

Section 4: Gastroenterology

CHAPTER 26: PEPTIC ULCER DISEASE AND GASTROINTESTINAL BLEEDING

Q.1. A 32-year-old woman presents with a 10-month history of an intermittent burning sensation in the epigastrium that is sometimes related to eating. She has heard about bacteria that can cause gastrointestinal (GI) symptoms. She has had no change in her weight and denies dysphagia. Her laboratory tests are normal. Which of the following would you recommend?

- A. Serum qualitative test for *H. pylori*
- B. Refer for endoscopy
- C. Obtain an upper GI series
- D. Treat her for *H. pylori* infection
- E. Obtain a CT scan of the abdomen

Answer: A. The patient presents with dyspepsia. In individuals who are under the age of 45 years and present with no other warning signs (e.g., anemia, weight loss, or dysphagia), a serum qualitative test for *H. pylori* can be obtained to document *H. pylori* infection, provided that the patient has no prior history of being treated. A serum IgG can remain positive even after antibiotic eradication. In *H. pylori*-positive individuals who do not respond to therapy, an upper endoscopy would be the next test. An upper GI series cannot detect *H. pylori* and is less sensitive than endoscopy in detecting lesions of the esophagus, stomach, and proximal small bowel. Empiric therapy for *H. pylori* is never recommended.

Q.2. The patient described in the preceding questions has a positive *H. pylori* antibody blood test. She is compliant with the medical regimen you prescribe. Although her symptoms initially respond, she returns to see you six months later with the same symptoms. Which of the following statements is correct?

- A. She is at high risk for reinfection with *H. pylori*
- B. A positive serum IgG indicates that eradication of *H. pylori* was unsuccessful
- C. The urease breath test is an ideal test to document failure of eradication

- D. Dyspepsia usually improves with *H. pylori* eradication
- E. The initial antibody test was probably a false positive

Answer: C. Reinfection by *H. pylori* is rare, and the persistence of infection usually indicates poor compliance with the medical regimen or antibiotic resistance. The serum IgG may remain positive indefinitely and cannot be used to determine failure of eradication; however, a fall in quantitative IgG levels has been used to document treatment success. If available, either the stool antigen or urease breath test is ideal to document treatment failure because of their high sensitivity and specificity and because they are easy to perform. The association between dyspepsia and *H. pylori* is hotly debated, but for the most part, dyspepsia does not usually improve with *H. pylori* eradication.

Q.3. An otherwise healthy 45-year-old man presents with severe hematochezia and moderate abdominal cramping since this morning. A barium enema one year ago was normal. On examination, his blood pressure is 120/78 and pulse is 100 while lying; when standing, the blood pressure is 110/76 and pulse is 136. His hematocrit is 34. What is the most likely cause of bleeding?

- A. Diverticular bleed
- B. Duodenal ulcer
- C. Inflammatory bowel disease
- D. Vascular ectasia (watermelon stomach)
- E. Mallory-Weiss tear

Answer: B. Acute GI bleeding from a lower GI source does not cause hemodynamic compromise as commonly as GI bleeding from an upper source. Therefore, despite the absence of melena and no appearance of hematemesis, the hemodynamic compromise indicates that an upper GI source should be sought. Ulcers that arise in the duodenal bulb can erode into the gastroduodenal artery, giving rise to brisk blood loss. A negative nasogastric aspirate does not rule out the possibility. Although diverticular bleeds account for most episodes of acute lower GI bleeding and can occasionally be associated with hemodynamic compromise, the normal barium enema one year ago makes it less likely that the bleeding was of diverticular origin. Inflammatory bowel disease is rarely the cause of severe acute GI

bleeding unless an ulcer has eroded into a vessel. Watermelon stomach is associated with chronic GI blood loss from vessel ectasias, presents as iron deficiency anemia, and is found primarily in older women. The presentation is not suggestive of a Mallory-Weiss tear because there was no vomiting, and hematochezia was present.

Q.4. A 56-year-old woman with rheumatoid arthritis has severe joint pain and swelling in her hands. She has a history of peptic ulcer disease five years ago but presently has no GI symptoms. You elect to start her on an NSAID. Which of the following is correct?

- A. Proton-pump inhibitors and H₂-blockers are equally effective in prophylaxis against NSAID-related GI toxicity
- B. Misoprostol is superior to an H₂-blocker in prophylaxis against NSAID-related GI toxicity
- C. Sucralfate is the drug of choice for prophylaxis in this patient
- D. *H. pylori* infection does not alter the risk for an NSAID-induced ulcer
- E. No prophylaxis is recommended for this patient

Answer: B. The patient has a history of peptic ulcer disease and is at risk for NSAID-related GI toxicity. Misoprostol and proton-pump inhibitors have been shown to be superior to H₂-blockers in the prophylaxis against NSAID-related GI toxicity. *H. pylori* may indeed increase the risk for an NSAID-induced ulcer in infected patients who are considering initiating NSAID therapy. Sucralfate has not been shown to be effective in prophylaxis.

Q.5. All of the following statements about *Helicobacter pylori* (*H. pylori*) are true except

- A. *H. pylori* does not invade the gastric or duodenal epithelium
- B. *H. pylori* stimulates gastric acid secretion
- C. Eradication of *H. pylori* prevents adenocarcinoma of the stomach
- D. *H. pylori* produces a urease that splits urea into ammonia and CO₂
- E. Triple-drug therapy for eradication of *H. pylori* is more effective than dual therapy

Answer: C. *H. pylori* resides in the mucus layer of the stomach, where it exerts its urease activity. It does not invade the epithelium. The production of ammonia, the stimulation of acid secretion, and the disruption to the protective mucus layer are three mechanisms by which *H. pylori* promotes injury. *H. pylori* also stimulates interleukin-8, a cytokine associated with inflammation. *H. pylori* is causally associated with gastric adenocarcinoma and MALT lymphoma of the stomach. Eradication of *H. pylori* has been shown to cause regression of MALT lymphoma, but it has not been shown to prevent adenocarcinoma of the stomach. Three- or four-drug regimens are superior to two-drug regimens.

Q.6. A 36-year-old woman complains of reflux symptoms and intermittent diarrhea. The diagnosis of gastrinoma is suspected so a fasting serum gastrin is obtained and found to be 280 pg/mL (normal <115 pg/mL). An abdominal CT is negative. What would you do now?

- A. Refer her for an exploratory laparotomy
- B. Measure serum gastrin in response to secretin infusion
- C. Treat her for *H. pylori*
- D. Obtain a dedicated small bowel series
- E. Measure gastric acid secretion

Answer: E. Although the fasting serum gastrin is elevated, this finding alone is insufficient for establishing the diagnosis of gastrinoma. The serum gastrin can be elevated in other conditions, most notably recent therapy with proton-pump inhibitors or H₂ antagonists and gastric achlorhydria. In fact, the serum gastrin has been reported to be elevated over 1000 pg/mL in patients with pernicious anemia. Thus, a measurement of basal acid output is required. If the gastric pH is less than 2, the diagnosis of gastrinoma is highly suspicious, and a serum secretin test should be performed. Secretin 2 IU/kg is given over 2 minutes and measurements of the serum gastrin are obtained 2.5, 5, 10, 15, and 30 minutes after infusion. A paradoxical increase in the serum gastrin of greater than 200 pg/mL is diagnostic of Z-E syndrome.

Q.7. A patient has a history of chronic iron deficiency anemia requiring a recent blood transfusion. She has undergone an extensive GI work-up including upper endoscopy, colonoscopy, capsule enteroscopy, and abdominal CT scan. Her only medications are ferrous sulfate, baby aspirin, COX II inhibitor, and HCTZ. Which statement is true?

- A. A dedicated small bowel series has a high likelihood of being positive
- B. 81 mg of aspirin per day decreases the benefit of using a COX II inhibitor
- C. The patient should have a provocative arteriogram with heparin infusion to identify the source of blood loss
- D. Hormonal therapy has been shown to be effective in decreasing blood loss due to arteriovenous malformations

Answer: B. Dedicated small bowel series is typically of low yield in the diagnostic evaluation of chronic iron deficiency anemia. Provocative arteriograms have been performed in patients with gastrointestinal hemorrhage of obscure origin, but only a small series of cases have been reported, and it remains to be determined if this therapy can truly be done safely with a significant diagnostic yield. Hormonal therapy has been given to patients with arteriovenous malformations, but a randomized controlled trial published in 2001 showed no benefit using ethinyl estradiol and norethisterone in reducing recurrent bleeding in patients with angiodysplasia. It is important to recognize that even a baby aspirin a day can decrease the benefit in mucosal protection gained from using a COX II selective inhibitor.

Q.8. Ischemic colitis

- A. Typically requires colonic resection
- B. Affects the watershed areas of the colon, namely, the splenic flexure, right colon, and rectum
- C. Is only seen in the elderly
- D. Requires colonoscopic intervention

Answer: B. Ischemic colitis most often results from low-flow states associated with hypotension or poor perfusion. For this reason, the vascular watershed areas of the colon are at highest risk of ischemic injury. Although it is true that ischemic colitis occurs most often in the elderly, younger individuals who use oral

contraceptives, have hypercoagulable states, or vasculitis are also at increased risk. Colonoscopy is often performed to confirm the diagnosis and assess severity, but no intervention is usually required. Fortunately, most cases of ischemic colitis resolve with supportive care and surgical resection is not necessary unless perforation or transmural infarction occur.

Q.9. Which regimen is most effective to treat *H. pylori*?

- A. Metronidazole, bismuth subsalicylate, amoxicillin for 14 days
- B. Clarithromycin and omeprazole for 14 days
- C. Metronidazole, lansoprazole, and clarithromycin for 14 days
- D. Metronidazole, clarithromycin, and omeprazole for 7 days
- E. Metronidazole, clindamycin, and bismuth subsalicylate for 14 days

Answer: C. Regimen A fails to include an H₂-blocker or proton-pump inhibitor. Regimen B uses only two drugs, and two drugs are not as effective as three- or four-drug regimens for eradicating *H. pylori*. Regimen D treats only for 7 days, when 10 to 14 days regimens have been shown to have greater efficacy. Regimen C is recommended by the FDA for the eradication of *H. pylori*. Answer E is not a regimen that has been tested.

Q.10. An 82-year-old woman with no past history presents to your clinic complaining of arthritic symptoms. She is on no medications at this time but needs something for her arthritis. You want to put her on nonsteroidal anti-inflammatory medicine but are concerned about her age and the risk of peptic ulcers. She has to pay for her medications out-of-pocket and requests the most inexpensive option possible. The most appropriate treatment plan would be

- A. Prescribe an inexpensive NSAID alone
- B. Prescribe an inexpensive NSAID and misoprostol
- C. Prescribe celecoxib
- D. Prescribe an inexpensive NSAID and sucralfate
- E. Prescribe an inexpensive NSAID and omeprazole

Answer: A. Although this woman is elderly and has a higher risk of developing NSAID toxicity, prophylaxis is currently not recommended unless there is a history of peptic ulcer disease or abdominal symptoms. Celecoxib would be an adequate alternative to minimize her risk but it is considerably more expensive than generic medications such as ibuprofen.

Q.11. A 56-year-old woman presents to discuss the results of her recent upper endoscopy. She was having some mild abdominal pain, so she underwent the procedure, which revealed an ulcer in the antrum of the stomach. Biopsy of the lesion revealed the presence of *H. pylori*. All of the following statements regarding her condition are correct *except*

- A. *H. pylori* has been associated with gastric MALT (mucosa associated lymphoid tissue)
- B. Reinfection occurs in about 75% of patients despite adequate treatment
- C. Triple drug therapy has been shown to be more effective than dual drug therapy
- D. If her *H. pylori* IgG antibody titer was elevated prior to therapy, it can be used to monitor treatment efficacy
- E. *H. pylori* is associated with adenocarcinoma of the stomach

Answer: B. *H. pylori* is thought to be responsible for a majority of cases of peptic ulcer disease. It has been associated with MALT as well as adenocarcinoma. Triple drug therapy has been shown to be more effective than dual therapy. With adequate treatment, reinfection is rare. Although urea breath testing is probably a better tool for diagnosis of active infection and adequacy of treatment, quantitative serology can be used to monitor treatment efficacy. A 30% fall in IgG titer should be seen after therapy.

Q.12. A 68-year-old man with a history of diabetes, hypertension, and coronary artery disease (s/p coronary artery bypass graft two years ago) presents to the emergency room with fevers and left-sided abdominal pain. His physical examination reveals a temperature of 101.5° F, pulse 96, and blood pressure of 135/80. His abdomen is soft with moderate left lower quadrant tenderness. There is no rebound

or guarding. Bowel sounds are present. A CT scan is done which reveals inflammation around an area of the left colon. The next step in his work-up/management should be

- A. Antibiotic therapy with ciprofloxacin and metronidazole
- B. Referral for urgent colonoscopy
- C. Referral to a surgeon for immediate hemicolectomy
- D. Barium enema
- E. Both A and D

Answer: A. The patient has evidence of diverticulitis. He has no evidence of perforation or abscess formation on the CT scan. Barium enema and colonoscopy should be avoided during acute infections since they will increase the risk of perforation. Surgery may be necessary if the patient fails to improve or if the attacks are recurrent but urgent surgery is not indicated. Antibiotic therapy geared toward gram-negative aerobes and anaerobes are the initial treatment of choice.

CHAPTER 27: ESOPHAGEAL DISEASE

Q.1. A 45-year-old woman with a history of arthritis has had severe heartburn and indigestion for six months, which has been refractory to antacid use. Her history is remarkable for arthritic pain in her hands and Raynaud's phenomenon. Her physical examination shows multiple telangiectasias on her face and arms. You obtain an esophageal manometry study. What findings are consistent with this diagnosis?

- A. Vigorous peristalsis and elevated lower esophageal sphincter (LES) pressure
- B. Absent peristalsis and elevated LES pressure
- C. Absent peristalsis and decreased LES pressure
- D. Vigorous peristalsis and decreased LES pressure
- E. Normal manometric readings

Answer: C. The patient has scleroderma esophagus, which results in atrophy of the esophageal smooth muscle. As a result, such patients lose peristalsis and LES tone, leading to severe GERD symptoms and esophagitis.

Q.2. A 56-year-old white male complains of intermittent dysphagia for the past three months, particularly with the ingestion of meat. He has no difficulties swallowing liquids. He has no history of smoking, uses no medications, and has had no weight loss. What test would be best to evaluate him?

- A. Upper endoscopy
- B. Chest/abdominal CT scan
- C. Barium swallow
- D. Esophageal manometry
- E. Laryngoscopy

Answer: C. Dysphagia should almost always first be evaluated by barium swallow. The patient's presentation is classic for a Schatzki's ring (congenital web at the GE junction). The diagnosis is best made by barium study because Schatzki's rings cannot always be visualized by endoscopy. CT scan and esophageal manometry cannot detect Schatzki's rings. Schatzki's rings are easily disrupted by bougie dilatation, and usually no further therapy is needed.

Q.3. A 45-year-old woman with occasional indigestion has had episodes of chest pain and dysphagia to both solids and liquids. An upper GI series and EGD fail to disclose any structural abnormalities. What is the most appropriate initial therapy?

- A. Sulcrafate
- B. Proton-pump inhibitor
- C. Prokinetic agent
- D. Benzodiazepine
- E. Heller myotomy

Answer: B. The patient has esophageal spasm, which is commonly caused by underlying gastroesophageal reflux. Therefore, a trial of acid suppressive therapy is warranted. If the trial fails to alleviate symptoms, smooth muscle relaxants or antidepressants may be tried. A Heller myotomy is not appropriate because this patient does not have achalasia.

Q.4. A 65-year-old white female with a history of arthritis, congestive heart failure, and osteoporosis complains of odynophagia for two weeks. A barium swallow shows a moderate-sized crater just above the gastroesophageal junction. What is the *least* likely contributor to this condition?

- A. NSAIDs
- B. Alendronate
- C. Iron sulfate
- D. Calcium channel-blocker
- E. Potassium chloride

Answer: D. All of the other medications have been associated with pill-induced esophagitis. Pill-induced esophagitis is usually associated with the failure to ingest at least 8 ounces of water with the medication while upright and, less commonly, an underlying motility disorder. Resolution of pill-induced esophagitis and ulceration occurs rapidly once the offending medication is discontinued. Acid suppressive therapy is usually prescribed to prevent reflux-related injury.

Q.5. A 65-year-old man frequently regurgitates food several hours after eating, and experiences chest pain and dysphagia to both liquids and solids. He has lost 20 pounds. A CXR shows an air/fluid level in a dilated esophagus and an absent gastric air bubble. No mass in the distal esophagus or proximal stomach is identified at upper endoscopy. The best therapy for this patient is

- A. Proton-pump inhibitor
- B. Endoscopic balloon dilatation
- C. Sucralfate
- D. Esophageal resection

Answer: B. The patient has the classic presentation and radiologic findings of achalasia. The upper endoscopy and CT scan are important for ruling out secondary achalasia which is caused by a malignant growth at the GE junction, producing symptoms and findings that mimic primary achalasia. Patients with achalasia typically do not suffer from GERD since they have a lower esophageal sphincter that fails to relax appropriately. However, achalasia patients can describe heartburn and

chest pain due to the accumulation of ingested material in a massively dilated esophagus. Achalasia responds well to endoscopic balloon dilatation and to myotomy. Injection of botulinum toxin at the GE junction has been helpful in nonsurgical candidates. Esophageal resection is not indicated for achalasia unless malignancy has developed.

Q.6. Which statement is true regarding Barrett's esophagus?

- A. Treatment with PPI to control GERD symptoms causes Barrett's epithelium to regress
- B. Barrett's esophagus with high-grade dysplasia should be treated by more frequent endoscopic surveillance and esophagectomy considered once malignancy is identified
- C. Most patients with Barrett's esophagus will eventually develop esophageal cancer
- D. Endoscopic surveillance should be conducted in patients with Barrett's esophagus with intestinal metaplasia, but the frequency is debated

Answer: D. Treatment with PPIs should be directed at control of GERD symptoms and not with the expectation that Barrett's epithelium will regress, as this has yet to be proven. The presence of high-grade dysplasia is an indication for esophagectomy or endoscopic ablation by photodynamic therapy because there is high likelihood that adenocarcinoma is present by the time high-grade dysplasia is identified. Although patients with Barrett's esophagus with intestinal metaplasia are at higher risk of developing adenocarcinoma compared to the general population, the reality is that the vast majority of patients will never develop adenocarcinoma. Endoscopic surveillance at periodic intervals is generally recommended in those patients with Barrett's esophagus and intestinal metaplasia.

Q.7. A 26-year-old woman has been using a PPI every morning to control moderate GERD symptoms. She reports awakening at night with a nonproductive cough several times per week. Correct statements include all *except*

- A. Inappropriate transient relaxations of the lower esophageal sphincter cause GERD

- B. Upper endoscopy is likely to reveal deep ulcerations in the distal esophagus
- C. Microaspiration may cause the nocturnal cough associated with GERD
- D. Dietary changes such as adherence to a low fat diet and avoidance of caffeine may improve her nocturnal GERD symptoms

Answer: B. Patients with nocturnal GERD symptoms most likely have nonerosive esophagitis, thus deep ulcerations are not likely to be found.

Q.8. A 56-year-old man chokes on a piece of steak while dining in a restaurant. The steak transiently becomes impacted in his esophagus. The next day, a barium swallow reveals a short, ringlike structure in his distal esophagus.

- A. The condition developed most likely as a result of the patient's long-standing GERD symptoms
- B. This condition often requires multiple endoscopic treatments to correct it
- C. The structure is likely to be benign
- D. If untreated, the patient is at increased risk for esophageal cancer

Answer: C. The patient has a congenital Schatzki's ring that produces the described symptoms, which are often referred to as the "steakhouse syndrome." The ring is generally disrupted with a single endoscopic dilatation. The Schatzki's ring does not increase the risk for developing esophageal cancer.

Q.9. A 65-year-old man reports that he frequently regurgitates food several hours after eating, and experiences chest pain and dysphagia to both liquids and solids. This has been associated with weight loss. He has no other medical problems. A CXR shows an air/fluid level in a dilated esophagus and an absent gastric air bubble. No mass in the distal esophagus or proximal stomach is identified at the time of endoscopy. The best therapy for this patient is

- A. Omeprazole
- B. Endoscopic balloon dilatation
- C. Sulcrafate
- D. Esophageal resection

E. Metoclopramide

Answer: B. The patient has primary achalasia, with typical CXR findings. The upper endoscopy has ruled out secondary achalasia, in that no mass was detected at the GE junction or cardia. The best treatment for this patient is endoscopic balloon dilatation, to stretch the LES, and disrupt muscle fibers. This therapy remains the mainstay for most patients with achalasia, although surgical myotomy and injection of botulinum toxin are also used.

Q.10. A 60-year-old African-American woman with a history of GERD and an extensive smoking and alcohol history presents complaining of dysphagia for the past two months. She also reports weight loss of 15 pounds over that span. A barium swallow is done and reveals narrowing of the mid-esophagus. An endoscopy is performed and is consistent with an esophageal tumor, so biopsies are taken and they reveal squamous cell carcinoma. Which of the following statements is correct?

- A. Gastroesophageal reflux disease is the most important risk factor for the development of squamous cell carcinoma of the esophagus
- B. Most patients with this disease should undergo esophagectomy in an attempt for cure
- C. The incidence of this type of tumor is decreasing in the United States
- D. A gallium scan should be performed to determine the extent of regional spread
- E. All of the above are correct

Answer: C. The incidence of squamous cell carcinoma is decreasing in the U.S. while the incidence of adenocarcinoma is increasing. The most important risk factors for SCC in this patient are cigarette and alcohol use. Reflux is a risk factor for adenocarcinoma. Esophagectomy is appropriate for less than half of the patients. The five-year survival after esophagectomy is still only 20%. A CT scan of the chest and endoscopic ultrasound are the best tests to determine the extent of regional spread.

Q.11. A 56-year-old woman presents complaining of chest discomfort. She had seen a cardiologist who performed a stress test and reported that the problem was not cardiac in nature. She notes that the pain is worse at times of stress. There is no

relationship with eating but sometimes it can occur while lying flat. A barium swallow reveals uncoordinated contractions along the esophageal wall consistent with "corkscrew esophagus." All of the following are appropriate therapies to try for this condition except:

- A. Omeprazole
- B. Pseudoephedrine
- C. Diazepam
- D. Isosorbide dinitrate
- E. Diltiazem

Answer: B. This patient has chest pain due to diffuse esophageal spasm. Given that there is often underlying gastroesophageal reflux, it is appropriate to try proton-pump inhibitors. Other therapies are geared to relaxing the smooth muscle. Nitrates, calcium channel-blockers, and benzodiazepines may be helpful in individual patients. Additionally, antidepressants (e.g., SSRIs, tricyclics) and antipsychotic medications have been used. Pseudoephedrine has not been found to be helpful for this condition. It can cause some degree of smooth-muscle contraction, so theoretically it should not be used.

Q.12. A 46-year-old man presents complaining of heartburn, hoarseness, and a "sour taste" in his mouth upon awakening. He has a history of reflux disease and has been taking proton-pump inhibitors for the last three years. He recently started taking the medication twice per day. His symptoms have improved somewhat but are still present. He is referred for EGD, which reveals high-grade dysplasia in distal esophagus but no evidence of carcinoma. How should this patient best be managed?

- A. Refer the patient for esophagectomy
- B. Add an H₂-blocker to his current therapy
- C. Refer the patient for fundoplication
- D. Continue twice per day proton-pump inhibitors and repeat the endoscopy in one to two years
- E. Obtain a gastric emptying study

Answer: A. This patient presents with severe symptomatic reflux, refractory to twice per day proton-pump inhibitor therapy. His EGD reveals evidence of Barrett's esophagus with high-grade dysplasia. Since the potential for malignant transformation is high with such pathologic findings, esophagectomy is recommended. Management of Barrett's esophagus of lesser severity requires routine surveillance, although the ideal frequency of repeat endoscopy is yet unknown. Depending on the severity of dysplasia, endoscopies may be repeated every six months to two years.

Q.13. A 56-year-old Brazilian woman with a history of idiopathic cardiomyopathy presents complaining of weight loss, dysphagia, and regurgitation. A chest x-ray is done that reveals an air-fluid level at the level of the esophagus. No gastric bubble is appreciated. A barium swallow reveals a dilated esophagus that tapers at the lower esophageal sphincter. Which of the following is appropriate in this patient's evaluation/treatment?

- A. Refer for partial esophagectomy
- B. Thick and thin smears of peripheral blood looking for parasites
- C. Therapeutic trial of a proton pump inhibitor
- D. Treat with two weeks of acyclovir
- E. Obtain serologic studies for antibodies to *Trypanosoma cruzi*

Answer: E. This patient has classic findings for achalasia. Most cases of achalasia in the United States are idiopathic. Chagas' disease, however, may mimic achalasia years to decades after the initial infection. It is important to recognize this disease in patients from South or Central America. Other manifestations of chronic Chagas' disease include cardiomyopathy, megacolon, and arrhythmias. Acute Chagas' disease is best diagnosed by examination of blood smears for the parasite. Chronic disease, however, is best diagnosed by serology. If this patient's serologies are negative, an upper endoscopy should be done to rule out other secondary causes of such findings such as a tumor at the GE junction (pseudoachalasia).

CHAPTER 28: PANCREATIC AND BILIARY DISEASE (BA)

Q.1. A 42-year-old accountant is referred to your office for evaluation of progressive weight loss. He has lost 20 pounds over the last 6 months. He has a long history (16 years) of insulin-dependent diabetes mellitus. He denies alcohol abuse but admits to

heavy smoking (2 packs of cigarettes per day for 20 years). Three days ago he noticed that his urine became dark and that his skin started to itch. He had a CT scan of the abdomen last week that revealed fullness in the head of the pancreas with dilatation of intra- and extrahepatic biliary ducts. The CT scan did not demonstrate a discrete mass in the pancreas or liver, gallstones, or pancreatitis. His physical examination is normal except for obvious jaundice. His blood work reveals WBC count 6.4, total bilirubin 5.7 mg/dL, alkaline phosphatase 340 U/L, amylase 64 U/L, and lipase 47 U/L. Which of the following tests would you order next?

- A. Hepatobiliary scintigraphy (HIDA-scan)
- B. Abdominal ultrasound
- C. Endoscopic retrograde cholangiopancreatography (ERCP)
- D. Percutaneous transhepatic cholangiography
- E. Upper GI series

Answer: C. The patient has developed obstructive jaundice. Obstructive jaundice and severe progressive weight loss in this young male with a long history of diabetes mellitus and heavy smoking could indicate a malignant neoplasm. Dilatation of both intra- and extrahepatic ducts, along with the fullness in the head of the pancreas, are suspicious for obstructing tumor in the head of the pancreas or in the major duodenal papilla (ampullary mass). The patient clinically does not have evidence of gastric outlet or duodenal obstruction (i.e., no nausea or vomiting), so an upper GI series is not indicated. Abdominal ultrasound and HIDA scan are unlikely to provide more information in this case. ERCP will allow visualization of the major duodenal papilla and reveal information about the biliary and pancreatic ducts (e.g., diameter, location, and grade of obstruction). ERCP can also relieve the obstruction with internal biliary stenting. If cannulation of the biliary ducts during the ERCP is not successful, then more invasive percutaneous transhepatic cholangiography is indicated. This patient may also need endoscopic ultrasound with fine-needle aspiration biopsy to rule out an early, small mass in the head of the pancreas not detected by abdominal CT scan.

Q.2. An 82-year-old female nursing home resident was admitted with left-sided aspiration pneumonia. She improved quickly on intravenous antibiotics. During her admission, a chest x-ray incidentally revealed a large calcification in the right upper

quadrant of the abdomen. Subsequent abdominal ultrasound confirmed the presence of a single large stone in the gallbladder (3 cm in diameter). She denies any abdominal discomfort or pain. What would be the best course of treatment for her gallstone disease?

- A. Urgent open cholecystectomy
- B. Elective laparoscopic cholecystectomy
- C. Reassure the patient that she does not need any additional therapy for gallstone at this time
- D. Oral dissolution of the stone with ursodeoxycholic acid
- E. Refer the patient for extracorporeal shock wave lithotripsy

Answer: C. Asymptomatic gallbladder stones do not require treatment. Only 13% of patients with silent gallstones will become symptomatic in the future. For this reason, open or laparoscopic cholecystectomy is not indicated for this patient with a silent gallbladder stone. Oral dissolution is only beneficial for small gallstones, preferably less than 5 mm (smaller stones dissolve faster). Stones larger than 2 cm will rarely be dissolved with this method. Extracorporeal shock wave lithotripsy has limited rate of success and high rate of recurrence and is rarely used in the United States.

Q.3. A 62-year-old woman presents to the emergency room complaining of abdominal pain. The patient had a laparoscopic cholecystectomy for multiple small gallbladder stones eight months ago. She did not have any symptoms after the surgery until last week, when she suddenly developed pain in the right upper quadrant. The painful episode lasted 15 minutes. The next day, the pain returned and became constant. The intensity of pain gradually increased. Today she started to have nausea and vomiting, and her daughter brought her to the emergency room. The patient is febrile (her temperature is 38.6° C) and is jaundiced. Physical examination revealed localized tenderness in the right upper quadrant without a palpable mass. Her blood work showed white blood cell count 16.4/ \square L, total bilirubin 6.3 mg/dL, alkaline phosphatase 347 IU/L, amylase 53 U/L, and lipase 32 U/L. Which of the following would you order *next* for this patient?

- A. Hepatobiliary scintigraphy (HIDA scan)

- B. Viral hepatitis serology
- C. Endoscopic retrograde cholangiopancreatography (ERCP)
- D. Laparotomy with the common bile duct exploration
- E. Liver biopsy

Answer: C. The patient presents with obstructive jaundice and cholangitis. The most likely cause is a retained gallstone or a stricture that developed postcholecystectomy. An HIDA scan, viral hepatitis screening, and liver biopsy are not indicated in this patient with obvious bile duct obstruction. An ERCP may identify the cause of obstruction. Endoscopic sphincterotomy with removal of the stone, or dilatation and stenting of the biliary stricture, will restore patency of the biliary system to cure cholangitis and obstructive jaundice. If ERCP is not successful, the patient will need percutaneous transhepatic drainage of the biliary ducts or laparotomy with the common bile duct exploration.

Q.4. A 25-year-old man with a history of AIDS presents to the emergency room with severe abdominal pain and episodic nausea and vomiting. He describes the pain as constant; it is located in the epigastric area and radiates to the back. The pain started 12 hours ago and is becoming more intense. His current medications include dideoxyinosine (ddI), ganciclovir, and pentamidine. Physical examination reveals a low-grade fever and tenderness in the epigastric area without guarding or rebound. Blood tests demonstrate white blood cells of 6900/ \square L, amylase of 362 U/L, lipase of 428 U/L, and total bilirubin of 1.1 mg/dL. What is/are the possible cause(s) of this patient's problem?

- A. HIV
- B. Cytomegalovirus
- C. Dideoxyinosine (ddI)
- D. Pentamidine
- E. All of the above
- F. None of the above

Answer: E. This patient has acute pancreatitis as evidenced by his symptoms and elevated amylase and lipase. Cytomegalovirus is the most commonly reported viral

infection that can involve the pancreas. HIV and many AIDS-related infections can affect the pancreas (e.g., *Cryptococcus*, *Mycobacterium tuberculosis*, *Candida*, and *Toxoplasma gondii*). Numerous medications may also cause acute pancreatitis (e.g., ddI, pentamidine, trimethoprim/sulfamethoxazole, and metronidazole).

Q.5. A previously healthy 42-year-old woman presents to the emergency room complaining of a 10-day history of abdominal pain and fever. She also notes that for the last three days her urine has been dark. She denies alcohol intake or illicit drug use. Her last menstrual period ended five days ago. Physical examination reveals tenderness in right upper quadrant and icteric discoloration of the skin, but no palpable mass in the abdomen. Blood tests demonstrate a white blood cell count of $8.3/\square L$, total bilirubin of 3.4 mg/dL, alkaline phosphatase of 280 IU/L, amylase of 54 U/L, and lipase of 47 U/L. A CT scan of the abdomen demonstrates a dilated biliary duct (18 mm in diameter) with a possible stone in it. There are no stones in the gallbladder. The intrahepatic ducts are not dilated. The pancreas appears normal. The patient is admitted to the hospital. The next morning an ERCP is performed and reveals a single choledochal cyst (2 cm in diameter) of the common bile duct with a single stone inside the cyst. Endoscopic sphincterotomy is done and the stone is removed from the choledochal cyst. What further management would you offer this patient?

- A. Recommend urgent laparoscopic cholecystectomy
- B. Recommend elective open cholecystectomy
- C. Reassure the patient that no further treatment is necessary
- D. Recommend surgical resection of the choledochal cyst

Answer: D. Choledochal cysts carry high malignant potential. The estimated risk of development of cholangiocarcinoma from the choledochal cyst is 3% to 20%. Laparoscopic or open cholecystectomy will not decrease the risk of future development of cholangiocarcinoma.

Q.6. Which of the following statements regarding pancreatic cancer is correct?

- A. The presence of a palpable gallbladder suggests a tumor in the tail of the pancreas

B. Patients with a tumor in the body or tail of the pancreas have a greater opportunity for surgical cure than do patients with a tumor in the head of the pancreas

C. Serum tumor marker CA 19-9 has a high sensitivity and specificity for pancreatic cancer in patients with signs and symptoms of the disease

D. A HIDA scan should be done as part of the metastatic workup prior to any treatment

Answer: C. Although serum CA 19-9 is not a useful screening tool in asymptomatic patients, it is quite sensitive and specific in patients with symptoms of the disease. Tumors arising from the tail or body of the pancreas are usually associated with a poorer prognosis and these patients are rarely resectable. A palpable gallbladder (Courvosier's sign) has been described as being suggestive of a tumor at the head of the pancreas but not the tail. This sign lacks specificity, however.

Q.7. A 78-year-old woman presents to you after having a total body CT scan done at a local facility. She was told that she has a few gallstones in her gallbladder and should discuss this with her primary physician. An ultrasound was apparently also done, which revealed the presence of a few 1-cm gallstones but no ductal dilatation or gallbladder thickening. She denies any abdominal discomfort or pain. Her aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase are normal. She is concerned because her mother died of complications from a "gallbladder attack." What course of action would you recommend in this patient?

A. Refer the patient for extracorporeal shock wave lithotripsy

B. Elective direct dissolution of the gallstones with methyl-tert-butyl-ether

C. Elective laparoscopic cholecystectomy

D. Reassure the patient that she does not need any additional therapy for the gallstones at this time

E. Oral dissolution of the stone with ursodeoxycholic acid

Answer: D. Asymptomatic gallbladder stones usually do not require treatment. Only 13% of patients with silent gallstones will become symptomatic in future. That

is why open or laparoscopic cholecystectomy is not indicated for this patient with a silent gallbladder stone. Oral dissolution is only indicated for small gallstones, preferably less than 5 mm (smaller stones dissolve faster). Stones larger than 2 cm will rarely be dissolved. Extracorporeal shock wave lithotripsy has a limited rate of success and a high rate of recurrence; it is rarely used in the United States. Direct dissolution of stones is an option in patients with large stones and at high risk for surgery.

Q.8. A 40-year-old woman presents complaining of a one-day history of intense epigastric abdominal, nausea, and vomiting. She reports that she has never had symptoms like this before. She has no significant past medical history. She denies cigarette use. She drinks about two drinks per week socially. She denies drug use. She takes no medications. Her physical examination is remarkable for a temperature of 100.2° F, pulse of 100/min, respiratory rate 20/min, blood pressure 115/75. There is epigastric tenderness that extends to the right upper quadrant. There is no rebound tenderness although there is some voluntary guarding. Bowel sounds are present. Her laboratory values reveal the following:

WBC 8.6/mm³

HCT 36%

Platelets 140/mm³

AST 33 U/L

ALT 22 U/L

Alkaline phosphatase 86 U/L

Amylase 300 U/L

Lipase 250 U/L

Creatinine 1.1 mg/dL

EKG Normal sinus rhythm, no evidence of ischemia

Upright chest x-ray No infiltrates, effusions, or evidence of free air under the diaphragms

What is the most appropriate *next* test to order?

A. Abdominal x-ray

- B. CT scan of the abdomen
- C. Ultrasound of the right upper quadrant and gallbladder
- D. Endoscopic retrograde cholangiopancreatography (ERCP)
- E. Hepatoiminodiacetic acid (HIDA) scan

Answer: C. This woman presents with signs and symptoms consistent with acute pancreatitis. After initial management, the goal should be to determine the underlying etiology of the attack. Gallstones and alcohol are the leading causes in the United States. Since this woman does not have a significant alcohol intake history, gallstones should be suspected. An ultrasound is the best test to detect gallstones. An abdominal x-ray is unnecessary since it would add little information and most gallstones would not be seen on plain x-ray. A CT scan is a good test for imaging the pancreas but ultrasound is better for detecting gallstones. In the absence of evidence of infection or severe pancreatitis, routine CT scanning is unnecessary. ERCP and HIDA scans do not visualize the gallbladder well.

Q.9. A 56-year-old man with a history of alcohol abuse presents complaining of diarrhea. He complains of frequent, foul-smelling, oily bowel movements that have gone on for about six months. He notes weight loss of 20 pounds over that period of time. He denies any abdominal pain, nausea, or vomiting. He reports that he used to have frequent episodes abdominal pain that were diagnosed as pancreatitis. He therefore stopped drinking about two years ago. His laboratory values are notable for normal AST, ALT, lipase, and amylase. All of the following statements regarding this man's condition are correct *except*

- A. A 72-hour fecal fat level is likely to be elevated
- B. Treatment for this condition consists of pancreatic enzyme replacement and a lactose-free diet
- C. Elevated lipase levels are usually not seen with this presentation
- D. A CT scan of the pancreas is likely to reveal calcifications
- E. A blood glucose level should be checked since diabetes frequently coexists with this condition

Answer: B. This man presents with evidence of pancreatic insufficiency due to chronic pancreatitis. Diarrhea and malabsorption (steatorrhea) are the hallmarks of

this manifestation of chronic pancreatitis. A 72-hour fecal fat should be elevated in such patients. Low fecal levels of chymotrypsin should also be seen. When pancreatic exocrine function declines due to chronic pancreatitis, the output of lipase from the pancreas is about 10 to 15% of normal, so serum levels will be low or normal instead of high (as seen in acute pancreatitis). Diarrhea is frequently accompanied by diabetes as a result of destruction of islet cells and impaired insulin production. Treatment of steatorrhea from chronic pancreatitis includes pancreatic enzymes and a low-fat diet. A lactose-free diet is not indicated.

Q.10. A 46-year-old woman with a history of alcohol abuse is admitted for acute pancreatitis due to alcohol. She is treated with supportive care but continues to deteriorate over 72 hours. A CT scan is obtained that reveals extensive pancreatic inflammation with the suggestion of necrosis. All of the following statements are correct regarding this patient's management *except*

- A. Endoscopic retrograde cholangiopancreatography (ERCP) should be performed urgently
- B. Antibiotic therapy with imipenem should be initiated
- C. A CT-guided needle aspirate of the pancreas should be obtained
- D. Surgical debridement should be initiated if gram stain and cultures from a pancreatic aspirate are indicative of infection
- E. Parenteral nutrition should be initiated

Answer: A. This woman presents pancreatitis that is worsening despite conservative management. A CT scan is suggestive of necrotizing pancreatitis. Management would include empiric initiation of antibiotics and parenteral nutrition (if it has not already begun). When necrotizing pancreatitis is diagnosed, a CT-guided aspirate should be done and, if it is positive for infection, surgical debridement is recommended. ERCP has no role in this patient's management since the etiology is known to be alcohol.

CHAPTER 29: DISORDERS OF THE SMALL AND LARGE INTESTINE

Q.1. A 25-year-old dental technician has noticed a 10-pound weight loss despite increased appetite, generalized weakness, and constipation with infrequent but unusually voluminous and malodorous stools. On physical examination, he is thin, pale, and appears tired. His abdomen is protuberant but soft. Labs reveal a microcytic anemia. Which of the following is *least* likely to be helpful?

- A. Upper endoscopy
- B. 72-hour stool collection for fecal fat
- C. CT scan of the abdomen
- D. Anti-endomysial antibodies
- E. Colonoscopy

Answer: E. This young man with weight loss, malodorous, bulky stools, increased appetite, and iron deficiency anemia has celiac disease as the most likely diagnosis. Patients occasionally may feel constipated; however, the stools are unusually bulky and consistently malodorous. The disease is diagnosed by biopsy of the small bowel by upper endoscopy (Answer A). Elevated anti-endomysial antibodies are highly suggestive. Fat malabsorption can be rigorously established by fecal fat collection. The differential diagnosis includes chronic pancreatitis, which is best evaluated by CT scan. A colonoscopy is helpful to evaluate iron deficiency anemia to rule out colonic tumors or other causes of occult blood loss or to assess for inflammatory bowel disease. However, in this patient with malabsorption, increased appetite, and young age, sprue is more likely to explain the constipation and iron deficiency anemia. He does not have abdominal pain, blood in the stools, or diarrhea, the most common symptoms of inflammatory bowel disease. Colonoscopy will be less useful.

Q.2. A 47-year-old web designer has a 14-year history of ulcerative colitis. He recently moved to your area and presents to your office for continued management of his ulcerative colitis. He has been asymptomatic for the past two years and off all medications for one year with no rectal bleeding, diarrhea, abdominal pain, tenesmus, or fever. Before that he had very active colitis requiring steroids and immunosuppressants. He brings records from his previous physician that include his

last three colonoscopy and pathology reports. The reports from 6 and 12 years ago documented active colitis with friable mucosa from the mid-transverse colon to the rectum, superficial ulcerations, crypt abscesses and crypt distortion, and acute and chronic inflammation. The most recent report, from almost three years ago, was fairly unremarkable endoscopically. Numerous random biopsies had been obtained. They showed mucosal changes on histology also consistent with a history of ulcerative colitis, but there was no evidence of active disease. What do you recommend?

- A. Initiate steroids; if stools are heme-occult positive, then refer for colonoscopy
- B. Do not start steroids; if stools are heme-occult positive, then refer for colonoscopy
- C. Start steroids; refer for colonoscopy
- D. Do not start steroids; refer for colonoscopy

Answer: D. The patient has not had active disease for several years and remains well despite being off medications for the past year. Steroids are indicated for active disease only, and steroids do not prevent recurrence. Ulcerative colitis is a chronic disease with recurrence expected. An argument can be made for azulfidine or mesalamine; 5-ASA agents have been documented to decrease flares and appear to decrease the risk of dysplasia and eventual colon cancer. Patients with ulcerative colitis for more than eight years should undergo colonoscopy every two years with random biopsies taken every 10 cm to rule out dysplasia; then more frequently after 20 years of disease. Definitive evidence of dysplasia requires referral for colectomy to avoid the extremely high risk of colon cancer. Presence of occult blood in the stool will not change endoscopic management because this patient needs to be on a regular screening protocol regardless of heme-occult status.

Q.3. A 56-year-old man has had profuse watery diarrhea for three months. Measured stool electrolytes are as follows: Na^+ 30 mmol/L, K^+ 85 mmol/L, Cl^- 15 mmol/L, and HCO_3^- 18 mmol/L. Which diagnosis is *least* likely?

- A. VIPoma
- B. Lactose intolerance
- C. Laxative abuse

D. Celiac sprue

Answer: A. The patient has a stool osmolar gap of 60. Since it is greater than 40, it is suggestive of an osmotic diarrhea. Vasoactive intestinal peptide tumors (VIPomas) cause secretory diarrhea and no osmotic gap. The other three all cause osmotic diarrhea.

Q.4. A 66-year-old woman, a recently retired social worker who cares for her disabled husband, has been experiencing left lower quadrant discomfort. For the past few months, she has been having bowel movements every other day, which is a change from her usual once or twice per day. She has a long history of noninsulin-dependent diabetes mellitus, arthritis, hypothyroidism, and hypertension. Medications are glyburide 5 mg, levothyroxine 0.1 mg, and diltiazem (extended release) 240 mg four times a day (previously managed on propranolol but changed on her last visit to diltiazem because of depressed mood), and ibuprofen as needed. She is very worried about colon cancer although she had a normal colonoscopy last year. What is the best plan for her?

- A. Initiate daily fiber supplements with magnesium hydroxide as needed and obtain a gastroenterology consult for a repeat colonoscopy
- B. Check her thyroid function and initiate daily fiber supplements and magnesium hydroxide as needed
- C. Initiate fiber supplements and magnesium hydroxide as needed and offer her psychological counseling for her symptoms
- D. Discontinue the diltiazem and place her on an ACE inhibitor

Answer: D. New onset of constipation will most often have a nonfunctional cause. In this case, the most likely cause is the change of antihypertensives to a calcium channel-blocker. These medications are more often associated with constipation than are α -blockers. New-onset constipation can sometimes be a symptom of colon cancer (Answer A), but this would be less likely in a patient that had a recent negative colonoscopy. One could consider a repeat colonoscopy should the constipation be persistent after addressing more likely causes. Constipation may also be secondary to hypothyroidism (Answer B), and one should be suspicious of hypothyroidism (especially in females and elderly patients). However, the calcium channel-blocker is a more likely cause than is noncompliance with a reasonable dose of thyroid

medication in this social worker that cares for her disabled husband. Similarly, stress may play a role in her constipation, but the correlation between medications and the constipation should be addressed first and is more likely to be helpful.

Q.5. A 40-year-old man complains of crampy abdominal pain associated with intermittent loose stools for the last three months. He had been healthy until he developed a week of severe diarrhea while visiting India. He then took metronidazole for a week. The diarrhea was resolving by then but evolved soon afterward into his current symptoms. He finds that eating precipitates his symptoms although his weight is stable. Physical examination is unremarkable. Stool microscopy is negative and labs are unrevealing. Which of the following diagnoses is the most likely explanation for his current symptoms?

- A. Irritable bowel syndrome
- B. Giardiasis
- C. Crohn's disease
- D. Lactose intolerance

Answer: A. Postinfectious irritable bowel syndrome is an increasingly recognized form of the disease as several studies have demonstrated that a prior bout of gastroenteritis is found in approximately 10 to 20% of individuals with IBS. Giardiasis is a common cause of acute infectious diarrhea, and a single stool examination may not be sufficient for the diagnosis, but giardiasis usually resolves within several weeks without becoming a chronic illness and usually clears with metronidazole. Acquired lactose intolerance commonly occurs with intestinal infections but resolves once the infection clears. The onset of Crohn's disease does not typically occur after a bout of gastroenteritis, although intestinal bacteria are thought to fuel inflammation in Crohn's disease and antibiotics, such as ciprofloxacin and metronidazole, are used in the management of the disease.

Q.6. A 32-year-old woman with a one-year history of ulcerative colitis involving her whole colon presents with a one-week history of severe abdominal pain and bloody diarrhea about 10 times per day. Her heart rate is 95/min, blood pressure 100/60, temperature 37.4° C. Abdominal exam reveals mild abdominal distention with bowel sounds. Stool culture is negative for infection. The patient is admitted and treated

with intravenous corticosteroids and oral mesalamine. Her abdominal x-ray reveals a cecal diameter of 10 cm. Seventy-two hours after admission her symptoms have minimally improved; she is having about eight episodes of bloody diarrhea, but still has constant abdominal pain, and her examination and abdominal x-ray findings are unchanged. Which of the following options would be *inappropriate*?

- A. Refer the patient for emergency colectomy
- B. Add narcotics to treat the abdominal pain
- C. Start intravenous infliximab
- D. Start intravenous cyclosporine

Answer: B. Narcotics are contraindicated in the setting of toxic megacolon, as are anticholinergics and other agents that may adversely affect colonic tone such as may occur with hypokalemia or hypomagnesemia. Narcotics decrease colonic transit and can result in increased colonic dilatation and the risk of colonic perforation. Emergent colectomy is indicated in the setting of toxic megacolon if warning features occur such as increasing colon diameter, abdominal distention or decreasing bowel sounds. Even prior to such warning symptoms developing, patients often undergo colectomy in the setting of toxic megacolon if corticosteroids fail to induce remission as ultimately, approximately half of affected patients ultimately require colectomy even when other medical therapies such as cyclosporine induces remission. One week of intravenous cyclosporine induces remission in one half to two thirds of patients with severe ulcerative colitis. Infliximab is better known for its effectiveness in inducing remission in patients with Crohn's disease, but recent studies demonstrate similar effectiveness in treating acute severe ulcerative colitis.

Q.7. A 55-year-old man presents complaining of frequent foul-smelling stools, excess gas, 10-pound weight loss, and unsteadiness of gait. His past history includes multiple prior episodes of small intestinal obstruction arising from adhesions from abdominal surgery for trauma. He still complains of occasional periumbilical pain after eating, and has generalized aches and pains and chronic soreness around his mouth. He takes a proton pump inhibitor for gastroesophageal reflux. Apart from his previous scars, his abdominal exam is normal. He has absent ankle jerks and he is unable to maintain an upright posture gait with his feet together once he closes his eyes. His investigations reveal stool fat levels of 15 g/24 hours. His labs are notable

for macrocytic anemia, an elevated alkaline phosphatase, and a low serum albumin. CT of his abdomen reveals some mildly dilated small bowel loops. Which of the following statements are *incorrect*?

- A. A hydrogen breath test is likely to show bacterial overgrowth
- B. His serum folic acid levels may be elevated and his vitamin B₁₂ is likely to be low
- C. His proton pump inhibitor is probably contributing to his symptoms
- D. Pancreatic insufficiency could explain these findings
- E. The finding of partial villous atrophy suggests that his primary problem is the result of mucosal enteropathy

Answer: E. He has fat malabsorption and steatorrhea secondary to bacterial overgrowth from intestinal stasis arising from his adhesions. Bacterial overgrowth leads to vitamin B₁₂ deficiency from bacterial consumption of B₁₂. His B₁₂ deficiency has caused him to develop subacute combined degeneration of the cord with a positive Romberg's sign, stomatitis, and evidence of a peripheral neuropathy. Folic acid levels may increase as folate is produced by luminal bacteria. The reduction in gastric acid by proton pump inhibitors increases intestinal bacteria and is probably exacerbating bacterial overgrowth in this setting. Acid is also needed to release protein-bound vitamin B₁₂ from food, and individuals who take PPIs absorb less vitamin B₁₂ from food but rarely to such an extent that it leads to vitamin B₁₂ deficiency. Many patients with small bowel bacterial overgrowth have mildly abnormal intestinal villi, which occur secondary to the effect of excess bacteria. Since his bacterial overgrowth is related to his anatomy, he will require regular cycles of antibiotics.

Q.8. A 75-year-old man presents two days after having sudden onset of abdominal pain in his left lower quadrant, which lasted for one day and was associated with the passage of several episodes of bloody stool. His pain has now resolved. He had a similar episode one month previously. His past medical history is notable for hypertension, diabetes mellitus, atrial fibrillation, and previous coronary artery bypass surgery. His medications include a β -blocker, metformin, and digoxin. His last screening colonoscopy four years ago was unremarkable. His abdominal exam is notable for mild tenderness in his left lower quadrant but is otherwise unremarkable.

His cardiovascular exam is notable for an irregular heart rhythm with a normal ventricular rate. His labs reveal mild anemia, mildly elevated glucose levels, a normal white count and lactate levels and his abdominal x-ray is unremarkable. Which of the following statements are *incorrect*?

- A. Diverticulitis, inflammatory bowel disease, or colonic ischemia could explain his symptoms
- B. A normal colonoscopic exam the day after admission would make colonic ischemia an unlikely diagnosis
- C. Competitive long-distance running, digoxin, estrogens, and vasopressin are known causes of colonic ischemia
- D. The finding of colitis and diverticula in the sigmoid colon could result from diverticulitis, inflammatory bowel disease, or colonic ischemia.

Answer: B. Colonic ischemia is the most likely diagnosis. Although diverticulitis and inflammatory bowel disease are possible, the short history is against IBD and to a lesser extent diverticulitis because the symptoms resolved without antibiotics. Colonic ischemia can present with mild transient symptoms that resolve without evidence on colonoscopy or persist with segmental hemorrhagic colitis, bleeding into the submucosa, gangrene, and eventually structuring. In addition to the causes listed in Answer C, other well-recognized causes of colonic ischemia include emboli, hypotension, vasculitis, hypercoagulable states, vascular surgery, and other drugs such as cocaine.

Q.9. A 46-year-old man had profuse diarrhea for two months. He notes that the diarrhea continues throughout the day. Fasting does not decrease the diarrheal episodes. He has tried using loperamide, but the relief is temporary. He notes a 10-pound weight loss over the last two months. He notes that he is not taking any medications except for the loperamide. Upon questioning, he recently quit smoking and has been chewing a lot of sugarless gum. You measure his stool electrolytes. The results are as follows:

- Na⁺ 40 mmol/L
- K⁺ 90 mmol/L
- Cl⁻ 15 mmol/L

HCO_3^- 18 mmol/L

What is the most likely diagnosis?

- A. Lactase deficiency
- B. Sucrase deficiency
- C. VIPoma
- D. Inadvertent excess sorbitol ingestion (e.g., through gum chewing)

Answer: C. This patient has chronic diarrhea that does not improve with fasting. This is a key feature in distinguishing between osmotic and secretory diarrhea. Additionally, his stool electrolytes do not reveal an osmolar gap (as seen with osmotic diarrhea). His osmolar gap is $290 - [(40 + 90) \times 2] = 30$, which is normal. An osmolar gap of greater than 50 is suggestive of osmotic diarrhea. Lactase deficiency, sucrase deficiency, and sorbitol ingestion would all cause an osmotic diarrhea. A VIPoma is the only one of the choices that causes a secretory diarrhea.

Q.10. All of the following are extraintestinal manifestations that are associated with ulcerative colitis *except*

- A. Arthritis
- B. Sclerosing cholangitis
- C. Autoimmune hemolytic anemia
- D. Uveitis
- E. Perianal fistula formation

Answer: E. There is a number of extraintestinal manifestations of ulcerative colitis including arthritis (i.e., seronegative spondyloarthropathy), primary sclerosing cholangitis, warm-antibody hemolytic anemia, and uveitis and episcleritis. Fistula formation is a hallmark of Crohn's disease and helps distinguish between the two processes.

Q.11. A 62-year-old man presents complaining of abdominal pain and diarrhea. He notes that the symptoms have been going on for three months now and he has lost about 20 pounds over that span. He also complains of migratory arthralgias for the

past year. He denies any past medical history. He never smoked cigarettes and drinks about two beers per week. He denies use of illicit drugs. A review of records from an evaluation done by another physician reveals a normal thyroid-stimulating hormone level, negative ANA, a normal sedimentation rate, and a negative HIV test. He had a flexible sigmoidoscopy done, which failed to reveal any abnormalities. You refer him for upper endoscopy and a duodenal biopsy is done, which reveals extensive PAS-positive material in the lamina propria and villous atrophy. What is the most appropriate therapy for this patient?

- A. A gluten-free diet
- B. A lactose-free diet
- C. Cholestyramine
- D. Trimethoprim/sulfamethoxazole
- E. Prednisone

Answer: D. This man presents with the hallmarks of Whipple's disease (i.e., abdominal pain, diarrhea, weight loss, and arthralgias). His workup has made the diagnoses of thyroid disease, HIV, inflammatory bowel disease, and collagen vascular diseases unlikely. His small bowel biopsy is consistent with changes seen in Whipple's disease. Electron microscopy of the specimen should be able to identify the Whipple bacillus. In contrast, the pathologic findings in celiac disease include decreased villous height to crypt depth, decreased epithelial surface cell height, and increased lymphocytic infiltration of the mucosa. PAS-positive material in the lamina propria is not seen. The treatment for Whipple's disease is one year of trimethoprim/sulfamethoxazole. A gluten-free diet would be used for celiac disease. A lactose-free diet is indicated for patients with lactose intolerance. Cholestyramine is used for patients with bile acid diarrhea, usually in the setting of ileal disease. Prednisone can be used in some cases of inflammatory bowel disease and refractory celiac sprue but is not appropriate for Whipple's.

CHAPTER 30: ACUTE AND CHRONIC LIVER DISEASE

Q.1. A 50-year-old woman presents with nocturnal pruritus, an elevated alkaline phosphatase of 284 U/L, and normal bilirubin and aminotransferases. She is on no

medications and has a normal physical examination. Ultrasound of the liver reveals no ductal abnormalities and no gallstones. What should be the next step?

- A. Request an ERCP
- B. Obtain a CT scan
- C. Check viral serologies
- D. Check antimitochondrial antibodies

Answer: D. This presentation is typical of primary biliary cirrhosis. Viral hepatitis does not present with only alkaline phosphatase elevation. With a normal ultrasound, no pain, and no jaundice, common bile duct stone is unlikely. A CT scan will not add any more information in this setting. Antimitochondrial antibodies are positive in over 90% of patients with primary biliary cirrhosis.

Q.2. A 24-year-old man presents with emotional lability and jaundice. Labs reveal a hemoglobin of 10 g/dL, total bilirubin of 8 mg/dL with direct fraction of 2.2, alkaline phosphatase of 89 U/L, AST and ALT in the 1500 U/L range, negative viral serologies, and negative toxicology screen. Which of the following is correct?

- A. He should have a serum ceruloplasmin checked
- B. He should be sent home and labs rechecked in one week
- C. He should have a CT of the head
- D. He should be admitted and have a 24-hour urine copper assay

Answer: D. This is an acute presentation of Wilson's disease. The patient has neuropsychiatric symptoms, liver disease, and evidence of hemolytic anemia. Ceruloplasmin in this setting is not reliable because it is an acute phase reactant. The diagnosis is best made by quantifying copper in liver tissue, but a 24-hour urinary copper is also a very sensitive tool and will show greater than 100 μ g of copper.

Q.3. A 48-year-old woman presents with an elevated ALT found on an insurance screening examination. Her hepatitis C antibody test is positive. She denies any risk factors for hepatitis C. What should you do?

- A. Reassure her that this is not a dangerous condition and recommend no therapy

- B. Repeat liver enzymes in six months
- C. Begin treatment with prednisone
- D. Check a hepatitis C RNA PCR

Answer: D. This woman has a positive antibody test in the setting of an elevated ALT. She denies any risk factors for hepatitis C, so it is imperative to rule out a false positive test. Hepatitis C RNA is a highly specific test to confirm the diagnosis. Because ALT levels do not predict severity of disease, there is no need to follow enzyme levels. All hepatitis C patients should be referred for consideration of therapy with interferon and ribavirin, not prednisone.

Q.4. The presence of which of the following antibody tests (IgG) indicate probable immunity to hepatitis B?

- A. Anti-HBc
- B. Anti-HBe
- C. Anti-HBs
- D. Anti-HDV

Answer: C. Surface antibody is indicative of immunity to hepatitis B infection. Core IgG antibody and antibody to e antigen indicate past or current infection but do not confer immunity.

Q.5. A 28-year-old woman at 34 weeks of gestation presents with elevated liver enzymes and pruritus. Labs reveal total bilirubin to be 4.2 mg/dL, AST 480 U/L, ALT 640 U/L, and alkaline phosphatase 232 U/L. Viral hepatitis serologies and ANA are negative. On physical examination, she is jaundiced, but has a normal blood pressure, no edema, and a soft abdomen. The fetus is in no distress. Which of the following is true?

- A. The baby should be delivered immediately
- B. Symptoms will resolve promptly after delivery
- C. There is little risk of recurrence with subsequent pregnancies

D. The mother should be screened for long chain 3-hydroxacyl-CoA dehydrogenase (LCHAD) deficiency

Answer: B. The likely diagnosis is intrahepatic cholestasis of pregnancy, which resolves after delivery. Prompt delivery is indicated only for fetal distress. Intrahepatic cholestasis tends to recur with subsequent pregnancies and can be treated with cholestyramine and ursodeoxycholic acid. LCHAD deficiency is associated with acute fatty liver of pregnancy and HELLP syndrome.

Q.6. A 35-year-old male patient presents with right upper quadrant pain, fever for the past 48 hours, preceded by new onset jaundice over the past few weeks. He states that he has had diarrhea on and off for several years but never had this investigated. A liver ultrasound is negative for gallstones or evidence of cholecystitis. His lab tests reveal total bilirubin 6.2, alkaline phosphatase 450, AST 150, ALT 120, albumin 2.6. The next diagnostic test of choice would be

- A. Liver biopsy
- B. Magnetic resonance cholangio-pancreatography
- C. Hepatitis B surface antigen and hepatitis C RNA assay
- D. Colonoscopy with biopsies

Answer: B. Magnetic resonance cholangiopancreatography to diagnose intrahepatic strictures associated with primary sclerosing cholangitis, and to exclude other causes of intrahepatic cholestasis. The patient likely has undiagnosed ulcerative colitis. If confirmed, an urgent endoscopic retrograde cholangiopancreatogram may be helpful to drain any pockets of obstructed bile flow. Liver biopsy is nondiagnostic in PSC, and should not be performed in the setting of acute cholangitis.

Q.7. The diagnosis of hemochromatosis involves all of the following *except*

- A. Serum iron levels and transferrin saturation
- B. Serum ferritin
- C. Liver biopsy with iron quantitation
- D. Evaluation for C282Y mutation

E. Slit lamp examination for KF rings

Answer: E. Slit lamp examination is performed when there is clinical suspicion of Wilson's disease. All the other markers are used in the diagnosis. Transferrin saturation is the ideal screening test, since serum ferritin is an acute phase reactant and therefore may be elevated nonspecifically. However, the gold standard for diagnosis is liver biopsy with iron quantitation. Genetic mutations (i.e., C282Y and H63D) may be seen in approximately 85% of patients with hemochromatosis and therefore is not a good test to screen for hemochromatosis.

Q.8. Patients with autoimmune hepatitis disease may have the following presentations *except*

- A. AST 2000, ALT 2500, T Bili 4
- B. New onset jaundice and hepatic encephalopathy
- C. ALP 300, ALT 50, T Bili 3.5
- D. Multiple relapses over several years
- E. Dramatic responsiveness of AST/ALT levels to oral prednisone therapy

Answer: C. Autoimmune hepatitis may present with a fulminant or subfulminant course with new onset of hepatic encephalopathy and transaminases greater than 2000. It tends to relapse without maintenance treatment, and responds well to oral prednisone in a vast majority of cases. However, autoimmune hepatitis does not tend to present with a cholestatic picture as described in C, unless associated with overlap syndromes with PBC or cholangiopathy.

Q.9. Which of the following statements is true?

- A. Alcoholic hepatitis typically has an AST/ALT ratio less than 2
- B. Alpha-1 Antitrypsin (A1AT) deficiency is associated with arteriovenous malformations of the brain
- C. Serum A1AT levels are diagnostic of A1AT deficiency
- D. Hepatitis A infection may have a relapsing course

Answer: D. Hepatitis A may develop a relapsing course with worsening transaminases after an initial improvement. This may continue for several months. However, there is no chronic form of hepatitis A infection, unlike hepatitis B or C. Alcoholic hepatitis typically has an AST/ALT ratio greater than 2. A1AT deficiency is associated with lung disease, liver disease, panniculitis, and Wegener's granulomatosis. Serum A1AT levels are used as a screen for A1AT deficiency but A1AT phenotyping (MM, MZ, ZZ, etc.) is recommended for diagnosis.

Q.10. A 52-year-old Chinese man with chronic hepatitis B presents with abdominal pain and new ascites. Ultrasound of the liver reveals enlarged liver, and portal vein thrombosis. The most likely diagnosis is

- A. Acute flare of hepatitis
- B. Hepatocellular carcinoma
- C. Outflow obstruction and congestion
- D. Superinfection with hepatitis D

Answer: B. Hepatomegaly, portal vein thrombosis, or new ascites in someone with chronic hepatitis B is hepatocellular carcinoma until proven otherwise. Replication flares do not typically present with pain or hepatomegaly.

Q.12. A 16-year-old woman with no significant medical history presents with quickly progressing encephalopathy and jaundice. A friend feels she may have taken a bottle of acetaminophen tablets one day prior to admission. Her bilirubin is 2.4 mg/dL, alkaline phosphatase 240 U/L, AST 2400 U/L, ALT 3200 U/L, creatinine 2.7, arterial pH 7.2, INR 6.6, and acetaminophen level 60. Which of the following is *false*?

- A. She will likely need a liver transplant
- B. She should be intubated and hyperventilated
- C. She should be transferred to a transplant center only if she does not awaken with lactulose therapy
- D. She should receive N-acetylcysteine

Answer: C. This young woman has a poor prognosis for recovery using the King's College criteria, and will likely need a liver transplant. She should be intubated

immediately for airway protection, given N-acetylcysteine, and transferred to a transplant center. Lactulose has no efficacy in acute liver failure.

Q.13. A 52-year-old man with a history of hypertension presents for a follow-up visit. He denies any complaints. His only medication is hydrochlorothiazide. He has some laboratory tests done that reveal mild elevations of his ALT and AST levels. His total bilirubin and alkaline phosphatase levels are normal. He is brought back to have his tests repeated and to have further testing. His AST and ALT are still elevated. His iron studies are normal. His hepatitis C antibody is negative. His hepatitis A IgM is negative. His hepatitis B surface antigen and antibody are negative. His IgM antibody to hepatitis B core antigen (IgM anti-HBc) is positive. Which of the following statements is correct?

- A. He is a chronic carrier of the hepatitis B virus
- B. There is a 90% chance that he is positive for hepatitis D
- C. Hepatitis B infection has been ruled out
- D. If his hepatitis B surface antibody turns positive in three months, then he had an acute hepatitis B infection
- E. Both A and B

Answer: D. The most specific marker for the diagnosis of acute hepatitis B is IgM antibody to hepatitis B core antigen (IgM anti-HBc). However, false positives can occur. Chronic carriers of hepatitis B will typically have a positive hepatitis B surface antigen (HbsAg) and a positive IgG antibody to hepatitis B core antigen (IgG anti-HBc). Patients may sometimes be low-level carriers with a negative HbsAg and only a positive IgG anti-HBc. Hepatitis D requires the presence of HbsAg to cause infection. It is associated with acute HBV infection (predominantly in intravenous drug users) but the overall incidence is low. When a patient presents with this pattern, repeating the tests in two to three months may assist in the diagnosis. If the IgM anti-HBc disappears and either a hepatitis B surface antibody or IgG anti-HBc appears, then it is likely that he had an acute infection.

Q.14. A 50-year-old woman presents complaining of pruritus. She reports that for the last eight months she has been itching, particularly around her trunk. Her

medical history is notable only for hypertension and obesity. Her current medications include hydrochlorothiazide, estrogen, and progesterone. Her labs are notable for an alkaline phosphatase of 487 U/L, an alanine aminotransferase (ALT) of 46 U/L, and an aspartate aminotransferase of 52 U/L. Her total bilirubin is 2.5 mg/dL with a direct bilirubin of 1.6 mg/dL. Which of the following statements is correct?

- A. Her antimitochondrial antibody is likely to be positive
- B. A serum ceruloplasmin level would be low
- C. She probably has autoimmune hepatitis
- D. Her estrogen and progesterone should be discontinued since they are probably responsible for her liver abnormalities
- E. The most likely etiology for her liver abnormalities is nonalcoholic fatty liver disease

Answer: A. This woman presents with an elevated alkaline phosphatase, mildly elevated transaminases, and an elevated bilirubin level. The alkaline phosphatase elevation is out of proportion to the other tests, suggesting a biliary process. Primary biliary cirrhosis (PBC) would present as such. Antimitochondrial antibodies are seen in most cases of PBC. Ceruloplasmin is usually low in Wilson's disease which can present with elevation of the transaminases and neuropsychiatric disturbances in young patients. Likewise estrogen administration, fatty liver, and autoimmune hepatitis should present with primary elevations of the transaminases rather than the alkaline phosphatase.

CHAPTER 31: COMPLICATIONS OF LIVER DISEASE

Q.1. Which of the following statements about pulmonary manifestations of liver disease is *incorrect*?

- A. Patients with hepatopulmonary syndrome typically show decreased oxygen saturation when going from sitting to lying
- B. Emphysema can be the initial presentation of alpha-1 antitrypsin deficiency
- C. Hypoxemia can develop from right-to-left intrapulmonary shunting of blood
- D. Primary biliary cirrhosis has been associated with fibrosing alveolitis

Answer: A. The hepatopulmonary syndrome is characterized by platypnea (difficulty breathing when going from lying to sitting) and orthodeoxia (decreased oxygen saturation upon sitting). It is associated with left-to-right shunting of blood. Alpha-1 antitrypsin deficiency and primary biliary cirrhosis are associated with the parenchymal lung diseases mentioned in B and D.

Q.2. A 50-year-old man with a history of alcoholic cirrhosis presents with new-onset ascites, fever, chills, and abdominal pain. His ascitic fluid is sampled and reveals a white blood cell count of 750/mL with 50% neutrophils. Gram stain of the fluid shows white blood cells but no organisms. Which of the following statements is correct regarding this patient's care?

- A. He should be started on ampicillin immediately until fluid cultures identify a specific pathogen
- B. Given the negative Gram stain, he should not be treated with antibiotics unless the ascitic fluid culture is positive
- C. He has a high likelihood of having another episode similar to this within the next year
- D. After being treated for this infection, he should be put on chronic suppressive therapy with daily administration of clindamycin

Answer: C. This patient has more than 250 neutrophils in his ascitic fluid and presents with symptoms typical of bacterial peritonitis. He should be treated with antibiotics regardless of the Gram stain and culture results because they can often be negative. Empiric therapy usually consists of a broad-spectrum agent such as cefotaxime. Recurrent episodes are common, with 70% of patients experiencing a second episode within one year. Prophylactic therapy is indicated for patients with recurrent infections but not after the first infection. Clindamycin or ampicillin would be poor antibiotic choices; better coverage against enteric gram-negatives would be warranted (e.g., norfloxacin).

Q.3. A 46-year-old man with a history of cirrhosis is brought in by his wife because he has been acting strangely. On examination, he is disoriented, is ataxic, and has slurred speech. He is also hyperreflexic. His white blood cell count is normal. His

hematocrit is 34%. Coagulation times are elevated. His ammonia level is normal. Which of the following statements regarding his management is correct?

- A. He should be treated with a low-protein diet and lactulose
- B. Lorazepam is the drug of choice to control his behavior
- C. He should be placed on gentamicin prophylactically to prevent the development of peritonitis
- D. If the patient complains of pain, acetaminophen should be avoided and nonsteroidal anti-inflammatory agents should be used

Answer: A. This patient has stage 2 hepatic encephalopathy. He should be treated with lactulose despite the normal ammonia level because this test is neither sensitive nor specific as a marker for encephalopathy. A low-protein diet is also recommended. All potentially nephrotoxic (e.g., NSAIDs, gentamicin) or sedating (e.g., lorazepam) medications should be avoided. Acetaminophen should be avoided as well.

Q.4. The following statements about liver transplantation are true *except*

- A. Allocation of cadaveric liver organs is based on an objective assessment of severity of liver disease
- B. Primary care doctors often assist in long-term post-transplant management
- C. Post-transplant preventive care includes hypertension, hyperlipidemia, diabetes mellitus, obesity, and bone disease
- D. Patients receive liver transplant based solely on waiting times

Answer: D. The allocation of cadaveric liver organs is based on severity of liver disease (model for end stage liver disease [MELD] score), rather than solely relying on waiting times. Primary care physicians are often involved in the long-term management of liver transplant patients, especially preventative care.

Q.5. All of the following are absolute contraindications to immediate liver transplantation *except*

- A. Metastatic cancer

- B. Human immunodeficiency virus (HIV)
- C. Severe chronic obstructive pulmonary disease with an FEV1 of 0.6 L
- D. Acute streptococcal pneumonia in a patient with asthma

Answer B. Patients with acute infection outside the liver, severe cardiac or pulmonary disease, or metastatic cancer are not eligible for liver transplantation. Patients with HIV, however, are candidates for transplant if they do not have advanced disease (CD4 <200, viral load >400 copies/mL)

Q.6. A 48-year-old man with a history cirrhosis secondary to hepatitis C presents to the emergency room with confusion, altered mentation, and erratic behavior. He is afebrile. His examination is notable for grossly normal motor strength throughout, hyperreflexia, asterixis, bulging flanks, and shifting dullness. His total bilirubin is 6 mg/dL, his creatinine is 1.8 mg/dL, and his prothrombin time is elevated. His white blood cell count is 11,000/ μ L with 85% neutrophils. His ammonia level is 30 μ g/dL (normal 15–45 μ g/dL). Which of the following statements is correct?

- A. Given his normal ammonia level, he does not have hepatic encephalopathy and another cause for his change in mental status should be entertained
- B. Despite his normal temperature, his ascitic fluid should be sampled to rule out bacterial peritonitis
- C. Empiric antibiotic therapy with an aminoglycoside should be started to cover gram-negative enteric organisms
- D. Lactulose should be started and the dose titrated to achieve an ammonia level of less than 10 μ g/dL

Answer B. This man presents with probably hepatic encephalopathy. His normal ammonia level does not rule hepatic encephalopathy, as it is neither sensitive nor specific for the disorder. Since he has evidence of ascites and encephalopathy, subacute bacterial peritonitis needs to be excluded by sampling the peritoneal fluid. This is indicated despite the normal temperature. Aminoglycosides should be avoided given his elevated creatinine and risk for hepatorenal syndrome. Lactulose is often used for hepatic encephalopathy but it is titrated to maintain two to four loose stools per day and not to the ammonia level.

Q.7. A 56-year-old woman with a history of alcoholic cirrhosis presents with increasing abdominal girth. She has no other complaints. Her examination reveals bulging flanks and shifting dullness. She has had no history of ascites in the past. She is currently on no medications. She used to drink a case of beer per day but says that she stopped three months ago. Her ascitic fluid is sampled and reveals an albumin level of 1.0 g/dL. Her serum albumin level is 3.0 g/dL. There are a 125 wbc/mL (60% neutrophils). An ethanol level is positive in the blood. Which of the following is the most appropriate next step in her management?

- A. Obtain a CA 19-9 level to rule out hepatocellular carcinoma
- B. Repeat the paracentesis and send fluid for cytology
- C. Perform a large-volume paracentesis with concomitant albumin infusion
- D. Restrict her sodium intake to 2 g per day and begin spironolactone
- E. Refer her for liver transplantation

Answer: D. This woman with alcoholic cirrhosis has a serum ascites albumin gradient (SAAG) of greater than 1.1 g/dL, which is consistent with portal hypertension and ascites formation due to her underlying cirrhotic liver. Some hepatologists recommend screening cirrhotic patients for hepatocellular carcinoma with α -fetoprotein or ultrasound but this is not based on outcome studies. CA 19-9 is not a marker for hepatocellular carcinoma. Given that the SAAG is consistent with portal hypertension, cytologic examination is unnecessary at this time. Repeated large-volume paracentesis should be reserved for patients with refractory ascites that limits functioning. Initial management should include sodium restriction and diuresis. Referral for transplantation is inappropriate at this time since she is still drinking and does not have end-stage disease.

Q.8. A 60-year-old man with a history of chronic hepatitis B, ascites, and three episodes of bacterial peritonitis over the last two years presents with abdominal pain, fevers, and chills. A paracentesis is done which reveals a WBC of 350/mL with 90% neutrophils. Gram stain of the fluid is negative. Which of the following statements regarding his management is most appropriate?

- A. He should empirically be started on clindamycin

- B. Norfloxacin would be an appropriate antibiotic choice for prophylaxis after this acute episode has cleared up
- C. Antibiotics should be withheld unless culture of the ascitic fluid is positive
- D. A large-volume paracentesis should be done at this time
- E. Both A and D are correct

Answer: B. This patient presents with spontaneous bacterial peritonitis. The neutrophil count in his fluid is greater than 250/mL, which makes the diagnosis. Treatment should empirically begin with a broad-spectrum antibiotic like cefotaxime, even with a negative Gram stain. Clindamycin provides inappropriate coverage of enteric gram-negative pathogens. A large-volume paracentesis is not indicated as part of the treatment of SBP. Since this patient has had recurrent episodes, prophylaxis should be strongly considered once the acute infection has cleared. Appropriate options include ciprofloxacin, norfloxacin, or trimethoprim-sulfamethoxazole.

Q.9. A 53-year-old woman with a history of cryptogenic cirrhosis presents with hematemesis. An endoscopy is performed that reveals bleeding esophageal varices. All of the following modalities are used in the treatment of acute variceal hemorrhage *except*

- A. Intravenous octreotide
- B. Intravenous propranolol
- C. Endoscopic sclerotherapy
- D. Endoscopic band ligation
- E. Transjugular intrahepatic portosystemic shunt

Answer: B. Acute variceal hemorrhage should initially be treated with hemodynamic resuscitation, intravenous octreotide, and endoscopic sclerotherapy or band ligation. If this fails to control the bleeding, referral for transjugular intrahepatic portosystemic shunting or surgical shunting should be made. Beta-blockers have been shown to prevent bleeding in patients with known varices but have no role in the management of an acute bleed.

Q.10. A 52-year-old man with a history of cirrhosis from hepatitis C and ascites is brought in by his wife because he has been acting strange. On examination, he is somnolent, confused, and responds only to noxious stimuli. He is also hyperreflexic. His white blood cell count is normal. His hematocrit is 34%. Coagulation times are elevated. His ammonia level is normal. All of the following are appropriate in his management *except*

- A. Institute a high-protein diet
- B. Perform a paracentesis
- C. Test the stool for occult blood
- D. Start lactulose
- E. Refer for transplantation

Answer: A. This patient has stage 3 hepatic encephalopathy. If he has not already been referred for transplantation, then referral should be made. He should be treated with lactulose despite the normal ammonia level since this test is neither sensitive nor specific as a marker for disease. This patient would not be able to eat given his underlying condition and would require nutritional support. When he improves, a low-protein diet should be instituted to minimize ammonia production. All potentially nephrotoxic (NSAIDs, gentamicin) or sedating medications (lorazepam) should be avoided. Infections such as SBP and gastrointestinal bleeding should be excluded since these may trigger encephalopathy.

Q.11. Which of the following statements regarding hepatorenal syndrome are correct?

- A. The diagnosis is made by finding a fractional excretion of sodium value of less than 1%
- B. Patients typically have a urine sodium concentration of greater than 40 mEq/L
- C. Renal function will typically improve with hydration
- D. Renal function will typically improve with neomycin administration
- E. None of the above is correct

Answer: E. The diagnosis of hepatorenal syndrome is made by exclusion. Even though the fractional excretion of sodium and urine sodium concentration are

typically low, dehydration needs to be ruled out by administration of fluid or withdrawal of diuretic medications. If renal function does not improve with either of these maneuvers, the diagnosis of hepatorenal syndrome is supported. Neomycin may improve symptoms of hepatic encephalopathy, but has not been shown to have any effect on hepatorenal syndrome.