## GASTROINTESTINAL DISEASES

<table>
<thead>
<tr>
<th>Disease</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute pancreatitis</td>
<td>A sudden inflammation of the pancreas that may be mild or life threatening but usually subsides</td>
</tr>
<tr>
<td>Chronic gastritis</td>
<td>A mucus-lined layer of the stomach is inflamed or irritated over a longer period of time</td>
</tr>
<tr>
<td>Peptic ulcer disease</td>
<td>A condition in which painful sores or ulcers develop in the lining of the stomach or the duodenum</td>
</tr>
<tr>
<td>Hepatocirrhosis</td>
<td>A replacement of liver tissue by fibrosis, scar tissue and regenerative nodule</td>
</tr>
<tr>
<td>Hepatic carcinoma</td>
<td>A malignancy of the liver that occurs in patients with underlying chronic liver disease and cirrhosis</td>
</tr>
<tr>
<td>Stomach carcinoma</td>
<td>A gastric cancer occurs when cancer cells form in the lining of the stomach</td>
</tr>
<tr>
<td>Ulcerative colitis</td>
<td>An inflammatory bowel disease (IBD) that affects the innermost lining of the colon and rectum</td>
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</tbody>
</table>

### CHIEF CELLS vs. PARIETAL CELLS

<table>
<thead>
<tr>
<th>Chief cells</th>
<th>Parietal cells</th>
<th>Intrinsic factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pepsinogen</td>
<td>Gastric acid (HCl)</td>
<td>Absorption of vitamin B₁₂</td>
</tr>
<tr>
<td>Protein digestion</td>
<td>↓stomach pH</td>
<td></td>
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</tbody>
</table>

**Intrinsic factor (IF) is a glycoprotein produced by the ______ of the stomach. It is necessary for the absorption of vitamin B₁₂ later on in the ______ of the small intestine.**

A. Parietal cells, Duodenum  
B. Parietal cells, Jejunum  
C. Parietal cells, Ileum  
D. Chief cells, Ileum

Pernicious anemia is a disease in which not enough red blood cells are produced due to a deficiency of ______. Pernicious anemia refers to anemia that results from lack of intrinsic factor. Lack of intrinsic factor is most commonly due to an autoimmune attack on the cells that create it in the stomach.

A. Vitamin B₁₂  
B. Vitamin B₃  
C. Vitamin B₁  
D. Vitamin C

### PORTOSYSTEMIC ANASTOMOSES

- The portal vein or hepatic portal vein (HPV) is a blood vessel that carries blood from the gastrointestinal tract, gallbladder, pancreas and spleen to the liver. This blood contains nutrients and toxins extracted from digested contents.

- Portosystemic anastomosis (connection between two blood vessels) includes all the connections made between veins of the portal circulation and the systemic circulation.

- Portal hypertension is abnormally high blood pressure in the portal vein and its branches. Cirrhosis is the most common cause in Western countries.

- In portal hypertension, as in the case of cirrhosis of the liver, the anastomoses become congested and form venous dilatations. Such dilatation can lead to esophageal varices, caput medusae, and anorectal varices. The varices become fragile and can bleed easily.

<table>
<thead>
<tr>
<th>Site of anastomosis</th>
<th>Clinical sign</th>
<th>Portal ↔ Systemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophagus</td>
<td>Esophageal varices</td>
<td>L gastric ↔ Esophageal</td>
</tr>
<tr>
<td>Umbilicus</td>
<td>Caput medusae</td>
<td>Paraumbilical ↔ small epigastric veins</td>
</tr>
<tr>
<td>Rectum</td>
<td>Anorectal varices</td>
<td>Superior rectal ↔ middle/inferior rectal</td>
</tr>
</tbody>
</table>

Mnemonic: Varices of gut, butt, and caput are commonly seen with portal HTN.

Portal hypertension is a term used to describe elevated pressures in the portal venous system (a major vein that leads to the liver). Increased pressure in the portal vein causes varices (large veins) to the following sites EXCEPT:

A. Esophagus  
B. Umbilicus  
C. Rectum  
D. Leg

- Varicose veins developing as a result of weakened one-way valves in veins. Varicose veins are more common in women than in men and are linked with heredity. Other related factors are pregnancy, obesity, menopause, aging, prolonged standing, leg injury and abdominal straining.
- Treatment can be either conservative or surgical.
### 24. ACUTE PANCREATITIS

<table>
<thead>
<tr>
<th>Acute pancreatitis</th>
<th>Chronic pancreatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage of pancreatic enzymes into pancreatic and peripancreatic tissue → Autodigestion</td>
<td>Irreversible parenchymal destruction leading to pancreatic dysfunction and insufficiency</td>
</tr>
<tr>
<td>Abrupt onset of severe pain</td>
<td>Persistent, recurrent episodes of severe pain.</td>
</tr>
<tr>
<td>Gallstones (40%), alcohol abuse (40%), hypercalcemia, hypertriglyceridemia, trauma, drug side effects (thiazide diuretics), viral infections, post-ERCP, scorpion bites</td>
<td>Alcohol abuse (90%), gallstones, CF, smoking, pancreatic divisum, family history</td>
</tr>
<tr>
<td>Severe epigastric pain (radiating to the back); nausea, vomiting, weakness, fever, shock.</td>
<td>Recurrent episodes of persistent epigastric pain; anorexia, nausea, constipation, flatulence, steatorrhea, weight loss, diabetes mellitus.</td>
</tr>
<tr>
<td>Flank discoloration (Grey Turner’s sign) and periumbilical discoloration (Cullen’s sign) may be evident on examination.</td>
<td></td>
</tr>
</tbody>
</table>

### ACUTE PANCREATITIS

<table>
<thead>
<tr>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ↑amylase, ↑lipase, ↓calcium if severe; &quot;sentinel loop&quot; or &quot;colon cutoff sign&quot; on AXR.</td>
</tr>
<tr>
<td>• Abdominal ultrasound or CT may show an enlarged pancreas with stranding, abscess, hemorrhage, necrosis, or pseudocyst</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Removal of the offending agent if possible.</td>
</tr>
<tr>
<td>• Supportive care, including IV fluids/electrolyte replacement, analgesia, bowel rest, NG suction, nutritional support, and O₂.</td>
</tr>
<tr>
<td>• Treat severe necrotizing pancreatitis with IV antibiotics, respiratory support, and surgical debridement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Roughly 85-90% are mild and self-limited; 10-15% are severe, requiring ICU admission. Mortality may approach 50% in severe cases.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pancreatic pseudocyst, fistula formation, hypocalcemia, renal failure, pleural effusion, chronic pancreatitis, sepsis.</td>
</tr>
<tr>
<td>• Mortality secondary to acute pancreatitis can be predicted with Ranson’s criteria</td>
</tr>
</tbody>
</table>

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A 30-year-old female presents with a one-day history of severe epigastric pain. The pain radiates to the back and the patient admits that she had consumed 15 alcoholic beverages the previous day. Vital signs reveal a BP 100/70 mmHg and HR 120/min. There is tenderness to palpation in the epigastrium and a positive Cullen’s sign. Laboratory results reveal markedly elevated amylase and lipase. The patient is managed conservatively over the next 24 hours with no symptomatic improvement.

- **What is the most likely diagnosis?** A. Acute pancreatitis B. Chronic pancreatitis
- **What is the most appropriate next step in the work-up?** A. Ultrasound B. CT scan

- CT scan may be performed in acute pancreatitis if the diagnosis is not clear or if complications such as pseudocysts, necrosis, or hemorrhage are suspected.

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A 50-year-old male with a history of alcohol abuse presents with abdominal pain that radiates to the back. He also complains that his stools have become extremely foul smelling and have an oily appearance. History reveals that he has been diagnosed with acute pancreatitis over ten times in the past ten years. Physical examination is remarkable for epigastric tenderness leading to permanent damage manifesting as steatorrhea and diabetes. Like acute pancreatitis, patients will complain of epigastric pain that radiates to the back. Chronic pancreatitis has additional features related to pancreatic insufficiency. This includes diabetes, steatorrhea, and weight loss. CT scan is the imaging test of choice and reveals pancreatic calcification. Serum lipase and amylase may be elevated but are often normal.

- **What is the most likely finding on the CT scan?** A. Calcification of the pancreas B. Pancreatic pseudocysts

- Chronic pancreatitis is a progressive inflammation of the pancreas leading to permanent damage manifesting as steatorrhea and diabetes. Like acute pancreatitis, patients will complain of epigastric pain that radiates to the back. Chronic pancreatitis has additional features related to pancreatic insufficiency. This includes diabetes, steatorrhea, and weight loss. CT scan is the imaging test of choice and reveals pancreatic calcification. Serum lipase and amylase may be elevated but are often normal.

- Alcohol is the most common cause of chronic pancreatitis.

- Treatment is pain control, low fat diet, lipase supplements, and vitamin A, D, E, and K replacement.

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Mnemonic:

![Image](https://www.acupuncturemedia.com/uploaded_images/i_get_smashed.png)
### 25. CHRONIC GASTRITIS

Inflammation of the gastric mucosa. Subtypes are as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>Rapidly developing, superficial lesions that are often due to NSAID use, alcohol, H pylori infection, and stress from severe illness (eg, burns, CNS injury).</td>
</tr>
<tr>
<td>Chronic</td>
<td></td>
</tr>
<tr>
<td>Type A (10%)</td>
<td>Occurs in the fundus and is due to autoantibodies to parietal cells. Causes pernicious anemia and is associated with other autoimmune disorders. Associated with an ↑risk of gastric adenocarcinoma and carcinoid tumors.</td>
</tr>
<tr>
<td>Type B (90%)</td>
<td>Occurs in the antrum and may be caused by NSAID use or H pylori infection. Often asymptomatic, but associated with an ↑risk of PUD and gastric cancer.</td>
</tr>
</tbody>
</table>

**History/PE**
- Patients may be asymptomatic or may complain of epigastric pain, nausea, vomiting, hematemesis, or melena.

**Diagnosis**
- Upper endoscopy to visualize the gastric mucosa. A double-contrast upper GI series can also be used but is less sensitive than EGD.
- H pylori infection can be detected by the urease breath test, serum IgG antibodies (which point to a history of exposure, not current infection), H pylori stool antigen (indicates current infection), or endoscopic biopsy.

**Treatment**
- ↓intake of exacerbating agents. Antacids, sucralfate, H₂ blockers, and/or PPIs may help.
- Administer triple therapy (amoxicillin, clarithromycin, omeprazole) to treat H pylori infection unless the patient is penicillin allergic, in which case metronidazole should be substituted for amoxicillin.
- Give prophylactic PPIs to patients at risk for stress ulcers (eg, ICU patients).

Gastritis is an inflammation of the protective lining of the stomach. Which one is not a common cause of gastritis?
- A. Acetaminophen
- B. Aspirin
- C. Ibuprofen
- D. Naproxen

**H. pylori** is a gram-negative, helically-shaped bacterium usually found in the stomach. **H. pylori** infection usually has no symptoms but sometimes causes gastritis or ulcers of the stomach or first part of the small intestine. The infection is also associated with the development of certain cancers occurring in less than 20% of cases.
- A. Borrelia burgdorferi
- B. Streptococcus pyogenes
- C. Helicobacter pylori
- D. Shigella

- H. pylori is a common type of bacteria that grows in the digestive tract and has a tendency to attack the stomach lining. It infects the stomachs of roughly 60% of the world’s adult population. H. pylori infections are usually harmless, but they’re responsible for the majority of ulcers in the stomach and small intestine.
- H. pylori often infect your stomach during childhood. While infections with this strain of bacteria typically don’t cause symptoms, they can lead to diseases in some people, including peptic ulcers, and an inflammatory condition inside your stomach known as gastritis.
- The urea breath test is a rapid diagnostic procedure used to identify infections by Helicobacter pylori, a spiral bacterium implicated in gastritis, gastric ulcer, and peptic ulcer disease. It is based upon the ability of H. pylori to convert urea to ammonia and carbon dioxide.

A 40-year-old male presents with epigastric pain. The pain is burning and occasionally radiates to his back. He states that eating helps the pain temporarily, however, the pain is worsened 3-4 hours postprandially. Physical examination is unremarkable. Diagnostic studies reveal a positive urea breath test. Laboratory values are otherwise within normal limits. The next best step in management is:
- A. indomethacin
- B. colchicine
- C. allopurinol
- D. omeprazole, amoxicillin, clarithromycin

- Treatment of choice for H. pylori is triple therapy: amoxicillin, clarithromycin, and a proton pump inhibitor.
- Bismuth subsalicylate may be added to the regimen, or used to replace the PPI. While some sources state metronidazole can be used as first line, resistance is more common and not the best first choice.
26. PEPTIC ULCERS

Although commonly thought to result from stress, PUD is now known to result from damage to the gastric or duodenal mucosa caused by impaired mucosal defense and/or acidic gastric contents. H. pylori is the causative factor in >90% of duodenal ulcers and 70% of gastric ulcers. Other risk factors include corticosteroid, NSAID, alcohol, and tobacco use. Males are affected more often than females.

<table>
<thead>
<tr>
<th>History/PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Presents with chronic or periodic dull, burning epigastric pain that is often related to meals and can radiate to the back.</td>
</tr>
<tr>
<td>• Patients may also complain of nausea, hematemesis (“coffee-ground” emesis), or blood in the stool.</td>
</tr>
<tr>
<td>• Examination is usually normal but may reveal epigastric tenderness and (+) stool guaiac.</td>
</tr>
<tr>
<td>• Acute perforation presents with a rigid abdomen, rebound tenderness, and/or guarding.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Rule out perforation</strong></td>
</tr>
<tr>
<td>□ Gastric ulcers: AXR reveals free air under the diaphragm</td>
</tr>
<tr>
<td>□ Duodenal ulcers: CT scan with contrast shows air in the retroperitoneal space. Order a CBC to detect GI bleeding.</td>
</tr>
<tr>
<td>• <strong>Upper endoscopy</strong> with biopsy to confirm and to rule out activate bleeding or gastric adenocarcinoma (10% of gastric ulcers)</td>
</tr>
<tr>
<td>• H pylori testing</td>
</tr>
<tr>
<td>• In recurrent or refractory cases, check serum gastrin levels to screen for Zollinger-Ellison syndrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gastric ulcer</th>
<th>Duodenal ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>H pylori in &gt; 70%</td>
<td>H pylori in &gt; 90%</td>
</tr>
<tr>
<td>age 50s - 60s</td>
<td>age 30s - 40s</td>
</tr>
<tr>
<td>↑pain after food intake</td>
<td>↓pain after food intake</td>
</tr>
<tr>
<td>weight loss</td>
<td>weight gain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>After a meal:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pain from Gastric ulcer ↓ Greater</td>
</tr>
<tr>
<td>• Pain from Duodenal pain ↓ Decreases</td>
</tr>
</tbody>
</table>

A 58-year-old male with past medical history of chronic back pain presents with epigastric pain that started two weeks ago. The pain is gnawing in quality and eating food makes the pain worse.

**What is the most likely diagnosis?**

A. cholelithiasis  
B. acute pancreatitis  
C. duodenal ulcer  
D. gastric ulcer

• Gastric ulcers commonly affect patients over 50. Pain is unchanged or made worse with eating. Most common complaint for PUD is gnawing or burning epigastric pain.

**Which risk factor is the most common cause for this condition in the general population?**

A. female gender  
B. alcohol use  
C. NSAID use  
D. Helicobacter pylori infection

• Patients over 55+ and/or with alarming symptoms such as weight loss, dysphagia, new-onset anemia, hemorrhage, and early satiety should received upper endoscopy with biopsy.

A 35-year-old female presents with epigastric pain that started two weeks ago. The pain is burning in quality and relieved when she eats. She states that she has been awakened by the pain three times in the past five nights. She admits to social alcohol use. Physical exam is unremarkable.

**What is the most likely diagnosis?**

A. duodenal ulcer  
B. gastric ulcer  
C. acute pancreatitis  
D. cholelithiasis

• Duodenal ulcers tend to have a cycle of symptom free periods for weeks followed by weeks of symptoms. Pain is relieved by eating but made worse hours later. Test questions may mention nocturnal pain due to sleep usually occurring hours after eating. Typical age group is in the 30s and 40s.

**What is the most common risk factor of this condition?**

A. female gender  
B. alcohol use  
C. NSAID use  
D. Helicobacter pylori infection  
E. viral infection

• 90% of duodenal ulcers are associated with H. pylori. Patients under 50 years of age without alarming signs should undergo **urea breath test** or H. pylori antibody test. **Upper endoscopy with biopsy** is the most accurate diagnostic test.
Cirrhosis is a consequence of chronic liver disease characterized by replacement of liver tissue by fibrosis, scar tissue and regenerative nodules (lumps that occur as a result of a process in which damaged tissue is regenerated), leading to loss of liver function.

Each time the liver is injured (by disease, excessive alcohol consumption or another cause) it tries to repair itself. In the process, scar tissue forms. As cirrhosis progresses, more and more scar tissue forms, making it difficult for the liver to function (decompensated cirrhosis). Advanced cirrhosis is life-threatening.

### Signs and Symptoms

<table>
<thead>
<tr>
<th>Early (some Fibrosis)</th>
<th>Later (extensive Fibrosis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>asymptomatic, non-specific sx</td>
<td>Jaundice, pruritis, ascites, (eg, weight loss, weakness, fatigue)</td>
</tr>
</tbody>
</table>

### Complications

- **Ascites**
  - ↑pressure in the portal vein → fluid to accumulate in abdomen

- **Spontaneous bacterial peritonitis**
  - infection of the ascitic fluid → development of a bacterial infection in the peritoneum

- **Splenomegaly**
  - Fluid backs up to spleen → enlarged spleen

- **Hepatorenal failure**
  - portosystemic shunt → renal vasoconstriction → low filtration

- **Hepatic encephalopathy**
  - ↓liver function → ↓detoxification → ↑toxins (ammonia) in the brain → asterixis, coma

- **Gynecomastia**
  - ↓liver function → ↓estrogen metabolism → gynecomastia, spider angioma, palmar erythema

- **Jaundice**
  - ↓bilirubin conjugation → ↑unconjugated bilirubin → jaundice

- **Hypoalbuminemia**
  - ↓albumin production → hypoalbuminemia

- **Coagulation issues**
  - impaired synthesis of clotting factors → coagulation issues → bleeding

### Diagnosis

- Gold standard: liver biopsy
- Lab: ↑bilirubin, ↑liver enzymes (AST, ALT, ALP, GGT), ↓thrombocyte

### Treatment

- Generally irreversible
- Prevent further damage: Treat underlying cause (hepatitis, alcohol)
  - Liver transplant

### Portal hypertension

Portal hypertension is an increase in the blood pressure within a system of veins called the portal venous system. Which of the following is the most common cause of portal hypertension?

A. Sarcoidosis  
B. Cirrhosis  
C. Schistosomiasis  
D. Budd–Chiari syndrome

- The portal vein is a blood vessel that carries blood from the gastrointestinal tract, gallbladder, pancreas and spleen to the liver. This blood contains nutrients and toxins extracted from digested contents.
- Portal hypertension is abnormally high blood pressure in the portal vein and its branches. Cirrhosis is the most common cause in Western countries. Cirrhosis slows the blood flow and puts stress on the portal vein.

### Cirrhosis

Cirrhosis is a late stage of scarring of the liver caused by many forms of liver diseases. Which of the following pathophysiology is most likely related with liver cirrhosis?

A. Portal hypertension  
B. Pulmonary hypertension  
C. Essential hypertension  
D. White coat hypertension

### Gastrointestinal Diseases

Venous Blood accumulates in portal system → pressure rises >12 mmHg → portosystemic shunts (blood is diverted away from portal system and backs up into systemic veins). Portosystemic Shunts occur at three points where the systemic and portal system connect:

- Esophagus → Esophageal varices
- Umbilicus → Caput Medusae
- Rectum → Anorectal varices

Patients with cirrhosis should be screened with an upper endoscopy every 1-2 years. This is to screen which of the following?

A. Gastritis  
B. Peptic ulcer diseases  
C. Esophageal varices  
D. Caput medusae

Esophageal varices are a very common cause of bleeding in patients with cirrhosis and may lead to a life-threatening hypotension.
28. HEPATIC CARCINOMA

- Liver cancer types: Hepatocellular carcinoma (HCC, also called hepatoma), Fibrolamellar HCC, Cholangiocarcinoma (bile duct cancer), Angiosarcoma (also called hemangiocarcinoma), Secondary liver cancer (also known as a liver metastasis).
- Hepatocellular carcinoma (HCC), also called hepatoma, is the most common type of liver cancer, accounting for approximately 75% of all liver cancers. HCC starts in the main type of liver cells, called hepatocellular cells. Most cases of HCC are the result of infection with hepatitis B or C, or cirrhosis of the liver caused by alcoholism.

HEPATOCELLULAR CARCINOMA

**Definition**
- One of the most common cancers worldwide despite its relatively low incidence in the developed countries.
- Primary risk factors for the development of hepatocellular carcinoma in the developed countries are cirrhosis from alcohol and chronic hepatitis (HCV).
- In developing countries, aflatoxins (in various food sources) and HBV infection are major risk factors.

**Risk factors**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B, C</td>
<td></td>
</tr>
<tr>
<td>Aflatoxin</td>
<td></td>
</tr>
</tbody>
</table>

**History/PE**
- Patients commonly present with RUQ tenderness, abdominal distention, and signs of chronic liver disease such as jaundice, easy bruisability, and coagulopathy.
- Examination may reveal tender enlargement of the liver.

**Diagnosis**
- Often sugged by the presence of a mass on ultrasound or CT scan as well as by abnormal LFTs and significantly elevated alpha-fetoprotein (AFP) levels.

**Treatment**
- Surgical: Partial hepatectomy for single lesions < 5cm with no cirrhosis; orthotopic liver transplantation in patients with cirrhosis.
- Nonsurgical: Transarterial chemoembolization (TACE) and/or sorafenib for advanced disease.
- Monitor AFP levels to screen for recurrence.

Primary liver cancer is a malignant tumor that starts in the liver. What is the most common type of primary liver cancer?

A. Cholangiocarcinoma  
B. Hepatocellular carcinoma  
C. Hemangiocarcinoma  
D. Liver metastases from pancreatic cancer

Worldwide, the most common risk factor for liver cancer is chronic infection with ________ virus or ________ virus. These infections lead to cirrhosis of the liver and are responsible for making liver cancer the most common cancer in many parts of the world.

A. Hepatitis A, Hepatitis E  
B. Hepatitis A, Hepatitis B  
C. Hepatitis B, Hepatitis C  
D. Hepatitis B, Hepatitis E

**AFLATOXINS**

- Aflatoxins are poisonous carcinogens and mutagens that are produced by certain molds (Aspergillus flavus and Aspergillus parasiticus) which grow in soil, decaying vegetation, hay, and grains. They are regularly found in improperly stored staple commodities such as cassava, chili peppers, cottonseed, millet, peanuts, rice, sesame seeds, sorghum, sunflower seeds, sweetcorn, tree nuts, wheat, and a variety of spices.
- Chronic low-level exposure to aflatoxins, particularly aflatoxin B1, is associated with increased risk of developing liver cancer, impaired immune function, and malnutrition. Acute high-level exposure, which is less common, causes early symptoms of diminished appetite, malaise, and low fever.

Aflatoxins are a family of toxins produced by certain fungi that are found on agricultural crops such as corn, peanuts, cottonseed, and tree nuts. Exposure to aflatoxins is associated with an increased risk of ________ cancer.

A. lung  
B. stomach  
C. brain  
D. liver

- The main fungi that produce aflatoxins are Aspergillus flavus and Aspergillus parasiticus, which are abundant in warm and humid regions of the world. Aflatoxin-producing fungi can contaminate crops in the field, at harvest, and during storage.
- The staple commodities regularly contaminated with aflatoxins include cassava, chilies, corn, cotton seed, millet, peanuts, rice, sorghum, sunflower seeds, tree nuts, wheat, and a variety of spices intended for human or animal consumption.
29. STOMACH CARCINOMA

Overview
• Stomach cancer begins when malignant cells form in the inner lining of the stomach. The disease usually grows slowly over many years. When gastric cancer is found very early, there is a better chance of recovery. Gastric cancer is often in an advanced stage when it is diagnosed. At later stages, gastric cancer can be treated but rarely can be cured.
• Gastric cancer: malignant cells in stomach. Types depending on the types of cell that originates from: Adenocarcinoma (from columnar glandular epithelium), Lymphoma (from lymphocytes), Carcinoid tumor (from G-cells in stomach), Leiomyosarcoma (from smooth muscle cells)
• Stomach cancers are about 90-95% adenocarcinomas. Adenocarcinoma is a type of cancer that starts in mucus-producing glandular cells of your body.
• The Asian countries with a high-risk of stomach cancer, specifically Korea, Japan, China, and the Philippines, were selected due to their geographical proximity and cultural similarities.

Types
• Histologically, there are two major types of gastric adenocarcinoma: intestinal type or diffuse type.
• Intestinal type: Differentiated cancer that originates from the intestinal metaplasia of gastric mucosal cells. Risk factors include a diet high in nitrites and salt and low in fresh vegetables (antioxidants), H pylori colonization, and chronic gastritis.
• Diffuse type: Undifferentiated cancer not associated with H pylori infection or chronic gastritis. Risk factors are unknown; signet ring cells on biopsy are characteristic.

Hx/PE
• Early-stage disease is usually asymptomatic but may be associated with indigestion and loss of appetite. Lat-stage disease presents with abdominal pain, weight loss, and upper GI bleeding.

Diagnosis
• Upper endoscopy with biopsy is necessary to rule out other etiologies and confirm the diagnosis.

Treatment
• If detected early, treatment is surgical resection. Most patients present with late-stage, incurable disease. Five-year survival is <10% for advanced disease.

Gastric cancer occurs when cancer cells form in the lining of the stomach. Which of the following is the most common type of gastric cancer?
A. Adenocarcinoma  B. Lymphoma  C. Carcinoid tumor  D. Leiomyosarcoma

Certain viruses or bacteria may increase the risk of developing cancer. Which of the following microorganisms causes chronic inflammation and significantly increases the risk of developing gastric cancer?
A. Hepatitis B virus  B. Helicobacter pylori  C. Human papilloma virus  D. Human immunodeficiency virus

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B and Hepatitis C</td>
<td>Liver cancer</td>
</tr>
<tr>
<td>Helicobacter pylori</td>
<td>Stomach cancer</td>
</tr>
<tr>
<td>Human papilloma virus</td>
<td>Cervical cancer</td>
</tr>
<tr>
<td>Human immunodeficiency virus</td>
<td>Lymphoma, Kaposi’s sarcoma</td>
</tr>
<tr>
<td>Epstein-Barr virus</td>
<td>Lymphoma</td>
</tr>
<tr>
<td>Human T-cell lymphotropic virus</td>
<td>Lymphoma, Leukemia</td>
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<tr>
<td>Human herpes virus 8</td>
<td>Kaposi’s sarcoma</td>
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A 50-year-old Asian female presents with unexplained weight loss over the past six months. History reveals that she has had intermittent epigastric pain for three months. Diagnostic studies reveal microcytic anemia. Upper endoscopy and biopsy are significant for gastric adenocarcinoma. Which of the following is a risk factor for this patient’s condition?
A. Blood type O  B. Aflatoxins  C. Cyclophosphamide  D. Helicobacter pylori infection

• Gastric cancer will present with weight loss and epigastric pain. Endoscopy is the diagnostic test of choice. Other symptoms include dysphagia, early satiety, anorexia, nausea and vomiting. Commonly tested risk factors include low fiber diet, obesity, Epstein-Barr virus, high salt intake, N-nitroso compounds, smoked foods, smoking, alcohol, blood type A, gastric surgery, and H. pylori.
• Diagnosis is made with endoscopy with biopsy. Treatment is surgical resection.

Nitrosamines are produced by the reaction of nitrites and secondary amines. Nitrites are used as food preservatives, e.g. cured meats. Secondary amines arise by the degradation of proteins. Nitrite and nitrosamine intake are associated with risk of _______ cancer and oesophageal cancer.
A. Liver  B. Breast  C. Stomach  D. Pancreas

• Nitrites in combination with amines or amides were proved to be carcinogenic to animals. Most nitrosamines can induce animal carcinogenesis by causing gene mutation and DNA adductions.
• Nitrates and nitrites are substances commonly found in cured meats. They can be converted by certain bacteria, such as H pylori, into compounds that have been shown to cause stomach cancer in lab animals.
An idiopathic functional disorder characterized by chronic, intermittent abdominal pain and changes in bowel habits.

Half of all IBS patients who seek medical care have comorbid psychiatric disorders (e.g., depression, anxiety, fibromyalgia).

IBD is a term for two conditions (Crohn’s disease and ulcerative colitis) that are characterized by chronic inflammation of the GI tract. Most common in Caucasians and Ashkenazi Jews, with onset most frequently occurring in the teens to early 30s or in the 50s.

IBD vs. Crohn’s disease

- Markedly increase risk of colorectal cancer
- Can affect any part of the GI tract from the mouth to the anus
- Only the colon and rectum are affected
- Can affect the entire thickness of the bowel wall
- Affects the inner-most lining of the large intestine
- Terminal ileum is commonly involved
- Bile duct is commonly involved (↑rate of primary sclerosing cholangitis)
- Cobblestoning and skip lesions on colonoscopy
- Pseudopolyps and continuous rectal involvement on colonoscopy

A. Ulcerative Colitis
B. Crohn’s disease