

## Acute Care Surgery Emergencies in the Bariatric Patient: Syllabus

Colonel Matthew Martin, MD, FACS  
 Trauma Medical Director, Madigan Army Medical Center  
 contact email: [matthew.j.martin16.mil@mail.mil](mailto:matthew.j.martin16.mil@mail.mil)

**Summary:** The field of bariatric surgery has changed rapidly over the past 2 decades, with bariatric procedures evolving from last-ditch measures to the primary effective intervention for morbid obesity and obesity-related comorbidities. The proven efficacy coupled with major reductions in perioperative morbidity and mortality has contributed to the widespread acceptance in the adult population, as well as an increasing acceptance in select pediatric and geriatric populations. Any practicing acute care surgeon can expect to increasingly encounter the post-bariatric surgery patient who requires urgent evaluation and potentially surgical intervention. Therefore, a basic understanding of the common bariatric surgical procedures being performed and their associated short and long-term complication profiles is necessary to safely and effectively evaluate, triage, and manage these patients. If a bariatric surgeon is not immediately available at your center to assist or advise, then a telephone conversation with a bariatric specialist at a local referral center can be invaluable in providing advice and determining the necessity for transfer. This syllabus will provide a review of the most important bariatric-specific problems that may present to an acute care surgeon.

### Review of Common Current Bariatric Procedures and Terminology

	<b>Restrictive</b>	<b>Restrictive + Malabsorptive</b>
<b>Current</b>	adjustable gastric band sleeve gastrectomy	gastric bypass (aka “Roux-Y” bypass) biliopancreatic diversion+duodenal switch
<b>Historical/Uncommon</b>	gastric plication vertical banded gastroplasty (VBG)	biliopancreatic diversion jejuno-ileal bypass
	horizontal gastroplasty	mini or single loop gastric bypass

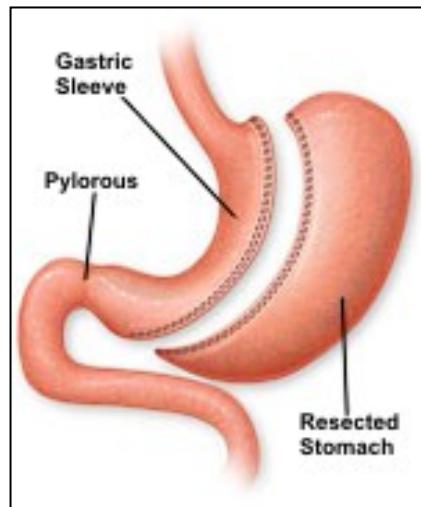
- The simplest classification is whether the operation is purely restrictive or whether it is a combined restrictive/malabsorptive procedure
- Restrictive means that only the stomach has been manipulated and there is no anastomosis or small bowel manipulation to worry about.
- Combined operations involve both the stomach and small bowel and have at least 2 anastomoses. Problems can involve the stomach, the small bowel, or both
- The adjustable gastric band (or “lap band”) was previously the fastest growing procedure, but now is being widely abandoned in favor of the sleeve gastrectomy
- The sleeve gastrectomy and gastric bypass are the two most commonly performed procedures now, and will make up the majority of patients presenting with acute abdominal emergencies requiring surgery or some other intervention
- Any procedure that involved a prosthetic device (gastric band, VBG) has the potential for the band/tubing to slip out of position or to erode into surrounding structures (stomach, small bowel)

## **Top 10 Principles for Bariatric Emergencies**

1. There is nothing unique about abdominal emergencies in the bariatric patient versus other patients who have undergone prior foregut surgery, but there are specific additional considerations and triggers for interventions that the acute care surgeon should be aware of. Bariatric patients still develop appendicitis, gallstones, etc., so work up the common problems also.
2. A bariatric history is critical! Establish exactly what procedure the patient had done (many times they will all be lumped as having a “prior gastric bypass”), when and where it was done, open vs laparoscopic, and were there any immediate postoperative complications or problems. If possible, contacting the original bariatric surgeon can provide critical information or advice.
3. In the early postop period (1-4 weeks) any patient presenting with significant abdominal complaints should be assumed to have a leak (anastomotic or staple line) until proven otherwise.
4. Leaks can present insidiously with minimal abdominal complaints. Reliable early signs are fever, tachycardia, unexplained elevation WBC count.
5. Many abdominal emergencies present with associated pulmonary symptoms, and pulmonary embolism can present similar to a leak. Both should be considered and ruled out, usually by CT imaging.
6. Postoperative bowel obstructions after a gastric bypass are due to an internal hernia until proven otherwise. CT scan can provide evidence of an internal hernia, but no imaging study is reliable enough to rule out an internal hernia. This “proof” usually requires surgical exploration done in a timely fashion to avoid catastrophic small bowel strangulation/necrosis or blowout of a proximal staple line.
7. The sleeve gastrectomy is the fastest growing bariatric procedure now being performed, so be familiar with the anatomy and the common emergencies with this procedure. Although touted as a “safer and less invasive” option than gastric bypass, the leak rate is similar (or higher).
8. Many acute abdominal complaints with the adjustable gastric band can be relieved by complete band deflation (can be done at bedside), turning an urgent issue into an elective one.
9. Upper GI contrast studies will miss a significant number of leaks. Following the UGI study with a CT scan (combined CT/Swallow protocol) will greatly improve detection of leak and evaluate for most other emergent abdominal pathologies.
10. The acutely decompensating patient belongs in the OR as soon as possible, and the stable patient with persistent and unexplained abdominal pain after complete radiologic evaluation usually warrants endoscopy and possible surgical exploration.

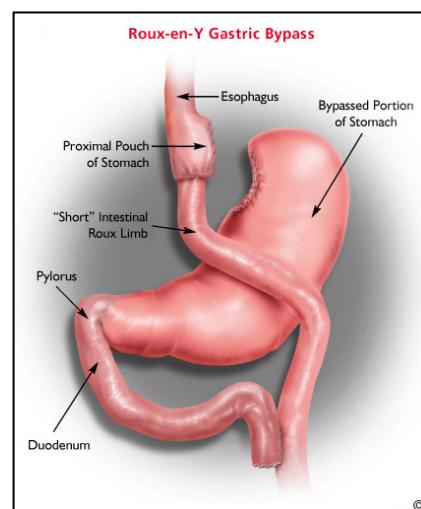
## Sleeve Gastrectomy

- Formation of narrow gastric tube
- Lateral divided portion of stomach removed
- Antrum/pylorus left intact
- No small bowel manipulation or rearrangement
- No anastomoses
- Long staple line at risk for leaks
- Risk of narrowing, particularly at incisura
- Leaks most commonly occur at the angle of His, just below or at the GE junction
- Entire anatomy still accessible by endoscopy



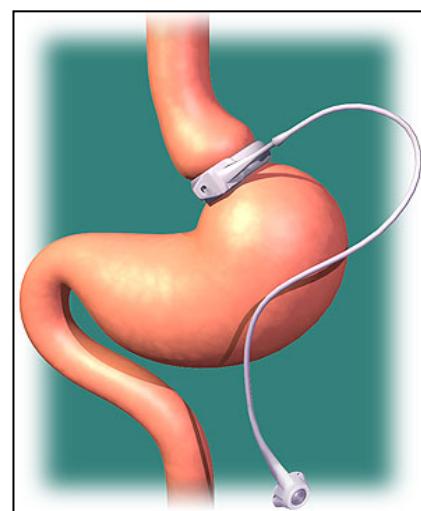
## Gastric Bypass (Roux-en-Y)

- Formation of very small gastric “pouch”
- Remainder of bypassed stomach (remnant) left in-situ
- Small bowel divided into roux limb (RL, aka “alimentary limb”) and biliopancreatic limb (BP limb)
- RL anastomosed to pouch (gastrojejunostomy or GJ)
- BP limb anastomosed to RL (jejunoojejunostomy or JJ)
- Length of RL dictates the degree of malabsorption
- Leaks most likely at GJ, but also possible at JJ or from the staple line of excluded gastric remnant
- Mesenteric defects usually closed, but can re-open due to technical failure or just from the weight loss (patients will lose fat in the mesentery also)
- Gastric remnant, duodenum, and biliary system now NOT accessible by standard endoscopy



## Adjustable Gastric Band or “Lap Band”

- Prosthetic circular band with inflatable balloon
- Placed on upper stomach just below GE junction
- Long tubing brought out abdominal wall and connected to an injection port in a subcutaneous pocket
- Band gradually inflated after surgery to obtain restriction
- Touted as the “safest and lowest risk” procedure, but also has the lowest success rate for weight loss and 25-50% of patients require band revision or removal eventually
- Most complications related to band/tubing erosion, band slippage, or mechanical problems with band, tubing, or port



## **Bariatric Evaluation and Management Principles for the Acute Care Surgeon**

**Table 1.** Bariatric-Specific Complications in the Early and Late Postoperative Periods

	<b>Gastric Bypass</b>	<b>Sleeve Gastrectomy</b>	<b>Adjustable Gastric Band</b>
<b>Early (1-4 weeks)*</b>	anastomotic leak GI bleeding intraluminal clot early stricture surgical site infection + early postop SBO	staple line leak GI bleeding gastric outlet obstruction early stricture surgical site infection + early postop SBO	dysphagia/GERD band slippage balloon or tubing fracture edema/stenosis at band site surgical site infection + iatrogenic gastroesophageal injury
<b>Late (&gt;30 days)</b>	internal hernia stricture marginal ulcer gastro-gastric fistula gallstones Intussusception (at J-J)	leak or fistula stricture gastric outlet obstruction portal/SMV vein thrombosis gallstones severe GERD	band slippage or erosion band over-inflation port malposition band/tubing fracture gallstones intolerance to band inflation

\* additional iatrogenic complications of surgery such as a missed enterotomy should be considered as with any early postoperative patient

+ an intra-abdominal abscess should be assumed to be due to a contained leak

### **Key Points in the Evaluation of the Bariatric Emergency**

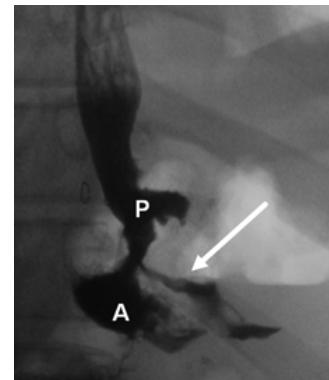
- Most critical piece of history is identifying what prior procedure was performed; this will help guide the workup and areas of main concern on imaging studies (see Table 1 above)
- Patients manifesting with hemodynamic instability or signs of rapid progression of sepsis or clinical deterioration should be explored without undue delays or extensive workups
- Liberal use of imaging (fluoro, CT, or combined) to rule out major life-threatening complications such as a leak or internal hernia is warranted, but beware the false negative study (can miss leaks and internal hernias)
- Bariatric patients become easily dehydrated and this is primarily due to the restrictive effect limiting po intake and not due to the malabsorptive component. They also should be given a decreased volume of oral contrast and do not require a “full oral prep”
- Radiologists not familiar with bariatric imaging may have problems sorting out the anatomy. Face to face discussion and review of the studies is critical
- A common mistake in evaluating the patient in the early postoperative period is interpreting concerning imaging findings as normal postop variants. Free air and fluid are not normal at 1 week or later after surgery
- Persistent emesis after any bariatric surgery is highly abnormal, and should raise a red flag of concern for an acute surgical emergency

## PROCEDURE-SPECIFIC EVALUATION & MANAGEMENT TIPS

### I. Prior Gastric Bypass

#### A. Early (within 30 days): Leaks, bleeding, and early postop SBO

- The top 3 concerns should be leak, leak, and leak; most commonly from the G-J anastomosis but can be from any anastomosis or staple line. Most early complications of laparoscopic gastric bypass can be managed laparoscopically in experienced hands, but do not hesitate to convert to open as needed.
- Leaks may present as florid peritonitis and sepsis (uncontained) or with subacute symptoms of pain, fever, tachycardia, nausea/emesis (usually contained).
- Signs of uncontained leak should prompt immediate surgical exploration, otherwise a contrast swallow study should be obtained (CT or combined UGI followed by immediate CT have highest sensitivity).
  - ☒ reliable only for leaks from G-J (arrow in figure), can easily miss leaks from J-J or from gastric remnant (although these are fortunately much less common)

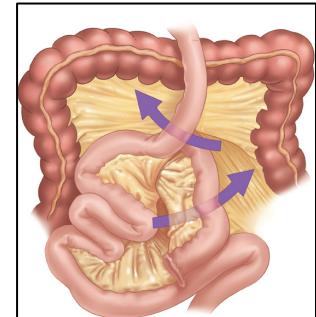


- There has been a paradigm shift over the last 5 years away from routine operative exploration and repair for locally contained G-J leaks in stable patients.
  - ☒ nonoperative management highly successful with the use of percutaneous drain placement and endoscopic stent placement
  - ☒ additional options include fibrin glue injection, endoscopic clip or suture closure of leak
- The next concern should be for a small bowel obstruction. Early SBO after laparoscopic gastric bypass is rarely due to adhesions, and is more commonly due to: 1) technical error with narrowing or kinking of the J-J, 2) intraluminal obstruction from a formed hematoma, or 3) a port-site hernia.
  - ☒ luminal J-J obstruction due to a formed hematoma can be a surgical emergency if completely obstructing
  - ☒ early obstruction of the J-J will cause both proximal dilation and emesis - these are both risk factors for disrupting the G-J anastomosis if not promptly treated by surgery or endoscopy
  - ☒ obstruction at or distal to the J-J will also dilate the BP limb and gastric remnant (GR in figure), which has no outlet for decompression. This is a surgical emergency!

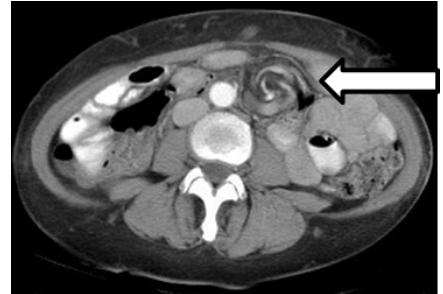


## B. Late (after 30 days): Internal hernia, strictures, and marginal ulcer

- The most important concept to understand in the gastric bypass patient is the difference in the management of postop small bowel obstruction. In the gastric bypass patient any postoperative SBO is assumed to be due to an internal hernia, and should not be managed expectantly for 2 primary reasons: 1) the herniated bowel can rapidly progress to ischemia and necrosis if not promptly reduced and 2) an NG tube will not decompress the BP limb and gastric remnant.
- Internal hernias:** most commonly occur through the mesenteric defect at the J-J (lower arrow in figure), followed by herniation through Petersen's defect (upper arrow). If the roux limb was routed through a retrocolic defect, then herniation at this site is possible also.
- Although there are a number of signs on CT scan suggestive of an internal hernia, none are highly sensitive or specific. These include:



- ☒ a mesenteric "swirl sign" indicating vascular torsion (arrow in Figure) is the most reliable sign
- ☒ clustered loops of bowel in the left upper quadrant
- ☒ small bowel loop behind the SMA
- ☒ J-J anastomosis to the right of midline (should be on left normally)

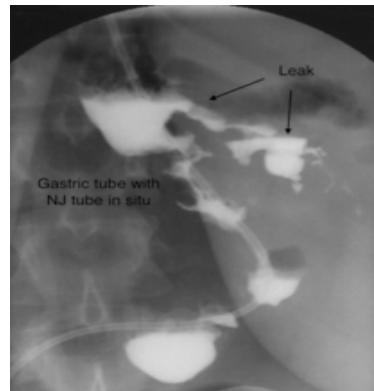


- Strictures:** typically take at least 4-6 weeks to develop and are most commonly at the G-J anastomosis. Progressive intolerance to solids > liquids and pain with eating are the usual presenting signs. Upper endoscopy should be performed and most strictures respond to serial balloon or bougie dilation. Upper GI contrast studies are not reliable, and can be read as normal even in the presence of a tight stricture.
- Marginal ulcer (MU):** ulceration at the gastrojejunostomy. This is typically only seen after gastric bypass and not with other bariatric procedures. The incidence is 2-15% and varies by anastomotic techniques and patient populations. Common symptoms are epigastric pain with eating, but they can also present as spontaneous perforations.
  - ☒ the most common etiologies are smoking and NSAID use, but they can also be seen with large or dilated pouches that have more acid producing parietal cells
  - ☒ the majority should heal with acid suppression and smoking/NSAID cessation
  - ☒ perforated MU – suture repair and plug or buttress with omentum, intraoperative endoscopy can be useful if the exact site of perforation is unclear

## II. Prior Sleeve Gastrectomy

### A. Early (within 30 days): Leaks and bleeding

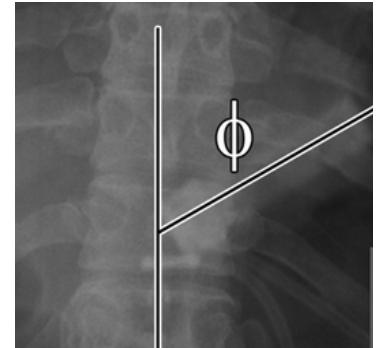
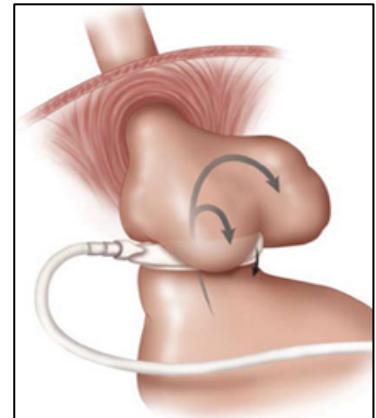
- **Leaks:** Similar to gastric bypass, the first concern should be a leak. They can occur anywhere along the sleeve staple line, but are almost always at the proximal end (Figure).
  - ☒ likely due to poor blood supply, thinner tissue close to esophagus, or backpressure blowout from relative narrowing of sleeve or pyloric dysfunction
- Initial management principles are similar to gastric bypass and include surgical exploration for uncontrolled leak with sepsis or instability, or percutaneous drainage for a contained leak/abscess. Attempts at primary repair in acute phase usually fail.
- These can be incredibly challenging to manage and achieve permanent resolution. Endoscopic stenting to achieve adequate coverage of the leak is much more difficult compared to gastric bypass leaks, and should be referred to a very experienced endoscopic surgeon or gastroenterologist.
- **Bleeding:** staple line bleeding has been greatly decreased by the use of buttressing materials, but can still occur. If intraluminal bleeding forms a large hematoma it can cause obstruction and result in a proximal blowout leak as described above. Urgent endoscopy or surgical re-exploration should be performed to evacuate the hematoma.



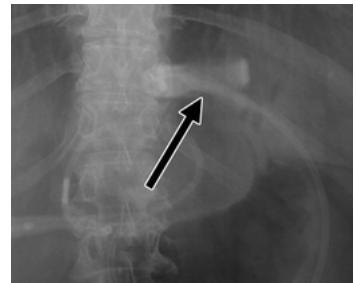
## III. Prior Adjustable Gastric Band (AGB)

### A. Late (after 30 days): Band slippage

- The primary reason for an acute emergent presentation with a prior AGB will be a slippage of the band causing gastric obstructive symptoms and possible strangulation of the stomach above the slipped band (Figure).
  - ☒ note that the band has slipped distally, and excess fundus/body is herniated upwards. In addition to obstructive symptoms this can cause acute gastric necrosis if left untreated
- Diagnosis can be made by a plain AP x-ray. The figure shows measurement of the “phi angle”. This is the angle formed by a straight line through the long axis of the band and a vertical line through the spinal column. Normal position is approximately 45 degrees (as shown in Figure), and anything > 58 degrees indicates slippage. In addition, an AGB in normal position should look like a hockey-puck viewed from the side as shown here.

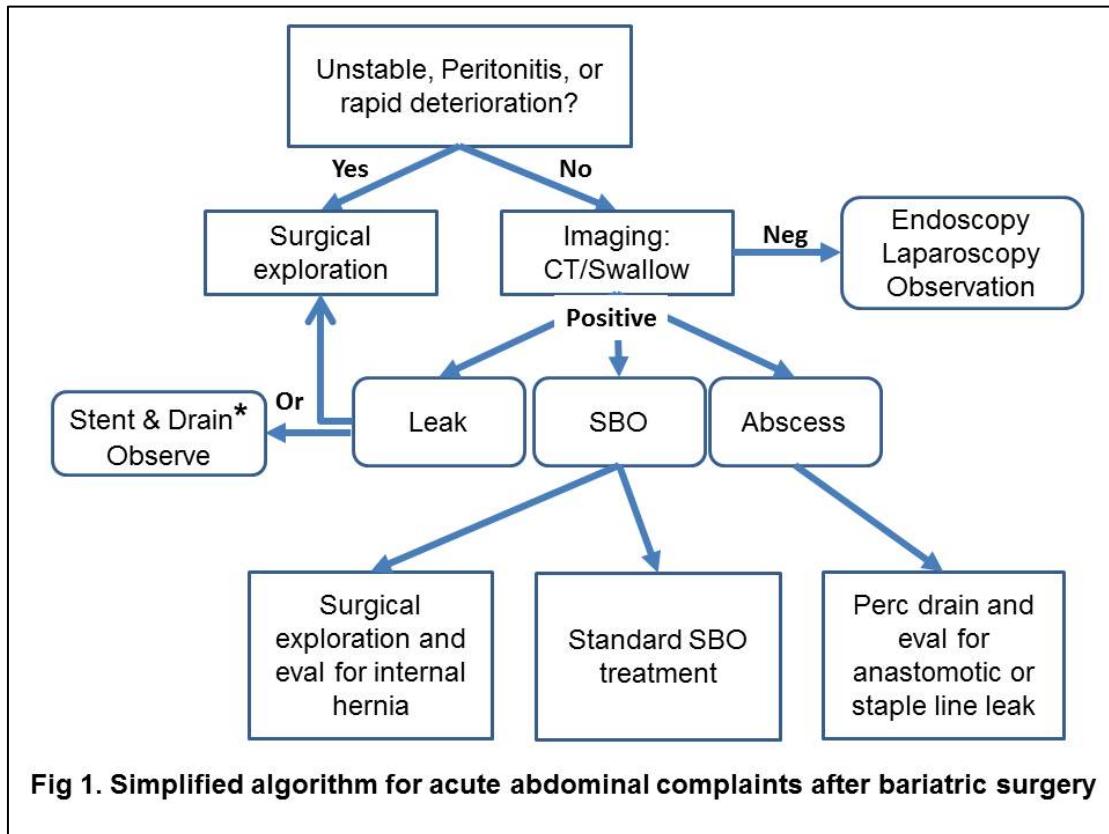


- The 2 figures here show signs of a slipped band.
- Note the increased phi angle in the upper figure, now at almost 90 degrees relative to the vertical axis of the spine.
- An additional sign of slippage is when the appearance of the band on an AP xray changes from a solid disc (as seen in the upper figure) to a circular shape with the lumen visualized (lower figure).
- This is known as the “O sign” and should prompt immediate evaluation or intervention for slippage.



- The patient will usually present with acute intolerance to oral intake, persistent emesis and even difficulty with oral secretions. Although the diagnosis can be made based on the clinical picture and plain x-ray, a contrast swallow or CT scan can be helpful in equivocal cases or to delineate the degree of slippage and gastric herniation, and rule out a perforation.
- The ultimate treatment is removal of the band, but in many cases deflating the band by accessing the subcutaneous port and aspirating all fluid will relieve the symptoms and obviate the need for emergent surgery. This can also allow the band to slip back into normal position, but should still be followed by band removal or revision.

### **Simplified Algorithm for the Bariatric Patient with Acute Abdominal Complaints**



## REFERENCES AND RESOURCES

Attached is an excellent wall chart created by the American Society of Metabolic and Bariatric Surgery outlining key algorithms and management strategies for the bariatric patient in the emergency setting is available for order through the ASMBS website or for free download here: [http://s3.amazonaws.com/publicASMBS/ASMBS\\_Store/ASMBS\\_ER\\_Poster9-20-10.pdf](http://s3.amazonaws.com/publicASMBS/ASMBS_Store/ASMBS_ER_Poster9-20-10.pdf)

1. Aurora AR, Khaitan L, Saber AA. Sleeve gastrectomy and the risk of leak: a systematic analysis of 4,888 patients. *Surgical Endoscopy*. 2012;26(6):1509-1515.
2. Baptista V, Wassef W. Bariatric procedures: an update on techniques, outcomes and complications. *Current Opinion in Gastroenterology*. 2013;29(6):684-693.
3. Bege T, Emungania O, Vitton V, et al. An endoscopic strategy for management of anastomotic complications from bariatric surgery: a prospective study. *Gastrointestinal Endoscopy*. 2011;73(2):238-244.
4. Boru C, Silecchia G. Bariatric emergencies: what the general surgeon should know. *Chirurgia*. 2010;105(4):455-464.
5. Campanile FC, Boru CE, Rizzello M, et al. Acute complications after laparoscopic bariatric procedures: update for the general surgeon. *Langenbeck's Archives of Surgery*. 2013;398(5):669-686.
6. Car Peterko A, Kirac I, Gaurina A, Diklic D, Bekavac-Beslin M. Diagnosis and management of acute and early complications of/after bariatric surgery. *Digestive Diseases*. 2012;30(2):178-181.
7. Chandler RC, Srinivas G, Chintapalli KN, Schwesinger WH, Prasad SR. Imaging in bariatric surgery: a guide to postsurgical anatomy and common complications. *AJR. American Journal of Roentgenology*. 2008;190(1):122-135.
8. Clinical Issues Committee of the ASMBS. American Society for Metabolic and Bariatric Surgery position statement on emergency care of patients with complications related to bariatric surgery. *Surgery for Obesity and Related Diseases* 2010;6(2):115-117.
9. Committee ACI. ASMBS guideline on the prevention and detection of gastrointestinal leak after gastric bypass including the role of imaging and surgical exploration. *Surgery for Obesity and Related Diseases* 2009;5(3):293-296.
10. Ellison SR, Ellison SD. Bariatric surgery: a review of the available procedures and complications for the emergency physician. *The Journal of Emergency Medicine*. 2008;34(1):21-32.
11. Eubanks S, Edwards CA, Fearing NM, et al. Use of endoscopic stents to treat anastomotic complications after bariatric surgery. *Journal of the American College of Surgeons*. 2008;206(5):935-938.
12. Hussain A, El-Hasani S. Bariatric emergencies: current evidence and strategies of management. *World journal of Emergency Surgery* 2013;8(1):58.
13. Juza RM, Haluck RS, Pauli EM, Rogers AM, Won EJ, LynSue JR. Gastric sleeve leak: a single institution's experience with early combined laparoendoscopic management. *Surgery for Obesity and Related Diseases* 2014;DOI 10.1016/j.jsoard.2014.06.011
14. Lehnert B, Moshiri M, Osman S, et al. Imaging of complications of common bariatric surgical procedures. *Radiologic Clinics of North America*. 2014;52(5):1071-1086.

# Clinical Pearls for Emergency Care of the Bariatric Surgery Patient

1. Unstable Vital Signs
  - Fever  $> 101^{\circ}$  F
  - Hypotension
  - Tachycardia  $> 120$  bpm  $\times$  4 hours
  - Tachypnea
  - Hypoxia
  - Decreased urine output

## EMERGENCY PRESENTATIONS:

2. Bright Red Blood by Mouth or Rectum, Melena, Bloody Drainage
3. Abdominal Pain or Colic  $> 4$  hours
4. Nausea  $\pm$  Vomiting  $> 4$  hours
5. Vomiting  $\pm$  Abdominal Pain

## BARIATRIC COMPLICATIONS:

- Intra-Abdominal Bleeding
- Leaks and Sepsis
- Obstruction
- Pulmonary Embolism
- Vomiting  $\pm$  Abdominal Pain
- Abdominal Compartment Syndrome

**IMPORTANT: KNOW THE ANATOMY:  
IT CAN BE VERY CONFUSING!**  
Patients often don't know which procedure they have had, and surgeons vary the procedure dramatically. If you're not the primary surgeon, call the surgeon who performed the procedure.

### Principles to Guide Management of Bariatric Emergencies

#### I. Critical Time Frame

- Diagnose within 6 hours
- To OR within 12-24 hours

#### II. Critical Warnings

- Call bariatric surgeon early; if not available, call general surgeon on call
- These are not typical abdominal surgery patients; they do not exhibit expected or typical signs and symptoms, and they have no physiological reserve to weather complications.
- NG-tube:
  - Avoid "blind placement" due to risk of perforation
  - Will not decompress the distal stomach
- Avoid NSAIDs, ASA, Plavix, Steroids:
  - Greater risk of ulcer, band erosion and perforation
  - Place on PPI for gastric erosion safeguard
- Thiamine deficiency:
  - Initially avoid glucose in IV fluids (unless hypoglycemia is confirmed)
  - Use RL or NS w/ 100 ampule of multivitamin
  - Can result in Wernicke's syndrome, characterized by ataxia, confusion, blurred vision. IV dextrose will increase the risk of permanent neurologic impairment.
- Avoid overloading the gastric pouch with oral fluids or contrast – should only give 6 oz.



Roux-en-Y  
Gastric Bypass



Vertical Banded  
Gastroplasty



Duodenal Switch



Sleeve Gastrectomy



Adjustable  
Gastric Band

## INTRA-ABDOMINAL BLEEDING

### I. Emergency Presentation

Bright Red Blood Oral or Rectal, Melena, Bloody Drainage, Tachycardia, Hypotension, Fainting

- < 48 hrs postop indicates potential bleed from staple line
- > 48 hrs postop indicates potential marginal ulcer hemorrhage
- Bleeding via oral route indicates potential pouch source
- Melena or bleeding via rectal route indicates potential duodenal ulcer or distal stomach or bowel source.

### II. Emergency Assessment and Treatment

- Give 1000 mL NS fluid bolus
- Stop Anticoagulants, ASA or Plavix
- Type/Crossmatch PRBCs; may need FFP or platelets
- Serial Hct/Hgb
- Frequent Vital Signs
- Monitor Urine Output
- Check Renal Profile
- Good IV access; may need central line

### III. To Surgery if:

- Hypotension
- Drop in Hct of 10%
- Falling Hct despite transfusion
- Tachycardia  $> 120 \times 4$  hrs despite fluid bolus or blood transfusion

\*NOTE: Consider EGD in OR under general anesthesia to control airway. Inject and cauterize by EGD. Check for perforation. HIGH RISK! Visualization difficult if brisk bleed.

## PULMONARY EMBOLISM

### I. Emergency Presentation

- Unstable vital signs with tachypnea  $\pm$  chest pain

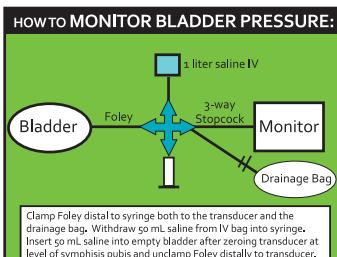
### II. Emergency Assessment

- IV contrast-enhanced chest CT
- Presentation of an intra-abdominal complication such as leak or closed-loop obstruction is often similar to that of PE.

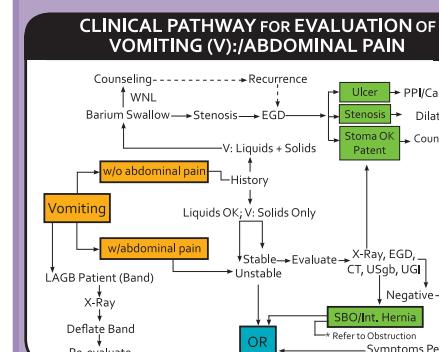
## VOMITING $\pm$ ABDOMINAL PAIN

### I. Emergency Presentation

Vomiting associated with abdominal pain needs prompt surgical evaluation and observation until resolved or surgical exploration.



### II. Emergency Assessment and Treatment



### Hospital Management of the Bariatric Surgery Patient

#### "FAST HUG"

- FOOD: Establish enteral or parenteral nutrition within 48 hours
- ANALGESIA: Control pain for patient comfort
- SEDATION: If on ventilator to prevent self-extubation
- THROMBO-EMBOLIC PROPHYLAXIS: Mechanical and chemical
- HEAD-OF-BED ELEVATED  $30^{\circ}$  for aspiration risk
- ULCER PROPHYLAXIS: Proton pump inhibitor
- GLUCOSE CONTROL: Tight control with glucose  $< 150$

## ABDOMINAL COMPARTMENT SYNDROME

### I. Emergency Presentation

- Associated with end-organ failure
- Can occur with intra-abdominal sepsis, bleeding or obstruction

### II. Emergency Treatment → To Surgery

- Open the abdomen to decompress
- Place VAC dressing

## LEAKS AND SEPSIS

### I. Emergency Presentation

- Unstable vital signs within 72 hours of bariatric surgery
- Persistent and progressive tachycardia ( $> 120$  bpm  $> 4$  hrs) is the most sensitive indicator of potential surgical emergency.

- Signs of sepsis/leak may be subtle at first and may need to rule out hypovolemia, atelectasis, bleeding, pulmonary embolism (PE), obstruction and/or leak.
- Unstable vital signs at presentation are all signs of sepsis/leak, especially within 72 hours of bariatric surgery: Fever  $> 101^{\circ}$  F, hypotension, tachycardia, tachypnea, hypoxia, decreased urine output.

\*Presentation of an intra-abdominal complication, such as leak, is often similar to that of PE. Once PE is ruled out (w/IV contrast-enhanced chest CT), consider immediate surgical exploration.

A negative abdominal CT does not definitively rule out a complication such as a leak. Abdominal series and gastrografin swallow can be negative even when there is a leak.

### II. Emergency Treatment

- Conservative nonoperative management of leaks may be considered if contained leak/abscess is well drained internally or externally with communication to drain documented by imaging and ONLY if the patient is stable clinically ( $T < 101^{\circ}$  F, pulse  $< 120$  bpm, WBC  $< 15,000$ , normal renal and respiratory function).

OTHERWISE:

- Surgical exploration

## Adjustable Gastric Band

- If nausea and vomiting is present, obtain flat plate of abdomen, with band tilted up compared to spine, and barium swallow to assess for possible stenosis or obstruction.
- If slip seen on x-ray → urgent deflate, possibly operate
- To deflate the band, ask patient where their port is located and should be able to palpate on abdominal wall or use fluoroscopy. Can also see it on flat-plate x-ray. Use sterile prep under local. Insert non-coring Huber needle similar to that used for port-a-caths, as the system is under pressure and will leak. Remove as much fluid as possible, then re-evaluate symptoms and findings.
- Maximum band volume is 4-14 mL depending on model.

## Adjustable Gastric Band Obstructions



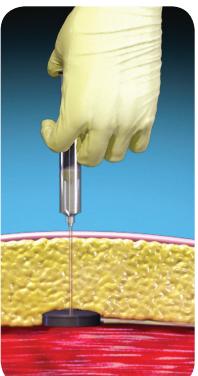
Normal LAGB -  
Band Tilted Up



LAGB Too Tight -  
Normal Tilt



LAGB Slippage -  
Posterior



LAGB Slippage -  
Anterior

For more information, please visit  
[www.asmbs.org](http://www.asmbs.org)

## OBSTRUCTION

### I. Emergency Presentation

- Abdominal Pain or Colic  $> 4$  hours
- Common postop complaint. Duration of more than 4 hours, or associated with vomiting, requires surgeon evaluation and observation until resolved or treated. CT/UGI diagnostic in most cases, but not all.
- No place for NG-tube or conservative management.
- Acute bleed indicates potential obstruction due to clots in GI tract which may cause perforation.
- Consider CT of abdomen with oral contrast or barium UGI with small-bowel follow-through to the colon with contrast to assess for possible obstruction.
- Consider EGD to (A) rule out gastric outlet obstruction or (B) remove gastrografin contrast prior to anesthesia to prevent aspiration.
- X-rays, labs and physical exam often negative in patients with obstruction.
- Closed-loop obstructions and internal hernias are a risk after gastric bypass and may be lethal if dead bowel. Bowel can become ischemic in six hours.
- Adhesions may cause bowel obstructions in any patient after abdominal surgery and be unrelated to bariatric surgery.
- Beware of RED HERRINGS. Gallstones on ultrasound appear to be etiology while the real issue is dead bowel secondary to closed-loop obstruction.
- Beware of aspiration of gastrografin or CT contrast - consider awake endotracheal intubation or EGD prep.

#### Roux-en-Y Gastric Bypass

Three Sites for Internal Hernias:  
Fig. 1 Potential mesenteric openings that could lead to internal hernia after Roux-en-Y gastric bypass. (A) Transverse mesocolon defect. (B) Petersen hernia (space between mesentery of Roux limb and transverse mesocolon). (C) Jejunolejunostomy mesenteric defect.  
With permission: J Lap Endo Adv Surg Tech 2000, 10: 373-5

### II. Emergency Treatment

- Presentation of an intra-abdominal complication, such as closed-loop obstruction, is often similar to that of PE. Once PE is ruled out (e.g., by IV contrast-enhanced chest CT) consider immediate surgical exploration.
- Dilated distal stomach or contrast in remnant = obstruction → requires immediate decompression.

Illustrations © 2006 Ethicon Endo-Surgery, Inc. Illustrations  
© Copyright 2010 American Society for Metabolic and Bariatric Surgery. All rights reserved.