In the past, ttt of pt with peptic ulcer was by surgery mainly. Nowadays, surgical interventions for PU become very rare due to PPIs and eradication therapy of H. pylori. BUT still there’s surgical roles in complications of PUD.
Peptic Ulcer Disease Complications & Management

• Not always Pepsin / acid related
• All peptic ulcers can be healed by using proton pump inhibitors, which can render a patient virtually achlorhydric
• Common sites for peptic ulcers are
  - 1st part of duodenum
  - Lesser curve of the stomach
    - Stoma following gastric surgery
    - Esophagus
    - Meckel’s diverticulum
Peptic Ulcer Disease Complications & Management

Etiology

• Acid overproduction !!!
• Infection with H. pylori is most important factor in development of PU
• NSAIDs
• Cigarette smoking predispose & relapse after treatment

Must ask any pt with PU about H.Pylori evaluation (by endoscopy) and NSAIDs. Because they are the most important causes of PU nowadays.
Peptic Ulcer Disease Complications & Management

• Medical Treatment

VS

• Surgical Treatment
Surgical Treatment

Indications

• Intractable Disease
• Complications

Surgical treatment used only in these two indications.
The treatment of PU is medical and medical and medical.
Surgical Treatment

• The incidence of surgery for uncomplicated peptic ulceration has fallen markedly, to the extent that peptic ulcer surgery is now little than historical interest
Surgical Treatment

Operations for Duodenal Ulceration

Aim to exclude the damaging effects of acid from the duodenum, which can be achieved by:

• Diversion of acid away from the duodenum
• Reducing the secretory potential of the stomach
• Both
Surgical Treatment

Operations for Duodenal Ulceration

- Billroth Gastrectomy (I & II)
- Gastrojejunostomy
- Truncal vagotomy and drainage procedure
- Highly selective vagotomy
- Truncal vagotommy and antrectomy
Billroth Gastrectomy I & II
Billroth Gastrectomy II
Vagotomy
Truncal Vagotomoy & Pyloroplasty

A) Posterior division of vagus nerve
B) Truncal vagotomy prevents nerve stimulation of the stomach

Ulcer
Longitudinal cut through pylorus
Anterior division of vagus nerve
Pyloroplasty
Truncal Vagotomy & Pyloroplasty
Surgical Treatment

Operations for Gastric Ulcer

• Billroth I Gastrectomy

• Resection of distal stomach including the ulcer with reconstruction, the cut stomach is then anastomosed to 1\textsuperscript{st} part of duodenum
Surgical Treatment

Sequelae after peptic ulcer surgery

• Recurrent ulceration (complications)
• Small stomach syndrome (vagotomy & loss of receptive relaxation)
• Bile vomiting
• Early and late dumping syndrome
## Dumping Syndrome

<table>
<thead>
<tr>
<th>Dumping Syndrome</th>
<th>Early</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence</td>
<td>5 – 10%</td>
<td>5%</td>
</tr>
<tr>
<td>Relations to meals</td>
<td>Almost immediate</td>
<td>Second hour after meals</td>
</tr>
<tr>
<td>Duration of attack</td>
<td>30 – 40 minutes</td>
<td>30 – 40 minutes</td>
</tr>
<tr>
<td>Relieved by</td>
<td>Lying down</td>
<td>Food</td>
</tr>
<tr>
<td>Aggravated by</td>
<td>More food</td>
<td>Exercise</td>
</tr>
<tr>
<td>Precipitating factors</td>
<td>Food, especially carbohydrate rich and wet</td>
<td>As for early dumping</td>
</tr>
<tr>
<td>Major symptoms</td>
<td>Epigastric fullness, sweating, light headedness, tachycardia, colic, sometimes diarrhea</td>
<td>Tremor, faintness, prostration</td>
</tr>
</tbody>
</table>
Surgical treatment

- **Sequelae after peptic ulcer surgery**
- Post vagotomy diarrhea
  - Rapid gastric emptying
  - Can be severe and explosive
  - Feeling of passing boiling water
- **Malignant transformation**
  - After truncal vagotommy and drainage or gastrectomy
  - Bile reflux gastritis, intestinal metaplasia then gastric cancer
  - Increased risk 4 times
Surgical Treatment

**Sequelae after peptic ulcer surgery**

- Nutritional consequences
  - Weight loss & anemia
  - Iron deficiency mostly due reduced absorption and loss of blood from gastric mucosa
  - Vitamin B12 deficiency after total gastrectomy due to loss of intrinsic factor, and to lesser extent due bacterial colonization

- Gallstone
  - Post truncal vagotomy due to denervation of biliary tree, stasis and stone formation
The complications of Peptic Ulceration

The common complications are:

- Perforation
- Bleeding
- Stenosis

This part of lecture is Very IMPORTANT
Perforation

Epidemiology

• The incidence of perforated peptic ulcer has changed little

• Change of epidemiology, it used to happen in middle aged, M:F 2:1, now there is steady increase in the age of patients suffering from perforation and increase in the number of women affected

• NSAID is responsible for most of these perforations
Perforation

Clinical Features

• History of peptic ulcer
• Sudden onset severe, generalized abdominal pain
• Starts as chemical peritonitis, then bacterial peritonitis which will be accompanied by deterioration of the patient’s condition
• History of NSAID intake
Perforation

- **Clinical Features**
- Tachycardia, pyrexia
- Shock
- Board like rigidity of abdomen
- Abdominal splinting
Perforation

Clinical Features

- In elderly, the classical presentation of PPU may be absent
- Use of NSAID
- Board like abdominal rigidity may be not present
- Epigastric tenderness
Perforation

**Clinical Features**

- The most common site for perforation is the **anterior aspect of duodenum**
- Anterior or incisural part of gastric ulcer may perforate
- Gastric ulcer may perforate in lesser sac (difficult to diagnose)
Perforation

Investigations

• Erect plain chest radiograph, will reveal free gas under the diaphragm in more than 50% of the cases
• Amylase level to R/O pancreatitis
• CT scan of the abdomen
Air under diaphragm: indicate perforation of viscera
Perforation

**Treatment**

- Resuscitation and analgesia
- The treatment is *principally surgical*
- Midline incision
- Thorough peritoneal toilet
- Duodenal ulcer, close and patch with omentum
- Gastric ulcer, should if possible, excised and closed
- If suturing is not possible, Billroth gastrectomy
Suturing of Perforated Peptic Ulcer
Perforation

**Treatment**

- Systemic antibiotics
- Vagotomy, highly selective vagotomoy
- Minimally invasive
- Conservative treatment
  - Small leak
  - Mild peritoneal contamination
  - I.V fluid, N/G tube
- Proton pump inhibitors lifelong especially if to continue on NSAID & H *pylori* eradication therapy
Bleeding

- Epidemiology
- Mirror that of PPU
- NSAID
Bleeding

Peptic Ulcer Bleeding

- 5% of emergency admissions
- 80% stop spontaneously
- 10% of patients die
- Rebleeding increases mortality by 10x
Bleeding

Treatment / Medical

- Limited efficacy
- All patients are started on PPI
- Endoscopic control
  - LASER & Argon diathermy
  - Injection
  - May have some value
  - Never effective in patients who are bleeding from large size vessels
Bleeding Peptic Ulcer
Bleeding

Treatment / Surgical Indications

• Patient continue to bleed
• Visible vessel in ulcer base
• Spurting vessel
• Ulcer with a clot
• Elderly
• Patient who has required more than 6 units of blood
Bleeding

Treatment / Surgical

• Aim to stop bleeding
• Upper midline incision
• Site usually localized by prior Endoscopy
• Duodenal mobilization
• Pyloro-duodenotomy
• Suture that under-run the bleeding vessel
• Gastric ulcer, excise ulcer if possible, if not, under-run bleeding vessel and take biopsies
Bleeding

- **Treatment / Surgical**
- Definitive acid lowering surgery is not required
- PPI
- Anti H *pylori*
Stenosis

• Stenosis is usually found in the 1st part of duodenum
• Condition is much less common nowadays
Stenosis

**Clinical Features**

- Long history of peptic ulcer disease
- Vomiting, unpleasant in nature, totally lacking in bile, containing foodstuff taken several days previously
- Weight loss
- Patient looks unwell and dehydrated
- O/E can see distended stomach, succussion splash may be audible on shaking the patient’s abdomen
Stenosis

**Metabolic effects**

- Vomiting of HCl results in hypochloremic alkalosis
- Initially Na & K levels are normal
- With dehydration, more profound metabolic abnormalities arise
- Renal dysfunction
- Initially urine has low chloride and high HCO3 content, HCO3 is excreted with Na, so patient become hyponatremic and more dehydrated
Stenosis

**Metabolic effects**

- Then because of dehydration, a phase of Na retention follows and K and Hydrogen are excreted in preference
- Paradoxical aciduria
- Hypokalemia
- Alkalosis leads to lowering of circulating ionized calcium and tetany may occur

Very very important
Stenosis

Management

(1) Correct metabolic abnormality

• Rehydration with isotonic saline with K supplementation

• Replacing NaCl and water allows kidney to correct the acid-base abnormality

• Correct anemia which may appear after rehydration
Stenosis

Management

(1) Empty the stomach with wide-bore N/G tube, may need lavage

(2) Endoscopy and contrast radiology to confirm and R/O malignancy

(3) Parenteral anti-secretory agent
Stenosis

Management

• Early cases may settle with conservative measurement, presumably as the edema around the ulcer diminishes as the ulcer is healed

• Gastroenterostomy

• Endoscopic balloon dilatation
  - Effective in early cases
  - Risk of perforation
  - Dilatation may have to be performed several times