Objectives:
After learning, students should be able to
1. Describe the pathology of esophagus
2. Describe the pathology of stomach
3. Describe the pathology of small and large intestines
4. Describe the pathology of appendix and peritoneum

Diseases of the gastrointestinal system

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ESOPHAGUS

- CONGENITAL ANOMALIES
  1. Atresia and Fistulas
  2. Webs, Rings, and Stenosis
- LESIONS ASSOCIATED WITH MOTOR DYSFUNCTION
  1. Achalasia
  2. Hiatal Hernia
  3. Diverticula
  4. Lacerations (Mallory-Weiss Syndrome)
- ESOPHAGEAL VARICES
- ESOPHAGITIS
  1. Reflux Esophagitis (Gastroesophageal Reflux Disease-GERD)
  2. Barrett Esophagus
  3. Infectious and Chemical Esophagitis
- TUMORS
  1. Benign Tumors
  2. Malignant Tumors

CONGENITAL ANOMALIES

1. Atresia and Fistula

- Absence (Agenesis) of the esophagus is extremely rare.
- Atresia, a segment of the esophagus is represented by
  only a thin and non-canalized cord replaces a segment of
  esophagus.
- Atresia rarely occurs alone, but is usually associated
  with a fistula connecting the lower or upper pouch with a
  bronchus or the trachea.
1. Achalasia

- Achalasia means "failure to relax." It is characterized by three major abnormalities: (1) aperistalsis, (2) partial or incomplete relaxation of the LES, and (3) increased resting tone of the LES.
- Primary achalasia is progressive dilation of the esophagus above the level of the LES.

2. Hiatal Hernia

- A **hiatus hernia or hiatal hernia** is the protrusion of the upper part of stomach into the thorax.
- The **sliding hernia** constitutes 95% of cases, where the gastroesophageal junction moves above the diaphragm together with some of the stomach.
- The **paraesophageal hernia (rolling)**, a part of the stomach herniates and lies beside the esophagus, without movement of the gastroesophageal junction.

### Lesions Associated with Motor Dysfunction

2. Webs, Rings, and Stenosis

- Esophageal **mucosal webs** are uncommon protrusions of the mucosa into the esophageal lumen.
- Esophageal **rings** are concentric plates of tissue protruding into the lumen of the esophagus.
- Esophageal **stenosis** consists of fibrous thickening of the esophageal wall.
3. Diverticula

- A diverticulum is an outpouching of the alimentary tract.
- Diverticula are develop in three regions of the esophagus.
  - **Zenker diverticulum** (pharyngoesophageal diverticulum) immediately above the UES.
  - **Traction diverticulum** near the midpoint of the esophagus.
  - **Epiphrenic diverticulum** immediately above the LES.

4. Lacerations (Mallory-Weiss Syndrome)

- Longitudinal tears in the esophagus at the esophagogastric junction or gastric cardia are termed **Mallory-Weiss tears**.
- They are encountered most commonly in alcoholics and are believed to be the consequence of severe vomiting.

**ESOPHAGEAL VARICES**

- Regardless of cause with **portal hypertension**
- The increased pressure in the esophageal plexus produces dilated tortuous vessels called **varices**.
- Varices develop in **90% of cirrhotic patients** and are most often associated with **alcoholic cirrhosis**.
ESOPHAGITIS

Inflammation of the esophageal mucosa is known as esophagitis.

1. Reflux Esophagitis (Gastroesophageal Reflux Disease-GERD)

- Reflux of gastric contents into the \textit{lower esophagus} is the most important cause of esophagitis.

2. Barrett Esophagus

- Barrett esophagus is a complication of long-standing gastroesophageal reflux.
- Barrett esophagus, the distal squamous mucosa is replaced by \textit{metaplastic columnar epithelium}, as a response to prolonged injury.
- It is the single most important risk factor for \textit{esophageal adenocarcinoma}.
- Two criteria are required for the diagnosis of Barrett esophagus: (1) endoscopic evidence of columnar epithelial lining above the gastroesophageal junction and (2) histologic evidence of intestinal metaplasia in the biopsy specimens from the columnar epithelium.
Barrett esophagus. Microscopic view showing squamous mucosa and intestinal-type columnar epithelial cells (goblet cells) in a glandular mucosa.

(Robbins, 2005)

3. Infectious and Chemical Esophagitis

- Esophageal inflammation may have many origins, as follows:
  - Ingestion of mucosal irritants such as alcohol, corrosive acids or alkalis (in suicide attempts), excessively hot fluids (e.g., hot tea in Iran); or heavy smoking
  - Cytotoxic anticancer therapy
  - Infection following bacteremia or viremia---- *herpes simplex viruses* and *cytomegalovirus (CMV)*
  - Fungal infection in immunosuppressed patients or during broad-spectrum antimicrobial therapy---- *candidiasis*

TUMORS

1. Benign Tumors

- Benign tumors of the esophagus are mostly *mesenchymal* in origin and lie within the esophageal wall.
- Most common are benign tumors of smooth muscle origin called *leiomyoma*.

2. Malignant Tumors

- Squamous cell carcinoma
- Adenocarcinoma

Squamous cell carcinoma is the most common type of carcinoma in the esophagus.
Adenocarcinoma of the esophagus is a malignant epithelial tumor with glandular differentiation. The majority of cases arise from the Barrett esophagus.

Transition from Barrett esophagus to adenocarcinoma

CONGENITAL ANOMALIES

1. Pyloric Stenosis

GASTRITIS
1. Acute Gastritis
2. Chronic Gastritis
3. Special Forms of Gastritis

PEPTIC ULCER DISEASE

MISCELLANEOUS CONDITIONS
1. Hypertrophic Gastropathy
2. Gastric Varices

TUMORS
1. Benign Tumors
2. Gastric Carcinoma
3. Less Common Gastric Tumors

CONGENITAL ANOMALIES

1. Pyloric Stenosis

Pyloric stenosis or pylorostenosis is narrowing of the opening from stomach to duodenum.

Pyloric stenosis also may occur in association with Turner syndrome (trisomy 18) and esophageal atresia.

Acquired pyloric stenosis in adults is one of the long-term risks of antral gastritis or peptic ulcers close to the pylorus.
GASTRITIS

Gastritis is simply defined as inflammation of the gastric mucosa.

1. Acute Gastritis

- Acute gastritis is an acute mucosal inflammatory process, usually of a transient nature. It may be accompanied by hemorrhage into the mucosa.
- This severe erosive form of the disease is an important cause of acute gastrointestinal bleeding.
- It is frequently associated with heavy use of nonsteroidal anti-inflammatory drugs (NSAIDs) and excessive alcohol consumption.

2. Chronic Gastritis

- Chronic gastritis is defined as the presence of chronic mucosal inflammatory changes leading eventually to mucosal atrophy and intestinal metaplasia, usually in the absence of erosions.
- The epithelial changes may become dysplastic and constitute a background for the development of carcinoma.
- Chronic gastritis is frequently associated chronic infection by H. pylori.
3. Special Forms of Gastritis

- **Eosinophilic gastritis** is an idiopathic condition that features a prominent eosinophilic infiltrate of the mucosa, muscle wall, or all layers of the stomach.
- **Allergic gastroenteropathy** is a disorder of children that may produce symptoms of diarrhea and vomiting.
- **Lymphocytic gastritis** is a condition in which lymphocytes densely populate the epithelial layer of the mucosal surface.
- **Granulomatous gastritis**. The presence of intramucosal epithelioid granulomas----*Crohn disease, Tuberculosis*.
- **Graft-versus-Host Disease**. Gastritis can be encountered in the setting of bone marrow transplantation.
- **Reactive gastropathy** is a group of disorders that exhibit characteristic mucosal histologic changes.

PEPTIC ULCER DISEASE

- Ulcers are defined histologically as a breach in the mucosa of the alimentary tract that extends through the *muscularis mucosae* into the *submucosa or deeper*.
- Peptic ulcers are chronic lesions that occur in the gastrointestinal tract exposed to the aggressive action of acid/peptic juices.
- At least 98% of peptic ulcers are located in the first portion of the *duodenum or in the stomach*, in a ratio of about 4:1.
- Peptic ulcer is frequently associated with *H. pylori* infection and NSAIDs.

![Diagram of the base of a nonperforated peptic ulcer, demonstrating the layers of necrosis (N), inflammation (I), granulation tissue (G), and scar (S), moving from the luminal surface at the top to the muscle wall at the bottom.](Robbins, 2005)

- Acute gastric ulceration----Focal, acutely developing gastric mucosal defects are a well known complication of therapy with NSAIDs or severe physiologic stress----*stress ulcers*.

![Multiple stress ulcers of the stomach, highlighted by dark digested blood on their surfaces.](Robbins, 2005)
MISCELLANEOUS CONDITIONS

1. Hypertrophic Gastropathy

- All characterized by enlargement of the rugal folds of the gastric mucosa.
- The rugal enlargement is caused by hyperplasia of the mucosal epithelial cells, without inflammation.
- Three variants are recognized:
  - Hypertrophic gastropathy, showing markedly thickened gastric folds.

2. Gastric Varices

- Gastric varices develop in the setting of portal hypertension but less often than esophageal varices.
- Most gastric varices lie within 2 to 3 cm of the gastroesophageal junction.
  - Menetrier disease, resulting from profound hyperplasia of the surface mucous cells with accompanying glandular atrophy.
  - Hypertrophic-hypersecretory gastropathy, associated with hyperplasia of the parietal and chief cells within gastric glands.
  - Gastric gland hyperplasia secondary to excessive gastrin secretion, in the setting of a gastrinoma (Zollinger-Ellison syndrome).

TUMORS

1. Benign Tumors

- In the alimentary tract, polyp is applied to nodule or mass that projects above the level of the surrounding mucosa.
- The great majority of gastric polyps (up to 90%) are non-neoplastic and appear to be of a hyperplastic nature.
- Gastric adenomas may be sessile (without a stalk) or pedunculated (stalked). The most common location is the antrum.
2. Gastric Carcinoma

- Carcinoma is the most important and the most common (90% to 95%) of malignant tumors of the stomach.

<table>
<thead>
<tr>
<th>TABLE 17-4 WHO Histologic Classification of Gastric Tumors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epithelial Tumors</strong></td>
</tr>
<tr>
<td>Intraepithelial neoplasia: adenoma</td>
</tr>
<tr>
<td>Adenocarcinoma*</td>
</tr>
<tr>
<td>• Papillary adenocarcinoma</td>
</tr>
<tr>
<td>• Tubular adenocarcinoma</td>
</tr>
<tr>
<td>• Mucinous adenocarcinoma</td>
</tr>
<tr>
<td>• Signet-ring cell carcinoma</td>
</tr>
<tr>
<td>• Undifferentiated carcinoma</td>
</tr>
<tr>
<td>• Adenosquamous carcinoma</td>
</tr>
<tr>
<td>Small-cell carcinoma</td>
</tr>
<tr>
<td>Carcinosarcoma</td>
</tr>
<tr>
<td><strong>Non-epithelial Tumors</strong></td>
</tr>
<tr>
<td>Leiomysarcoma</td>
</tr>
<tr>
<td>Leiomyoma</td>
</tr>
<tr>
<td>Schwannoma</td>
</tr>
<tr>
<td>Granular cell tumor</td>
</tr>
<tr>
<td>Leiomyosarcoma</td>
</tr>
<tr>
<td>Gastrointestinal stromal tumor (GIST) (gradation from benign to malignant)</td>
</tr>
<tr>
<td>Kaposi sarcoma</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td><strong>Malignant Lymphoma</strong></td>
</tr>
</tbody>
</table>

3. Less Common Gastric Tumors

- **Gastric Neuroendocrine Cell (Carcinoid) Tumors**
  Most gastric carcinoid tumors originate from the Enterochromaffin-like cells or (ECL cells) in gastric mucosa.

- **Gastric Lymphoma**
  Gastric lymphomas represent 5% of all gastric malignancies. Nearly all gastric lymphomas are B-cell lymphomas of mucosa-associated lymphoid tissue.
**Gastrointestinal Stromal Tumor (GIST)**

Much more common are gastrointestinal stromal tumors, also called GIST. GIST originate from the interstitial cells of Cajal, which control gastrointestinal peristalsis. These tumors have a special phenotype in that 95% of them stain with antibodies against c-KIT.

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**CONGENITAL ANOMALIES**

1. **Atresia and Stenosis**
   - The obstruction may be complete (atresia) or incomplete (stenosis).
   - **Duodenal atresia** is most common; the jejunum and ileum are equally involved, but the colon is not involved.

2. **Meckel Diverticulum**
   - Failure of involution of the vitelline duct, which connects the lumen of the developing gut to the yolk sac.
   - This solitary diverticulum lies on the anti-mesenteric side of the bowel, usually within 2 feet (85 cm) of the ileocecal valve.

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**ENTEROCOLITIS**

**MALABSORPTION SYNDROMES**

**INFLAMMATORY BOWEL DISEASE (IBD)**

1. Crohn Disease (CD)
2. Ulcerative Colitis (UC)

**VASCULAR DISORDERS**

1. Ischemic Bowel Disease
2. Angiodysplasia
3. Hemorrhoids

**DIVERTICULAR DISEASE**

**INTESTINAL OBSTRUCTION**

**TUMORS OF THE SMALL AND LARGE INTESTINES**

1. Tumors of the Small Intestine
2. Tumors of the Colon and Rectum
3. Gastrointestinal Lymphoma Mesenchymal Tumors
4. Tumors of the Anal Canal
3. Congenital Aganglionic Megacolon—Hirschsprung Disease

- Hirschsprung disease is a congenital disorder characterized by aganglionosis of a portion of the intestinal tract.

- Congenital megacolon, or Hirschsprung disease, results when the migration of neural crest cells arrests at some point before reaching the anus or when the ganglion cells undergo inappropriate case.

ENTEROCOLITIS

- Many are caused by microbiologic agents; others arise in the setting of malabsorptive disorders and idiopathic inflammatory bowel disease.

- Diarrhea is often accompanied by pain, urgency, and perianal discomfort. Low-volume, painful, bloody diarrhea is known as dysentery.

- Infectious Enterocolitis—Viral Gastroenteritis, Bacterial Enterocolitis, Parasitic Enterocolitis

*Shigella enterocolitis. Segment of colon showing pale, inflamed mucosa with patches of coagulated exudate.*

*Pseudomembranous colitis from C. difficile infection. A, Gross photograph showing plaques of yellow fibrin and inflammatory debris adherent to a reddened colonic mucosa. B, Low-power micrograph showing superficial erosion of the mucosa and an adherent pseudomembrane of fibrin, mucus, and inflammatory debris.*
- Miscellaneous Intestinal Inflammatory Disorders
  - Acquired Immunodeficiency Syndrome (AIDS)
  - Transplantation
  - Drug-Induced Intestinal Injury
  - Radiation Enterocolitis

**MALABSORPTION SYNDROMES**

- Malabsorption is characterized by defective absorption of fats, fat-soluble and other vitamins, proteins, carbohydrates, electrolytes and minerals, and water.

- The most common clinical presentation is *chronic diarrhea*, and the hallmark of malabsorption is *steatorrhea* (excessive fecal fat content).

**INFLAMMATORY BOWEL DISEASE (IBD)**

- Inflammatory bowel disease (IBD) is an idiopathic disease caused by a dysregulated immune response to host intestinal microflora.

- The two disorders known as inflammatory bowel disease (IBD) are *Crohn disease (CD)* and *ulcerative colitis (UC)*.

- These diseases share many common features but have distinctly different clinical manifestations.

1. **Crohn Disease (CD)**

- CD is an autoimmune disease that may affect any portions of the gastrointestinal tract from esophagus to anus, but most often involves the *distal small intestine and colon*.

- In CD, there is gross involvement of the small intestine alone in about 40% of cases, of small intestine and colon in 30%, and of the colon alone in about 30%.
Crohn disease of ileum, showing narrowing of the lumen, bowel wall thickening, serosal extension of mesenteric fat, and linear ulceration of the mucosal surface (arrowheads). (Robbins, 2005)

Crohn disease of the colon; a deep fissure extending into the muscle wall. Abundant lymphocyte aggregates are present. (Robbins, 2005)

2. Ulcerative Colitis (UC)
- UC is a chronic inflammatory disease limited to the colon and rectum.
- Ulcerative colitis is an ulceroinflammatory disease limited to the colon and affecting only the mucosa and submucosa.

Ulcerative colitis. Ulcerated hemorrhagic surface with knob by pseudopolyps. (Robbins, 2005)

Ulcerative colitis. Microscopic view of the mucosa, showing diffuse active inflammation with crypt abscess and glandular architectural distortion. (Robbins, 2005)
Comparison of the distribution patterns of Crohn disease and ulcerative colitis, as well as the different conformations of the ulcers and wall thickenings.

(Robbins, 2005)

VASCULAR DISORDERS

1. Ischemic Bowel Disease

- Ischemic lesions may be restricted to the small or large intestine, or may affect both.

- The predisposing conditions for ischemia are as follows:
  - Arterial thrombosis
  - Arterial embolism
  - Venous thrombosis
  - Nonocclusive ischemia: cardiac failure, shock, dehydration, and vasoconstrictive drugs (e.g., digitalis, vasopressin, propranolol)
  - Miscellaneous: radiation injury, volvulus, stricture, amyloidosis, diabetes mellitus, and internal or external herniation

(Robbins, 2005)

**TABLE 17-10 Distinctive Features of Crohn Disease and Ulcerative Colitis**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Crohn Disease – SI</th>
<th>Crohn Disease – C</th>
<th>Ulcerative Colitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microscopic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowel region</td>
<td>Ileum &amp; colon</td>
<td>Colon &amp; Ileum</td>
<td>Colon only</td>
</tr>
<tr>
<td>Distribution</td>
<td>Skip lesions</td>
<td>Skip lesions</td>
<td>Diffuse</td>
</tr>
<tr>
<td>Symmetry</td>
<td>Early</td>
<td>Verrucose</td>
<td>Laterose</td>
</tr>
<tr>
<td>Wall appearance</td>
<td>Thickened</td>
<td>Thin</td>
<td>Thin</td>
</tr>
<tr>
<td>Ulcer</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Distensibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macroscopic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflammation</td>
<td>Transmural</td>
<td>Transmural</td>
<td>Limited in mucosa</td>
</tr>
<tr>
<td>Ulcer</td>
<td>Deep, Yeast</td>
<td>Deep, Yeast</td>
<td>Mucosal</td>
</tr>
<tr>
<td>Lymphoid nodule</td>
<td>Marked</td>
<td>Marked</td>
<td>Marked</td>
</tr>
<tr>
<td>Perforation</td>
<td>Marked</td>
<td>Marked</td>
<td>Marked</td>
</tr>
<tr>
<td>Serositis</td>
<td>Marked</td>
<td>Marked</td>
<td>Marked</td>
</tr>
<tr>
<td>Granulocytes</td>
<td>Yes (60%)</td>
<td>Yes (60%)</td>
<td>Yes (60%)</td>
</tr>
<tr>
<td>Fistulas/sutures</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Clinical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peristaltism inhibition</td>
<td>Yes</td>
<td>Yes, if severe</td>
<td>No</td>
</tr>
<tr>
<td>Malignant potential</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Response to surgery</td>
<td>Poor</td>
<td>Fever</td>
<td>Fixed</td>
</tr>
</tbody>
</table>

*SI, Crohn disease of the small intestine; C, Crohn disease of the colon. Features are often not all present in a single case.

Infarcted small bowel, secondary to acute thrombotic occlusion of the superior mesenteric artery

(Robbins, 2005)
2. Angiodysplasia
- Angiodysplasia is a non-neoplastic intestinal lesion of vascular dilation and malformation.
- Although the prevalence of these lesions is less than 1% in the adult population, they account for 20% of significant lower intestinal bleeding.

3. Hemorrhoids
- Hemorrhoids are variceal dilations of the anal and perianal venous plexuses.
- The varicosities may develop in the inferior hemorrhoidal plexus and are located below the anorectal line (external hemorrhoids). Alternatively, they may develop from dilation of the superior hemorrhoidal plexus and produce internal hemorrhoids.

DIVERTICULAR DISEASE
- A diverticulum is a blind pouch leading off the alimentary tract, lined by mucosa that communicates with the lumen of the gut.
- Congenital diverticula involve all three layers of the bowel wall. The prototype is the Meckel diverticulum.
- Acquired diverticula may occur in the esophagus, stomach, and duodenum, but the most common site is the left side of the colon, with the majority in the sigmoid colon.
Diverticulosis. A, Section through the sigmoid colon, showing multiple sac-like diverticula protruding through the muscle wall into the mesentery. B, Low-power photomicrograph of diverticulum of the colon, showing protrusion of mucosa and submucosa through the muscle wall.

INTESTINAL OBSTRUCTION

Obstruction of the gastrointestinal tract may occur at any level, but the *small intestine* is most often involved due to its narrow lumen.

<table>
<thead>
<tr>
<th>Mechanical Obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesions</td>
</tr>
<tr>
<td>Hernias, internal or external</td>
</tr>
<tr>
<td>Volvulus</td>
</tr>
<tr>
<td>Intussusception</td>
</tr>
<tr>
<td>Tumors</td>
</tr>
<tr>
<td>Inflammatory strictures</td>
</tr>
<tr>
<td>Obstructive gallstones, fecaliths, foreign bodies</td>
</tr>
<tr>
<td>Congenital strictures; atresias</td>
</tr>
<tr>
<td>Congenital bands</td>
</tr>
<tr>
<td>Meconium in meconiosis</td>
</tr>
<tr>
<td>Imperforate anus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pseudo-obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralytic ileus (e.g., postoperative)</td>
</tr>
<tr>
<td>Vascular—bowel infarction</td>
</tr>
<tr>
<td>Myopathies and neuropathies (e.g., Hirschsprung)</td>
</tr>
</tbody>
</table>

**TUMORS OF THE SMALL AND LARGE INTESTINES**

1. Tumors of the Small Intestine
   - Adenoma
   - Adenocarcinoma

2. Tumors of the Colon and Rectum
   - Non-Neoplastic Polyps Adenoma
   - Familial Syndromes Colorectal Carcinogenesis
   - Colorectal Carcinoma
   - Carcinoid Tumor

3. Gastrointestinal Lymphoma Mesenchymal Tumors

4. Tumors of the Anal Canal
Adenoma of the ampulla of Vater, showing exophytic tumor at the ampullary orifice.

Familial adenomatous polyposis (FAP)

A. Pedunculated adenoma showing a fibrovascular stalk lined by normal colonic mucosa and a head that contains abundant dysplastic epithelial glands. B. A small focus of adenomatous epithelium in an otherwise normal (mucin-secreting, clear) colonic mucosa, showing how the dysplastic columnar epithelium (deeply stained) can populate a colonic crypt.

Carcinoma of the cecum. The fungating carcinoma projects into the lumen but has not caused obstruction.
APPENDIX

1. Acute Appendicitis

- Appendiceal inflammation is associated with obstruction.
- Ischemic injury then favors bacterial proliferation with additional inflammatory edema and exudation.
- Acute suppurative appendicitis---abscess formation within the wall, along with ulcerations and foci of suppurative necrosis in the mucosa
- Acute gangrenous appendicitis---large areas of hemorrhagic green ulceration of the mucosa and green-black gangrenous necrosis through the wall

Acute appendicitis. The inflamed appendix shown below is red, swollen, and covered with a fibrinous exudate. For comparison, a normal appendix is shown above.

The mucosa of the appendix shows acute inflammatory cell (neutrophils) infiltration with residual lymphoid follicles. The stroma is edematous with vascular congestion.

(Robbins, 2005)

(Pathobiology)
2. Tumors of The Appendix

- The most common appendiceal tumor is the carcinoid.
- One unique type of appendiceal carcinoid tumor is goblet cell carcinoid (adenocarcinoid).

3. Mucocele and Pseudomyxoma Peritonei

- Mucocele is the macroscopic description of a dilated appendix filled with mucin.
- The most common mucinous neoplasm is the benign mucinous cystadenoma.

**REFERENCES**