

Ultrasound-Guided Breast Interventions

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KEYWORDS

- Mammography • Fine-needle aspiration biopsy • Ultrasound-guided breast procedures
- Cyst aspiration

KEY POINTS

- Physicians performing ultrasound-guided breast procedures should be familiar with and fulfill qualifications outlined in the American College of Radiology Practice Guidelines for the Performance of Ultrasound-Guided Percutaneous Breast Interventional Procedures.
- Most breast lesions visible on ultrasonography are amenable to ultrasound-guided core biopsy, typically using an entry from the periphery of the breast that produces a path parallel to the chest wall.
- Fine-needle aspiration biopsy and cyst aspiration techniques use a short approach with the needle advancing toward the lesion at an angle of 30° to 45°.
- Postprocedure mammogram following placement of a radiopaque biopsy marker can confirm concordance between the sonographic and mammographic findings.
- Postprocedure patient follow-up includes performance and documentation of any delayed complications and treatment administered, radiologic-histologic correlation, and communication of biopsy results and recommendations to the patient and/or referring physician.

CLASSIFICATION

Ultrasound-guided breast interventions may be diagnostic, therapeutic, or both. Interventions include, but are not limited to:

- Percutaneous biopsy
 - Breast lesions
 - Axillary adenopathy
- Preoperative (wire) localization
- Cyst aspiration
- Abscess drainage.

The primary content of this article focuses on percutaneous ultrasound-guided breast biopsy using freehand guidance. Many of the concepts used for ultrasound-guided biopsy can be transferred to other ultrasound-guided interventions.

Ultrasound-guided needle biopsies can be classified as:

- Core-needle biopsy (CNB, automated throw needle)
 - Sensitivity of 97% to 99%
 - Can provide tissue sufficient for receptor status analysis
- Directional vacuum-assisted biopsy (DVAB, mammotomy)
- Fine-needle aspiration biopsy (FNAB):
 - Sensitivity and specificity of 85% to 88% and 56% to 90%, respectively, for non-palpable breast lesions
 - Can be useful in evaluating
 - Cystic lesions
 - Additional lesions or abnormal lymph nodes in the setting of a known primary breast cancer.

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GENERAL PRINCIPLES

Percutaneous image-guided biopsy has largely replaced diagnostic surgical biopsy in the evaluation of breast lesions in many practices. Compared with diagnostic surgical biopsy, percutaneous image-guided breast biopsy is:

- Less invasive, with reduced morbidity, better cosmetic results, and less scarring detectable on future breast imaging
- More efficient and less expensive than diagnostic surgical biopsy, with shorter recovery time
- Equivalent in accuracy to open surgical biopsy.

Once a malignancy has been diagnosed by percutaneous image-guided biopsy:

- The patient and surgeon are able to discuss therapeutic options in advance of a surgery.
- The extent of disease can be evaluated by ultrasonography or magnetic resonance (MR) imaging.
- Image-guided biopsy documenting multifocal or multicentric disease may alter surgical management.
- Percutaneous biopsy of nonpalpable malignancy results in a single therapeutic surgical operation in 81% of women.
- Receptor status as determined by CNB or DVAB samples can also guide neoadjuvant chemotherapy, if needed.

Advantages of ultrasound guidance for percutaneous breast biopsy over stereotactic guidance include:

- Lack of ionizing radiation, which is particularly important for pregnant women with a breast mass
- Real-time visualization of the needle during biopsy improves confidence that a small lesion has been accurately sampled
- Supine positioning is often more comfortable than prone, lateral decubitus, or sitting positions used for stereotactic procedures
- Stereotactic biopsy can be limited by a compressed breast thickness of at least 2.5 cm, whereas small breast thickness rarely affects the ability to perform ultrasound-guided breast biopsy
- In experienced hands, ultrasound-guided breast biopsies are often more efficient than stereotactic biopsy.

TRAINING

The American College of Radiology (ACR) Practice Guidelines for the Performance of Ultrasound-Guided Percutaneous Breast Interventional Procedures define qualifications and responsibilities for radiologists who perform these procedures (**Boxes 1 and 2**). Initial qualifications can be completed during residency or fellowship training programs.

INDICATIONS

Indications for ultrasound-guided breast interventions include:

- **Simple and complicated cysts**, when:
 - Symptomatic
 - Complicated cyst is suspected, but mass may be solid and is new or enlarging
 - Abscess is suspected, and therapeutic drainage is clinically indicated.
- **Complex and solid masses**, when:
 - Mass is assessed as suspicious (Breast Imaging Reporting and Data System [BI-RADS] assessment category 4) or highly suggestive of malignancy (BI-RADS 5)
 - Presence of more than 1 suspicious mass, to facilitate treatment planning.

Box 1

Principles from the ACR Practice Guideline for the Performance of Ultrasound-Guided Percutaneous Breast Interventional Procedures

Initial training:

Fulfill qualifications specified in the ACR Practice Guidelines for Performance of a Breast Ultrasound Examination (see **Box 2**)

Be capable of correlating results of mammography, other procedures, and the biopsy pathology with the sonographic findings, or review these results with a qualified physician

Obtain a minimum of 8 hours of continuing medical education (CME) in breast ultrasound-guided biopsy techniques

Perform at least 12 ultrasound-guided biopsy procedures under direct supervision

Thereafter, the ACR recommends that radiologists:

Perform at least 24 ultrasound-guided procedures every 2 years to maintain skills

Obtain at minimum of 3 hours of CME in ultrasound-guided breast biopsy every 3 years

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