Biliary tract disease

1. Which of the following statements regarding the common bile duct are correct?

   a. Length averages 4 cm in adults
   b. Diameter is usually more than 1.5 cm in adults
   c. Diameter increases with age
   d. Usually unites with the pancreatic duct outside of the duodenum
   e. Enters the duodenum near the junction of the first and second portions

2. Heme released during degradation of senescent erythrocytes is the source of what percentage of bilirubin produced daily?

   a. 10%
   b. 25%
   c. 50%
   d. 75%
   e. 90%

3. Which of the following statements regarding bile secretion is correct?

   a. Serves as a route of secretion of nitrogenous waste
   b. Facilitates the intestinal absorption of lipids and fat soluble vitamins
   c. Is solely dependent upon the duodenal release of cholecystokinin
   d. Is minimally affected by enterohepatic circulation of bile salt
   e. Flow is stimulated by the release of duodenal secretin.

4. Mixed micelles are complexes of all of the following EXCEPT:

   a. Bile salts
   b. Cholesterol
   c. Phospholipids
   d. Calcium
   e. Fatty acids
5. Which of the following statements regarding cholesterol solubility in bile is correct?

a. Is only dependent on the relative concentration of cholesterol in the solution
b. Can be expressed as a numerical value known as the saturation index
c. Is not influenced by the concentrations of bile acids and phospholipids
d. Is enhanced solely by the presence of phospholipids
e. Is temperature dependent in patients

6. Which of the following statements regarding enterohepatic circulation is correct:

a. Provides an important negative feedback on bilirubin synthesis
b. Returns bile salts to the liver via the hepatic arterial system
c. Is a highly inefficient system resulting in large losses of bile salts
d. Can be interrupted by resection of the terminal ileum or primary ileal disease
e. Requires an intact colon for bile salt absorption.

7. Which of the following statements regarding the gallbladder mucosal surface is correct?

a. Has a limited absorptive function
b. Secretes glycoproteins and hydrogen ions
c. Absorbs water primarily as a passive phenomenon associated with the active transport of bile salts
d. Secretes bicarbonate ions with an overall alkalinization of bile
e. Absorption rates directly related to plasma secretin levels
8. Which of the following statements regarding the human sphincter of Oddi is correct?
   a. Has phasic wave activity which increases in response to cholecystokinin
   b. Is influenced by hormonal but not neural factors
   c. Actively pumps bile and pancreatic juice in response to a meal
   d. Plays no role in refilling an empty gallbladder
   e. Prevents reflux of duodenal contents into the biliary tree

9. Which of the following statements regarding biliary atresia is correct?
   a. Is an uncommon cause of persistent jaundice in the newborn
   b. Is most commonly a 'correctable' variant with preservation of the intrahepatic and proximal extrahepatic biliary tree
   c. Should be managed by early hepatic transplantation in most cases
   d. Can be successfully managed by hepatic protoenterostomy (Kasai procedure) even in the absence of extrahepatic ducts
   e. Is often associated with duodenal atresia

10. Which of the following statements regarding choledochal cysts is correct?
    a. Occur more often in males
    b. Present only in childhood
    c. Are associated with an alteration in the arrangement of the choledochopancreatic duct junction
    d. Do not require surgical intervention if asymptomatic
    e. Are not associated with an increased incidence of malignancy

11. The pathogenesis of cholesterol gallstones involves all of the following EXCEPT:
    a. Cholesterol saturation
    b. Crystal nucleation
    c. Cystic duct obstruction
    d. Stone growth
    e. Gallbladder contractility
12. Which of the following statements regarding cholesterol crystal nucleation is correct?
   a. Occurs primarily in the bile canaliculi
   b. Is enhanced by bile dilution
   c. Is promoted by biliary mucin glycoproteins
   d. Is not associated with cholesterol supersaturation.
   e. Biliary phospholipids are transformed less efficiently than cholesterol.

13. Which of the following statements regarding biliary sludge is correct?
   a. Is not a precursor of gallstones
   b. Can be observed in patients in prolonged fasting states
   c. Is composed only of cholesterol precipitates
   d. Is of little or no clinical significance
   e. Is not associated with total parental nutrition

14. Pigment gallstones are composed of the calcium salts of all of the following EXCEPT:
   a. Sulfate
   b. Palmitate
   c. Bilirubinate
   d. Carbonate
   e. Phosphate

15. Which of the following statements regarding acute cholecystitis is correct?
   a. Is often the initial presentation of gallstones
   b. Complicates the course in 10-20% of patients with gallstones
   c. Occurs only in the presence of gallstones
   d. Is always associated with positive bacterial bile cultures
   e. Term is synonymous with biliary colic
16. Which of the following is false regarding primary common duct stones?
   a. Are associated with increases in the bacterial enzyme alucuronidase
   b. Are usually earthy and crumble easily
   c. Are associated with stasis
   d. Are associated with infection
   e. Are more common than secondary stones

17. All of the following are common isolates from bile obtained in patients with acute cholangitis EXCEPT:
   a. Candida albicans
   b. E. Coli
   c. Klebsiella species
   d. Enterococcus
   e. Anaerobes

18. Abnormalities of the Sphincter of Oddi are associated with all of the following EXCEPT:
   a. Baseline Sphincter of Oddi pressure above 40 mmHg
   b. Delayed emptying of radio nucleotide into the duodenum
   c. Typical biliary tract pain
   d. History of previous biliary tract procedures
   e. Symptoms relieved by sphincteroplasty in 85% of patients

19. Which of the following statements regarding primary sclerosing cholangitis is correct?
   a. Is frequently associated with high fevers and chills
   b. Is usually associated with a rapidly progressive course leading to liver failure
   c. Can usually be managed successfully by a combination of corticosteroids and anti-inflammatory drugs
   d. Is commonly associated with inflammatory bowel disease
   e. Is the end result of repeated bouts of acute cholangitis
20. Which of the following statements regarding postoperative bile duct strictures is correct?

a. Occur less frequently following laparoscopic cholecystectomy than open cholecystectomy
b. Usually present within the first year after the initial operation
c. Can occur only after cholecystectomy
d. Can always be prevented by cholangiography
e. Are rarely associated with ischemia

21. The major arteries of the common bile duct:

a. Run in the 3 and 9 o'clock positions
b. Play little role in the development of bile duct strictures
c. Have extensive collaterals extending circumferentially
d. Receive most of their blood supply from the liver
e. The cystic artery is a branch of the lateral common bile duct artery in 20% of patients

22. Which of the following statements regarding a bile duct stricture discovered four weeks after the injury is correct?

a. Requires immediate surgical intervention
b. Requires cholangiography prior to surgery
c. Primary duct to duct repair is associated with the best long-term potency
d. Will not occur in patients with a biliary enteric anastomosis
e. Results from endoscopic techniques equal results from surgical intervention

23. The biliary tract malignancy with the best prognosis is:

a. Gallbladder carcinoma
b. Intrahepatic cholangiocarcinoma
c. Hilar cholangiocarcinoma
d. Distal bile duct carcinoma
e. All are associated with the same 5 year survival
24. Etiologic factors for cholangiocarcinoma include all EXCEPT:

   a. Gallstones
   b. Primary sclerosing cholangitis
   c. Choledochal cysts
   d. Clonorchis sinensis
   e. Ulcerative colitis

25. All of the following are common isolates from bile obtained in patients with acute cholangitis EXCEPT:

   a. Candida albicans
   b. E. Coli
   c. Klebsiella species
   d. Enterococcus
   e. Anaerobes

26. A higher than average incidence of gallstones is associated with all the following hematologic disorders EXCEPT

   a. hereditary spherocytosis
   b. hereditary elliptocytosis
   c. idiopathic autoimmune hemolytic anemia
   d. sickle cell anemia
   e. primary hypersplenism

27. Which of the following statements regarding the common bile duct are correct?

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   c. Diameter increases with age
   d. Usually unites with the pancreatic duct outside of the duodenum
   e. Enters the duodenum near the junction of the first and second portions
28. Which of the following statements regarding the human sphincter of Oddi is correct?
   a. Has phasic wave activity which increases in response to cholecystokinin
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   c. Actively pumps bile and pancreatic juice in response to a meal
   d. Plays no role in refilling an empty gallbladder
   e. Prevents reflux of duodenal contents into the biliary tree

29. Abdominal ultrasonography is carried out during evaluation for a possible abdominal aortic aneurysm. The presence of stones in the gallbladder is identified on this study. The patient's only abdominal symptom is a sense of fullness after eating. The appropriate first step in managing the gallstones is
   a. observation
   b. laparoscopic cholecystectomy
   c. open cholecystectomy
   d. ursodeoxycholic acid therapy
   e. electroshock wave lithotripsy (ESWL)

30. Percutaneous transhepatic cholangiography (PTC)
   a. is frequently complicated by significant hemobilia
   b. is the preferred approach when ultrasound shows dilated intrahepatic ducts without extrahepatic duct dilation
   c. is the preferred method of localizing an intrahepatic abscess
   d. is preferred when distal common bile duct obstruction is suspected
   e. All of the above

31. Gallstone formation has been associated with
   a. aortic valve replacement
   b. ileal resection
   c. sickle cell disease
   d. use of birth control pills
   e. a&c
   f. All of the above
32. Gallstone formation has been associated with

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c. sickle cell disease
d. use of birth control pills
e. a&c
f. All of the above

33. Correct statements about acute cholecystitis include

a. An acute attack usually follows a heavy meal
b. A radiopaque calculus is usually present on abdominal x-rays
c. Vomiting is an uncommon presenting symptom
d. Serum bilirubin can rise above 6 mg/dL within the first 12 h
e. The greatest incidence of acute cholecystitis occurs in Caucasian men

34. A 45-year-old woman is seen because of the abrupt onset of steady severe right upper quadrant pain after ingestion of a heavy meal. On examination, there is a palpable, tender right upper quadrant mass. The appropriate diagnostic step is

a. abdominal ultrasonography
b. biliary scintigraphy (HIDA scan)
c. computed tomography (CT)
d. endoscopic retrograde cholangiopancreatography (ERCP)
e. oral cholecystography

35. The next diagnostic test in a jaundiced patient when ultrasonography suggests common duct dilatation is

a. computed tomography
b. biliary scintigraphy
c. endoscopic retrograde cholangiopancreatography
d. intravenous cholangiography (IVC)
e. percutaneous transhepatic cholangiography (PTC)
36. A large retained stone impacted in the distal common bile duct is noted when T-tube cholangiography is performed after choledochostomy. The best management of the stone is

a. dissolution with sodium cholate  
b. dissolution with heparin  
c. catheter extraction via the tract of the T-tube  
d. operative removal  
e. transduodenal papillotomy with endoscopic stone extraction

37. The best initial procedure in defining the cause of obstructive jaundice in a 75-year-old man is

a. endoscopic retrograde cholangiopancreatography (ERCP)  
b. percutaneous transhepatic cholangiography (PTC)  
c. ultrasonography  
d. CT scanning  
e. radionuclide scanning

38. In the most common anomaly of extrahepatic bile duct anatomy, the cystic duct

a. is absent  
b. inserts into the right hepatic duct  
c. lies parallel to the common duct and enters it close to the duodenum  
d. passes anterior to the common duct and enters its left side  
e. passes posterior to the common duct and enters its left side

39. Reabsorption of gallbladder fluid is largely determined by

a. concentration of bilirubin in gallbladder  
b. concentration of cholesterol in gallbladder bile  
c. transport of hydrogen ions  
d. transport of potassium ions  
e. transport of sodium ions
40. The presence of chronic liver disease, rather than extrahepatic biliary obstruction, is suggested by the presence on physical examination of each of the following EXCEPT

   a. ascites
   b. cutaneous xanthomas
   c. intense jaundice
   d. spider hemangiomas
   e. splenomegaly

41. All the following statements regarding cancer of the gallbladder are true EXCEPT

   a. most affected patients are females
   b. most affected patients have associated gallstones
   c. the liver is the most frequent site of metastases
   d. treatment should include right hepatic lobectomy
   e. the prognosis for 5-year survival is less than 5 percent

42. Gallstone formation has been associated with

   a. aortic valve replacement
   b. ileal resection
   c. sickle cell disease
   d. use of birth control pills
   e. a&c
   f. All of the above

43. Bilirubin can be described by which of the following statements?

   a. Bilirubin is formed mostly from the breakdown of hemoglobin
   b. Large amounts of bilirubin-albumin complex can be excreted even if obstruction of the biliary duct is present
   c. Once formed, bilirubin joins with albumin to form a stable protein pigment complex
   d. The peripheral circulation is the site of bilirubin conjugation with glucuronic acid
   e. Conjugated bilirubin is acted upon by the hepatocyte to produce urobilinogen and urobilin
   f. a&c
   g. All of the above
44. Concerning the common hepatic duct, which of the following statements is true?
   a. It is usually contained within a series of fibrous "plates," the hepatic plates, which surround the portal structures
   b. It runs downward and posterolateral to the portal vein for approximately 4 cm before it is joined by the cystic duct.
   c. It is usually in close association with the proper hepatic artery, which lies to its right.
   d. The right hepatic branch of the proper hepatic artery crosses usually posteriorly either the right hepatic duct.

45. Concerning the common bile duct, which of the following statements is/are true?
   a. It runs behind the first portion of the duodenum (retroduodenal portion).
   b. It enters a groove in or behind the superior lateral part of the head of the pancreas (pancreatic portion).
   c. It is usually joined on its left side by the main pancreatic duct and forms the ampulla of Vater
   d. Answers a and c
   e. All of the above

46. Concerning the natural history of gallstones, which of the following statements is/are true?
   a. About four-fifths of patients who are screened and found to have gallstones initially have no symptoms.
   b. New biliary symptoms develop in patients with asymptomatic gallstones at a rate of about 15% per year.
   c. When patients with asymptomatic gallstones ultimately develop symptoms, their presentation of gallstone disease is not characteristically associated with complications or deaths.
   d. Answers a and c
   e. All of the above
47. Which of the following statements is **false** regarding ERCP?

a. Cholecystitis is more likely after ERCP in patients with gallstones
b. Significant post-ERCP cardiopulmonary complications are rare
c. Filling of pseudocysts in the absence of subsequent drainage should be avoided if possible
d. Cholecystitis is more likely in those who fail to fill of the gallbladder with contrast during the examination

48. Concerning intrahepatic bile duct stones, which of the following statements is/are **true**?

a. Intrahepatic stones are defined as calculi, or concretions, located proximal to the confluence of the right and left hepatic ducts
b. Primary intrahepatic stones are mainly reported in Far Eastern Asian populations
c. Patients with hepatolithiasis present clinically with recurrent attacks of abdominal pain, fever, and jaundice
d. Pathologically, the intrahepatic ducts are dilated and contain multiple strictures and stones
e. Answers a and c
f. All of the above

49. Relations of major vascular structures to the common bile duct include which of the following

a. The infrahepatic supraduodenal portion of the duct, which usually descends adjacent and to the right of the hepatic artery
b. The anterior surface of the portal vein, which is directly anterior or anterolateral to the supraduodenal portion of the duct
c. The pancreatic portion of the duct, which has no relationship with the portal vein, and approaches it obliquely from below and from the left
d. Answers a and c
e. All of the above
50. Which of the following statements is/are true?

a. Once a patient has an attack of biliary colic type pain, there is a 5% per year incidence of repeat pain episodes.
b. Once a patient has an attack of biliary colic type pain, virtually 100% of patients will be moderately to severely symptomatic by 10 years
c. Once a patient has acute cholecystitis or gallstone pancreatitis, there is a roughly 30% chance of a recurrent episode within 3 months
d. All of the above

51. In order to reduce the incidence of post-procedure cholangitis, one should …?

a. Completely fill all ducts proximal to a malignant obstruction
b. Drain all ducts proximal to a malignant obstruction
c. Treat all patients with prophylactic antibiotics
d. Treat patients with prosthetic valves and biliary obstruction with prophylactic antibiotics
e. Answers a and c
f. All of the above

52. Concerning intrahepatic bile duct stones, which of the following statements is/are true?

a. Biliary calculi in persons of Chinese and Japanese descent in the United States are not different from biliary calculi in the United States population in general
b. A more "traditional Asian" diet containing high protein and fat predisposes to intrahepatic stones
c. Intrahepatic stones are primarily a disease of old age (seventh to eighth decade of life
d. Answers a and c
e. All of the above
53. Which of the following statements is *false* about the anatomy of the gallbladder?

a. It lies in a fossa on the inferior surface of the liver along a line (Heister's line) dividing the left medial portion of the left lobe from the left lateral portion.
b. It has small vessels and bile ducts that can pass directly from the liver into the body through the fossa.
c. When pathologically dilated, it forms a bulge or pouch in its neck, called the infundibulum.
d. When full, its fundus comes in contact with the anterior abdominal wall opposite the ninth costal cartilage in an angle formed between the right rectus muscle and the costal margin.

54. Current data tend to show that, with regard to the treatment of asymptomatic gallstones:

a. Operative management (pre-emptive cholecystectomy) is associated with a decrease in survival in elderly patients
b. There is no survival advantage associated with cholecystectomy in younger patients
c. Laparoscopic surgery appears to fare little better than open procedures
d. Answers a and c
e. All of the above

55. Post-ERCP hemorrhage … ?

a. Is primarily a complication related to sphincterotomy rather than diagnostic ERCP
b. Is more frequent in patients taking aspirin
c. Can occur up to 1 to 2 weeks after the procedure
d. Is more frequent in patients with cirrhosis
e. Answers a and c
f. All of the above
56. The clinical course of patients with intrahepatic biliary stones is characterized by all of the following except:

a. Frequent attacks of cholangitis  
b. Multiple liver abscesses  
c. Cholangiographic appearance of pruning, acute angulation and decreased arborization of intrahepatic ducts  
d. Subsequent development in some of cholangiocarcinoma

57. Concerning the hepatic arterial blood supply, which is the following statements is/are true?

a. A middle hepatic branch usually arises from the proper hepatic artery  
b. The cystic artery arises as a branch of the proper hepatic artery in 60% of patients  
c. The most important vessels supplying the supraduodenal common bile duct are vessels that run along the lateral borders of the duct at the 3- and 9-o'clock positions  
d. The superior base of the triangle of Calot is formed by the proper hepatic artery  
e. Answers a and c  
f. All of the above

58. Concerning the anatomy of the termination of the bile duct in the duodenal wall, which of the following statements is/are true?

a. The bile duct and the pancreatic duct typically join to form a common channel of varying length (the ampulla) within the papilla in 85% of patients  
b. Endoscopically, the major papilla may be recognized at the junction of a transverse and a longitudinal fold of duodenum mucosa (plica longitudinalis), which forms a T configuration  
c. The most useful landmark for finding the minor papilla during a gastrectomy is the gastroduodenal artery, behind which lies the accessory duct and the minor papilla  
d. Answers a and c  
e. All of the above
59. Concerning gallbladder cancer, which of the following statements is/are true?

a. Gallstones are present in up to 85% of patients with gallbladder malignancies
b. The risk of gallbladder cancer is increased more than 10-fold in patients who have gallstones greater than 3 cm in diameter
c. The risk of cancer is also dramatically elevated in patients in whom calcification of the gallbladder wall is visible on plain radiography, the so-called porcelain gallbladder
d. Nonepithelial polypoid lesions such as mesenchymal tumors (fibroma, lipoma) or pseudotumors (cholesterol, lymphoid, and inflammatory polyps) appear to have no malignant potential
e. All of the above

60. Incidental laparoscopic cholecystectomy has been recommended for those patients with silent gallstones

   a. who are diabetic
   b. who are undergoing other laparoscopic procedures
   c. prior to kidney transplant
   d. All of the above

61. Which of the following is the most important factor predisposing to ERCP-induced pancreatitis?

   a. Suspected sphincter of Oddi dysfunction
   b. Pancreatic sphincterotomy
   c. Prior history of post-ERCP pancreatitis
   d. Moderate-to-difficult cannulation
   e. Normal serum bilirubin
62. Concerning the treatment of primary intrahepatic biliary calculi, which of the following statements is/are true?

a. Primary intrahepatic stones are managed effectively by endoscopic retrograde cholangiography and sphincterotomy
b. Hepatic resection is indicated if the stones and strictures are fortuitously localized to a single atrophic liver segment or lobe
c. Choledochoduodenostomy or Roux-en-Y choledochojejunostomy are the standard surgical treatment for most patients
d. Ursodeoxycholic acid is an effective treatment of primary intrahepatic calcium bilirubinate stones in intractable cases
e. Answers a and c
f. All of the above

63. Which of the following statements is/are true about primary sclerosing cholangitis (PSC)?

a. PSC is frequently associated with inflammatory bowel disease
b. PSC is characterized by diffuse fibrosing inflammatory destruction of the intra- and/or extra-hepatic biliary duct system
c. PSC follows a progressive course leading to biliary cirrhosis and its inherent complications
d. Answers a and c
e. All of the above

64. Concerning the clinical manifestations of PSC, which of the following statements is/are true?

a. Ulcerative colitis is seen in 10%-15% of patients
b. Asymptomatic patients are rare (7%-10%).
c. As many as 17% of asymptomatic patients with PSC have cirrhosis on liver biopsy at the time of diagnosis
d. Answers a and c
e. All of the above
65. Concerning the diagnosis of PSC, which of the following statements is true?

    a. Almost all patients with PSC have elevated serum alkaline phosphatase levels, usually three to five times normal
    b. Sonographically, biliary abnormalities are not usually visible, unless there is biliary dilation
    c. Intrahepatic bile duct changes demonstrated on CT scans include pruning and beading of the ducts
    d. During a HIDA scan, the clearance rate of the isotope through the liver is markedly prolonged
    e. All of the above

66. Which of the following statements is/are true regarding PSC?

    a. Cholangiocarcinoma is a complication of PSC in less than 4% of patients.
    b. PSC increases the risk of colorectal cancer in patients with ulcerative colitis.
    c. Ten percent of patients with PSC complicated by cholangiocarcinoma present with metastatic disease
    d. All of the above

67. Concerning bile duct injury, which of the following statements is false?

    a. The diagnosis of bile duct injury is usually suggested by symptoms caused by bile peritonitis within 1-2 hours of injury
    b. The liver is the most common organ injured in conjunction with the bile duct.
    c. Often, jaundice is observed on the third to fifth day after injury, along with the passage of clay-colored stools and dark-colored urine
    d. Increasing abdominal girth accompanied by signs of dehydration and low-grade sepsis may be observed during the first week after trauma
68. Which of the following statements is true about bile duct injury?

a. The common bile duct is more susceptible to injury than the right or left hepatic duct
b. Blunt injury is most likely to damage the common bile duct at the cystic duct junction
c. Blunt injury to the bile ducts generally spares the hepatic arteries and portal vein
d. Answers a and c
e. All of the above

69. Which of the following statements is/are true?

a. The blood supply of the supraduodenal common bile duct arises from branches of the gastroduodenal artery and right hepatic artery
b. The blood supply of the supraduodenal common bile duct is oriented to flow in axially in blood vessels which lie in the 3 o'clock and 9 o'clock positions
c. The blood supply of the intrahepatic bile duct and common bile duct below the retroduodenal artery is rich and non-axial
d. End-to-end repairs of transected supraduodenal common bile ducts are associated with a 55% incidence of strictures
e. Answers a and c
f. All of the above

70. Cholecystectomy is the treatment of biliary injury in all of the following situations except:

a. When the cystic duct is injured
b. When the right or proper hepatic arteries have been ligated
c. When there is a gunshot wound to the gallbladder
d. In stable patients with large stab wounds
e. In unstable patients
71. Concerning the management of bile duct injuries which is true:

a. Small lacerations, with minimal tissue loss are closed with or without a T tube
b. Injuries involving < 50% of the **medial or posterior aspect** of the duct are repaired with anterior T tube 2 cm away from injury
c. Injuries involving < 50% of the **anterior** aspect of the duct are repaired over a T tube
d. Near total transection or complete transection is probably best treated by choledochojejunostomy with or without internal or external stents
e. Small lacerations of the pancreatic or intramural portion of CBD are treated with pancreaticoduodenectomy