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Virtual Case Conference Series

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Bariatric Emergencies for the Acute Care Surgeon

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Case Series: Expert Q&A Review

Presented by the Emergency General Surgery Committee

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This document summarizes the clinical Q&A discussion from two bariatric emergency cases. Patient identifiers have been removed. Intended for educational use only.

Case 1 — Perforated Gastric Remnant with Loss of Abdominal Domain

An elderly male with a remote Roux-en-Y gastric bypass (RYGB), prior exploratory laparotomy with subtotal colectomy and end ileostomy, and a large chronic ventral hernia with loss of domain presented with acute-onset severe abdominal pain, leukocytosis, and metabolic acidosis. CT demonstrated a massive ventral hernia containing the majority of intra-abdominal contents, free fluid, and findings concerning for closed-loop obstruction with possible bowel ischemia. Perforation of the gastric remnant was identified intraoperatively. The patient required staged damage control surgery with direct peritoneal resuscitation (DPR), primary repair of the remnant stomach perforation, reduction of an incarcerated Petersen's defect on re-exploration, and ultimately a bridging Vicryl mesh closure with skin approximation. He was discharged on post-operative day nine.

Q: What are the key diagnostic considerations and initial workup in a post-RYGB patient presenting with acute abdominal pain?

Standard evaluation includes CBC, metabolic panel with lactate, and CT abdomen/pelvis with IV contrast. In post-RYGB patients, several unique anatomic vulnerabilities must be kept in mind:

- Marginal ulcer at the gastrojejunal anastomosis is the most common site of perforation and should be at the top of the differential when bilious/succus contamination is found.
- Internal hernias (Petersen's defect, jejunojejunal mesenteric defect, transverse mesocolon defect in retrocolic bypasses) can cause both obstruction and vascular compromise.
- Remnant stomach pathology — perforation, ulceration, or rarely malignancy — must be considered; the remnant is a blind-ended structure largely inaccessible endoscopically.
- Obtaining the original operative report is highly valuable: technique varied considerably in the 1990s–2000s, and retrocolic routing (common in early laparoscopic bypass) creates an additional potential hernia site at the transverse mesocolon.
- Prior colectomy, as in this case, changes the anatomy but does not eliminate internal hernia or remnant perforation risk.
- Loss of abdominal domain, if identified on CT, must factor into the operative plan before entering the OR.

Q: What is the preferred surgical approach — open, laparoscopic, or robotic — for a patient with loss of domain, prior open surgeries, and possible perforation?

No single approach is universally correct; the decision depends on patient stability, degree of loss of domain, prior adhesions, and available expertise.

- A hybrid approach — initial MIS entry (robotic or laparoscopic, left upper quadrant) to survey the peritoneal cavity, followed by open access through the hernia sac for pathology within it — can minimize fascial disruption while still managing contamination.
- Intentionally avoiding full fascial opening in patients with severe loss of domain is a key principle: once the fascia is opened, closure may be impossible.
- If the patient is unstable or adhesions preclude MIS, proceeding directly to exploratory laparotomy through the prior midline scar is appropriate and should not be considered a failure of judgment. An experienced open surgeon may actually be faster open than minimally invasive.
- For MIS cases with worsening hemodynamics intraoperatively, early conversion to open is appropriate.
- Prior colectomy eliminates colon from the operative field and reduces visceral volume, which may provide a slight advantage for fascial closure but does not fundamentally change the approach.

Q: When bilious or succus contamination is found intraoperatively after RYGB, where should the surgeon look for the source?

Systematic assessment of the most common sites should proceed as quickly as the patient's stability allows:

- Marginal ulcer at the gastrojejunal anastomosis: most common perforation site; look here first.
- Gastric remnant: perforation can result from ischemia due to traction from herniated bowel, peptic disease, or occult malignancy. If the remnant is accessible, tissue biopsy of the perforation edges should be obtained, as remnant gastric tumors have been reported and the remnant cannot be accessed endoscopically after bypass.
- Perforated duodenal ulcer: still occurs in post-bypass patients.
- Small bowel: internal hernia with ischemia can lead to perforation at any level.
- In this case, the perforation was found on the anterior body of the gastric remnant, likely from ischemia and tension created by the incarcerated hernia contents exerting traction.
- Bilious or succus appearance (versus stool) helps localize to upper GI or small bowel origin; cultures sent from the fluid did not grow organisms in this case.

Q: What is the operative strategy when the patient becomes hemodynamically unstable on the table with an open abdomen?

Damage control principles apply: control the source of contamination and hemorrhage, then get the patient off the table.

- Do not attempt definitive repair of all pathology in a single operation if the patient is acidotic, coagulopathic, or on multiple vasopressors.
- Adhesiolysis should be limited to what is necessary to identify and address the primary source; matted bowel within a hernia sac can be deferred to planned re-exploration.
- Temporary abdominal closure with direct peritoneal resuscitation (DPR) allows physiologic recovery in the ICU before return to the OR.
- Secondary pathology may not be apparent until re-exploration under more controlled conditions — in this case, Petersen's defect with incarcerated small bowel was identified only at the second operation.
- The attending surgeon appropriately deferred formal adhesiolysis of matted bowel in the hernia sac once contamination was controlled, accepting a planned second look rather than risking further hemodynamic compromise.

Q: What is Direct Peritoneal Resuscitation (DPR), and how is it set up?

DPR involves continuous intraperitoneal infusion of dialysate solution through the open abdomen, functioning analogously to peritoneal dialysis. Proposed benefits include enhanced visceral perfusion, reduced mesenteric edema, and systemic anti-inflammatory effects.

- Setup: an Ioban drape is applied over the viscera; a plastic barrier (e.g., bowel bag) is placed and fenestrated, with two JP or Blake drains inserted through the barrier. The system is covered with a second Ioban layer to create a sealed irrigation loop.
- Infusion protocol at this institution: 800 mL/hr of peritoneal dialysis solution for the first hour, followed by 400 mL/hr for subsequent hours; a Blake drain at the base of the mesentery drains passively to the exterior.
- This technique is used routinely at this center for contaminated damage control cases and was applied across multiple re-explorations in this patient.

Q: How should the abdomen be closed when fascial approximation is not achievable due to loss of domain?

Fascial closure is always the goal but is often not achievable after extensive adhesiolysis with true loss of domain — attempting primary closure under tension risks dehiscence, ischemia, and abdominal compartment syndrome.

- Bridging Vicryl mesh (sutured to fascial edges with overlying skin closure) has historically been used as a temporizing measure. However, contemporary data and expert opinion are moving away from it for the following reasons: Vicryl is absorbed within weeks, providing no durable structural support; fistulization and skin dehiscence rates remain high (reported up to 27–30%) regardless of Vicryl use; and even when Vicryl granulates successfully, failure to subsequently skin graft the granulated bed leaves patients at sustained fistula risk.
- When hernia sac or peritoneum is present overlying the viscera, this tissue provides biologic coverage before skin closure and may be preferable to Vicryl as the visceral barrier — peritoneum is a true biologic layer, not synthetic mesh.
- Skin-only closure over peritoneum/hernia sac is a reasonable alternative when skin mobility allows; risk of evisceration exists with any closure strategy.
- Biologic mesh is generally avoided in contaminated fields due to cost and lack of clear superiority.
- Intraoperative Botulinum toxin injection into the lateral abdominal wall musculature can be used adjunctively to reduce fascial tension over the following weeks.
- FasciaTENS (dynamic fascial traction, more widely used in Europe) applies mechanical traction to facilitate delayed primary fascial closure and may represent a superior alternative — limited availability currently in the United States.
- If skin cannot be approximated and granulation occurs, split-thickness skin graft should be planned once an adequate granulated base forms, to reduce long-term fistula risk.
- The goal at the index contaminated operation is physiologic rescue, not definitive hernia repair; elective abdominal wall reconstruction is planned later once the patient has recovered.

Q: Should a venting gastrostomy tube be placed in the gastric remnant at the time of perforation repair?

- Expert consensus in this case: no, if (1) the perforation has been primarily closed, (2) the distal obstruction driving the perforation has been relieved, and (3) tissue quality at the repair site is acceptable.
- Placing an additional tube through an already-repaired viscus introduces new risk in a contaminated, hostile field.
- Alternative if there is concern about the repair: the gastric remnant can be sutured to the abdominal wall and marked with clips, enabling fluoroscopic-guided percutaneous access by interventional radiology postoperatively without requiring operative tube placement.

KEY TAKEAWAYS

- In post-RYGB patients, obtain the original operative report if possible — technique varied considerably in the 1990s–2000s and determines which internal hernia defects are present.
- Loss of domain must be identified on CT pre-operatively and drive the operative strategy; avoid reflexive full fascial opening when closure will be impossible.
- A hybrid MIS/open approach through the hernia sac — without opening the full fascia — is a viable strategy in select stable patients. Proceed directly to open laparotomy in hemodynamically unstable patients.
- Marginal ulcer at the gastrojejunal anastomosis is the most common perforation site in post-RYGB patients; remnant stomach perforation must also be considered, with tissue biopsy obtained if accessible.
- Damage control principles apply when the patient is unstable intraoperatively: control contamination, close the source, defer complex adhesiolysis and secondary pathology to planned re-exploration.
- Petersen's defect and other internal hernias may not be apparent at the index operation — a thorough second-look exploration is essential.
- DPR is a useful adjunct in contaminated open abdomens; follow an institutional infusion protocol.
- Bridging Vicryl mesh is associated with fistulization and provides only transient protection; contemporary expert opinion favors moving away from it where alternatives (peritoneum, hernia sac, skin-only) exist. If Vicryl granulates, plan skin grafting to reduce long-term fistula risk.
- Definitive hernia repair should be deferred to an elective, non-contaminated setting after full patient recovery.

Case 2 — SMA Occlusion versus Internal Hernia in Post-RYGB Patient

A middle-aged male with RYGB approximately eighteen months prior presented with severe abdominal pain out of proportion to examination and a borderline elevated lactate. He had a single prior episode of atrial fibrillation not currently requiring anticoagulation. CT angiography demonstrated an abrupt cutoff of the superior mesenteric artery (SMA) just inferior to the pancreas with associated mesenteric edema and small bowel hypoenhancement, raising concern for acute SMA occlusion. General and vascular surgery were consulted simultaneously. At exploratory laparotomy, the bowel was found severely threatened; a Petersen's defect with a volvulized Roux limb compressing the SMA was identified. Retrograde bowel reduction decompressed the SMA, restoring distal pulsatility and full bowel viability. Petersen's defect was closed. The patient was extubated in the OR and discharged on post-operative day three.

Q: When CT demonstrates apparent SMA occlusion in a post-RYGB patient, what is the differential and how does imaging help distinguish the etiology?

The two principal diagnoses are: (1) true arterial occlusion (thromboembolism or in situ thrombosis), and (2) extrinsic SMA compression from internal hernia with volvulus.

- Distinguishing CT features — Internal hernia: swirl sign (twisted mesentery rotating around a fixed point), clustered dilated small bowel loops converging into a mesenteric defect. The swirl is typically dramatic when volvulus is compressing the SMA.
- Distinguishing CT features — True arterial occlusion: abrupt SMA cutoff without a swirl sign; patent celiac and IMA; portal venous gas or pneumatosis suggest advanced ischemia.
- In this case, the abrupt SMA cutoff without an obvious swirl was interpreted as vascular occlusion; the internal hernia etiology was confirmed only at laparotomy — underscoring that CT findings guide team preparation but should not delay operative intervention when bowel ischemia is suspected.
- Both diagnoses require emergent surgery; imaging helps determine which subspecialty teams to mobilize pre-operatively.

Q: Should vascular surgery be involved pre-operatively and intra-operatively, and is a hybrid OR needed?

- Yes — when imaging suggests SMA occlusion, vascular surgery should be consulted simultaneously with general surgery.
- If available, a hybrid OR enables intraoperative angiography and endovascular intervention (thrombectomy, thrombolysis, stenting) without patient transport.
- If the source proves to be an internal hernia with extrinsic SMA compression rather than true arterial occlusion, vascular surgery can stand by and intervene if pulsatility does not recover after bowel reduction.
- In this case, vascular surgery was present at the start of the operation and transitioned to an observational role once the internal hernia was identified and successfully reduced, with full restoration of distal pulsatility confirmed by palpation.
- Post-operative vascular imaging was not obtained in this case given the dramatic clinical recovery; however, it should be considered if there is any residual doubt about SMA patency.

Q: What is the recommended approach to navigating Roux-en-Y bowel anatomy at laparotomy when internal hernia is suspected?

Running the bowel antegrade from the ligament of Treitz is disorienting in post-RYGB anatomy due to multiple limb divisions and adhesions. Expert consensus strongly favors starting retrograde from the terminal ileum.

- Begin at the ileocecal valve and run retrograde: this reliably identifies the common channel, then the jejunojejunal anastomosis, then the alimentary and biliopancreatic limbs.
- This approach is especially valuable laparoscopically and in re-operative fields with adhesions.
- In this case, antegrade dissection was initially attempted due to uncertainty about the diagnosis; the Roux limb would not reduce from above. Once retrograde dissection was undertaken from the ileocecal valve, the volvulus reduced within minutes.
- RYGB configuration variants relevant to internal hernia risk: antecolic vs. retrocolic Roux limb routing (retrocolic creates an additional defect at the transverse mesocolon); the jejunojejunal mesenteric defect; and Petersen's space (between Roux mesentery and transverse mesocolon). All three potential defect sites should be checked.

Q: How do you close Petersen's defect, particularly in patients with significant post-bypass weight loss and attenuated mesenteric tissue?

The goal is complete obliteration of the defect to prevent re-herniation. Closure with permanent or long-lasting suture (e.g., silk, non-absorbable) is the standard technique.

- Technique: begin at the base (inferior aspect, near the transverse mesocolon) and work upward. Starting at the base of the transverse mesocolon and pulling it in with a purse-string or running suture first reduces the effective defect size before completing the superior closure.
- After significant weight loss, the mesentery becomes thin, vascular structures are prominent and superficial, and suture bites are difficult to place without injuring vessels. Two-layer closure may improve durability when individual bites are tenuous.
- If omentum is available, it can be mobilized to reinforce or plug the defect — analogous to a Graham patch. The falciform ligament can also be brought down for additional tissue coverage, though it may also be attenuated after massive weight loss.
- Mesh closure of Petersen's defect is described in the bariatric literature but is not standard practice in the acute or contaminated setting; primary tissue closure with suture remains the standard of care.
- Even well-executed primary closures can re-open, particularly when tissue quality is poor. Adhesions that form postoperatively at the closure site may provide additional natural reinforcement.
- Proceeding with the best closure achievable, rather than abandoning attempts due to difficulty, is appropriate — partial closure with omental reinforcement is preferable to leaving the defect open.

KEY TAKEAWAYS

- Abrupt SMA cutoff on CT in a post-RYGB patient may represent extrinsic vascular compression from a volvulized internal hernia rather than true arterial thromboembolism — operative findings are definitive.
- Consult general and vascular surgery simultaneously when CT suggests SMA occlusion; use a hybrid OR if available for potential endovascular intervention.
- Run the bowel retrograde from the ileocecal valve when internal hernia is suspected — this is more reliable than antegrade in post-RYGB anatomy, especially laparoscopically.
- Successful volvulus reduction restores SMA flow and full bowel viability without vascular intervention in cases of purely extrinsic compression; confirm pulsatility distally before concluding.
- Petersen's defect closure is technically challenging after significant weight loss; begin at the base near the transverse mesocolon, use permanent suture, and reinforce with omentum or falciform ligament when available.
- Mesh closure of Petersen's defect is not standard practice in the acute setting; primary suture closure remains the standard of care.
- Post-operative monitoring with serial abdominal exams and hemodynamic assessment is essential after bowel ischemia reversal to detect reperfusion injury or missed necrosis requiring re-exploration.