

# Disease of the Stomach

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I have no disclosures

I work for the Curators of the  
University of Missouri

# **Disease of the Stomach**

## **1. Neuromuscular disorders**

**Gastroparesis**

**Dumping syndrome and Rapid Gastric Emptying**

## **2. Gastritis and Gastropathies**

**Autoimmune Metaplastic Atrophic Gastritis**

**Environmental Metaplastic Atrophic Gastritis**

# **Disease of the Stomach (cont'd)**

## **3. Peptic Ulcer Disease**

**Epidemiology**

**Risk Factors**

**Other Causes of Ulcer Disease**

**Gastrinoma with or without MEN Type 1**

**Systemic Mastocytosis**

**Miscellaneous Disorders**

## **4. Upper GI Bleeding**

## **5. Granulomatous Gastritides**

**Sarcoidosis**

**Xanthogranulomatous Gastritis**

# Disease of the Stomach (cont'd)

## 6. Distinctive Gastritides

Colagenous Gastritis

Lymphocytic Gastritis

Eosinophilic Gastritis

## 7. Miscellaneous Forms of Gastritis

IBD (Crohn's disease

Gastritis Cystica Profunda

GVHD

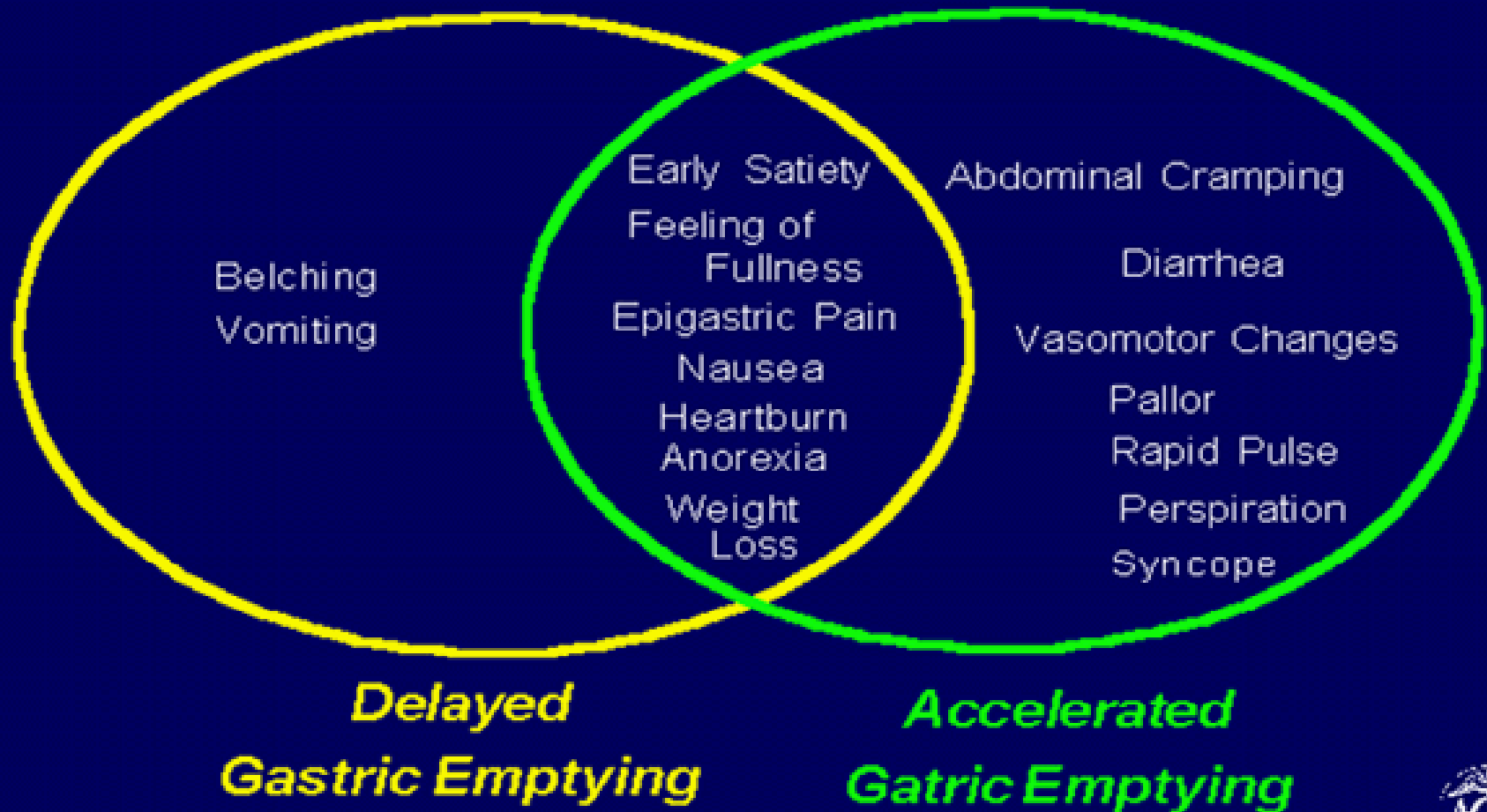
## 8. Carcinoid Tumor in AMAG

# Gastric & Intestinal Motility Disorders (*Classifications*)

- **Neuropathy**
  - Diabetic Gastroenteropathy
  - Post-Vagotomy
  - Neuropathic variety of intestinal pseudo-obstruction
- **Myopathy**
  - Scleroderma
  - Myopathic variety of intestinal pseudo-obstruction
- **Drugs/Humoral**
- **Undefined**
  - ?N.U.D.
  - ?I.B.S.

# SOME OF THE SYMPTOMS OF DELAYED AND ACCELERATED GASTRIC EMPTYING OVERLAP

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# Diabetic Gastroenteropathy

## A Wide Spectrum of Dysfunction and Symptomatology

- **Esophageal Dysfunction**
  - Dysphagia
- **Gastroparesis**
  - Nausea/Vomiting
  - Post-prandial fullness
  - Abdominal Pain
- **Accelerated Emptying**
  - “Dumping” syndrome
- **Delayed Intestinal Transit**
  - Constipation
  - Abdominal Pain
- **Rapid Intestinal Transit**
  - Diarrhea
- **Gallbladder Dysfunction**
  - Gallstones
- **Anal Sphincter Neuropathy**
  - Incontinence



# Diabetic Gastropathy

## Clinical Features

- **Common (50% of long-standing Type 1)**
- **Most prevalent in Type 1 but also occurs in Type 2**
- **Usually (50-70%) associated with autonomic neuropathy**
- **High blood sugar levels can exacerbate gastropathy**
- **Consequences may include:**
  - Delayed emptying of solids and indigestible particles
  - Rapid emptying of liquids
  - Bezoar formation
  - Poor blood sugar control (tendency to hypoglycemia)
  - Malnutrition/weight loss

# Dumping Syndrome

- Occurs in patients after vagotomy and pyloroplasty
- Abnormal post-op anatomy causes rapid emptying of food into the duodenum
- Symptoms 1<sup>st</sup> hour
  - Pain, bloating, nausea, vomiting
- Symptoms 2 to 4 hours later
  - Sweating, lightheadedness, cramps, diarrhea
- (Later symptoms due to rapid absorption of carbs)

# Rapid Gastric Emptying

- **Definition: When more than 30% of the meal leaves the stomach within 30 minutes or more than 70% at 60 minutes**
- **Causes:**
  - Idiopathic
  - Early Diabetes Mellitus Type 2
  - Zollinger-Ellison Syndrome
  - Surgeries

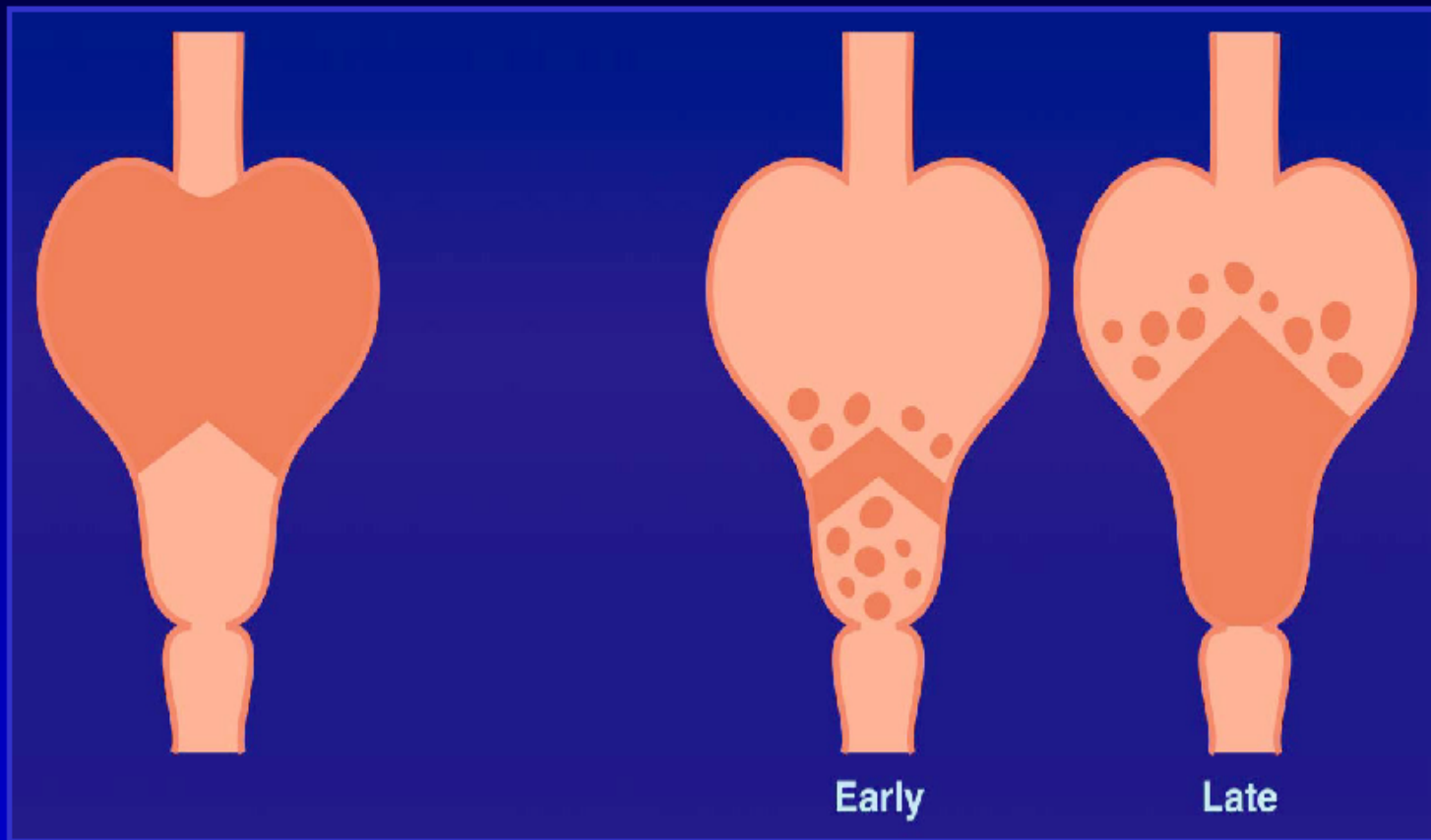
# Gastropathy and Gastritis - Definitions

- **GASTROPATHY** - Literally, any gastric lesion  
Used as substitute for “gastritis” when inflammation absent or minimal
- **GASTRITIS** - Leukocyte infiltration in stomach
  - **ACTIVE (=ACUTE) GASTRITIS** - Neutrophil infiltration present
- **CHRONIC GASTRITIS** - Mononuclear leukocytes increased
- **CHRONIC ACTIVE GASTRITIS** - Mixed chronic and active inflammation

# Atrophic Gastritis: Clinical Features

<b>Features</b>	<b>Autoimmune (Type A)</b>	<b>Environmental (Type B)</b>
<b>Causes</b>	<b>Autoimmunity Genetic?</b>	<b>Dietary Duodenal reflux?</b>
<b>Parietal Cell Ab's</b>	<b>All</b>	<b>None</b>
<b>Pernicious Anemia</b>	<b>Common</b>	<b>None</b>
<b>Serum Gastrin</b>	<b>High (often)</b>	<b>Low or Normal</b>
<b>HCl Secretion</b>	<b>Absent</b>	<b>Low</b>
<b>Gastric Ulcer</b>	<b>Rare</b>	<b>Increased</b>
<b>Gastric Cancer</b>	<b>? Increased</b>	<b>Increased</b>

# Metaplastic Atrophic Gastritis - Distributions of Autoimmune vs Environmental Types



**Autoimmune**

**Environmental**



# Granulomas In Gastritis – Typical Causes

- **SYSTEMIC DISEASE-ASSOCIATED (non-infectious)**
  - Crohn's disease
  - Sarcoidosis
  - Wegener's granulomatosis (rare)
- **CONFINED TO STOMACH (non-infectious)**
  - Isolated (idiopathic) granulomatous gastritis
  - Foreign material
  - Tumor-associated (eg, MALT Lymphoma)
- **INFECTIOUS**
  - H pylori*
  - Tuberculous
  - Tertiary syphilis (gummatous)
  - Whipple's disease
  - Histoplasmosis

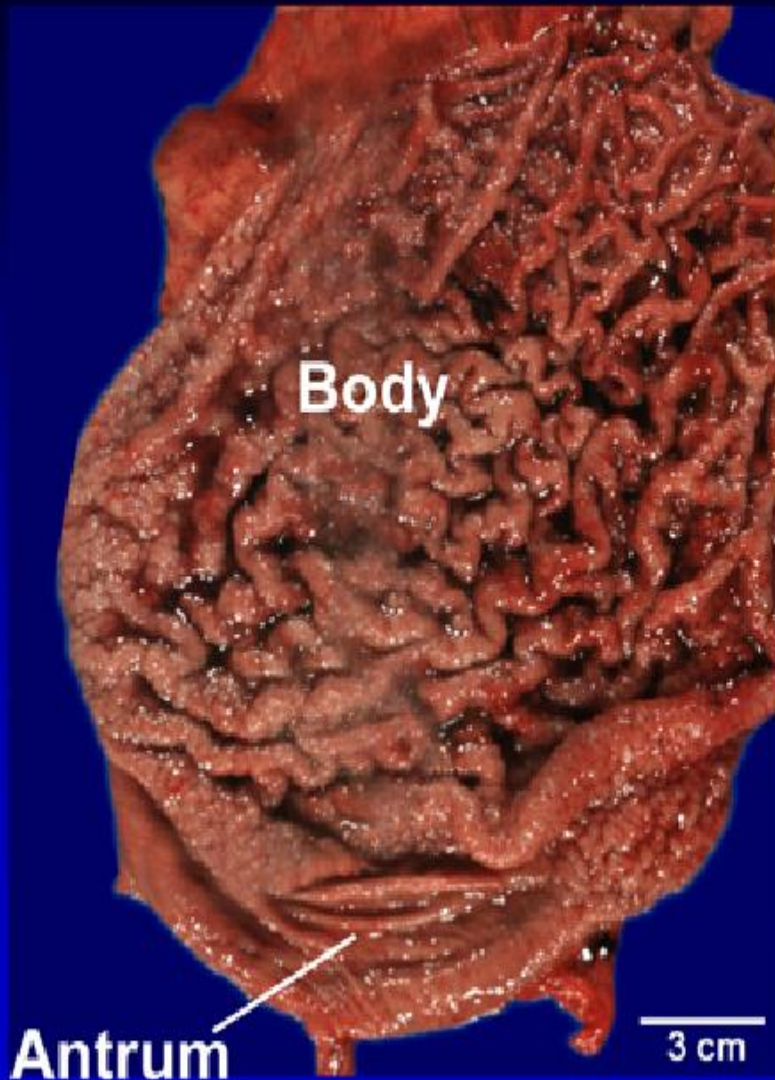


# Large Gastric Folds: Classification

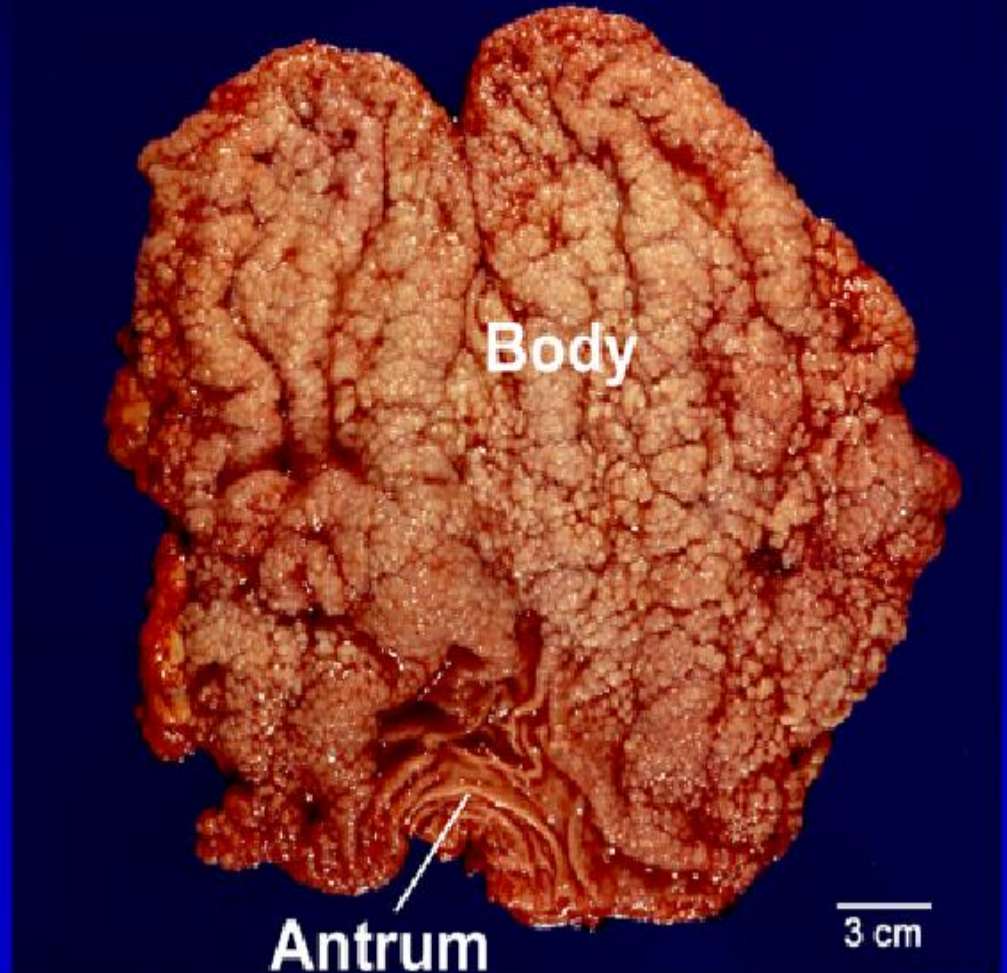
- **Gastrin-Stimulated Rugal Hypertrophy**
  - Z-E associated      Some DU patients
- **Hypertrophic Hypersecretory Gastropathy**
  - Not gastrin-stimulated
  - Protein-losing gastropathy
- **Menetrier's Disease**
- **Miscellaneous Causes**
  - Hyperplastic polyps
  - Neoplasia (carcinoma, lymphoma)
  - Inflammatory (various)
  - Infiltrative (amyloid)



# Hyperplastic Gastropathies - Gross



Zollinger-Ellison



Ménétrier's



# Non-Ulcer Dyspepsia

- *H. pylori* frequency about the same as in asymptomatic population
- Prospective clinical trials of anti-*H. pylori* therapy generally have had disappointing results
- As yet unable to identify subpopulation that achieves long term symptomatic benefit from *H. pylori* therapy

# Causes of Peptic Ulcer

- *Helicobacter pylori* infection
- NSAID use
- Rare causes
  - Pathologic hypersecretory states
  - Herpes simplex infection
  - Crohn's disease, etc.
  - Systemic Mastocytosis



## Ulcers May Be Caused by Non-acid/peptic Disorders

### Esophagus

- herpes simplex
- tablet induced  
tetracycline  
KCl  
others
- cytomegalovirus

### Stomach

- carcinoma
- Kaposi's
- lymphoma
- pancreatic rest
- syphilis
- candida

### Duodenum

- Crohn's disease
- pancreatic carcinoma



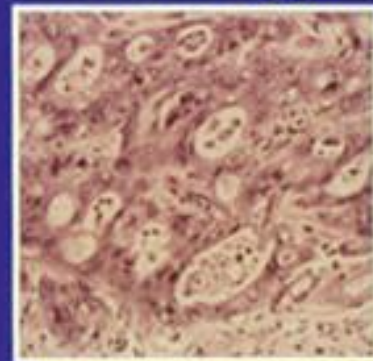
## Gastric Cancers May Ulcerate and Resemble Gastric Ulcers

**X-Ray**

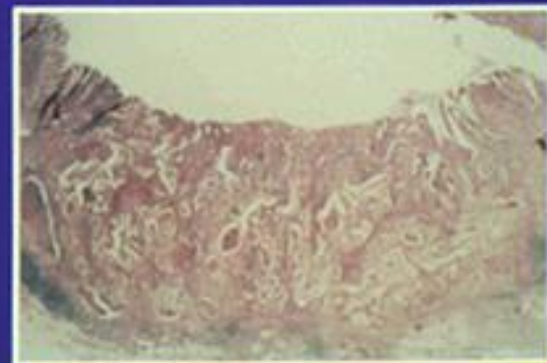
**Endoscopy**

**Histology**

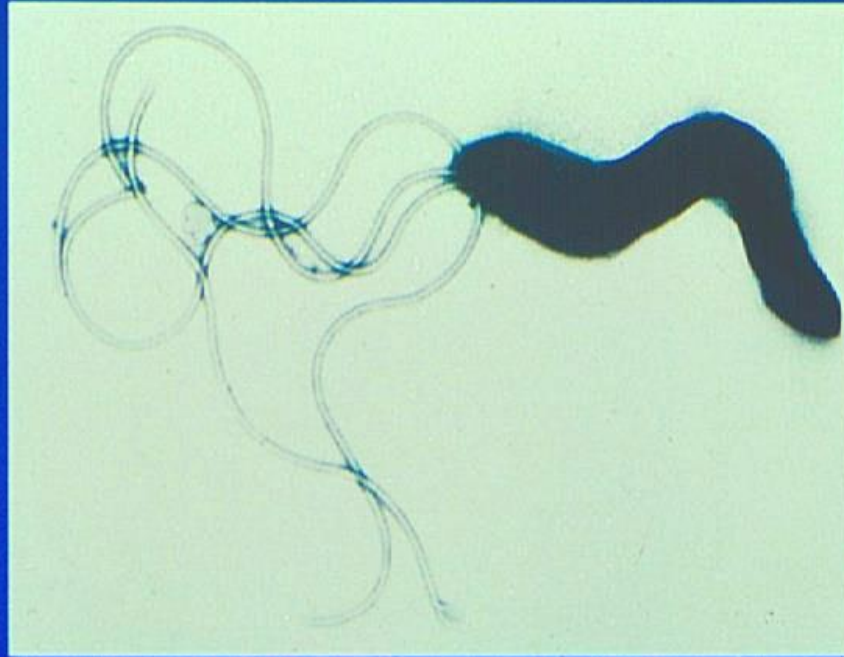
**Gastric  
Cancer**



**Gastric  
Ulcer**



# EM of spiral flagellated *H. pylori*



J. A. J. van Laauws & G. Tytgat *Helicobacter pylori*: 1989



# Helicobacter Pylori

- **Gram-negative**
- **Spiral rod**
- **Fastidious**
- **Microaerophilic**
- **Urease-positive**
- **Unipolar flagella**

# Pathophysiology

## Postulated Steps in Infection

- Ingestion of *H. pylori*
- 'Swim' through mucus
- Attach to mucosa
- Multiply
- Damage tissue
- Internalization into epithelium?

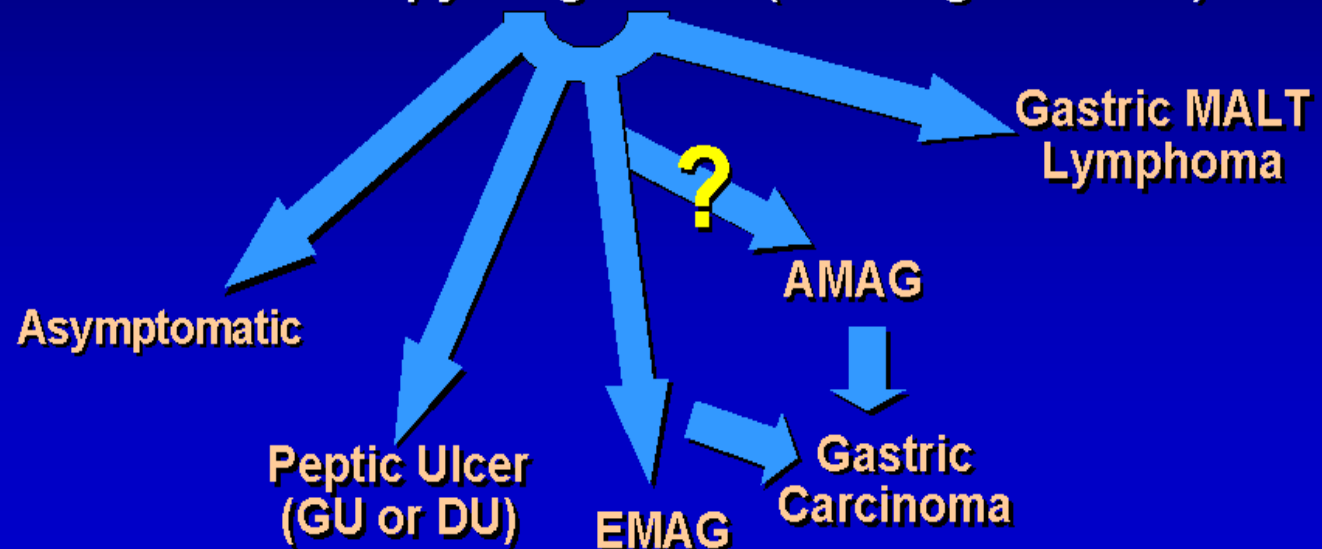


# Clinical Outcomes & Sequelae of *Helicobacter pylori* Infection

Acute infection (usually unrecognized)

Acute gastritis (transient hypochlorhydria)

Chronic Active *H. pylori* gastritis (life-long infection)



# Diagnostic Tests

- **Non-invasive**
  - Antibody tests
  - Urea Breath Tests
  - Stool antigen
- **Invasive**
  - Rapid Urease Tests
  - Histology
  - Culture

# Antibody Tests

- **Used for initial diagnosis**
- **FDA approved tests are for serum IgG, antibody tests and are sensitive, specific, and cost effective**
- **IgA or IgM tests: unapproved and poor**
- **Titers decline slowly, limiting use for follow-up**
- **Saliva and urine tests are experimental**

# Urea Breath Tests

## Diagnose Active Infection

- **[13C] - urea**
  - stable isotope
  - non-radioactive
- **[14C]- urea**
  - radioactive isotope
  - special handling and disposal

# World Health Organization

International Agency for Research on Cancer  
Working Group Meeting - June 1994

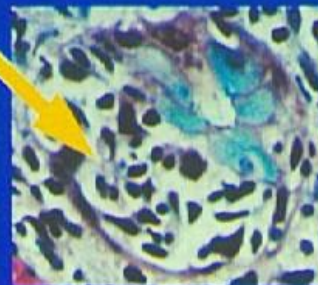
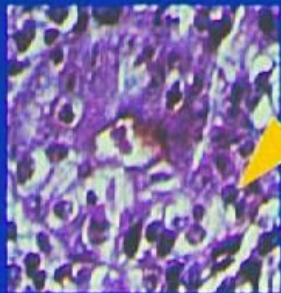
- **Conclusions:**

- There is sufficient evidence in humans for the carcinogenicity of infection with *H. pylori*.
- *H. pylori* is a Group 1 or definite carcinogen

# GASTRIC MALT LYMPHOMA

**MALT:** Mucosa-Associated Lymphoid Tissue  
- a benign reactive process consisting of lymphoid follicles

**MALT LYMPHOMA:** monoclonal proliferation of neoplastic B-lymphocytes infiltrating gastric glands (lymphoepithelial lesions)



# **Gastric Malt Lymphoma**

## **Presentation**

- **Clinical**

- Asymptomatic!
- Dyspepsia
- Weight Loss
- Ulcer

- **Endoscopic**

- Mucosa appears normal
- Thick folds
- Ulcerations

# Gastric Malt Lymphoma

## Effect of Treatment of *Hp*

- Cure of *H. pylori* infection results in remission of approx. 75% of gastric MALT lymphomas
- Regression usually occurs within 6 months, but may take longer
- No features predict unresponsiveness
- Recurrence of MALT lymphomas associated with reinfection



# ***H. PYLORI* Treatment**

**PPI Therapies X 14 days**

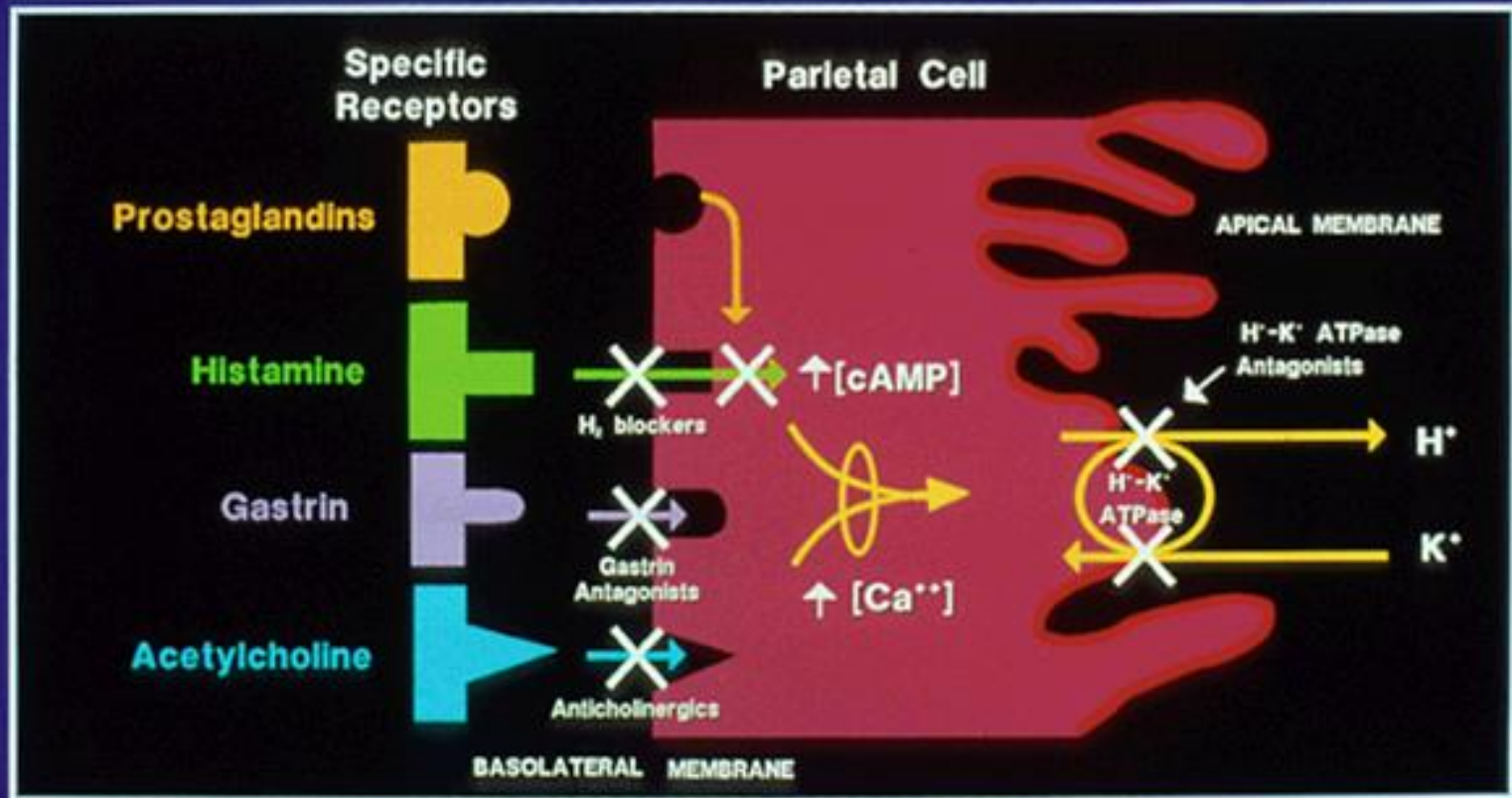
- **TRIPLE THERAPY (OAC)**

- Omeprazole 20 mg b.i.d.
- Amoxicillin 1000 mg b.i.d.
- Clarithromycin 500 mg b.i.d.

- **Lansoprazole can substitute for Omeprazole**



## Parietal Cell Secretion is Regulated by Site-Specific Agonists and Antagonists

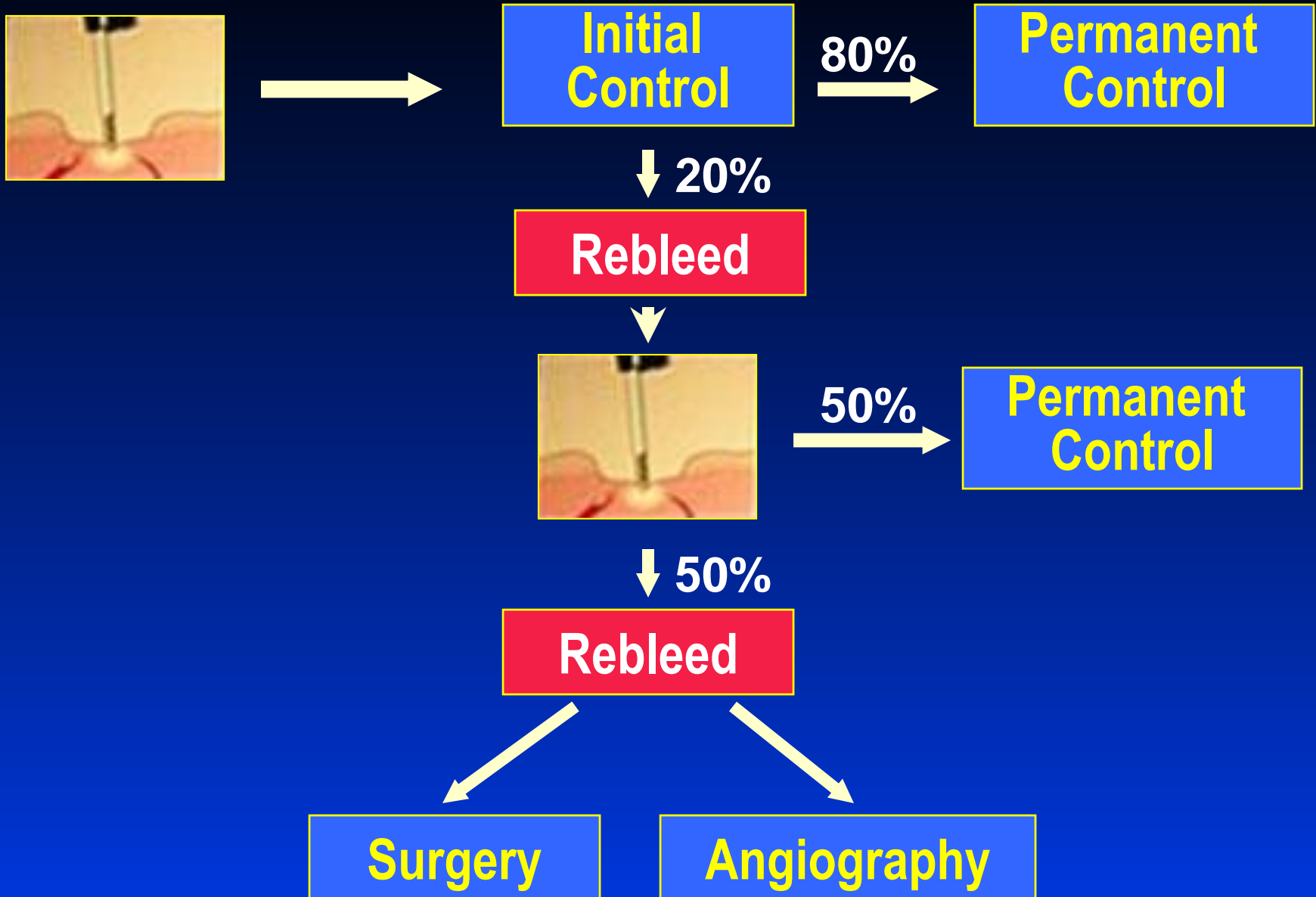


# NSAID ULCER

## Clues

- **History**
  - NSAID use, arthritis
- **Location**
  - Greater curve GU
  - Giant DU
- **Presentation**
  - UGI Bleeding
- ***H. pylori* tests**
  - neg. for *H. pylori*
- **Clinical Course**
  - Difficult to heal

# Peptic Ulcer -Therapeutic Endoscopy



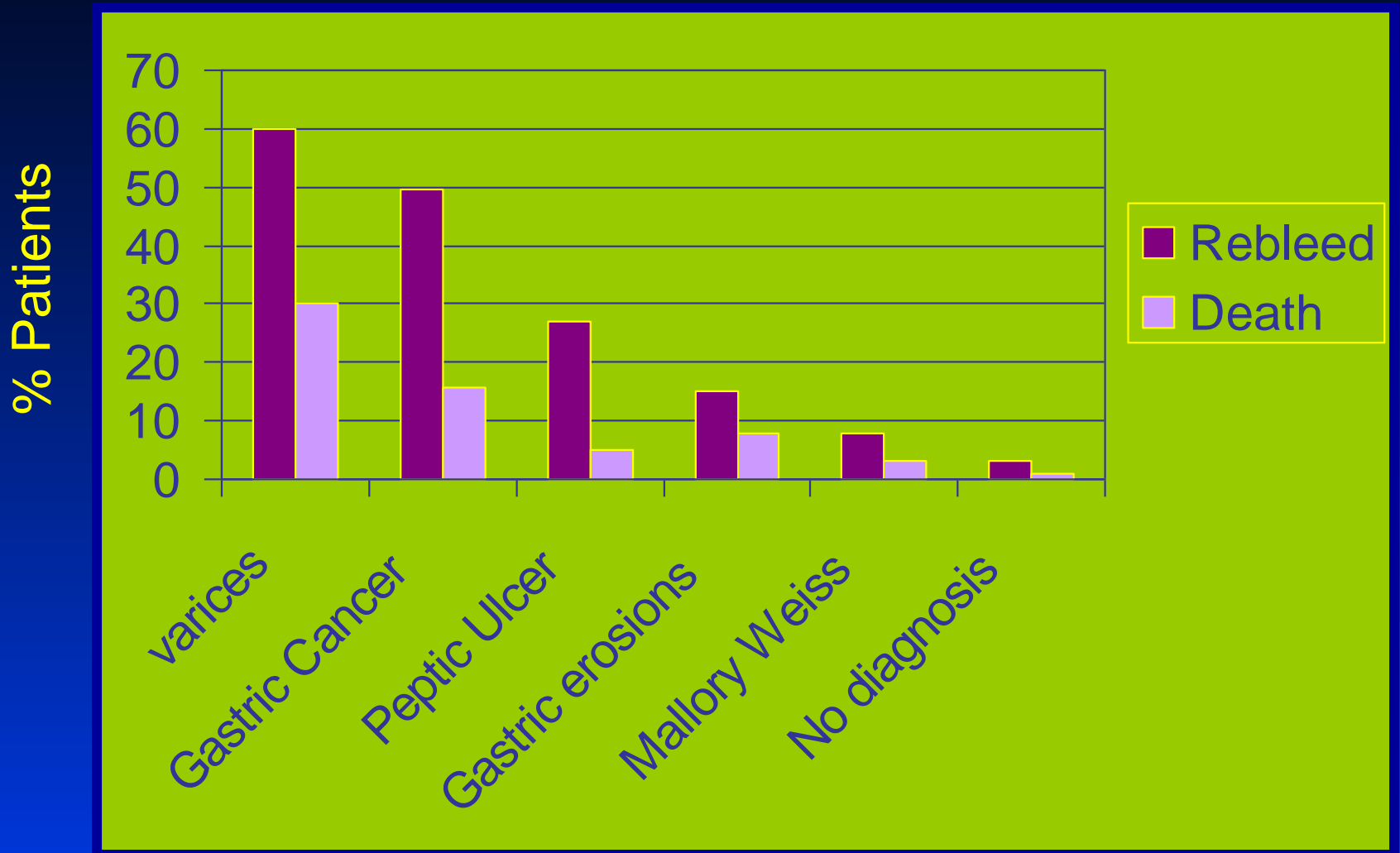
# **UGI BLEEDING**

## **Adverse Clinical Prognostic Factors**

- **Shock, red blood**
- **Cause of bleeding  
(varices or cancer)**
- **Comorbid disease**
- **Older age**
- **Onset in hospital**
- **Recurrent bleeding**

# UGI Bleeding

## Outcome



# UGI Bleeding – Stress Ulcer

## Indications for Prophylaxis

- **Critical illness**
  - ventilator dependent > 48 hours
  - coagulopathy
- **Burns**
  - > 30% surface area
- **Head injury**
  - Neurosurgical patients

# UGI Bleeding

## Vascular Anomalies

### GUT

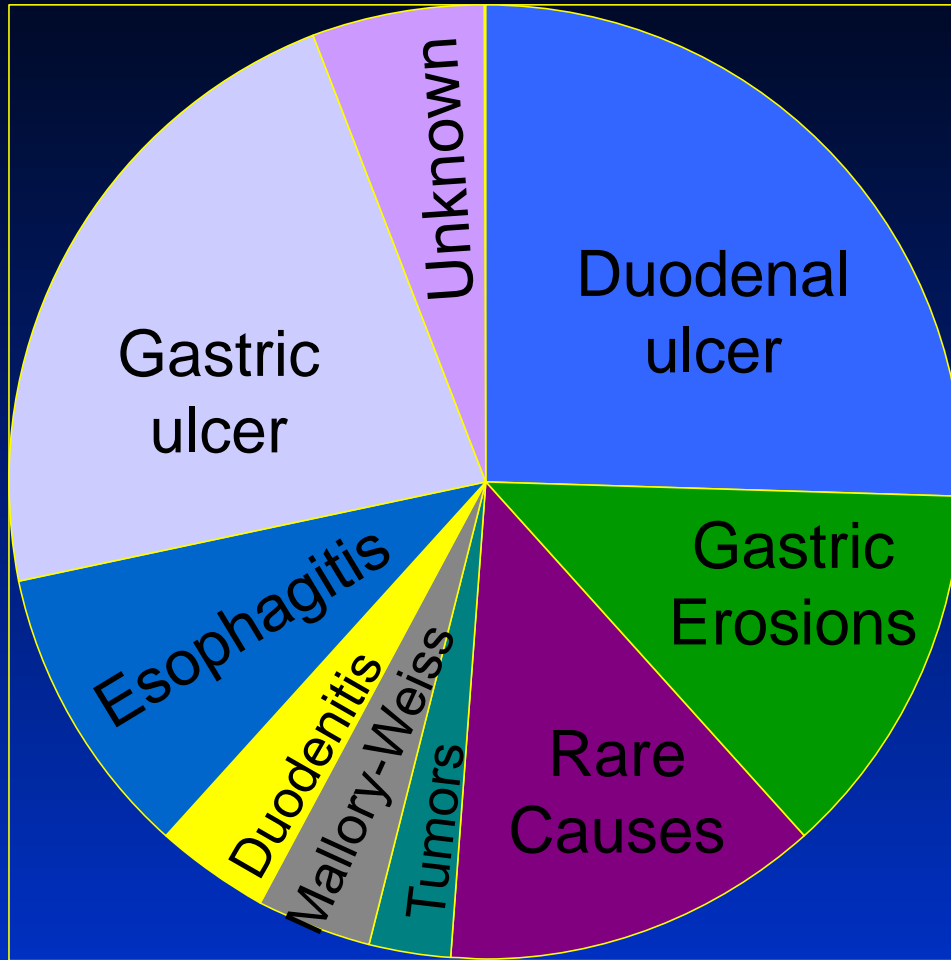
- **Vascular ectasia**
  - angiodysplasia
  - watermelon stomach
  - congestive gastropathy
- **Vascular tumor**
- **Dieulafoy's lesion**
- **AVM**

### GUT + skin

- **Olser-Weber-Reneu**
- **CRST**
- **Blue rubber bleb**
- **Ehlers-Danlos**

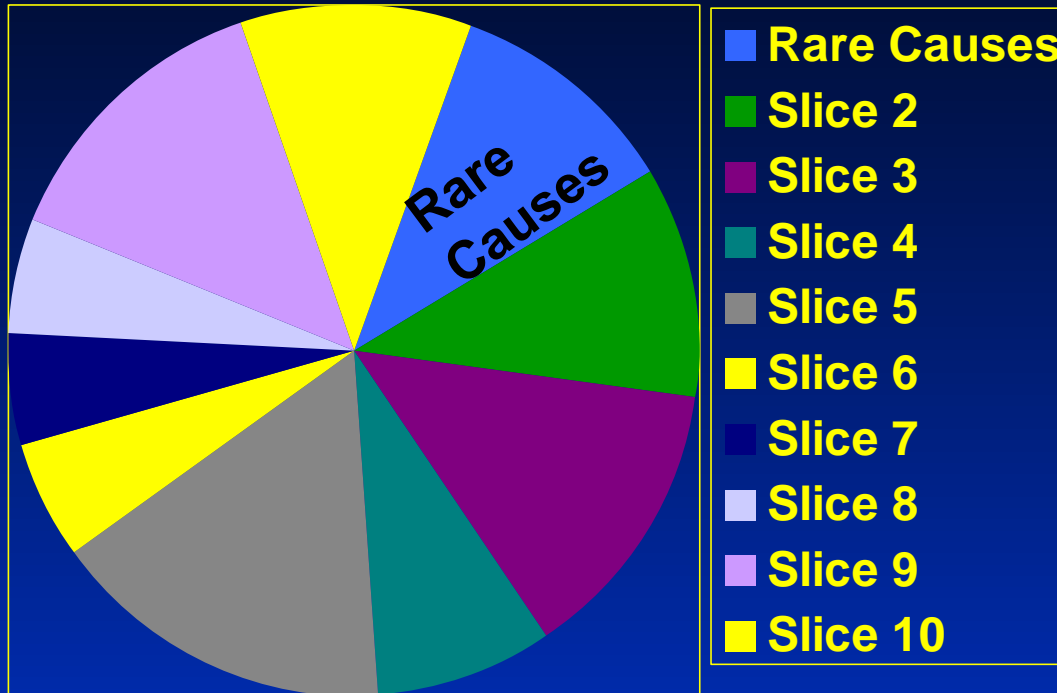


# UGI Bleeding



- Duodenal ulcer
- Gastric erosions
- Rare causes
- Tumors
- Mallory-Weiss
- Duodenitis
- Esophagitis
- Gastric Ulcer
- Unknown

# UGI Bleeding



- AVMs
- Stomal ulcer
- Dieulafoy's lesion
- Watermelon stomach
- Hemobilia
- Connective tissue disorder
- Kaposi's sarcoma
- Aorto-enteric fistula
- Benign tumors
- Others

# Zollinger-Ellison Syndrome

## Is a Clinical Triad Consisting of:

- Gastric acid hypersecretion
- Severe peptic ulcer disease
- Non-beta islet cell tumors of the pancreas

- The tumors produce gastrin (G17 & G34); referred to as “gastrinomas”
- Tumors localized usually to head of pancreas, duodenal wall or regional lymph nodes
- About 1/2 of gastrinomas are multiple and 2/3 are malignant
- About 1/4 have multiple endocrine neoplasia syndrome (MEN I) - tumors of parathyroid, pituitary, and pancreatic islets

# Clinical Features that Distinguish ZE Syndrome from DU

- Diarrhea
- Weight loss/steatorrhea
- Large gastric folds
- Large amounts of gastric secretions
- Family history of endocrine tumor
- Intractable or post-surgical recurrence of ulcer disease
- Increased gastric acid secretion, decreased duodenal/jejunal pH
- Inactivation of lipase
- Mucosal Inflammation
- Trophic effect of gastrin
- Secretory effect of gastrin
- MEM I - parathyroid tumor/hyperplasia
- Acid hypersecretion due to gastrin-secreting tumor

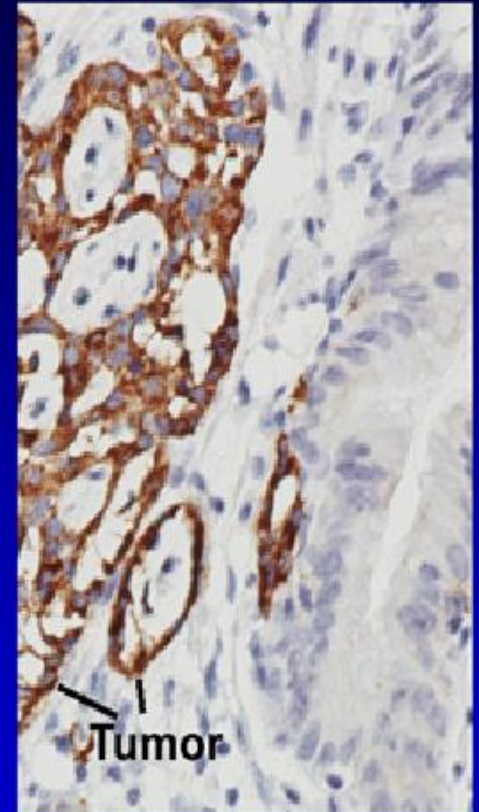
# Carcinoid Tumor in Autoimmune Metaplastic Atrophic Gastritis With Infiltrating Tumor



Polyps & Atrophic Mucosa



Carcinoid Tumor



Infiltrating Tumor

# Gastric Carcinoid Tumors: Main Features

Precursor State	Serum Gastrin	Primary Cell Type	Percent of Gastric Carcinoids	Percent of Gastric Potential
Autoimmune Metaplastic Atrophic Gastritis	↑	ECL	60-80	Low
MEN 1 (Z-E)	↑	ECL	15-20	Intermediate
Sporadic	NL	Mixed	~5	High

