

**ANSWERS: CHAPTER 27**

**MATCHING**

1. d  
2. g  
3. j  
4. i  
5. a  
6. h  
7. b  
8. e  
9. f  
10. c

**MULTIPLE CHOICE**

1. b  
2. c  
3. b  
4. d  
5. c  
6. a  
7. d  
8. b  
9. a  
10. d

**FILL-IN-THE-BLANK**

1. Needle tip  
2. Vascular structures  
3. Benign; malignant; metastatic  
4. Prothrombin time; partial prothrombin time; international normalized ratio  
5. Fresh frozen plasma (FFP); K  
6. Vessels; bowel; trachea; adjacent organs  
7. Core needle biopsy; biopsy gun  
8. Histologic; breast; kidney; liver; prostate gland; transplanted  
9. Line; dot  
10. Best; safest  
11. Informed consent; time-out  
12. Skin; area of interest  
13. Within the plane; needle path  
14. Freehand  
15. Diagnostic; therapeutic  
16. Cirrhosis; malignancy  
17. Thoracentesis; upright  
18. Prostate specific antigen; digital rectal examination; left lateral decubitus  
19. Thrombin; distal  
20. 10 mm

**SHORT ANSWER**

1. Sonography-guided procedures are minimally invasive, accurate, and safe. No ionizing radiation or contrast agents are required. They are readily available, inexpensive, and reproducible. The procedure is performed in real time, allowing for precise needle placement. The patient can be placed in multiple positions and therefore a wider variety of approaches can be considered. The needle tip can be followed in real time.

2. Biopsy of deep lesions in obese patients, lesions that are not visualized with sonography, and lesions located within or behind bone or gas-filled bowel may not be successfully biopsied with sonographic guidance.

3. A lesion is biopsied to determine the nature of the lesion. A procedure may be done to determine if a lesion is benign or malignant or to differentiate a primary malignancy from metastatic disease.

4. Complications are rare and are related to the organ or area of interest but include localized pain, vasovagal reaction, hematoma formation, infection, swelling, peritonitis, and pneumothorax.

**IMAGE EVALUATION/PATHOLOGY**

1. This needle is in plane and is perpendicular to the ultrasound beam, which is why it is so easily visualized.

2. This needle is visualized out of plane, and is therefore seen as an echogenic dot. When the needle is in plane, the length of the needle is visualized, making it easier to locate sonographically; however, performing the biopsy with the needle in plane is not always possible.

3. The parallel lines represent biopsy guidelines. A fixed biopsy guide is used to plan the procedure and keep the biopsy needle in a fixed plane during the procedure. This makes needle visualization easier because the needle remains within the plane of the sonographic image. The cursor in the center of the biopsy guidelines represents the distance to the lesion of interest. The puncture length, as well as the minimum needle length needed for the procedure, is calculated by the ultrasound machine.

4. Possible complications include bile leak, hematoma formation, infection, and pneumothorax.

5. A kidney biopsy is most commonly done to obtain cortical tissue to evaluate for parenchymal and glomeruli disease, rather than to obtain a sample from a mass. Biopsy of transplant kidneys is commonly performed to evaluate for allograft rejection. The lower pole of the kidney is typically biopsied to avoid the risk of major vessel puncture.

**CASE STUDY**

1. A thoracentesis may be therapeutic to relieve patient discomfort or diagnostic. Diagnostic indications include unilateral effusion, bilateral effusions of different sizes, pleurisy, fever, an echocardiogram and laboratory values inconsistent with heart failure, and an effusion that does not resolve with heart failure therapy. Possible complications include pain, bleeding, pneumothorax, infection, damage to the liver or spleen, and vasovagal events.