

## MANUAL OF DIAGNOSTIC ULTRASOUND

### CHAPTER 1 – BASIC PHYSICS OF ULTRASOUND

1. What is the frequency used to examine the abdominal area?
  - a. 1-2 MHz
  - b. 3-5 MHz
  - c. 7-10 MHz
  - d. 15-20 MHz
2. Velocity of sound depends on what?
  - a. Resolution and density of the medium
  - b. Compressibility and resolution of the medium
  - c. Density and compressibility of the medium
  - d. Density and wavelength of the medium
3. What is the black zone behind the bone called?
  - a. Acoustic impedance
  - b. Refraction
  - c. Acoustic shadow
  - d. Reflection
4. What is the usual term for the back-scattered parts of the emitted ultrasound that reaches the transducer?
  - a. Resolution
  - b. Reflection
  - c. Wavelength
  - d. Echo
5. Doppler techniques are used to analyze what?
  - a. Organs
  - b. Bone
  - c. Blood flow
  - d. Tissue
6. The phased-array technique is used mainly for what type of imaging?
  - a. Abdominal
  - b. Vascular
  - c. Echocardiography
  - d. Fetal
7. What is used as a contrast agent to obtain stronger signals from blood flow?
  - a. Iodine
  - b. Microbubbles
  - c. Isotopes
  - d. gadolinium
8. Ultrasound that produces a rise of less than \_\_\_\_\_ is deemed without risk.
  - a. 0.5 °C
  - b. 1.0 °C
  - c. 1.5 °C
  - d. 2.0 °C

### CHAPTER 2 – EXAMINATION TECHNIQUES

9. Transcutaneous ultrasound is used to evaluate which of the following?
  - a. Neck and chest
  - b. Abdomen and extremities
  - c. Brain
  - d. A & B

10. Which of the following should not be used to ensure good contact between the transducer and the skin?
- Disinfectant
  - Water
  - Water-soluble gel
  - Oil
11. The standard mechanical index should be set less than what for adults?
- < 0.5
  - < 0.6
  - < 0.7
  - < 0.8
12. Each organ, structure or tumor should be examined in at least two planes.
- True
  - False
13. What is the term for an echo pattern consisting of only a few weak echoes?
- Echo free
  - Echo rich
  - Echo average
  - Echo poor
14. An angle of \_\_\_\_\_ must be used for the ultrasound beam to reach the vessel of interest if measurements are to be made.
- < 20 °
  - < 40 °
  - < 60 °
  - < 80 °
15. The gain of the Doppler signals should be \_\_\_\_\_ so that single color pixels are seen in the tissue.
- Low
  - High
  - Standard
  - Adjusted

### CHAPTER 3 – INTERVENTIONAL ULTRASOUND

16. Before any ultrasound-guided procedure, what coagulation parameter checks are mandatory?
- Prothrombin activity, 50% or greater
  - International normalized ratio less the 1.5
  - Platelet count 50,000 per ml
  - All the above
17. Performing a double biopsy of the liver for metastasis raises the diagnostic sensitivity to \_\_\_\_\_percent and the specificity to \_\_\_\_\_percent
- 67.5, 50
  - 77.5, 60
  - 88.7, 70
  - 97.5, 100
18. Spleen biopsies are performed \_\_\_\_\_ because of the risk of post-procedural bleeding.
- Carefully
  - Infrequently
  - Routinely
  - Expertly

19. How many methods are there to insert a catheter into an abscess?
- 1
  - 2
  - 3
  - 4
20. What are the most frequent liver malignancies where surgical resection is the only prospect for a cure?
- Hepatocellular carcinoma (HCC)
  - Colorectal cancer
  - Breast cancer
  - A&B
21. What is the 5-year survival rate for percutaneous ethanol injection or radiofrequency ablation for liver metastasis?
- 5-10%
  - 15-20%
  - 25-30%
  - 40-50%
22. What is the estimated major complication rate after a diagnostic procedure?
- 0.02%
  - 0.03%
  - 0.05%
  - 0.08%
23. In two large studies therapeutic radio frequency procedures resulted in a mortality rate ranging from \_\_\_\_\_ to \_\_\_\_\_.
- 0.07% to 0.1%
  - 0.08% to 0.15%
  - 0.09% to 0.3%
  - 0.10% to 0.35%

#### CHAPTER 4 – NECK

24. How many follicles are in a thyroid lobule?
- 10
  - 15
  - 20
  - 25
25. What is the peak flow velocity in thyroid arteries?
- Less than 10 cm/s
  - Less than 15 cm/s
  - Less than 20 cm/s
  - Less than 25 cm/s
26. The lymph pattern becomes increasingly echo-rich in \_\_\_\_\_ due to fatty degeneration.
- Children
  - Young adults
  - Adults
  - Older adults
27. An **echo-rich** pattern is a common sonographic finding in autoimmune disorders.
- True
  - False

28. Hyperthyroidism results when the volume of autonomic tissue is greater than \_\_\_\_\_.
- 1-3 ml
  - 2-4 ml
  - 5-10 ml
  - 6-11 ml
29. Papillary carcinoma accounts for what percent of thyroid carcinomas?
- 50%
  - 60%
  - 70%
  - 80%
30. Examination of the \_\_\_\_\_ is the main objective of follow-up checks after thyroid surgery.
- Surgical site
  - Lymph nodes
  - Cancer
  - Gland
31. Small thyroids, less than \_\_\_\_\_ in adults are consequences of inflammatory disease or therapy.
- 3 ml
  - 5 ml
  - 10 ml
  - 12 ml
32. Which of the following are some of the criteria for malignant focal lesions of the thyroid?
- Micro calcifications and no halo
  - Greater sagittal diameter
  - Size < 3 cm
  - A & B

## CHAPTER 5 – CHEST

33. Reactive and inflammatory lymph nodes are seldom larger than what size?
- 5 mm
  - 10 mm
  - 15 mm
  - 20 mm
34. How often are rib and sternum fractures diagnosed by ultrasound than by chest x-ray?
- Two times
  - Three times
  - Four times
  - Five times
35. Which of the following **is not** a direct sign of rib and sternum fractures?
- Gap
  - Step
  - Pleural effusion
  - Dislocation
36. What is the thickness of a normal pleura?
- 0.1 - 0.2 mm
  - 0.1 - 0.3 mm
  - 0.2 - 0.3 mm
  - 0.2 - 0.4 mm

37. The extent of a lung collapse and the breadth of a major pneumothorax **can** be seen by sonography.
- True
  - False
38. What is the overall sensitivity of chest sonography in pulmonary embolism?
- 50%
  - 65%
  - 80%
  - 95%
39. Which of the following are some of the features of pulmonary carcinomas?
- Hypoechoic, inhomogeneous
  - Infiltration of the chest wall, irregular vascularization
  - Pulmonary edema
  - A & B
40. In traumatic serial rib fractures, what is seen better in sonography than in radiography?
- Pulmonary effusion
  - Pulmonary obstruction
  - Pulmonary edema
  - Pulmonary contusions

#### **CHAPTER 6 – ABDOMINAL SAFETY AND RETROPERITONEUM**

41. The lower part of the abdominal aorta ranges in diameter from \_\_\_\_\_ to \_\_\_\_\_.
- 5 mm, 8 mm
  - 10 mm, 15 mm
  - 12 mm, 18 mm
  - 15 mm, 20 mm
42. Abscesses are associated with which of the following?
- Trauma
  - Laparotomy
  - Enterocutaneous fistula
  - All the above
43. The presence of what in the abdominal cavity is a common symptom of many types of disorders?
- Air
  - Ascites
  - Blood
  - A & B
44. Peritonitis may arise from which of the following?
- Infection of an abdominal organ
  - Bowel perforation
  - Blood loss
  - A & B
45. Peritoneal tuberculosis is a common extrapulmonary manifestation seen in advanced stages of what infection?
- Herpes
  - HIV
  - Fungal
  - Staph aureus

46. Aneurysms are a significant complication with a transverse diameter of greater than what?
- 1.5 cm
  - 2.0 cm
  - 3.0 cm
  - 3.5 cm
47. The distance between an abdominal aneurysm and the \_\_\_\_\_ is particularly important.
- Vena cava
  - Superior mesenteric artery
  - Inferior mesenteric artery
  - Renal arteries
48. Dissecting aneurysms cause only a slight dilatation of the aorta.
- True
  - False

## CHAPTER 7 – LIVER

49. Hepatomegaly is present when the liver exceeds what measurement?
- 10 cm
  - 15 cm
  - 20 cm
  - 25 cm
50. Hepatitis is the general term for inflammatory and infectious disease of the liver.
- True
  - False
51. Which of the following are specific sonographic findings of cirrhosis?
- Coarse liver pattern and increased attenuation
  - Diffuse steatosis
  - Hepatosplenomegaly
  - All the above
52. How is hepatic candidiasis transmitted?
- Silva
  - Airborne
  - Bloodstream
  - Contact
53. Which of the following are sonographic features of diffuse fatty liver disorder?
- Bright liver and hepatomegaly
  - Decreased portal vein visualization
  - Poor penetration of the posterior liver
  - All the above
54. What is the most common benign tumor of the liver?
- Focal nodular hyperplasia
  - Hepatic adenoma
  - Hemangioma
  - Biliary cystadenoma
55. What percentage of patients with hepatocellular carcinoma (HCC) have cirrhosis?
- 10%
  - 30%
  - 60%
  - 80%

56. Metastatic liver disease is most commonly associated with what primary site?

- a. Lung
- b. Breast
- c. Colon
- d. Brain

#### CHAPTER 8 – GALLBLADDER AND BILE DUCTS

57. The intrahepatic ducts are considered normal if their diameter is \_\_\_\_\_ or less and not more than \_\_\_\_\_ of the diameter of the adjacent portal vein.

- a. 1 mm, 20%
- b. 2 mm, 30%
- c. 2 mm, 40%
- d. 3 mm, 50%

58. What is the internal diameter of the common hepatic duct?

- a. < 2 mm
- b. < 3 mm
- c. < 4 mm
- d. < 5 mm

59. What percentage of patients with acute cholecystitis have gangrenous changes develop?

- a. 5-8%
- b. 10-14%
- c. 15-19%
- d. 20-30%

60. What is the mortality rate associated with gallbladder perforation?

- a. 5%
- b. 10%
- c. 15%
- d. 20%

61. Multiple gallbladder polyps less than \_\_\_\_\_ are usually benign.

- a. 10 mm
- b. 15 mm
- c. 20 mm
- d. 25 mm

62. How many times more likely is a woman to have gallbladder carcinoma than a man?

- a. Two times
- b. Three times
- c. Four times
- d. Five times

63. The extrahepatic duct is considered to be dilated when the common hepatic duct is more than \_\_\_\_\_ in diameter.

- a. 2 mm
- b. 4 mm
- c. 6 mm
- d. 8 mm

64. Which of the following **is not** a symptom of bacterial cholangitis?

- a. Chills
- b. Fever
- c. Right upper quadrant pain
- d. Jaundice

## CHAPTER 9 – PANCREAS

65. What is the normal internal diameter of the pancreatic duct?
- 1 – 1.5 mm
  - 2 – 2.5 mm
  - 3 – 3.5 mm
  - 4 – 4.5 mm
66. With ageing and obesity, in what percent of cases is the pancreas as echogenic as the adjacent retroperitoneal fat?
- 30%
  - 35%
  - 40%
  - 45%
67. What is considered the normal size of the head of the pancreas?
- 2.0 cm
  - 2.5 cm
  - 3.0 cm
  - 3.5 cm
68. Alcohol abuse **is not** a cause of acute pancreatitis.
- True
  - False
69. Pseudocysts account for what percentage of acute pancreatitis?
- 5 – 10%
  - 10 – 20%
  - 25 – 30%
  - 35 – 40%
70. Pancreatic carcinoma is the \_\_\_\_\_ leading cause of death among both males and females in western countries.
- Third
  - Fourth
  - Fifth
  - Sixth
71. Microcystic cystadenoma is always benign and frequently found in older women.
- True
  - False
72. Mucinous cystic neoplasms have \_\_\_\_\_ potential.
- Infection
  - Malignant
  - Necrotic
  - Obstructive

## CHAPTER 10 – SPLEEN

73. How long should a patient fast before an ultrasound of the spleen?
- 6 hours
  - 8 hours
  - 10 hours
  - 12 hours



74. Accessory spleens occur in what percent of the population?
- 3%
  - 5%
  - 8%
  - 10%
75. Which of the following may be mistaken for a splenic lesion?
- Kidney lesion, tail of the pancreas
  - Adrenal tumors, stomach
  - Small bowel
  - A & B
76. Splenomegaly is considered when the length of the spleen measures longer than what length from pole to pole?
- 6 cm
  - 8 cm
  - 10 cm
  - 12 cm
77. Splenomegaly may be due to which of the following?
- Sickle-cell disease
  - Neoplasm
  - Infection
  - All the above
78. What is the most common neoplasm involving the spleen?
- Hemangioma
  - Lymphomas
  - Hamartoma
  - Pseudotumor
79. Portal hypertension strongly correlates with a portal vein larger than what size?
- 8 mm
  - 9 mm
  - 13 mm
  - 15 mm

#### **CHAPTER 11 – GASTROINTESTENIAL TRACT**

80. The pylorus region of the stomach wall can measure up to what thickness?
- 4 mm
  - 6 mm
  - 8 mm
  - 10 mm
81. What is the thickness of the duodenum?
- < 1 mm
  - < 2 mm
  - < 3 mm
  - < 4 mm
82. Absence of the esophageal-gastric junction and a digestive track diameter great than \_\_\_\_\_ at the diaphragm is considered a hiatus hernia.
- 16 mm
  - 18 mm
  - 20 mm
  - 22 mm

83. What is the antrum cross-sectional area for patients with non-ulcer dyspepsia?
- > 3.5 cm
  - > 4.0 cm
  - > 4.5 cm
  - > 5.0 cm
84. Gastric ulcers are usually situated on the small curvature of the distal part of the stomach.
- True
  - False
85. Large vessels in the base of a duodenal ulcer indicates a high risk of what?
- Cancer
  - Ulcer
  - Perforation
  - Bleeding
86. Diffuse growing carcinomas cause thickening of the entire gastric wall by \_\_\_\_\_.
- 10 – 15 mm
  - 20 – 25 mm
  - 30 – 35 mm
  - 40 – 45 mm
87. The 14-16 loops of small bowel are situated in what part of the abdomen?
- Upper
  - Middle
  - Lower
  - Lateral
88. Ulcerative colitis is limited to what area?
- Small bowel
  - Stomach
  - Colon
  - Esophagus
89. Acute appendicitis has a blind end and a diameter greater than what?
- 6 mm
  - 8 mm
  - 10 mm
  - 12 mm

## CHAPTER 12 – ADRENAL GLANDS

90. The adrenal gland in neonates may be \_\_\_\_\_ the size of the kidneys.
- One eighth
  - One fourth
  - One third
  - One half
91. The left adrenal is above and medial to the left kidney and is usually **easily** seen.
- True
  - False

## CHAPTER 13 – KIDNEYS AND URETERS

92. What is the length of a normal adult kidney?
- 3 – 5 cm
  - 6 – 8 cm
  - 9 – 12 cm
  - 14 – 17 cm
93. What percentage of kidneys have an accessory renal artery supplying the lower lobe?
- 5%
  - 8%
  - 10%
  - 15%
94. What percent of renal cysts are due to benign cystic disease?
- 20%
  - 40%
  - 60%
  - 70%
95. What criteria is consistent with autosomal dominant polycystic kidney disease for 30 – 59-year-old?
- Two or more renal cysts
  - Two or more cysts in each kidney
  - Three or more cysts in each kidney
  - Four or more cysts in each kidney
96. What percent of patients with multilocular cystic tumors are boys under the age of two?
- 60%
  - 75%
  - 80%
  - 90%
97. What is the most common type of malignant renal tumor?
- Sarcoma
  - Wilms tumor
  - Lymphoma
  - Renal cell carcinoma
98. Sonography is accurate for detecting renal calculi larger than what size?
- 3 mm
  - 5 mm
  - 7 mm
  - 8 mm
99. Small end-stage kidneys measuring less than \_\_\_\_\_ will not recover any significant function.
- 5 cm
  - 7 cm
  - 8 cm
  - 9 cm
100. What is the diameter of ureters?
- 1 – 3 mm
  - 4 - 6 mm
  - 7– 9 mm
  - 10 – 12mm

101. In what percentage of girls does a ureterocele occur as a duplex ureter draining the upper pole of the kidney?
- 50%
  - 70%
  - 75%
  - 90%
102. What percentage of retroperitoneal fibrosis are idiopathic?
- 52%
  - 55%
  - 68%
  - 72%

#### **CHAPTER 14 – URINARY BLADDER, URETHRA, PROSTATE AND SEMINAL VESSELS**

103. How much fluid does a normal bladder hold when full?
- 100 ml
  - 200 ml
  - 400 ml
  - 500 ml
104. What is the most common reason for an ultrasound of the bladder?
- Bladder cancer
  - Bladder tumors
  - Bladder emptying
  - Bladder pain
105. Ultrasound is a valuable tool to image the urethra.
- True
  - False

#### **CHAPTER 15 – SCROTUM**

106. What percentage of palpable intratesticular masses are malignant?
- 60%
  - 70%
  - 90%
  - 95%
107. How are the majority of epididymo – orchitis managed?
- Surgery
  - Pain relief
  - Antibiotics
  - No intervention
108. What percent of men have a large straight artery and vein run between the periphery of the testes and the hilum?
- 3%
  - 6%
  - 10%
  - 12%

109. What is the length of a normal testes?
- 1 – 3 cm
  - 2 – 4 cm
  - 3 – 5 cm
  - 6 – 8 cm
110. With testicular torsion how long before the testes can infarct?
- 1 – 3 hours
  - 5 – 8 hours
  - 6 – 12 hours
  - 6 – 24 hours
111. The term “incomplete torsion” describes a twist of the spermatic artery of \_\_\_\_\_ or less.
- 60°
  - 90°
  - 180°
  - 360°
112. Seminomas and teratomas are rare above what age?
- 40 years
  - 50 years
  - 60 years
  - 70 years
113. Teratomas **never** vary in appearance.
- True
  - False
114. What is the most common testicular tumor in older men?
- Lymphoma
  - Stomal tumor
  - Epidermoid cysts
  - Sarcoidosis
115. The testes are a sanctuary site for what disease?
- Lymphoma
  - HIV
  - Leukemia
  - Malaria
116. Testicular cysts can sometime grow to what size?
- > 2 cm
  - > 4 cm
  - > 5 cm
  - > 8 cm
117. What does bilateral ectasia in younger men suggest?
- Malignancy
  - Infertility
  - Leukemia
  - Lymphoma
118. Testicular epidermoid cysts comprise what percent of testicular tumors?
- 1%
  - 2%
  - 3%
  - 4%

119. What can cause an intratesticular hematoma?

- a. Tumors
- b. Trauma
- c. HIV
- d. Lymphoma

**CHAPTER 16 – SPECIAL ASPECTS OF ABDOMINAL ULTRASOUND**

120. Which of the following are possible causes of an acute abdomen?

- a. Inflammatory disease
- b. Bowel obstruction
- c. Perforation
- d. All the above