric surgeon's office but he is out of town so she was told to report to the nearest emergency department.

Diagnostic Test Upper GI contrast study. This reveals obstruction at the level of the band with moderately dilated gastric pouch above the band and severe gastroesophageal reflux of contrast.

Management The balloon in the band needs to be deflated. A Huber™ needle can be inserted into the subcutaneous port palpated on the anterior abdominal wall. Patients typically know where their port is located. The port can be stabilized between two fingers while the patient lifts his/her head off the pillow, and the port is percutaneously accessed as any mediport would be. If a LAGB-specific Huber™ needle isn't available, any type of needle can be used in this urgent setting. Once accessed, all of the fluid should be aspirated out of the system. The patient can be given oral fluids and discharged home if symptoms are resolved and fluids are tolerated. Close follow-up with her bariatric surgeon should be arranged to further manage the band.

Scenario 2: Internal Hernia After Roux-en-Y Gastric Bypass

A 55-year-old female 3 years post laparoscopic gastric bypass presents to the emergency department with sudden, severe abdominal pain that started 6 hours ago. The abdominal pain is associated with nausea and dry heaving. When asked, she reports that her last bowel movement and flatus were on the previous morning. She has had two similar, but less severe, episodes of this pain in the last month that resolved after 2 hours. Her heart rate is 120 bpm and her blood pressure is 100/75 mmHg. On examination, she cannot get comfortable in the bed, and her abdomen is diffusely tender but soft without peritonitis.

Diagnostic Test CT of the abdomen and pelvis. Sudden onset of severe abdominal pain after gastric bypass must be considered an internal hernia or small bowel volvulus until proven otherwise. This patient may not tolerate a full dose of oral contrast for the CT, but an attempt to ingest some should be made. IV contrast should be used unless contraindicated. The pathognomonic finding on CT is the "swirl sign" of the mesenteric vasculature suggesting an internal hernia (Fig. 39.12). Other findings of bowel obstruction may or may not be present in the acute setting. Routine labs including serum lactate may further support the diagnosis of early bowel ischemia.

Management In this clinical setting, any findings on CT suggesting an internal hernia, closed loop obstruction, or bowel obstruction or ischemia require emergent operation. After resuscitation, the patient's abdomen should be explored laparoscopically or open depending on the surgeon's expertise. Internal herniation of the small bowel most commonly occurs under the mesentery of the Roux limb or through the jejunojeju-

Fig. 39.12 Mesenteric "swirl sign" seen in a patient with an internal hernia after gastric bypass

nostomy mesenteric defect. The bowel should be run *distally to proximally* starting at the terminal ileum to effectively reduce the volvulus and then assessed for viability. Untwisting the bowel and identifying the site of the internal hernia can be confusing, even for an experienced bariatric surgeon, so care should be taken to slowly follow the bowel's course and reduce it to the normal position rather than performing a bowel transection to achieve this. In cases of chronic internal hernia, some adhesiolysis may be needed to restore the normal RYGB anatomy. In all cases, the original anatomy can be restored with patience and careful handling of the bowel. In a stable patient, resection (if indicated) and re-anastomosis are safe. The remaining mesenteric defects should all be re-closed with nonabsorbable suture. In an unstable patient, resection only and temporary closure of the abdomen are appropriate, and intestinal continuity can be restored when the patient stabilizes. If the Roux limb is ischemic (commonly from vascular compromise due to pressure from the bowel herniated beneath it), it should be resected up to the level of the gastric pouch. Care should be taken to divide as little of the distal gastric pouch as possible and to stay below the left gastric artery pedicle so that continuity can be restored later and the gastric bypass preserved. In cases where the majority of the midgut has become necrotic, care decisions should be presented to the patient's family and, if available, the intestinal transplant team consulted to offer their opinion regarding future reconstruction.

Scenario 3: Perforated Marginal Ulcer After RYGB

A 56-year-old male presents with severe upper abdominal pain and a rigid abdomen. His past medical history is significant for a previous myocardial infarction and a Roux-en-Y gastric bypass 7 years prior. The patient has smoked one pack of cigarettes per day for the past 5 years. He is conscious and responds to questions appropriately. His heart rate is 125 bpm and his blood pressure is 105/75 mmHg.

Diagnostic Test An upright abdominal x-ray shows free air under the diaphragm. The emergency department also obtained a CT scan of his abdomen that revealed free air, a moderate amount of free fluid, and inflammatory changes around the gastrojejunostomy in the upper abdomen.

Management This patient has a perforated marginal ulcer at the gastrojejunostomy, likely related to smoking. After adequate resuscitation, the patient should be taken to the operating room. In most cases, this problem can be managed laparoscopically. A liver retractor should be placed to expose the anterior pouch, and anastomosis and placing the patient in reverse Trendelenburg position can facilitate exposure of this area. Occasionally, omentum will have already sealed the perforation in which case it can be secured with sutures as a Graham patch. If the perforation is visible, the quality of the tissue should be assessed and primary closure attempted when possible. Omentum should then be sewn in place over the repair. If the perforation is not easily localized, intraoperative endoscopy can be used to insufflate air into the pouch while submerged in saline to identify the area of bubbling. Following repair, the abdomen should be washed out and wide drainage of the gastrojejunostomy and left upper quadrant obtained.

Whenever possible, some form of enteral access for postoperative nutritional support should be achieved. In a stable patient, time can be taken to place a remnant gastrostomy tube or a feeding jejunostomy tube. If these options aren't available, a transnasal feeding tube can be placed into the Roux limb distal to the repair to provide nutritional support.

Scenario 4: Anastomotic Leak After Gastric Bypass

A 46-year-old female presents to the emergency department feeling progressively more ill 4 days after an uneventful laparoscopic Roux-en-Y gas-

tric bypass. She reports having progressively worse abdominal pain. Her vital signs reveal a fever of 104 F and a heart rate of 136 bpm. Her abdominal exam shows generalized tenderness with guarding.

Diagnostic Test CT of the abdomen and pelvis reveals free extravasation of oral contrast from the gastrojejunostomy with a poorly defined air and fluid collection in the left upper quadrant.

Management Patients presenting acutely within days of a Roux-en-Y gastric bypass with fever and tachycardia should be evaluated for an anastomotic leak first. The most common site for leak is the gastrojejunostomy anastomosis. Imaging may not always show extravasation of oral contrast, but other secondary findings of inflammation or fluid at one of the anastomotic sites should also prompt surgical intervention. After resuscitation and initiation of antibiotics, the patient should be taken to the operating room and explored laparoscopically or open depending on the surgeon's skill set. Reverse Trendelenburg position can facilitate exposure of the upper abdomen, and the site of the leak should be clearly identified. A gastrojejunal anastomotic leak may be severely indurated, and primary closure may not be possible. In this case, omental patch and wide drainage are appropriate. If the leak is present at the jejunojejunostomy, primary repair is usually adequate, and resection is rarely needed. Enteral access of some kind should be obtained to facilitate healing postoperatively as long as the patient is stable. Once the patient has stabilized, the patient can be transferred to a bariatric surgeon and may require additional surgical or endoscopic therapy (clips, stent).

Scenario 5: Sleeve Gastrectomy Leak

A 25-year-old male presents to the emergency department 1 week after laparoscopic sleeve gastrectomy with 2 days of persistent fever and vague abdominal pain. On examination, he is found to be febrile with a heart rate of 115 bpm and a blood pressure of 110/75 mmHg. He is ill-appearing and his abdomen is tender in the left upper quadrant.

Diagnostic Test CT of the abdomen with IV and oral contrast will provide the diagnosis of a sleeve gastrectomy leak (Fig. 39.13). There may be free or contained extravasation of oral contrast as well as an air and fluid collection in the left upper quadrant. No other imaging is necessary, and while upper GI contrast studies may show the leak, they do not provide any information about the extent of the adjacent collections.

Management A stable patient that presents with a contained left upper quadrant abscess secondary to a sleeve leak can be managed with percutaneous drainage and transfer to a bariatric center. In this case, however, there is no defined collection and there is free extravasation that must be controlled. Primary repair is rarely possible in these cases as the leak is most commonly at the GE junction and the tissue is of very poor quality

Fig. 39.13 A contrast study of a patient presenting with fever post a sleeve gastrectomy. The patient is found to have a contained leak (arrow)

by this time. The safest strategy is to wash out the left upper quadrant, sew an omental patch over the perforation, and widely drain the area. In a stable patient, a feeding jejunostomy tube should be placed as these leaks commonly evolve into chronic fistulas that require prolonged periods without oral intake to heal. Once contamination is controlled, the patient can be transferred to a bariatric center for additional endoluminal therapy to facilitate healing of the leak.

Summary

The increase in bariatric surgery procedures performed in the last decade has increased the chances that the on-call general surgeon will be faced with some of these postoperative complications. In some cases, these patients can be transferred or managed without surgical intervention, but there are some scenarios where the general surgeon should manage the acute complication to avoid progression of the problem, delays in treatment, and increased risk for patient mortality. These emergent problems in the bariatric surgery patient can be managed by the general surgeon by following basic surgical principles: stabilize the patient, identify the anatomy, identify the problem, stop contamination or bleeding, wide drainage, and enteral access if indicated. General surgeons are familiar with Roux-en-Y reconstructions, staple line leaks, internal hernias, and bowel obstructions after many other types of general surgery procedures, and it is critical that they manage these problems in bariatric patients the same way they would in patients who have had surgery for gastric cancer, biliary malignancies, and small bowel disease.

Gaining familiarity of bariatric surgery anatomy and the initial diagnosis and management of bariatric surgery complications is an important skill for the general surgeon given the increasing number of bariatric surgery patients in our society. While bariatric surgery consultation or transfer is often appropriate and necessary, it should never delay treatment for a life-threatening complication that can be initially managed by the general surgeon on call.

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