Surgical Management for Gastric Ulcer Perforation

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Surgical Management for Gastric Perforation

- There's a hole in my bucket..how should I mend it?
- Just patch it!

Moshe Schein
“Every doctor, faced with a perforated ulcer of the stomach or intestine, must consider opening the abdomen, sewing up the hole, and averting a possible or actual inflammation by careful of the abdominal cavity” (Johan Mikulicz, 1850-1905)
Current Indication for Surgical Intervention

- 1. Bleeding → Most Common Complication → 100 per 100,000 population
- 2. Perforation → 11 per 100,000 population → highest rate of mortality
- 3. Obstruction → scarring of prepyloric and duodenal ulcers
- 4. Failed Medical therapy → PPIs
- 5. Risk of Malignancy → large gastric ulcers
## Modified Johnson Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Acid secretion</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Lesser Curvature</td>
<td>Low</td>
</tr>
<tr>
<td>II</td>
<td>Body of Stomach and duodenum</td>
<td>High</td>
</tr>
<tr>
<td>III</td>
<td>Prepyloric (2-3 cm of pylorus)</td>
<td>High</td>
</tr>
<tr>
<td>IV</td>
<td>High on Lesser Curve, near GEJ</td>
<td>Low</td>
</tr>
<tr>
<td>V</td>
<td>Anywhere, induced by medication</td>
<td>Low</td>
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Types of Gastric Ulcer

55%  
Type I  
in the antrum, near lesser curvature

25%  
Type II  
Combined gastric and duodenal ulcer

15%  
Type III  
Prepyloric

5%  
Type IV  
Ulcer in the proximal stomach and Cardia
Intractable gastric ulcer

Type I
Partial gastrectomy and Billroth I
or
Ulcer excision and HSV

Type II
Similar to duodenal ulcer:
Truncal vagotomy and antrectomy
or
HSV

Type III
Truncal vagotomy and antrectomy

Type IV
If ulcer within 2 cm of GE junction, Kelly-Madalener or Csendes procedure
For more distal lesions, Pauchet's procedure

Type V
If medication cannot be stopped, excision and truncal vagotomy

FIGURE 56-13 Treatment algorithm for surgical therapy of intractable gastric ulcers. HSV, Highly selective vagotomy; GE, gastroesophageal.
Gastric Perforation

- Smoking and NSAIDs → etiologic factors for ulcer perforation → particularly older woman
- The outcome of patients depends on:
  1. Time Delay to presentation and treatment
  2. Site of perforation → gastric perforation → poorer prognosis
  3. Patient’s age → elderly → worse outcome
  4. Presence of hypotension (systolic <100) → Worse outcome
Gastric Perforation

- perforation was most common at the duodenal bulb (62%), pyloric region (20%), and the gastric body (18%)
Gastric Perforation

- Perforated gastric ulcer have a higher rate of reperforation and complications
- Conservative therapy in situations where the source is gastric perforation, is not recommended.
- H. pylori infection $\rightarrow$ 70–90% of duodenal ulcers and 30–60% of gastric ulcers $\rightarrow$ antibiotic therapy is very effective at eradication.
Perforated gastric ulcer

Long ulcer history/previous *Helicobacter pylori* treatment

- Is the patient stable?
  - Yes: Omental patching, biopsy of ulcer, and *H. pylori* testing and treatment
  - No: Omental patching, biopsy of ulcer and *H. pylori* testing and treatment

Recent onset of ulcer symptoms

- Omental patching, biopsy of ulcer and *H. pylori* testing and treatment. For type III ulcer recommend antrectomy and truncal vagotomy

Type I and IV: Partial gastrectomy or omental patching
Type II: Truncal vagotomy and antrectomy or patching
Type III: Truncal vagotomy and antrectomy

**FIGURE 56-21** Recommended treatment algorithm for surgical management of perforated gastric ulcers.
Surgical Management

- It is important to quickly diagnose a perforated peptic ulcer.
- The prognosis is improved if treatment is provided within 6 hours of perforation.
- Delay in treatment beyond 12 hours → an increase in both morbidity and mortality
Surgical Management

- A prospective study of patients with perforations >48 hours, pre-operative shock, and concurrent medical illness were associated with an increase in mortality.
The goals of Surgical procedures

- 1. Permit ulcer healing
- 2. Prevent or treat ulcer complication
- 3. Address underlying ulcer etiology
- 4. Minimize postoperative digestive consequence

“No single therapy Procedure satisfies all these objectives”
Emergency Surgery for Complicated Peptic Ulcer Disease

1. Deal with the complication that necessitated surgical intervention
2. Reduce the risk of future ulcer recurrence
3. Perform a safe, quick and effective operation
4. Minimize long-term effects on the GI tract
5. Establish the H.Pylori status of the patient
Emergency Surgery for Complicated Peptic Ulcer Disease

- The therapeutic goal in a perforated peptic ulcer is to repair the hole in the GI tract and treat peritoneal contamination.
- Operative intervention is almost always indicated in the treatment of perforated peptic ulcers.
- Emergency surgery for a perforated peptic ulcer has a 6–30% risk of mortality.
Emergency Surgery for Complicated Peptic Ulcer Disease

- The choice of operation will depend on the site of perforation found at exploration and systemic condition.
- The most common technique → patch repair with an omental pedicle → Graham patch or omentopexy
- In this technique the ulcer is not closed → pedicle of vascularized omentum is sutured over the perforation site with multiple interrupted sutures
Emergency Surgery for Complicated Peptic Ulcer Disease

- Can be performed by a laparoscopic or open approach → ulcers over 10 mm in size appear to increase the risk of conversion to open surgery.
- There were no significant differences between the groups receiving an open or laparoscopic repair in terms of mortality, incidence of reoperation, or in the identification of post-operative intra-abdominal fluid collections.
Emergency Surgery for Complicated Peptic Ulcer Disease

- Vagotomy and pyloroplasty is the easiest operation to perform, but has an 10–15% ulcer recurrence rate.
- Vagotomy with antrectomy → ulcer recurrence rate is very low.
- The disadvantages are that the operative mortality is higher than either of the other procedures
Emergency Surgery for Complicated Peptic Ulcer Disease

- The choice of definitive operation should depend on the experience of the surgeon.
- In the absence of significant experience with ulcer surgery, vagotomy and pyloroplasty or not performing definitive surgery in the emergent setting → not recommended
- Malignancy 4–14% of gastric perforations → biopsy or excision of the ulcer → important
What should we do with Gastric Perforation
Omentoplasty or Omental patch? Necessary or not?

- Cellan-Jones 1929 → after excision of friable edges, the application of purse string sutures and on top an omental graft
- Problem → Narrowing of the duodenum
- To Avoid that → Suggested omentoplasty without primary closing of the defect

“Do not stitch the perforation but plug it with viable omentum and patch a perforation ulcer if you can, if you cannot, then you must resect” (Mosche Schein)
Is an Omentoplasty is Sufficient or is a Definitive ulcer operation required

1. Is the performance of an operation indicated?
2. Is an omental “Plication” sufficient or is definitive ulcer operation?
3. Is the patient stable enough to undergo a definitive ulcer operation?
4. Which definitive ulcer operation is indicated?
5. Laparoscopic or Laparotomy
Omentum: A unique organ of exceptional Versatility

- Protect the peritoneal cavity → Collections of macrophages
- Limits the spread of infection “The policeman of the abdomen”
- Potent Lymphatic absorb enormous of oedeme fluids
- Highly vascular organ → promote the Growth of blood vessels
- Source of Growth factors, neurotransmitter, Neurotrophic factors and inflammatory mediators
- Contains omnipotent stem cells → can differentiate into a variety of cell types

OMENTAL PATCH TECHNIQUES

- Cellan-Jones (1929)
  - The classic pedicled omental
  - accepted as the gold standard treatment
  - erroneously attributed to Graham (1937)

- Roscoe Graham (1937)
  - use of a free graft of the omentum
  - 3 sutures classically used with a piece of omentum graft laid over these sutures, which are then tied

In both techniques, no attempt is made to actually close the perforation

Graham RR. The treatment of perforated duodenal ulcers. Surg Gynecol Obstet 1937(64):235-8
OMENTAL PATCH TECHNIQUES

- **Karanjia technique**: modified Cellan-Jones
  - Omental pedicle is secured to the tip of a NGT passed through the PDU.
  - NGT withdrawn for 5-6 cms before the omentum is secured to healthy serosa

- **“Omentoplasty”**: on lay patch with pedicle
  - Suture closure of ulcer – sutures not cut
  - Segment of omentum secured on top of the closed perforation with same suture

Concerns:
- Poor seal obtained when suture knots interposed between duodenal serosa and the omental patch
- The apposition of omentum is not as broad as with original described omental patch

A

- Omentum
- Space between duodenal serosa and omentum
- Duodenum

B

- Ulcer perforation plugged with omentum
Fig. 3 Alternative techniques for suture of a perforated ulcer: a primary suture; b primary suture with pedicled omental flap; c pedicled omental flap sutured into the perforation (Cellan–Jones repair); d free omental plug sutured into the perforation (Graham patch); e use of three long-tailed sutures to close the perforation and buttress with a pedicled omental flap; f use of tacking sutures around the perforation (for example when friable edges or a large perforation may not allow approximation of wound edges).
Figure 1: Different suture techniques for closing perforation

- **Primary closure by interrupted sutures**
- **Primary closure by interrupted sutured covered with pedicled omentoplasty**
- **Cellan-Jones repair**: plugging the perforation with pedicled omentoplasty
- **Graham patch**: plugging the perforation with free omental plug
OMENTAL FREE GRAFT OR PEDICLE?

Current evidence inconclusive - available results controversial

- post operative leak rates high as 12% in pedicled omental graft as compared to 0% in free omental graft
  Jani K, Saxena V, Vaghasia R.

- pedicled omental grafting is superior technique
  Chaudhary A, Bose SM, Gupta NM, Wig JD, Khanna SK.
  Ind J Gastroenterol. 1991;10:14–5

- free omental graft preferred rather than a pedicled graft
  Sharma D, Saxena A, Rahman H, Raina VK, Kapoor JP
  Dig Surg 2000, 17:216-8
Re-leak following omentoplasty

- The rate leak reported 2.76%
- 1. Age > 60 years
- 2. Pulse rate > 110/minute
- 3. Blood pressure < 90 mmHg
- 4. Hb, 10 g/dl
- 5. Serum albumin < 2.5 g/dl
- 6. Total lymphocyte count < 1800 cells/mm³
- 7. Size of operation > 5 mm
Irigation of the Peritoneal cavity

- Some Surgeons → Doubt the usefulness of Irrigation → but Nothing has been found in the literature supporting this theory
- Irrigation → One of the most Important parts of surgery → 6-10 liters even up to 30 litres of warm saline are recommended
Drainage or not?

- Still controversial
- 80% → no need
- Drain → Will not reduce the incidence of intraabdominal fluid collections or abscesses (Schein.M)
- 10% can become infected and intestinal obstruction
- Often left it as a sentinel
Giant Ulcer???
Surgical Reconstruction

Truncal

- Selective (total gastric)

- Proximal (highly selective, parietal cell)
Surgical Reconstruction

- Both Billroth reconstruction → lead to bile reflux → 5-35%
- To avoid that → Roux-en-Y reconstruction (Roux 1897)
- Roux-en-Y reconstruction → plaqued with a Roux stasis syndrome
- Braun variation Billroth (1893) → lower incidence of Bile reflux → some authors recommend this as standard reconstruction.
Surgical Reconstruction

- Others promote “uncut” Roux-en-Y

Braun anastomosis vc Roux-en-Y

- Clinical Study Billroth II with Braun Enterointerostomy Is a Good Alternative Reconstruction to Roux-en-Y Gastrojejunostomy in Laparoscopic Distal Gastrectomy

- Long-Hai Cui, Sang-Yong Son, Ho-Jung Shin, Cheulsu Byun, Hoon Hur, Sang-Uk Han, and Yong Kwan Cho

BII Braun anastomosis successfully diverted a substantial amount of bile from the remnant stomach, this method may be a good alternative to RY reconstruction in preventing bile reflux.
Complication of Ulcer Operations

1. Early Satiety
2. Postvagotomy syndrome → diare → 30%
3. Dumping Syndrome → 20%
4. Alkaline Reflux gastritis → 10%
5. Afferent and Efferent loop syndrome → Mechanical obstr of the limb kinking, anastomosis narrowing, or adhesion
6. Roux stasis syndrome
7. Recurrent Ulceration
8. Anastomosis leaks
Conclusion

- Gastric ulcer perforation is a common problem.
- To choose the best operation, the surgeon must consider characteristics of the ulcer (location, chronicity, type of complication), the likely etiology, the patient age, and the operation.
- The morbidity of ulcer disease is replaced by the morbidity of the operation.
TERIMA KASIH