Reoperative Surgery for Gastrogastric Fistulas After Divided and Nondivided Roux-en-Y Gastric Bypass (RYGB)

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Gastrogastric fistula: known complication of stapled procedures; many patients asymptomatic; serious complications of symptomatic fistula include marginal ulceration, gastroesophageal reflux disease (GERD), pain, and weight regain; usually managed surgically

Definition: abnormal communication between gastric pouch and fundus or small bowel; may occur at linear staple line or gastrojejunostomy; may involve pouch or esophagus

Causes: pouch ischemia; contained leak; infected hematoma; distal obstruction and stenosis; staple line malfunction; incomplete division between fundus and pouch; unsealing of staple line; marginal ulceration

Patient complaints: abdominal pain; GERD; bilious vomiting; gastrointestinal (GI) bleeding or perforation; loss of restriction with weight gain

Diagnosis: upper GI radiography; contrast may not enter bowel if fistula large; endoscopy may miss small fistulas; computed tomography (CT) not recommended; 49% of fistulas occur at top of proximal fundus

Management: reported incidence of fistulas from nondivided bypass as high as 49%; less likely than fistulas associated with divided bypass to benefit from nonsurgical interventions (eg, fibrin glue, endoscopic suturing); linear cutting stapler used in divided bypass; associated fistulas are true fistulas that may leave fistulous tract between fundus and pouch; may be amenable to nonsurgical closure or clipping; nontraditional surgical techniques excise the leak with fibrin glue, suturing, clips, or plication (all performed endoscopically) best reserved for small fistulas; none work consistently

Revision surgery: endoscopic procedures associated with high rates of re-opening within 1 yr, especially of larger fistulas

Effective interventions: correcting problem laparoscopically or through open surgery; options include ablation through stapling over staple line and fistula (not recommended; high risk for recurrence); resecting old staple line and fistula, sometimes with partial or complete removal of fundus; speaker performs all procedures laparoscopically; work-up — study operative report, even if old; obtain upper GI radiographs and endoscopy to determine exact location and characteristics of fistula; order routine laboratory tests as with other complex bariatric cases

Late leaks: may signal fistula recurrence; prevention techniques include avoiding ischemia and using larger staples; leaks may occur despite good staple line maintenance; removing reaction — does not prevent late leak, but does prevent recurrent fistula

Conclusions: if performing revision surgery, completely mobilize stomach, understand anatomy, find Roux limb, try to locate staple line, staple on fresh tissue whenever possible; avoid taking down gastrojejunostomy whenever possible; use bougie or endoscope; use larger staple height than with conventional primary cases; go slow and be patient; respect fundus; have experienced surgical team

Reoperative Surgery for Malnutrition/ Limb Shortening/Reversal

Dr. Shikora

Malnutrition: associated more with distal bypass than restrictive procedures; risk related to malabsorption and possibly dysfunctional eating habits

Nutrient absorption: fats and fat-soluble vitamins absorbed distally; iron and calcium absorbed proximally; vitamin B₁₂ absorbed distally but requires mixing in duodenum; gastric bypass associated mostly with malnutrition of proximally absorbed nutrients; intestinal bypass and biliopancreatic diversion (BPD) associated with malnutrition of more distally absorbed nutrients; much overlap; proteins and carbohydrates absorbed throughout GI tract; length and function of intestine varies; often associated with hyperthyrotropic, hypoplasia, and changes in function; optimal bowel limb length unknown; no good data on best limb to shorten; protein malabsorption results when significant portion of total absorptive capacity bypassed; fat-soluble vitamins and bile salt malabsorption associated with more distal procedures

Indications for revision: protein deficiency; vitamin and mineral deficiencies leading to severe anemia or neurologic complications

Educational Objectives

The goal of this program is to improve the management of complications associated with bariatric surgery. After hearing and assimilating this program, the clinician will be better able to:

2. Recognize the types of malnutrition most likely to occur after different bariatric procedures.
3. List the indications for revision in a patient with malnutrition associated with bariatric surgery.
4. Revise a jejunostomy bypass when indicated.
5. Convert gastroplasties when necessary and manage the associated technical challenges.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio-Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and is not a proprietary business or commercial interest. For this program, the following has been disclosed: Dr. Shikora is on the advisory board of Synovis Surgical Innovations. Drs. Brolin and Marea and the planning committee reported nothing to disclose.
symptoms; severe diarrhea or steatorrhea; severe dysphagia (see refinement below).

Revision of gastric bypass: optimal limb length unknown; optimal pouch size also unknown (cannot be measured accu-
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bic deficiency; 60% developed vitamin D deficiency; data different 8 yr out; similar findings obtained by other investiga-
tors; BPG such ventriculogastric fistula; significant protein
malnutrition requiring total parenteral nutrition; supplement
mental protein, or additional limb shortening; intractable diar-
hetea also reported.

Lessons: do not add significant malabsorption to very small pouch unilaterally; pouch size should be increased by a significant protein malnutrition associated with BPD ranges from 3%
(probably associated with common channel of 100 cm) to 22%
(common channel of 50 cm); many BPD patients develop significant vitamin and mineral deficiencies; no uniform ap-
proach to repair; options include lengthening common channel, alimentary limb, extending intestinal continuity, or adding “kissing anastomosis”; no evidence supports one over another or optimal limb to be used.

Considerations: impossible to predict appearance or type of malula-
tretion due to variabilities in procedures and patients’ eating habits; no consensus on limb length for primary or revision
procedures; monitor patients closely; do not combine very small gastric pouch with malabsorptive procedure.

Complications of Jejunoileal Bypass and Indications for Revision
Robert E. Brolin, MD, Adjunct Professor of Surgery, Uni-
versity of Pittsburgh Medical School, and Director of Bar-
iatric Surgery, University Medical Center at Princeton, Princeton, NJ

Background: early procedures associated with high rates of se-
rious adverse effects; in 1982, John Chancellor of NBC News announced procedure “no longer recommended”, pa-
tients became thin, but also frail and easily tired
Revisions: originally involved complete reversal, with reanastom-
sis of distal gut to proximal gut; patients died of liver failure; revision associated with regain of lost weight; in 1979 study of revisions of jejunoileal bypass (BPD) made viaросевыый approach (18-36 months) followed up; virtually nothing published on revision of JIB may be thin; routine use of buttressing material recommended; making pouch within previous in-
tradivisional risk of creating transverse gastric segments (some resection often necessary)

Technical points: open approach to JIB revision recommended, patients may have adhesions from duodenum to terminal il-
ium; avoidance of peritoneal cavity; Scott end-to-end anastomosis with bypassed ileocoloectomy (could be anywhere in colon)/beversal at gastrogastrostomy (staple often will not fit into lumen of excluded bowel; suture of anastomosis indicated); tube gas-
trostomy in excluded stomach at completion of RYGBP “ab-
dominal emergency.”

Conclusions: JIB revision technically challenging; easiest to per-
form through open surgery due to extensive adhesions present; placement of gastrostomy and pancreateco-
ectomy to minimize iatrogenic issues from bowel being removed from di-
gestive continuity for isolation of pouch Reverse [BPG] in re-
versa virtually all complications; only taking down JIB assures regain of lost weight; reversal to gastrectomy associated with late surgical deficiency; JIB reversal variety of pouch sizes.

Suggested Reading
Bal E et al: Managing medical and surgical disorders after di-


Verification of Vertical Banded Gastric Bypass (VBG) to RYGBP
Robert T. Maremna, MD, Director, Bariatric Surgery, Flagler Hospital, Saint Augustine, FL

Preoperative considerations: reasons for surgery (failure of previous surgery = weight loss, or death related to previous surgery or failure, significant protein
malnutrition requiring total parenteral nutrition, supplement
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symptoms; severe diarrhea or steatorrhea; severe dumping syndrome.

Revision of gastric bypass: optimal limb length unknown; opti- manual pouch size also unknown (cannot be measured accu- mately); study of 75 patients having laparoscopic gastric bypass — 5% developed protein malnutrition at 2 yr; 50% developed liver enzyme abnormalities; 2% developed anemia; 50% developed anemia, 60% developed vitamin D deficiency; no data different 8 yr out; similar findings obtained by other authors; laparoscopic VBG such technique may also lead to oblitera- tus formation; no published experience with lap band or sleeve gas- troplasty; no published experience with lap band or sleeve gas- troplasty; between gastroplasty and liver recommended to prevent ad-hesion formation; erosions may be obstructive; multiple segments, mobilizing pouch outlet control device from pouch (usually from staple line failure), pouch enlargement, outlet stenosis, band erosion, chronic erosions or aspiration, or eosoph- ageal dysmotization.

Avoiding pitfalls with banded gastroplasty: identify band lo- cation (expose anterior gastroplasty up to diaphragm); re- remove clip markers and perform remnant gastrectomy to remove isolated segments.

Robert T. Marema, MD,
Director, Bariatric Surgery,
Flagler Hospital, Saint Augustine, FL

Preoperative considerations: reasons for surgery (failure of weight loss, or complications of previous VBG such as fistula; great degree of fundus often incorporated; fundic portion may enlarge over time, leading to failure; previous surgery: banding gastroplasty); pitfall: do not make gastrojejunostomy too small; patient typically makes adherent with diameter of 21 mm (1.2 cm); banding materials historically include drain or other tubing (eg, Silastic), mesh (eg, Marlex, Prolene), polytetrafluoroethylene, and expanded fascia; sutureanastomosis big problem associated with bands; may lead to pouch outlet stenosis with pouch dilatation, or pouch outlet aganglione, adhesion to adjacent structures (light, pancreas, intestine, or adhesions due to variabilities in procedures and patients' eating habits; no consensus on limb length for primary or revision procedures; monitor patients closely; do not combine very small gastric pouch with malabsorptive procedure.

Complications of Jejunostomal Bypass and Indication

Robert E. Brolin, MD, Adjunct Professor of Surgery, Uni- versity of Pittsburgh Medical School, and Director of Bar- iatric Surgery, University Medical Center at Princeton, Plainsboro, NJ

Background: early procedures associated with high rates of se- rious adverse effects; in 1982, John Chancellor of NBC News announced procedure “no longer recommended,” pa- tients became thin, but also frail and easily tired.

Revisions: originally involved complete reversal; with rean- anastomosis and restoration of gastric conduit and patients died of liver failure; revision associated with regain of lost weight; in 1979 study of revisions of jejunostomal bypass (JBB); Brolin et al.

Technical points: open approach to JBB revision recommended; patients may have adhesions from duodenum to terminal il- ileum; Patient positioned to side; on Scott end-to-end anastomosis with bypass ileocolostomy (could be anywhere in colon!); be versatile at performing gas- trojejunostomy (staple too small to staple; hand- sewn gastrojejunostomy indicated); versatility also required for jejunojejunostomy (stapler often will not fit into lumen of excluded bowel; suture of anastomosis indicated); tube gas- trostomy in excluded stomach at completion of RYGBP “ab- normal”.

Conclusions: JBB revision technically challenging; easier to per- form through open surgery due to extensive adhesions patients develop; placement of gastrostomy tube was not straightforward; to miti- pprolonged ileus resulting from bowel being removed from di- gestive continuity for isolation of JBB reverses virtually all complica- tions; only taking down JBB assures regain of lost weight; reversal to gastroplasty associated with late esophageal stenosis; revision of JBB reverses virtually all complica- tions; no published experience with lap band or sleeve gas- troplasty.

Technical Pitfalls of Conversion of Vertical Banded Gastroplasty (VBG) to RYGBP

Robert T. Marema, MD, Conversion of Vertical Gastroplasty (VBG) to RYGBP

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COMPICATIONS IN SURGERY OF THE FOREGUT

1. Which of these statements about gastrogastric fistula formation after nondivided Roux-en-Y gastric bypass surgery is accurate?
   (A) Seldom associated with stapling procedures  (C) Generally treated nonsurgically
   (B) Patients rarely develop serious complications  (D) Many patients asymptomatic

2. All the following imaging studies are recommended to help in the diagnosis of a gastrogastric fistula, except:
   (A) Upper gastrointestinal radiography
   (B) Endoscopy
   (C) Computed tomography

3. If nutrient deficiencies occur after a gastric bypass, they are most likely to involve:
   1. Vitamin E
   2. Vitamin A
   3. Calcium
   4. Iron

4. Which nutrients are absorbed in the distal portions of the gastrointestinal tract?
   1. Protein
   2. Fat
   3. Carbohydrate
   4. Vitamin A

5. When a significant portion of the total absorptive capacity of the gastrointestinal tract is bypassed, malnutrition may result.
   (A) True
   (B) False

6. For jejunal bypass revision, a laparoscopic approach is usually recommended.
   (A) True
   (B) False

7. Conversion of a jejunal bypass to Roux-en-Y gastric bypass is associated with:
   (A) Weight maintenance or further weight loss
   (B) Development of protein malnutrition
   (C) Minimal improvement in complications
   (D) Late weight regain

8. Patients who develop chronic emesis after undergoing vertical banded gastroplasty should be advised to take sips of water during meals.
   (A) True
   (B) False

9. Of the different banded gastroplasty procedures, the pouch orientation that is considered easiest to convert to a Roux-en-Y gastric bypass is:
   (A) Transverse
   (B) Oblique
   (C) Vertical

10. The biggest problem associated with a banded gastroplasty is:
    (A) Inadequate weight loss
    (B) High risk for infections
    (C) Pouch leakage
    (D) Cicatrix formation

Answers to Audio-Digest General Surgery Volume 58, Issue 18: 1-A; 2-A; 3-A; 4-C; 5-D; 6-B; 7-A; 8-C; 9-D; 10-B

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