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Biopsy tips and tricks - stereo, US, MRI

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Stereotactic biopsy

1. Lesions in very thin breasts - screw and push the needle instead of firing, insert pad between the breast and compression paddle, use VAB probe with a small notch
2. Lesions in very superficial location - inject local anesthesia with saline between the skin and the lesion, approach from other direction of the breast, use VAB probe with a small notch
3. Lesions in very posterior breast or axillary tail area of breast - oblique prone position (with passing arm though the whole)
4. Faint microcalcifications - use other landmarks

US-guided biopsy

False negative rate has been reported in 1.2–3.3% after US-guided 14 gauge core needle biopsy and 0–2% after 11 gauge vacuum-assisted biopsy. Main causes of the false negative results after US-guided biopsy are technical error, failure to act on image - pathology discordant case, or lack of follow up after concordant benign biopsy results. We will discuss about reducing technical errors and biopsy tips.

1. Lesion characteristics difficult to sample by US-guided core biopsy
   - clustered microcalcifications without definite mass, small nodule with increased vascularity
2. Confirmation of needle passing through the lesion
   - Perpendicular plane of US image or just sweeping the probe up and down across the lesion
3. Four of five cores including the center of the lesion do not sample just one area but sample at various portions of the lesion including the most suspicious area.
4. Lesions in deep location - “lever method”, “Fire and advance method” using semi-automated gun, elevation of the lesion using saline injection beneath the lesion

MR-guided biopsy

Images should be acquired at a slice thickness of 3mm or less (goal: approximately 1mm in plane resolution). - ACR Practice Guideline

Vacuum-assisted biopsy (VAB) device is more recommended than true-cut core needle biopsy or fine needle aspiration. VAB allows a single probe insertion with directional sampling of small targets, rapid collection of a significantly larger volume of tissue, without requiring extreme precision in targeting.

1. Proper positioning - Lesions in the posterior breast, upper inner quadrant, and subareolar regions. Prone oblique position or accessing by placing the affected breast in the contralateral coil
2. Compression - Too much compression disturbs the lesion enhancement, too less disturbs proper fixation of the breast.
3. Preparation for speedy and efficient biopsy - MR-guided biopsy, biopsy is not performed under real-time direct visualization, within limited time before the wash out of contrast enhancement. Check the location of grid after the initial noncontrast sequence. Draw the position of fiducial marker on a laminated sheet before MR scanning. Everything should be prepared before biopsy.
4. Use lidocaine mixed with epinephrine -

Epinephrine can be helpful in minimizing the parenchymal hematoma formation.

5. Start sampling from the center of the lesion - After more sampling, more hematoma in the region displaces the probe from the lesion.
6. Remove the hematoma using “lavage” function before obtaining post-biopsy image

After biopsy, radiologists compare the pre- and post-biopsy images to ensure that the target has been adequately sampled. Hematoma can obscure the biopsy site. After ensuring the adequate sampling, deploy the marker at the biopsy site.

Image - Pathology Correlation

This is the final and the most important step of all kinds of biopsy. Discordant results were reported in 7% of MR-guided VAB, about 3% of stereotactic and US-guided biopsy. Malignancy rate after re-biopsy for the benign discordant results was 30% in MR-guided biopsy, 14% in stereotactic or US-guided biopsy.

For benign concordant results, follow up imaging is recommended after 6 months, especially in the cases of nonspecific benign concordant results.

References

1. Delva D, Tomalty L, Payne P. Practice tips. Fine needle aspiration of breast lumps.Can Fam Physician. 2002 Jun;48:1055-1056
2. Price ER, Morris EA. Magnetic resonance imaging-guided breast biopsied: tips and tricks. Can Assoc Radiol J. 2011;:62:15-21
3. American College of Radiology. ACR practive guideline for the performance of contrast-enhanced magnetic resonance imaging (MRI) of the breast.
4. Lee J-M, Kaplan JB, Murray MP, et al. Imaging-histologic discordance at MRI-9-gauge vacuum-assisted breast biopsy. AJR Am J Roentgenoloy 2007;189:852-859
5. Youk JH, Jung I, Kim EK et al. US follow-up protocol in concordant benign result after US-guided 14-gauge core needle breast biopsy.Breast Cancer Res Treat 2012;132:1089