

# Post Gastrectomy Syndromes

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## **Case Presentation**

- Xx yr old male with recurrent peptic ulcer disease.
- EGD- ulcer in antrum of stomach
- Biopsy-high grade dysplasia with focal ulceration
- Endoscopic USS-single superficial 50mm ulcer, tattooed
- Referred for gastric resection

# Case Presentation

- PMH- HTN
- PSH-None
- Allergies-NKDA
- Medications- Metoprolol, Nexium, Vitamins
- Allergy-NKDA
- FSHx-non contributory

## Case Presentation

- Gen examination- not pale, anicteric
- BP 140/84 PR 74
- Abdominal exam- Soft ,NT/ND
- DRE- no mass, no blood, guaiac -ve
- Chest-CTA bilat
- CVS-S1S2 no murmur
- Ext- WNL

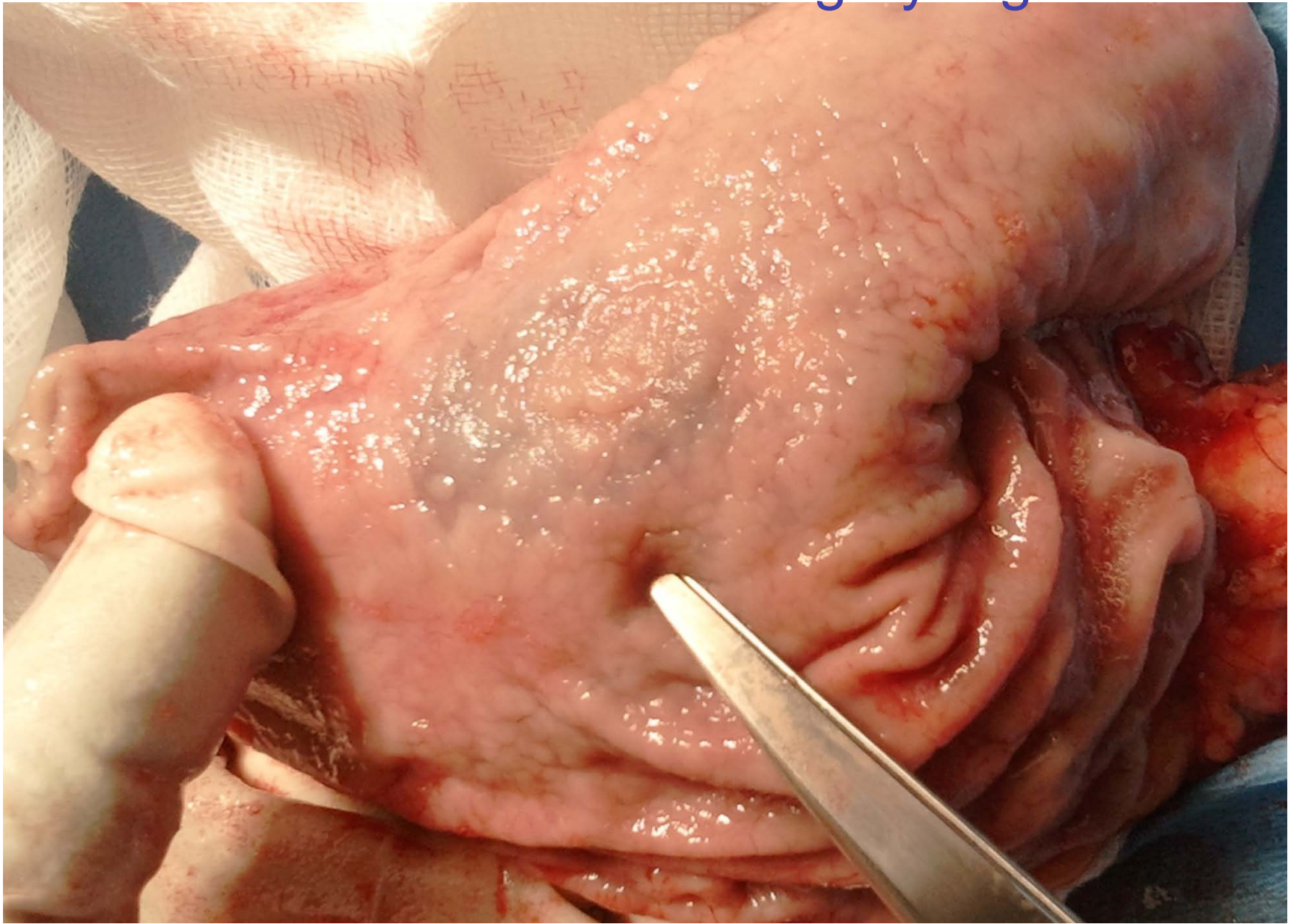
# Case Presentation

## -Laboratory tests

- CBC: 4.6/13.3/38.7/151
- BMP:142/3.9/107/28/15/0.95/92
- LFTs: 6.9/4.4/23/24/46/0.5
- Coagulation: 11.4/26/1

## **Operative procedure**

- Laparoscopic assisted partial gastrectomy with Billroth II gastrojejunostomy



## **Hospital Course**

- POD#1- Started on clear liquid diet
- POD#3-Discharged home
- Pathology- Dysplasia, focally high grade. No invasive component identified

# Postgastrectomy Syndromes

- Dumping Syndrome
- Alkaline Reflux Gastritis
- Post Vagotomy Diarrhea
- Afferent Limb Syndrome
- Roux Syndrome
- Duodenal Stump Blow Out
- Gastroparesis
- Recurrent Ulceration
- Gastric Remnant Carcinoma
- Small Capacity Syndrome
- Anemia/Metabolic Disorders
- Other problems (gallstones, bezoars ,etc)

# History of Gastrectomy

## 1879

- Jules Pean performs 1st stomach resection for cancer
- Distal gastrectomy & gastroduodenostomy
- Patient died 5 days later post transfusion

## 1880

- Ludwik Rydygier performs stomach resection for pyloric cancer
- Patient died 12 hours post-operatively from heart failure



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**History of gastrectomy**

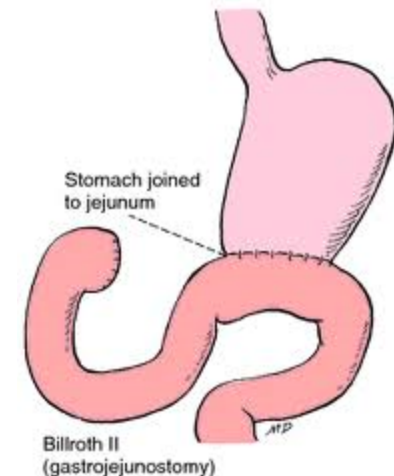
## 1881

- Theodor Billroth first to successfully resect the distal stomach
- Patient had distal gastric cancer
- Continuity re-established by gastroduodenostomy (Billroth I)
- Patient recovered, but died 4 months later with abdominal carcinomatosis

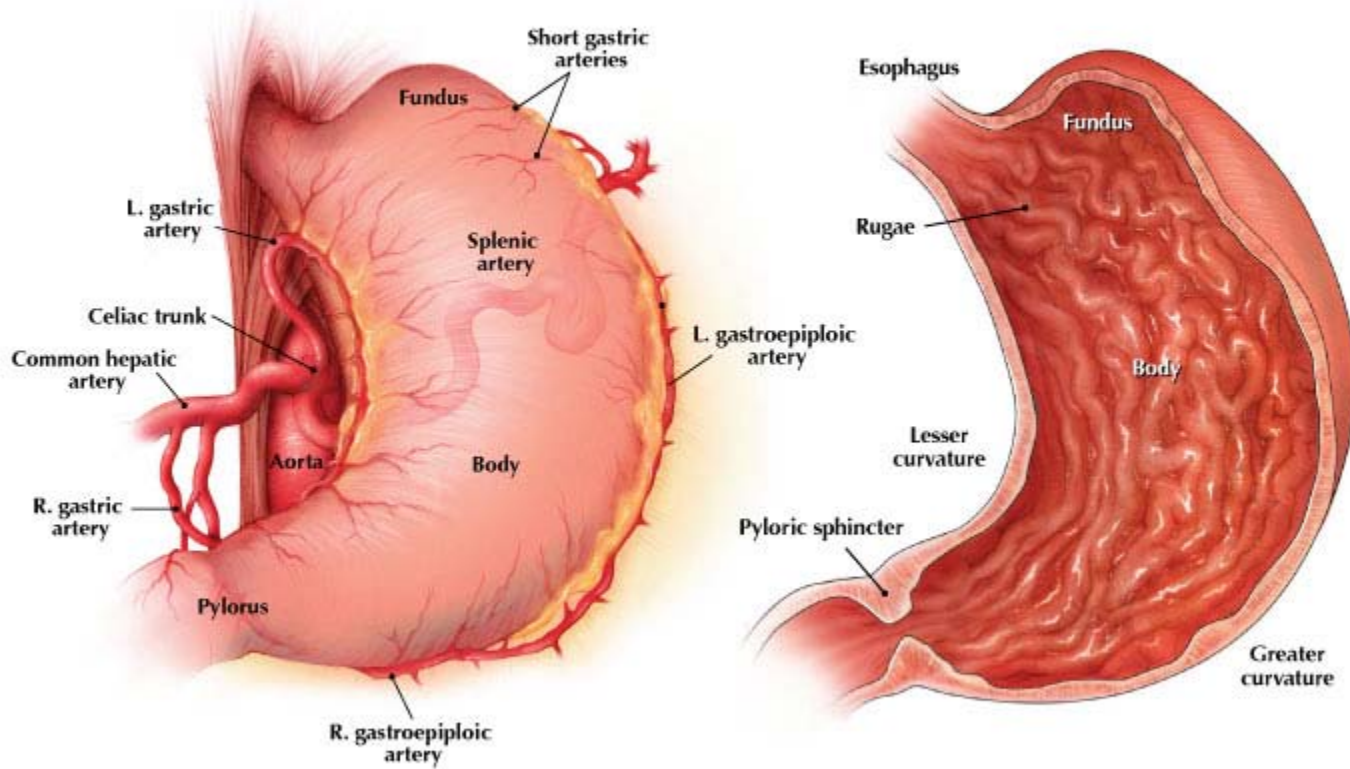


## 1885

- Billroth performs successful distal gastrectomy & gastrojejunostomy (Billroth II) for gastric cancer



# STOMACH ANATOMY



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# **Post Gastrectomy Syndromes**

# Dumping Syndrome

- Etiology- not completely understood
  - Alterations in pyloric mechanism
  - Loss of receptive relaxation after truncal vagotomy
  - Rapid gastric emptying
- Occurs in 5-10% of patients post
  - Pyloroplasty
  - Pyloromyotomy
  - Distal gastrectomy

## **Early dumping syndrome**

- Can occur after any meal, commoner after high carbohydrate meals
- Abrupt hyperosmolar load into small bowel
- Peripheral / splanchnic vasodilatation
- Post prandial (10-30mins)

# **Dumping syndrome**

## **Early dumping syndrome**

- Tachycardia, diaphoresis, weakness, crampy epigastric discomfort, belching, palpitations, flushing, diarrhea
- Hormonal aberrations- VIP, bradykinin, serotonin, insulin etc
- Cardiovascular symptoms-recumbence/ IVF

# **Dumping syndrome**

## **Late dumping syndrome**

- Induced by meals with increase CHO contents
- 1 to 4 hours following meal
- Rebound hypoglycemia after initial sugar load relieved by sugar administration

# **Dumping syndrome**

## **Dietary Management**

- Small meals
- Avoid liquids at meals
- Add dietary fiber compounds

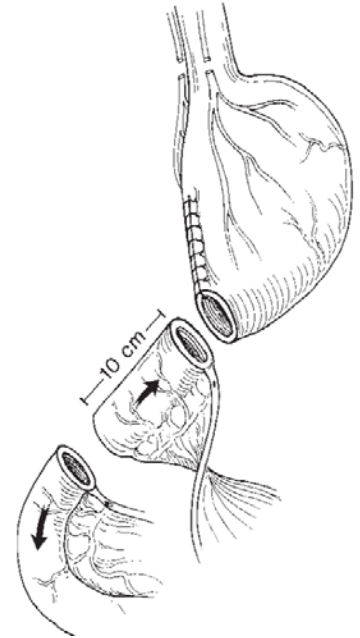
# Dumping syndrome

## Medical Management

- Failed dietary management - Start octreotide
  - Ameliorates abnormal hormonal pattern
  - Restores migrating motor complex
- Acarbose (alpha-glucosidase inhibitor) - late dumping
- 90% improve with time and non-surgical management

## **Surgical Management**

- No definitive surgical solution
- Operations to treat dumping syndrome include:
  - Takedown gastrojejunostomy, pyloric reconstruction
  - Reversed segment interposition
  - Conversion of Billroth II to Billroth I
  - Conversion to Roux-en-Y anastomosis



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**Alkaline Reflux Gastritis**

- **Pathogenesis**

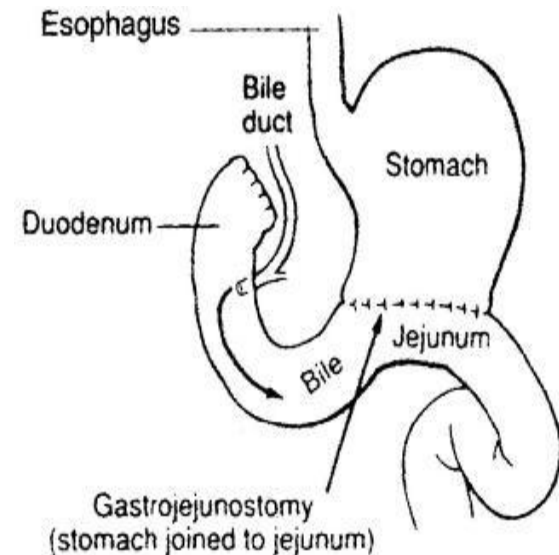
- Abnormal mucosal barrier function
- Motility disorders
- Presence of bile acids

- Duodenal secretions reflux into stomach/esophagus

- **Clinical presentation**

- epigastric pain radiating to back
- persistent nausea w/bilious vomiting
- occurs months or years post-op

- **Diagnosis**- postprandial duodenogastric reflux on HIDA scan



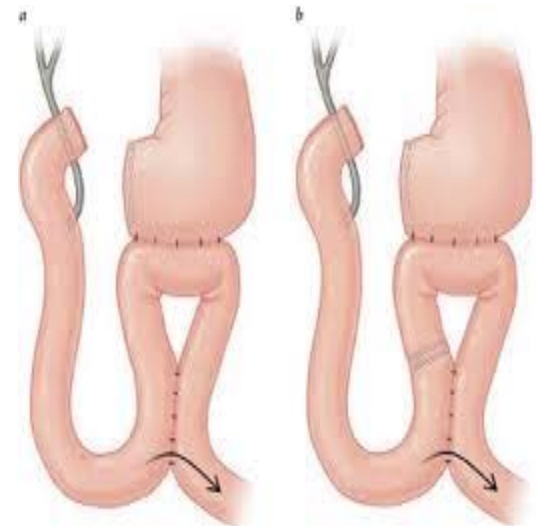
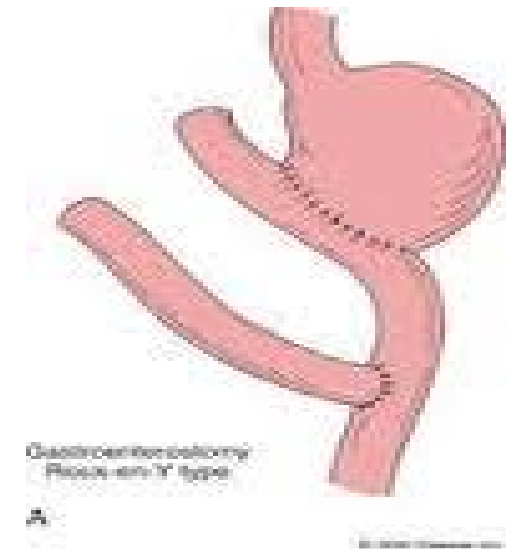
# Alkaline Reflux Gastritis

- **Medical management**

- Dietary modification- pyloric tone
- Prokinetic agents- gastric emptying
- Bile acid binding resin or sucralfate

- **Surgical management**

- Roux-en-Y gastrojejunostomy
- Braun enteroenterostomy



# Gastroparesis

- **Acute gastroparesis**- commonest postgastrectomy syndrome
- **Diagnosis**- inability to tolerate adequate oral intake 7-14 days post op.
- Normal gastric emptying time (60minutes)- 60% solid/80% liquid
- Common in DM, chronic GOO, duodenal obstruction

- **Metabolic causes** : electrolyte abnormalities, endocrine disorders, medications
- **Functional causes** : GOO, duodenal obstruction, post truncal vagotomy
- **Mechanical causes**
  1. Stomal edema
  2. Small anastomotic leaks
  3. Adhesions
  4. Hematoma formation

# **Gastroparesis**

- **Acute gastroparesis**
- **Treatment:**
  1. NG tube decompression
  2. Prokinetic agents - reglan, erythromycin, cisapride
  3. Correction of electrolyte abnormalities
  4. Parenteral alimentation
  5. Feeding jejunostomy

# Gastroparesis

- **Chronic gastroparesis**- much later post op
- **Presentation**- early satiety, nausea, intermittent vomiting, epigastric pain.
- **Emesis** of food ingested several days earlier is pathognomic
- **Diagnosis**- Radionuclide empty test
- **Treatment**- Prokinetics, electrical pacing , surgical resection of atonic portion of stomach

# Diarrhea

- From truncal vagotomy /dumping/malabsorption
- Occurs soon after surgery, daily or intermittent
- Symptoms improve over months/years post op
- Mechanisms include:
  - Bile acid malabsorption
  - Rapid gastric emptying
  - Bacterial overgrowth
  - Fat malabsorption from acid inactivation of pancreatic enzymes

# Diarrhea

## Medical Management

- Bacterial overgrowth - Empiric antibiotics
- Bile acid malabsorption - Cholestyramine
- Rapid gastric emptying - Codeine/loperamide
- Fat malabsorption - Pancreatic enzymes

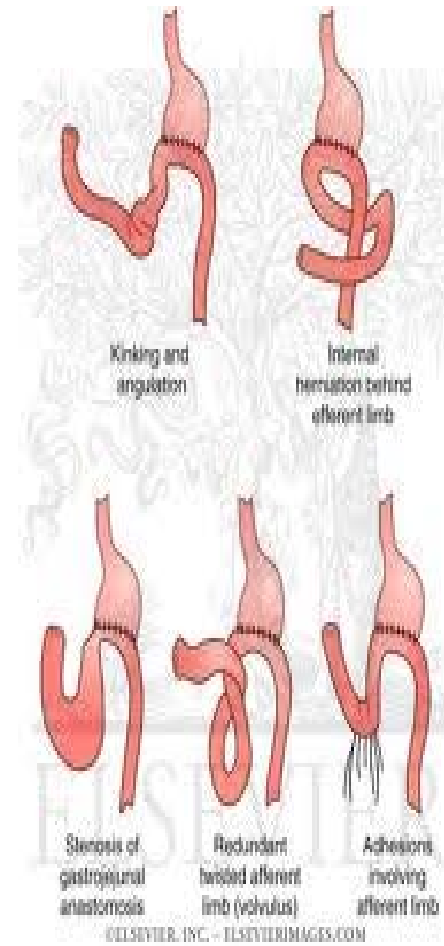
# Diarrhea

## Surgical Management

- Operative treatment is rare
  - Reversed jejunal interposition placed beyond Treitz
  - Onlay antiperistaltic distal ileal graft
- Obstructive symptoms and/or bacterial overgrowth may result

# Afferent Limb Syndrome

- Upstream duodenal / jejunal limb
  - Bile, pancreatic flow to gastrojejunostomy
- **Afferent Limb Syndrome (ALS)**
- Occurs POD 1 to years post-surgery
- Result of technical problems
  - Overlong limb
  - Narrow anastomosis
  - Redundant afferent limb

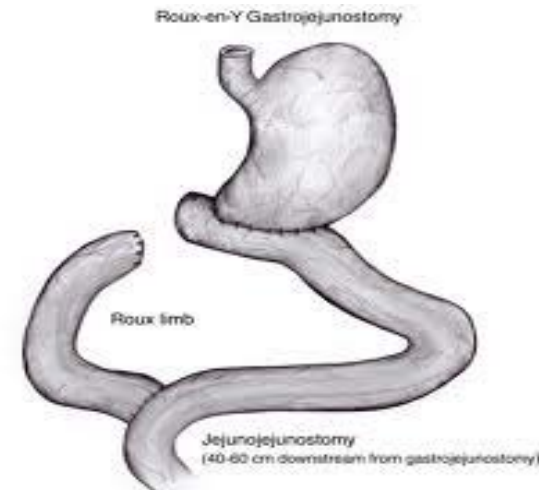
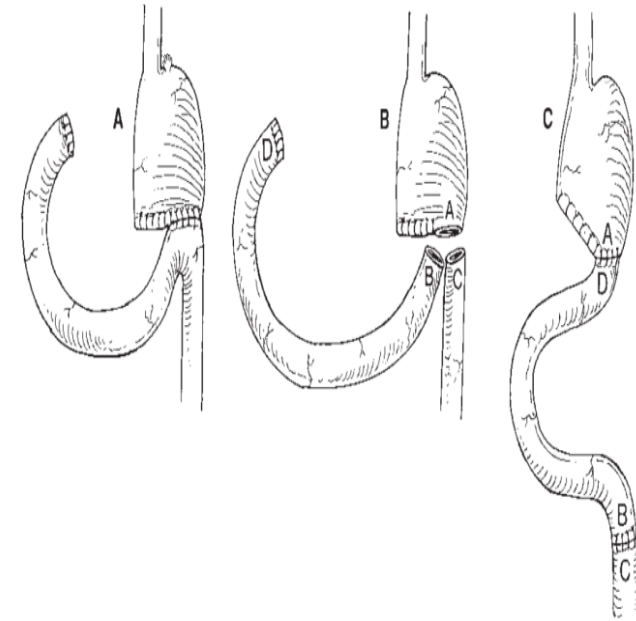


# Afferent limb syndrome

- Affects about 1% with Billroth II
- **Acute complete afferent limb obstruction**
  - True surgical emergency
    - Mortality up to 57%
    - Infarction, rupture and peritonitis
- **Chronic partial afferent limb obstruction**
  - Not an emergency
    - Requires corrective surgery

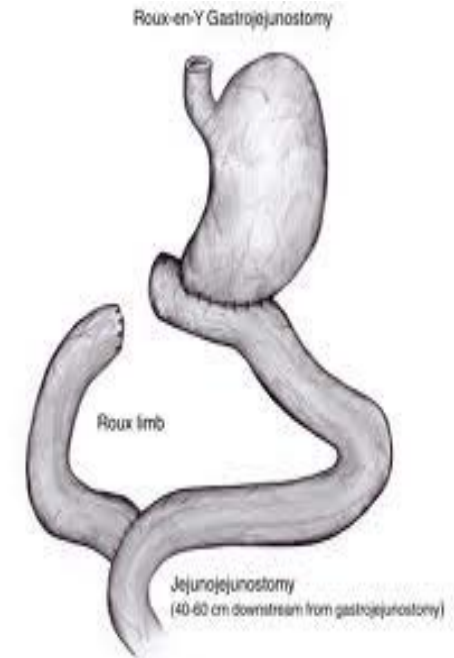
# Afferent Limb Syndrome

- **Surgical Management**
- Resection of redundant afferent jejunal limb
- Deconstruction of Billroth II gastrojejunostomy
- Reconstruction with:
  - Billroth I gastroduodenostomy
  - Roux-en-Y gastrojejunostomy



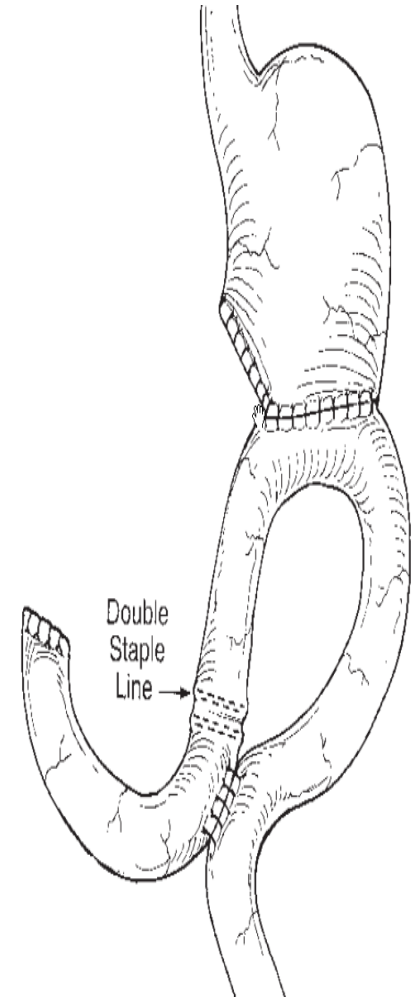
# Roux Syndrome

- Roux-en-Y gastro /esophago-jejunostomy
- Difficult gastric emptying
  - Absence of mechanical obstruction
- Vomiting, epigastric pain, wgt loss
  - Abnormal gastric motility
  - Abnormal motility in Roux limb
- Commoner w/large gastric remnant
- Truncal vagotomy implicated



# Roux Syndrome

- **Medical Management**
- Promotility agents
- **Surgical Management**
- Reduce gastric remnant
- Resect Roux limb if dilated / flaccid
- Reconstruction:
  - Another Roux
  - Billroth II with Braun enteroenterostomy
  - Jejunal interposition between stomach and duodenum



# Duodenal Stump Blowout

- 1%-3% Gastrectomy ,Mortality up to 12%

## **-Management**

- Duodenal decompression and drainage

### 1. End duodenostomy

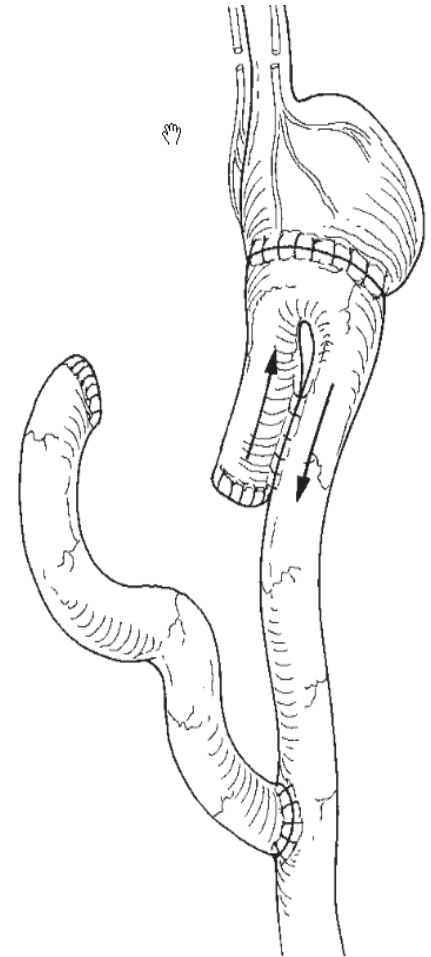
- Placement of tube through suture line closing duodenum
- Effort to create controlled duodenal fistula

### 2. Lateral duodenostomy

- Placement of tube through lateral of 2nd portion of duodenum
- Used for intraluminal decompression

# Small Capacity Syndrome

- Debilitating and life threatening complication of extensive gastric resection
- **Presentation**-early satiety, severe malnutrition, profound weight loss
- **Treatment**
  1. Frequent smaller meals
  2. Vitamin deficiency treatment
  3. Surgery: creation of a Hunt Lawrence pouch



# Recurrent ulceration

- **Etiology**
  - Incomplete vagotomy, retained antrum, G cell hyperplasia, undiagnosed ZE
- **Retained antrum**- residual antral tissue within duodenal stump after gastric resection
- G cells bathed in alkaline duodenal fluid-continuous gastrin secretion - acid production in proximal stomach remnant – marginal ulcer at anastomosis
- Most common sites-peripyloric, duodenal, peristomal areas.

# Recurrent ulceration

- **Diagnosis**

- Zollinger Ellison syndrome: gastrin level >1000pg/ml

- Retained antrum: Radionuclide scan

- **Treatment**

- 1. **Medical:** Proton pump inhibitors

- 2. **Surgical:** complete vagotomy, resection of G cell hyperplasia or retained antrum

# Gastric Remnant Carcinoma

- Significant risk >10yrs after gastrectomy

## **Pathogenesis**

- Hypochlorhydria
- Bacteria reduction of nitrates
- Low gastrin
- Deconjugation of bile salts
- Metaplasia (Enterogastric reflux)

## **Treatment**

1. Routine surveillance after 10yrs
2. Surgical resection (poor prognosis)

# Anemia and Metabolic disorders

## Anemia

- B12 malabsorption - loss of intrinsic factor / parietal cells
- Fe<sup>+</sup> malabsorption - loss of GI acidity

## Bone Disease

- Calcium malabsorption - bypassed duodenum
- Fat malabsorption - Vitamin D deficiency

## Weight Loss

- Poor dietary intake or malabsorption

**-Treatment:** Dietary and Vitamin supplementation

## Other Problems

- **Gallstones**
- Gallbladder denervation: Dysmotility - Stasis - Stones
- Prophylactic cholecystectomy rarely justified
  - Consider only if gallbladder is abnormal
- **Post Vagotomy Dysphagia**
  - Relatively uncommon
  - Primarily encountered after Highly selective vagotomy
- **Treatment** – Endoscopic dilatation

## Other problems

- **Bezoars**- Aggregation of indigestible material
- Trichobezoars-ingested hair
- Phytobezoars- food, fruits, vegetables
- **Presentation**- early satiety, malnutrition, bowel obstruction
- Diagnosis-UGI series, EGD
- **Management**
  1. Conservative
  2. Gastroenterase/papase for digestion
  3. Endoscopic crushing

