Surgery for Complications of Peptic Ulcer Disease (Definitive Treatment)

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Department of Surgery
Overview

- Introduction
- Epidemiology
- Pathophysiology
- Clinical manifestation
- Diagnosis
- Complications
- Treatment options
  - Medical treatment
  - Nonsurgical procedures
  - Surgical options
    - Temporary treatment
    - Definitive treatment
Introduction

- There is one major difference between the operative treatment of hemorrhage form peptic ulcer and the operative treatment of perforation:

  “The use of definitive ulcer curing operation is mandatory in patients who have hemorrhage, whereas in patients who have perforation it is optional.”

  Johnston 1989

- Surgery, if necessary, should be aim to stopping the hemorrhage and not curing the disease.

  Ohmann et al; 2000 World J Surg
Introduction

■ Between 1950’s to 1970’s PUD was the major indication for UGI surgery.
■ 50-80% reduction in operation for PUD in US and Europe since 1980’s.
■ Some studies suggest increase in the number of patients presenting with complicated PUD.
■ H2-Blockers, PPI, H. Pylori treatment, and endoscopic procedures reduced the number of surgical interventions.
■ Increase of patients population age and more use of NSAIDs are counteracting forces.
Operation for PUD: Paradigm Lost

- Retrospective Study
- Over 20 years period
- 771 PUD operations:
  - 76% for duodenal ulcers
  - 24% for gastric ulcers
- 80% decrease in number of PUD operations

WH Schwesinger et al.; J Gastrointestinal Surgery (2001); 5: 438-443
Peptic Ulcer Disease

Definition:

- Defect in the mucosa with extend to submucosa or deeper layers.
- Caused due to imbalance between acid secretion and mucosal defense system.
Epidemiology

- M=F (Gastric Ulcer)
- M>F (Duodenal Ulcer)
- Prevalence: 2%
- Lifetime risk: 10%
- Mortality: 1.7 per 100,000 population
- Healthcare cost: Direct cost $3.3 billion & indirect cost $6 billion per year.
Pathophysiology

- H. Pylori
- NSAIDs
- Injury of mucosal barrier. “No acid, no ulcer”
- Medications
- Smoking
- Alcohol
- Others: Gastrinoma (ZE), G-cell hyperfunction / hyperplasia, trauma, burn, major physiologic stress
PU Types (Johnson Classification)

**Type I:** Near Angularis incisura, lesser curvature, \( N \ or \ \downarrow \ acid \ secretion \)

**Type II:** Associate with DU, \( N \ or \ \uparrow \ acid \ secretion \)

**Type III:** Prepyloric, \( N \ or \ \uparrow \ acid \ secretion \)

**Type IV:** Associate with active DU, \( N \ or \ \downarrow \ acid \ secretion \)
Clinical Manifestation

- Abdominal pain
- Nausea
- Vomiting
- Bloating
- Weight loss
- Positive occult blood
- Anemia
Diagnosis

- Clinical Diagnosis
- Upper GI endoscopy
- UGI series
- Mucosal Biopsy
- Gastrin level test
- Urease breath test
## Complications of PUD

<table>
<thead>
<tr>
<th>Complication</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bleeding</strong></td>
<td>Hypotension, hematemesis / melena, need for transfusion, visible vessel, ongoing bleeding</td>
</tr>
<tr>
<td><strong>Perforation</strong></td>
<td>Acute abdomen (chemical → bacterial peritonitis), free fluid / air</td>
</tr>
<tr>
<td><strong>Obstruction</strong></td>
<td>GOO (5%): vomiting, profound ↓K/Cl acidosis, pain, weight loss</td>
</tr>
</tbody>
</table>
Indications for Surgical Treatment

- Indications for surgical treatment:
  - Uncontrolled or recurrent bleeding
  - Perforation
  - Obstruction
  - Non-healing ulcer or intractability

- Always consider presence of gastric cancer with GU
Surgical Therapy PUD in 21\textsuperscript{st} Century, more common than you think

- VA Study, over the coarse of 5 years.
- Retrospective study.
- 1/3 of GI operations.
- 66\% ASA class of 3-4.
- 47\% positive for H. Pylori.
- 54\% associate with NSAID use.
- 60\% (26/43) without history of PUD.
- 33\% (43/128) of GI surgeries was performed for PUD.
- 81\% (35/43) for bleeding or perforated ulcers (emergent setting).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Characteristics and comorbidities</th>
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</thead>
<tbody>
<tr>
<td>Patient No.</td>
<td>43</td>
</tr>
<tr>
<td>Age (y) (mean ± SD)</td>
<td>60 ± 11.3</td>
</tr>
<tr>
<td>ASA status (Mean ± SD)</td>
<td>3 ± 0.8</td>
</tr>
<tr>
<td>Duration of follow-up (median, range)</td>
<td>18 months (0-60)</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
</tr>
<tr>
<td>% chronic obstructive pulmonary disease</td>
<td>21 (9)</td>
</tr>
<tr>
<td>% coronary artery disease</td>
<td>30 (13)</td>
</tr>
<tr>
<td>% diabetes</td>
<td>19 (8)</td>
</tr>
<tr>
<td>% chronic kidney disease (Cr &gt;2.0)</td>
<td>14 (6)</td>
</tr>
<tr>
<td>% tobacco use</td>
<td>86 (37)</td>
</tr>
</tbody>
</table>

GA Sarosi \textit{et al} ; The American Journal of Surgery 190 (2005) 775-779
Surgeons need to know operative choices.

Still includes 1/3 of GI operations.

80% of patients had either omental patch or simple excision technique.
Perforated Peptic Ulcer: Main Factors of Morbidity & Mortality

- Retrospective study.
- 210 patients with peptic ulcer.
  - 124 (59%) pt with duodenal ulcer.
  - 86 (41%) pt with gastric ulcer.
- 88 (42%) underwent simple closure.
- 122 (58%) underwent definitive treatment (TV + D & Excision).

Most common Causes of Morbidity:
- Pneumonia (11.4%)
- Wound Infection (5.7)
- Wound Dehiscence (5.2%)

Most common Causes of Mortality:
- Sepsis (4.8%)
- Respiratory Failure (2%)
- MI (2%)
Perforated Peptic Ulcer: Main Factors of Morbidity & Mortality

- **Variables associate with morbidity:**
  - Perforation evolution > 24 hours
  - Associate illnesses (x6)
  - Resection surgery

- **Variables associate with mortality:**
  - BP < 100 mmHg on admission
  - Associate illnesses (x12)
  - Resection surgery

Bleeding PU

- 5% of patients present with bleeding and 20% of Patients have at least one episode of bleeding.

- The incidence of GI bleeding due to PUD have not changed in the last 2 decades. *Ohmann et al; World J surg 2000,20:284-293*

- 1.5-2% continue bleeding, despite of endoscopic treatment.

- 10-20% re-bleed after endoscopic treatment, require operative approach.

- 5-10% require emergent operation.

- The risk of re-bleeding increase with size (>2 cm), age, other comorbidities, and presence of shock.
Surgical Options for Bleeding PU

- Suture ligation of the base
- Extraduodenal ligation of GD artery
- Gastric resection (BI/II)
- Pyloroplasty
- Vagotomy

[Percentages: 20%, 5%, 75%]
Endoscopic vs Surgical Treatment for Bleeding PUD

- Randomized prospective study (4 years)
- Surgery (52/3500)
- Endoscopy (~ 1100/3500)
  - 100 pt with re-bleeding
  - 27% of them failed endoscopic treatment → emergent surgical treatment (46% complication rate)
- 93% of patient underwent surgery after failed initial endoscopy, complete hemostasis achieved. (36% complication rate)
- Mortality between two arms were not significantly different.

Perforate PUD

■ About half of perforated ulcers seal spontaneously. *Donovan et al; 1998, Arch Surg*

■ No difference in M & M between conservative and surgical treatment. *Crofts et al; 1989, NEJM*

■ Conservative treatment can be safely tried in 2/3 of patients. *Marshall et al; 1999, Br J Surg*

■ If delay the operation more than 12 hrs after presentation, the outcome will be worse. *Hermansson et al; 1999 Eur J Surg*
Surgical Options

- Truncal vagotomy
- Selective vagotomy
- Proximal gastric vagotomy (or HSV)
- Posterior vagotomy and anterior seromyotomy
- Antrectomy and vagotomy
- Vagotomy and drainage
Highly Selective Vagotomy

- 0.5 % mortality
- Recurrence rate of 9-15%
- 65-75% reduction of gastric acid secretion
- Not the treatment of choice for type II & III GU
- Treatment of choice for uncomplicated, intractable DU
Surgical Treatment

Graham’s Patch

Billroth I

Billroth II
Oversewing + Vagotomy vs Distal Gastric Resection for PUD

- Randomized Prospective study
- 59/120 O + V, 61/120 DGR
- Post-Op bleeding recurrence: 17% after O + V vs 3% after DGR ($P < 0.05$)
- Duodenal leak: 3% after O + V vs 13% after DGR ($P < 0.01$)
- Overall mortality: 22% and 23% respectively.

Millat et al; World J Surg 1993; 17: 568
Simple Closure vs Definitive Surgery for Perforated PU

- Prospectively study (5 years).
- 33/78 Simple closure (SC), 32/78 Definitive surgery (DS).
- No death in both groups with similar complication rate.
- Good/excellent results were achieved in 30 per cent of SC compared with 81% of DS ($P < 0.01$).
- 85% of simple closure patients developed recurrent ulcer symptoms and 33% had already had a second definitive operation. Two patients (8%) in Group II were reoperated due to recurrent ulcer.
- In patients where long-term follow-up and medical treatment for duodenal ulcer is unsatisfactory, truncal vagotomy with drainage should be the treatment of choice for perforation. Simple closure should be reserved for high-risk patients or when the surgeon is inexperienced.

### Preferred surgical treatment for PUD

<table>
<thead>
<tr>
<th>Ulcer Type</th>
<th>Preferred Approach</th>
<th>Alternative Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duodenal Ulcer</strong></td>
<td>Vagotomy, Pyloroplasty, Suture Ligation</td>
<td>PGV + duodenotomy and suture ligation or Vagotomy and antrectomy</td>
</tr>
<tr>
<td><strong>Type I Gastric Ulcer</strong></td>
<td>Distal Gastrectomy</td>
<td>Ulcer excision, Vagotomy, pyloroplasty</td>
</tr>
<tr>
<td><strong>Type III (prepyloric) Ulcer</strong></td>
<td>Vagotomy, antrectomy</td>
<td></td>
</tr>
<tr>
<td><strong>Type IV Gastric Ulcer</strong></td>
<td>Distal Gastrectomy with esophagogastrojejunostomy</td>
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</table>
When we should not consider conservative treatment:

- Worsening of symptoms, HD unstable, radiological finding of leak.
- Presents more than 24 hrs from onset of symptoms
- Age more than 70 y/o
- Persistent bleeding.
- More than 5 U of PRBC/24hrs
- Recurrence of bleeding after the 2 or 3rd endoscopic attempt.
Conclusion

- Cessation of NSAID use and suppression of acid secretion are both associated with a decreased likelihood of ulcer recurrence.

- Eradication of H pylori appears to be associated with markedly reduced recurrence of bleeding or perforation.

- Operative suppression of acid secretion is associated with decreased persistence or recurrence of hemorrhage/perforation.

- Historically, the data suggested that a more aggressive suppression of acid secretion (i.e., subtotal gastric resection) was more likely to prevent recurrence of hemorrhage than a lesser procedure such as limited antrectomy.
Tehran
Questions?