

Duodenotomy and Oversew Bleeding Duodenal Ulcer

Richard Davis

Introduction:

Bleeding duodenal ulcers present with upper gastrointestinal hemorrhage on a possible background of chronic epigastric pain or previous treatment for ulcer disease. Bleeding can be catastrophic and life-threatening, or slow and gradual. Patients need to be treated according to the principles described in [Approach to Upper Gastrointestinal Hemorrhage](#). The most important decision is whether to intervene immediately after resuscitation, or to watch closely. This is decided based on the patient's presentation, amount of blood lost, and response to resuscitation. As with all patients in resource-limited settings, a careful history and thorough physical examination prevent the surgeon from pursuing an inappropriate treatment.

When upper endoscopy is available, it will be done first. This allows diagnosis and possibly intervention. All patients going for endoscopic intervention are also consented for open surgery.

Guidelines recommend two attempts at endoscopic intervention before proceeding with surgery. In our setting, without expertise in endoscopic intervention and with limited equipment, we make one attempt at endoscopic intervention and then proceed with laparotomy. Most in resource-limited settings do not have the ability to inject epinephrine around an ulcer, apply a heater probe, or clip exposed vessels endoscopically. In this case, endoscopy is used only to determine the location of the bleeding: treatment will either be surgical or conservative with high dose proton-pump inhibitors. It is much easier to localize the site of bleeding at endoscopy than at open surgery; we describe how to approach this scenario without an endoscope, if you have to, in the "Approach" chapter cited above.

Bleeding gastric ulcers are better treated with resection if the patient is stable, because of the risk of malignancy and also to decrease the risk of future bleeding. See the chapters in this Manual for details on different types of gastric resection and reconstruction.

Duodenal ulcers that are not located in the posterior bulb are less prone to life-threatening hemorrhage. If these require surgery, simple oversewing of the ulcer with several interrupted

absorbable stitches is effective. (In a resource-rich setting, such ulcers would probably have responded to endoscopic intervention and would never have had surgery at all.) This article deals with the specific issue of the posterior duodenal bulb, where an ulcer erodes into the gastroduodenal artery. Specific measures are needed to control hemorrhage here.

The role of vagotomy is still controversial. Certainly, patients who are hemodynamically unstable should have the least surgery necessary to restore hemostasis, which is duodenotomy and oversew of the ulcer only. Our practice is to not perform vagotomy if the patient is naive to *Helicobacter pylori* treatment. We perform truncal vagotomy only if the patient has a history of one or more treatments for *H. pylori*, and if they are stable enough to tolerate further surgery after hemostasis is achieved. Such patients come along only rarely- in our experience there is usually no previous diagnosis or treatment for ulcer disease. These patients are cured of *H. pylori* infection with antibacterial therapy after recovering from the surgery.

Duodenotomy and oversew of duodenal ulcer proceeds in the following steps:

- Laparotomy and abdominal exploration
- Longitudinal gastro-duodenotomy
- Ligating the vessels at the base of the ulcer.
- Transverse closure of the gastro-duodenotomy (pyloroplasty.)
- Truncal vagotomy if indicated

Steps:

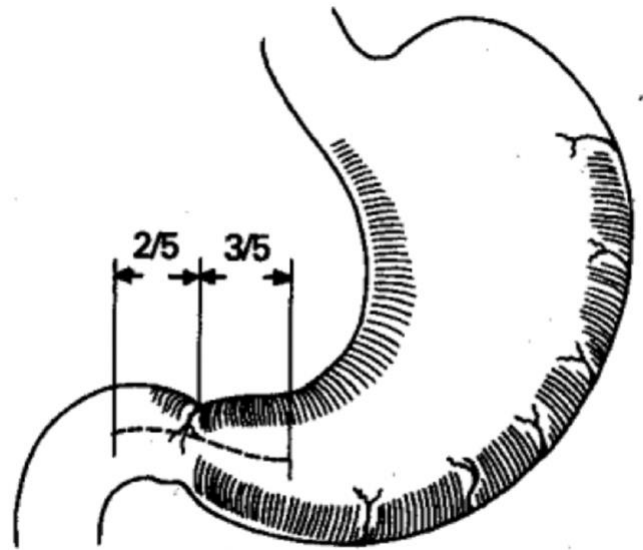
1. Patients in hemorrhagic shock should be treated with "Permissive Hypotension." Administer fluids and blood to maintain perfusion of the brain and vital organs, but not to return to normotension, which increases blood loss and mortality. The strategy of permissive hypotension is used only on patients who are headed to the operating room, to have their bleeding controlled.
2. Anesthesia is general, with endotracheal intubation and careful monitoring of vital signs by a skilled and experienced anesthetist.



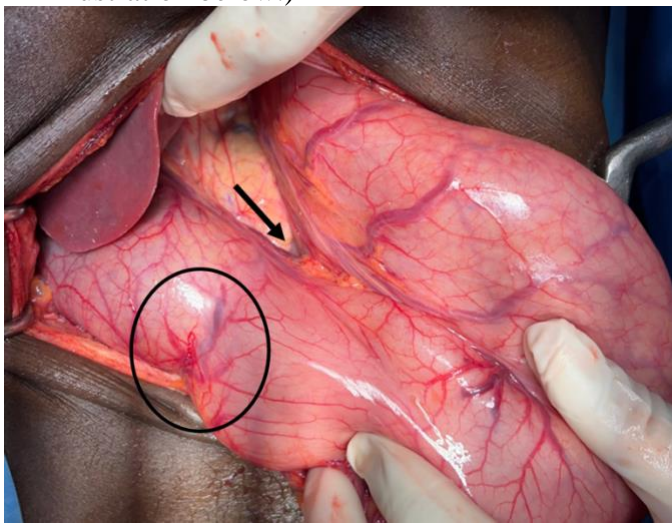
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3. Make an upper [midline laparotomy](#) incision extending from the xiphoid process to just above the umbilicus.
4. Explore the upper abdomen thoroughly, looking for signs of malignancy or portal hypertension, especially if an endoscopy has not been done before the surgery.
5. Locate the pylorus by palpation and plan an incision along the gastroduodenal junction. This incision will have the pylorus at the midpoint (or 2/5 duodenal and 3/5 gastric as shown in the illustration below.)

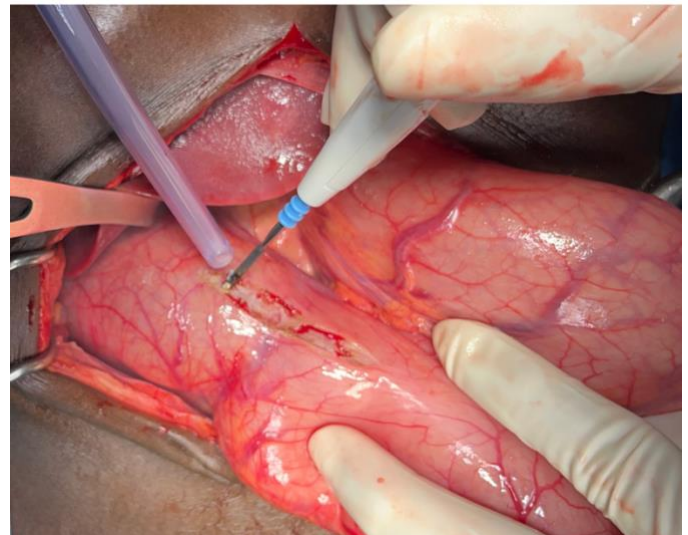


Once the pylorus is located, plan an incision centered over it. An incision 2/5 on the duodenum side prevents excessive incision into the duodenum, yet allows sufficient access to the bulb. Source: *Primary Surgery Vol. 1 : Non Trauma*
<https://global-help.org/products/primary-surgery/>



Some stomach landmarks help identify the pylorus if it is not palpable due to inflammation in the area. It is usually 2-5cm distal to the incisura angularis (Black arrow) which can be enhanced by gentle traction on the greater curvature. Often there is a collection of veins over the pylorus, an indentation at its location, or both as in this picture (Black circle.)

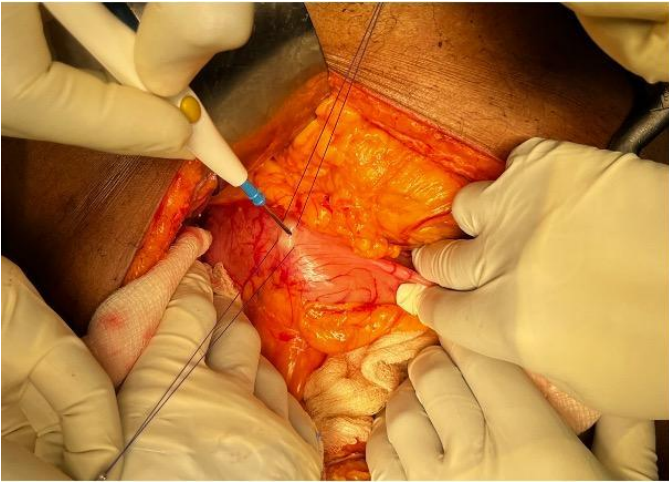
6. Make the incision, proceeding in layers. This technique achieves better hemostasis and also keeps the intestine full of gas, making the incision easier to see. Some surgeons prefer to place traction sutures to elevate the serosa, others do not. We demonstrate both techniques here.



Make an incision through all of the serosa, then all of the muscularis, before entering the mucosa. Control bleeding here, the patient has lost enough already!

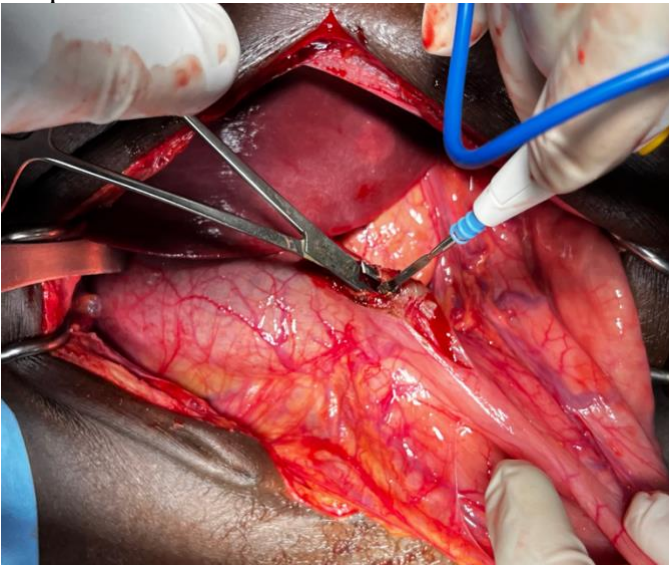
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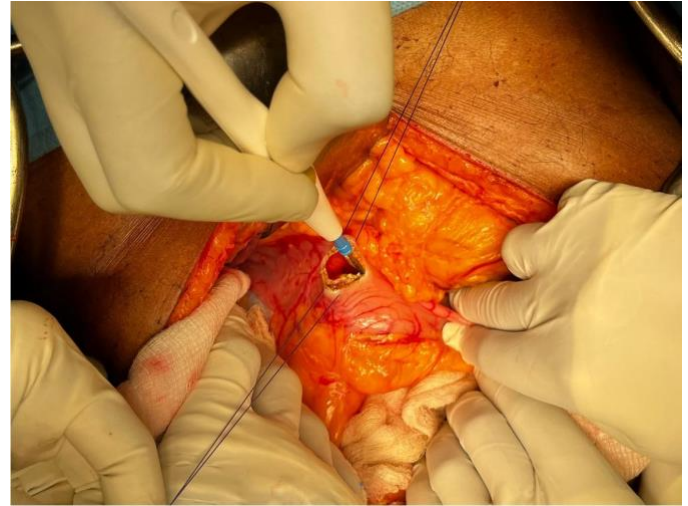


With gentle traction on the sutures, incise the anterior wall of the duodenal-gastric junction.

7. Once the mucosa has been entered, the stomach and duodenum will deflate. Use a hemostat to elevate the intestine that remains to be cut, or pull the bowel gently with the traction sutures if you placed them.

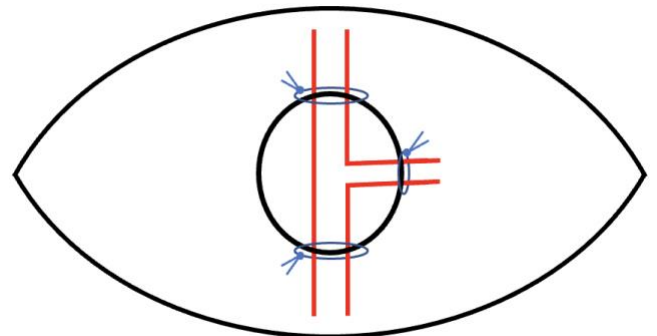


Insert a hemostat into the duodenotomy and elevate the mucosa that remains to be cut.



Elevate the bowel wall as you divide it, as the assistant maintains gentle traction on the traction sutures.

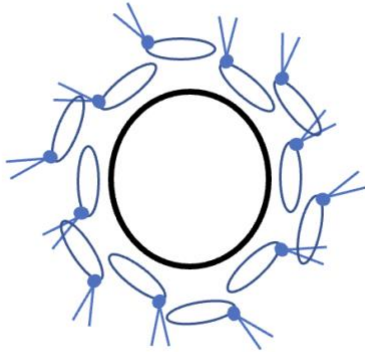
8. Once the ulcer is visualized, place simple interrupted sutures above, below, and medial to the ulcer, right at its border. Do not go deeper than 5-6mm. The common bile duct runs within the pancreas near here and can be ligated with a deep “strangulation” stitch.



Schematic of the vessels that cause bleeding in a posterior duodenal bulb ulcer, seen through the ellipse of a longitudinal duodenotomy. The vertically oriented vessel is the gastrooduodenal artery, and the horizontally oriented one is the transverse pancreatic artery. Although all of these vessels will not be visible at the base of a bleeding ulcer, ligatures must be placed in these positions during surgery.

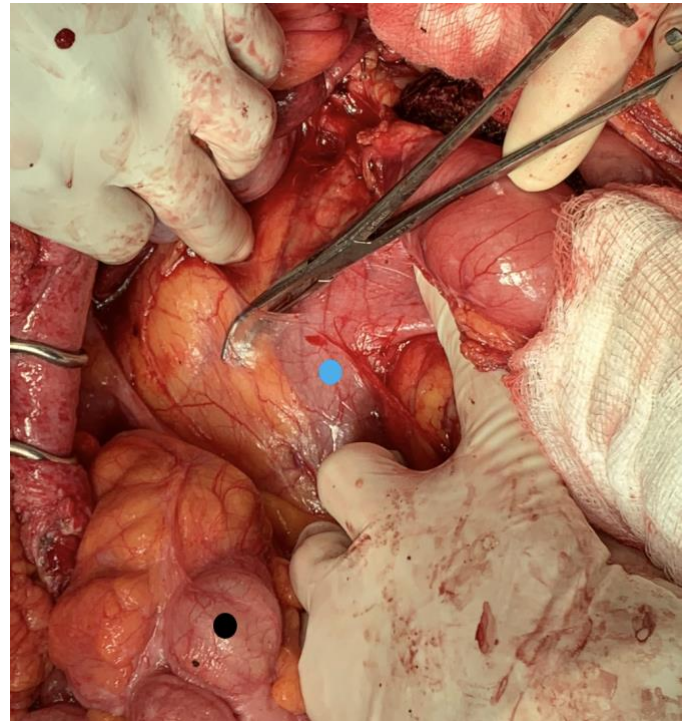
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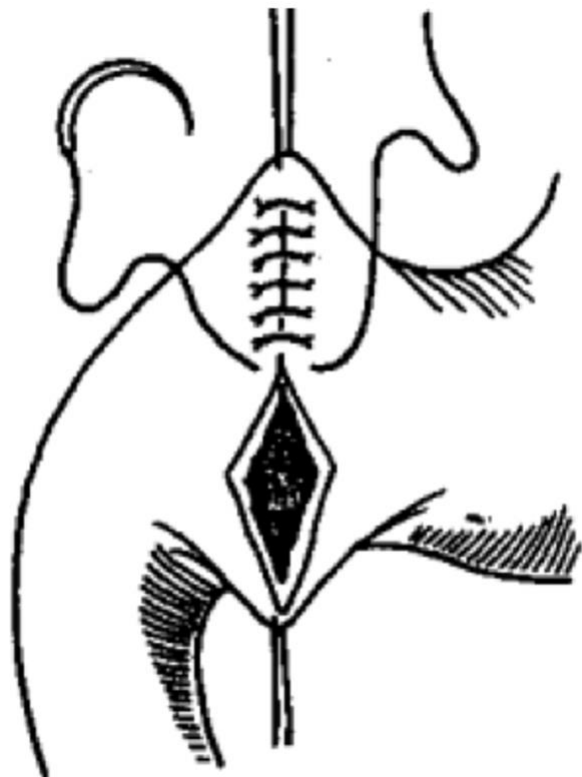


Occasionally you will find only a superficial ulcer that is oozing slowly from its edges, NOT located in the posterior duodenal bulb. In this case, encircle the ulcer with interrupted stitches as shown here. The needle should pass no deeper than the full thickness of the bowel, to prevent damage to any structures underneath such as the common bile duct.

9. The gastroduodenotomy is closed transversely to prevent narrowing at the pylorus. We prefer a two layer closure using absorbable sutures. The inner layer is running incorporating the mucosa and submucosa, and the outer layer interrupted seromuscular inverting (“Lembert” stitches.) If there is any tension on the closure, completely mobilize the 1st-3rd sections of the duodenum off the retroperitoneum (Kocher’s maneuver.) We mobilize the duodenum at this stage of the procedure rather than before duodenotomy, to avoid a delay in getting hemostasis.



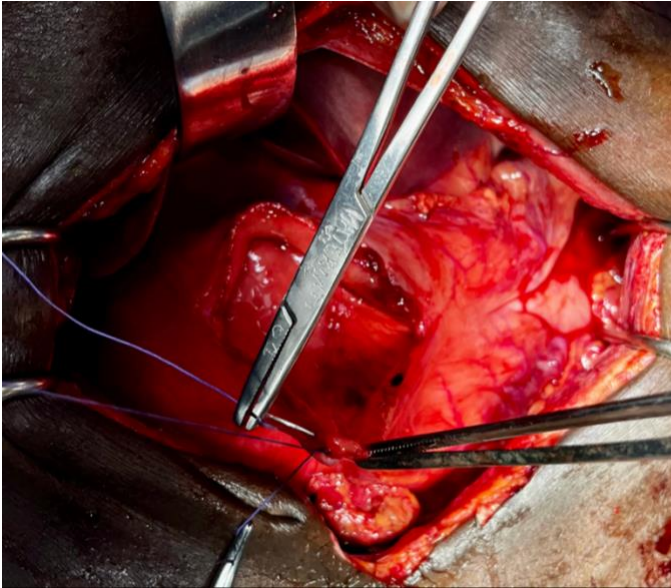
Mobilization of the duodenum (Blue dot) off of the retroperitoneum. In some cases you need to mobilize the transverse colon (Black dot) inferiorly, away from the area to have full access to the duodenum.



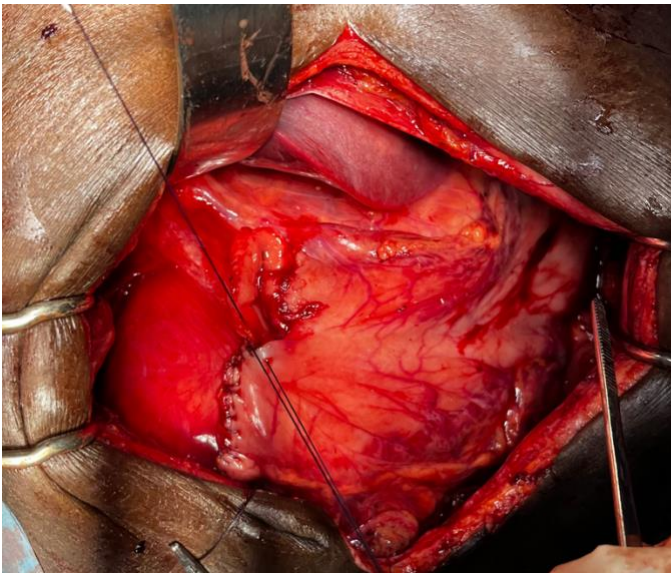
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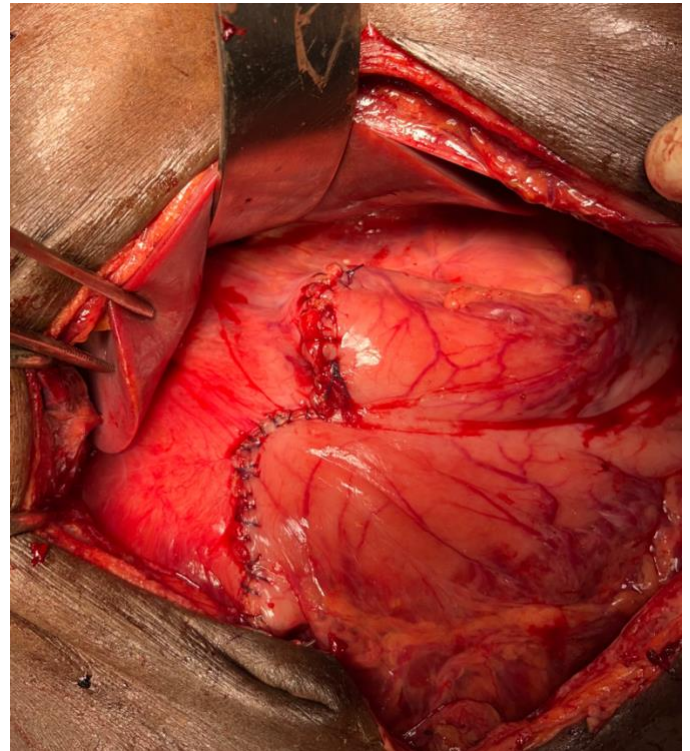
Schematic of a pyloroplasty: transverse closure of a longitudinal gastroduodenotomy. Source: Primary Surgery Vol. 1 : Non Trauma
<https://global-help.org/products/primary-surgery/>



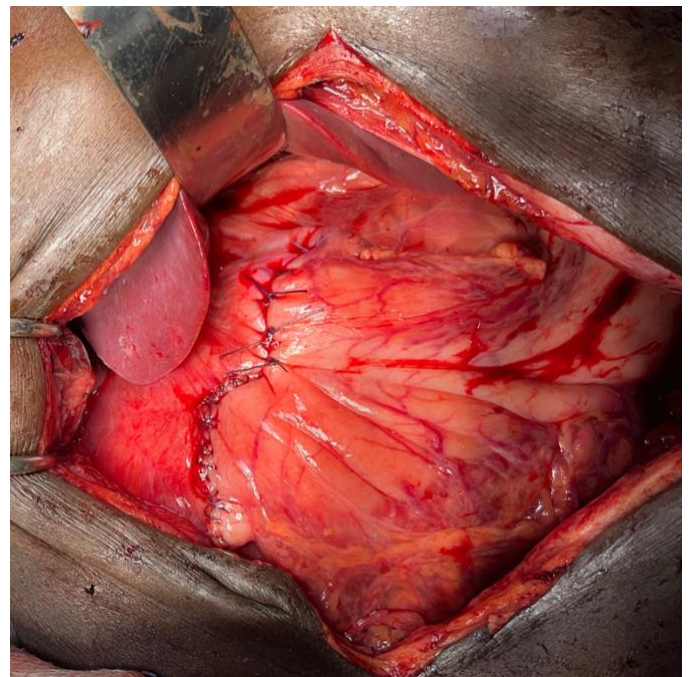
Beginning the inner layer closure with running absorbable suture through the mucosa and submucosa.



The inner layer, partially completed.



The completed first layer of the closure; the closure is wide and there is little chance of gastric outlet obstruction, which would have been a possibility if the gastroduodenotomy had been closed longitudinally.



The cranial half of the outer layer has been completed (top of photo) with interrupted seromuscular inverting (Lembert) sutures.

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Pitfalls

- Recurrence of bleeding is unlikely if the sutures are placed properly as described here.
- Leakage of the gastroduodenotomy closure is a feared complication, but is rare in this situation. Make sure to fully mobilize the duodenum (Kocher maneuver) to make sure the suture line is not under tension. Wound dehiscence is more likely if the patient is malnourished or taking chronic steroids. Malnutrition and other wound healing problems are more common in patients with obstructed ulcer disease or variceal bleeding due to cirrhosis.
- In patients who are hemodynamically unstable, we would not perform a truncal vagotomy. In patients who have never received *Helicobacter pylori* therapy, we also do not perform vagotomy. For intractable or recurrent disease, or if *H. pylori* treatment is not available, a truncal vagotomy is effective. See below.
- Wound infection is more likely after this operation, so watch for it.

of the stomach- one could argue that even in this situation, a truncal vagotomy is not necessary.

The end result is that most experienced surgeons, even those practicing in resource-limited settings, do not perform this operation very often. Nevertheless, we are in the process of writing a chapter on truncal vagotomy and it will be added to this Manual.

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Truncal Vagotomy

Truncal vagotomy was used much more previously than now. The main reason for this is that acid-reducing medicines, especially proton pump inhibitors, are so effective against gastritis and ulcer disease. Eradication of *helicobacter pylori* virtually cures ulcer disease.

Nevertheless, the indication for truncal vagotomy in this era is as follows: A life-threatening complication (perforation, hemorrhage) in a patient who is on adequate anti-ulcer treatment. The patient must be stable enough to tolerate a second operation that has no effect on the immediate outcome, but prevents the likelihood of it occurring again.

In our experience, this is extremely rare. Most patients who present with life-threatening complications are not on anti-ulcer therapy. And most such patients are in extremis; the surgeon is attempting to do the minimum operation to effectively close the perforation or stop the bleeding.

Another operation for intractable ulcer disease, [Antrectomy and Bilroth I Reconstruction](#), effectively removes all of the gastrin-producing cells

