ANSWERS: CHAPTER 5

MATCHING
1. c 5. l 9. i 13. b
2. h 6. n 10. a 14. d
3. j 7. f 11. k
4. m 8. e 12. g

IMAGE LABELING
1A. Ductus venosus
1B. Umbilical vein
2. Ligamentum teres
3A. Main lobar fissure
3B. Portal vein
4A. Ligamentum venosum
4B. Caudate lobe
5A. Hepatic artery
5B. Splenic artery
5C. Celiac axis
5D. Aorta
5E. IVC

MULTIPLE CHOICE
1. c 9. c 17. a 25. c
2. b 10. c 18. d 26. b
3. c 11. d 19. c 27. c
4. b 12. c 20. a 28. d
5. c 13. d 21. c 29. a
6. d 14. b 22. b 30. b
7. c 15. d 23. c
8. b 16. b 24. d

FILL-IN-THE-BLANK
1. Glisson’s capsule; peritoneal
2. Ligamentum venosum; ligamentum teres; portal hypertension
3. Right; left; caudate; quadrate; external markings; function
4. Left; medial; lateral; hepatic
5. Caudate; IVC
6. Reidel’s lobe
7. Hepatocyte; Kupffer
8. Situs inversus
9. Portal; hepatic; bile duct
10. Curved; linear
11. Steatosis; alcohol abuse; obesity
12. Increased; decreased
13. Hepatitis; hypoechoic; echogenic
14. Alcoholism
15. Liver; spleen; pancreas
16. Congenital; trauma; parasitic; inflammatory
17. Age; anechoic; echogenic; calcified
18. Capsule; medially; crescent
19. Hydatid; anaphylactic shock
20. Colon; portal vein
21. Pneumocystis carinii; starry sky
22. Cavernous hemangioma
23. Focal nodular hyperplasia; adenoma
24. Hepatoma; cirrhosis
25. Increased; AFP
26. Portal; hepatic; obstruction
27. Metastases; gallbladder, colon, pancreas, stomach, breast, and lung
28. Hyperechoic; target; hypoechoic
29. Contrast enhanced
30. Stenosis; hyperplasia; outflow

SHORT ANSWER
1. Couinaud’s anatomy divides the liver into eight segments based on liver function. Each of the eight segments is a functionally distinct liver segment with a portal vein, hepatic artery, and bile duct branch. The hepatic veins form the boundaries of the segments. Hepatic surgery is planned based on this segmentation; therefore, it is important to provide the exact location of a lesion seen in the liver. A segment can be removed, minimizing blood loss and decreasing morbidity.

2. Because the liver cannot be evaluated in a single image, multiple images must be taken to ensure that the entire liver has been evaluated. A subcostal or intercostal approach is used to evaluate the liver. The patient will frequently need to take in a breath to shift the liver more posteriorly. Having the patient place their arms over his or her head widens the rib spaces and may provide a better window. The patient can be turned into an oblique or decubitus position to provide better access.

3. The caudate lobe is anatomically distinct from the right and left lobes. It receives blood supply from both right and left portal veins and has its own bile ducts. The caudate lobe is drained by vessels that drain directly into the IVC, bypassing the hepatic veins. Because the vessels that supply the caudate lobe do not course through the rest of the liver, they are not as affected by hepatic fibrosis or outflow obstruction. Caudate lobe enlargement can be seen in cases of Budd-Chiari syndrome, as well as cirrhosis.

4. In the early stages of cirrhosis, the liver may be enlarged or may appear normal sonographically. As the disease progresses, the liver atrophies, particularly the right lobe; the surface of the liver is irregular; and surface nodularity becomes evident. The texture of the liver becomes coarse and heterogeneous and the hepatic vasculature becomes more difficult to visualize. Portal hypertension may be present along with ascites. Patients with cirrhosis
are at an increased risk of developing hepatocellular carcinoma; therefore, a careful evaluation for liver lesions is important.

5. The majority of patients with hepatocellular carcinoma in the U.S. have a history of cirrhosis. Patients will have abnormal LFTs, and the AFP will be elevated in 70% of cases. Patients may have jaundice and ascites. Patients may present with RUQ pain and fullness or a palpable mass. Sonographically, HCC can be a single mass or multiple lesions spread throughout the liver. The mass can be hypoechoic to hyperechoic and may contain necrotic areas. Invasion into the hepatic veins and portal vein is common.

**IMAGE EVALUATION/PATHOLOGY**

1. The liver in this image is echogenic and heterogeneous. There is decreased visualization of the hepatic vasculature. The most likely diagnosis is fatty infiltration.

2. Solitary, echogenic, lobulated mass in the posterior right lobe of the liver consistent with a cavernous hemangioma.


4. A – Middle Hepatic Vein; B – Left Hepatic vein; C – IVC; Medial segment of the left lobe.

5. Debris within the abscess. A patient with an abscess may have fever, leukocytosis, and pain. This patient may have RUQ pain or a palpable mass due to the size of the abscess, and elevated LFTs.

**CASE STUDY**

1. A solid mass is visualized in the anterior left lobe of the liver. The mass is isoechoic to the liver tissue and is seen distorting surrounding vessels. The most likely diagnosis given the patient’s age and clinical history is focal nodular hyperplasia.

2. The liver is shrunken and has a nodular contour. No internal vascularity is seen. The liver texture is echogenic. Ascites is seen surrounding the liver and a right pleural effusion is present. The portal vein is filled with echogenic material consistent with portal vein thrombosis.