Fine-Needle Aspiration of the Liver

Dan VanderHart, DVM, DACVR
Clifford R. Berry, DVM, DACVR
University of Florida

Fine-Needle Aspiration

Liver cytology via fine-needle aspiration (FNA) has been shown effective in diagnosing some liver disorders; however, cytologic examination of the liver does have limitations and must be interpreted within the context of the clinical picture.[1-5]

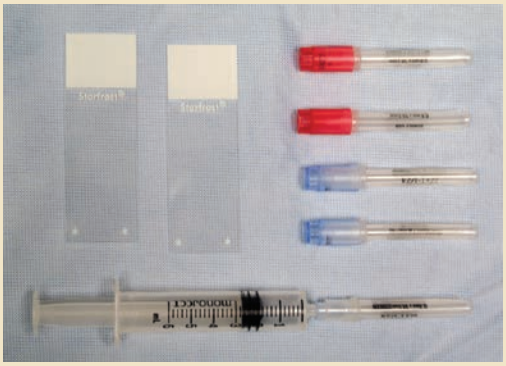
FNA is a relatively low-risk procedure that usually can be performed without sedation or general anesthesia. Contraindications for liver FNA include coagulopathies, lack of a safe access route (eg, vascular structure in the biopsy path), inexperience on the part of the sonographer, and an uncooperative patient.

What You Will Need

- 25-or 22-gauge, 1.5-inch needles
- 6-mL syringe
- Microscope slides labeled with patient name and tissue source

Usually, 25-gauge needles are a good choice with regard to sample size, minimizing hemodilution, and decreasing patient discomfort. Because some lesions do not exfoliate well, a larger-gauge needle can be used.

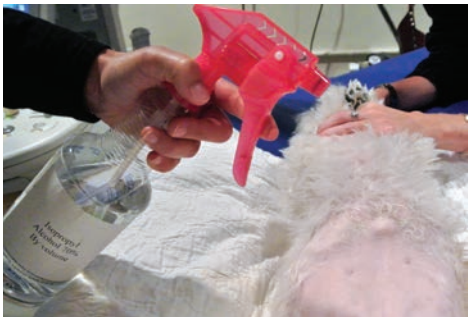
A syringe filled with room air is used to blow the sample onto the microscope slide.



Step-by-Step ■ Ultrasound-Guided Fine-Needle Aspiration Cytology of the Liver

Step 1

Prepare the area. If the patient is not already clipped, clip and clean the sampling area; consider a surgical scrub if the skin is particularly dirty or a sample will be submitted for culture. Remove ultrasound gel applied to the area, as it can create an artifact on the slide to be viewed by the pathologist.



Leave the area wet with alcohol or liquid (not jelly) lidocaine as a contact medium for the ultrasound transducer. Clean the transducer by placing an alcohol gauze sponge on the transducer tip while preparing the patient.

FNA = fine-needle aspiration

MORE ▶

Step 2

Locate the sampling area. If a general liver sample is needed, the most accessible portion of the liver should be selected. For diffuse liver disease, target the peripheral aspects of the liver lobes (left of midline) to avoid larger blood vessels that are more central within the hepatic parenchyma and the gallbladder, which is located right of midline.

If culture study of a specific nodule or region of the liver is desired, optimize the image of the region on the ultrasound machine. Take care to locate and avoid any structure in the path of the lesion or in the direct vicinity of the lesion that, if inadvertently sampled, could contribute to complications.

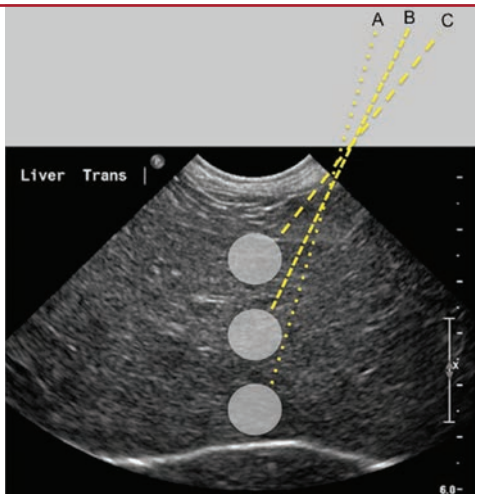
Author Insight **Extreme caution should be made to avoid contact between the transducer and the needle. A distance at least 1 cm should always be kept. The matching layer of the transducer is a soft material and can be easily damaged with a needle. Contact may also increase contamination.**

Step 3

Plan the trajectory. First, always orient the needle with the long axis of the transducer (always within the imaging plane) to ensure visualization of the needle throughout the process.

Next, recognize the spatial orientation of the transducer to anticipate from which direction of the monitor the needle will enter. Stick with the marker side of the transducer or the nonmarker side of the transducer to eliminate guessing.

Third, calculate the angle of trajectory based on lesion depth. After the angle has been planned, the needle should be placed at least 1 cm away from the head of the transducer oriented in planned trajectory to avoid scraping the transducer and contaminating the needle.



Author Insight **With diffuse hepatic changes or general liver sampling, the most accessible portion of the liver is often the first choice for sampling. Caution should be used to avoid piercing the gallbladder and larger hepatic veins or portal vessels to minimize the risk for hemorrhage.**

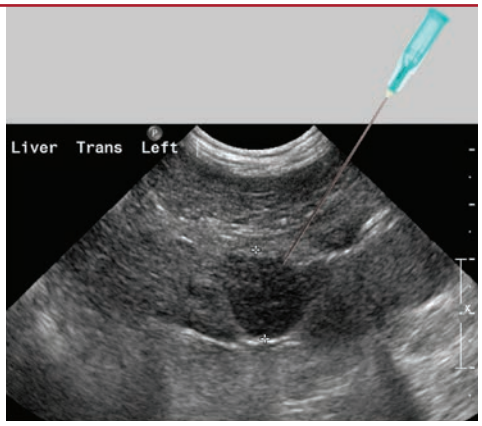
Step 4

Advance the needle to the lesion within the planned trajectory and with the needle at least 1 cm away from the transducer.

Visualize the tip of the needle throughout the entire process. Keep the beveled edge of the needle toward the transducer to increase its visualization. Doing so can ensure proper sampling of the lesion and avoid inadvertent needle placement.

Always realign the probe to the needle; do not change the angle of the needle once it has entered the patient, as this can cause unnecessary trauma.

Step 5



Sample the lesion. When the needle has been advanced to the lesion, sampling can begin. Make multiple advances into the lesion to avoid excessive tissue trauma, which can lead to hemodilution of the sample. This is often referred to as the *woodpecker technique*, in which the sample is drawn into the needle via capillary action rather than by active suction.

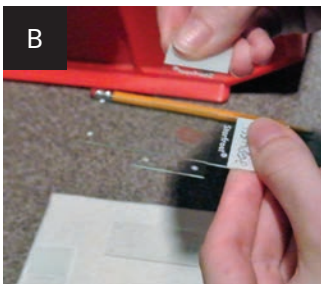
Alternatively, aspirate the lesion using a needle with an attached syringe. After the needle has been advanced into the lesion, apply gentle suction. An extension set can be placed between the needle and syringe, and an assistant can perform aspiration, if necessary. Three or four samples are routinely obtained, unless the patient has inherent risk factors (eg, bleeding disorders, poor accessibility, restlessness).

Author Insight **For lesions that do not exfoliate well, a 22-gauge needle attached to a short extension set and an empty 5–6 mL syringe can be used to provide suction. This technique allows an assistant to aspirate the lesion while the sonographer focuses on needle placement.**

Author Insight **For large masses, multiple portions of the mass—including the periphery—should be targeted. Larger masses often have necrotic central regions that inhibit the ability of a clinical pathologist to identify the type of lesion.**

Step 6

Prepare the slide. After sampling the lesion, retract the needle from the patient and prepare slides immediately to limit clot formation. An air-filled, 5–6-mL syringe should be attached to the needle and one sample expelled onto each slide (**A**). In some cases, the sample may need to be divided onto more than one slide.



Then, using a second slide, gently spread the sample across the slide surface. Avoid dropping a slide directly on top of the sample slide because the cells can fragment and smear, thereby creating a nondiagnostic sample.

The goal is to create a smooth monolayer that is well spread to ensure proper cytologic evaluation similar to a blood smear (**B**). The more blood present on cytology slides, the more difficult it is for the pathologist to interpret the lesion sample (ie, hemodilution). Label the slide with appropriate patient identification and the organ of origin (**C**). ■ cb

See **Aids & Resources**, back page, for references & suggested reading.

For More

For comparative ultrasound-guided findings of hepatic differentials in dogs and cats, see the companion **Comparative Imagery** on page 14 of this issue.