The Breast 19 (2010) 446–449

Contents lists available at ScienceDirect

The Breast

journal homepage: www.elsevier.com/brst

Original article

Breast lesions with ultrasound imaging-histologic discordance at 16-gauge core needle biopsy: Can re-biopsy with 10-gauge vacuum-assisted system get definitive diagnosis?

Jun Lai Li*,[a], Zhi Li Wang[a], Li Su, Xiao Jun Liu, Jie Tang

Department of Ultrasound, Chinese People's Liberation Army General Hospital, 28 Fuxing Road, Beijing 100853, China

ARTICLE INFO

Article history:
Received 24 November 2009
Received in revised form
4 April 2010
Accepted 8 April 2010
Available online 24 September 2010

Keywords:
Breast lesions
Imaging-histologic discordance
Vacuum-assisted biopsy
Core needle biopsy

ABSTRACT

The aim of this study was to evaluate if re-biopsy with 10-gauge vacuum-assisted biopsy (VAB) could get definitive diagnosis for breast lesions with ultrasound (US) imaging-histologic discordance at 16-gauge core needle biopsy (CNB).

From January 2007 to June 2008, a consecutive biopsy was performed on 1069 lesions with US-guided 16-gauge CNB. A total of 28 lesions were considered to be US imaging-histologic discordant and all of them underwent subsequent 10-gauge VAB. All malignant lesions located at VAB were treated with subsequent surgery and all benign lesions at VAB were followed up for at least 1 year.

Six of the 28 lesions (21.4%) had pathologic upgrade after VAB. In them, one case upgraded from adenosis to ductal carcinoma *in situ* (DCIS); one case upgraded from adenosis to infiltrating ductal carcinoma (IDC); one case upgraded from atypical ductal hyperplasia to IDC; two cases upgraded from intraductal papilloma to DCIS; and one case upgraded from sclerosing adenosis to invasive lobular carcinoma (ILC). The subsequent surgery further demonstrated the diagnosis of VAB for all the lesions with histologic upgrade.

Re-biopsy could improve diagnostic accuracy in patients with breast lesions showing imaging-histologic discordance during CNB, and 10-gauge VAB was a valuable method to deal with re-biopsy.

Percutaneous core needle biopsy (CNB) has become the most common and the standard method for pathologic evaluation of breast lesions. It has improved the diagnosis of breast lesions before surgery. However, CNB could underestimate the diagnosis of some disease, especially high-risk lesions, such as atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH) or lobular carcinoma *in situ* (LCIS).[1,2] Reports indicate a 20–56% rate of underestimation of ADH at stereotactic 14-gauge CNB.[3–5]

The ultrasound (US) imaging and CNB result might be discordant sometimes. Liberman et al.[6] reported that the imaging-histologic discordance was present in 3.1% lesions after CNB. Dershaw et al. reported that after CNB, 18% lesions were recommended for a re-biopsy.[7] To avoid the underestimation of breast lesions, some studies[8,9] have reported the application of vacuum-assisted biopsy (VAB) system by stereotactic biopsy or guided by mammography, which decreased the underestimation of breast lesions.

The current study was undertaken to determine the role of a 10-gauge VAB system in patients with US imaging-histologic discordance after 16-gauge CNB.

Material and methods

Patients

From January 2007 to June 2008, a percutaneous US-guided 16-gauge core needle biopsy was performed on 1069 consecutive breast lesions. Among all the lesions, 628 lesions were palpable and 269 lesions were with pain. In them, 26 patients with 28 lesions, which were suspicious of malignant lesions on US image, obtained non-malignant result with 16-gauge core needle biopsy.

The age of the patients with imaging-histologic discordance was 38–65 years (mean age ± standard deviation, 48.6 ± 12.5 years). Of these patients, 25 patients had one lesion each and the last patient had three lesions.

Informed consent was obtained from all patients, and the study was approved by our local Ethics Committee. Written informed consent was obtained from every patient at enrolment.

* Corresponding author. Tel.: +86 10 66939532; fax: +86 10 68161218.
E-mail address: li_jl@yeah.net (J.L. Li).
[a] Both authors are the co-first authors.

0960-9776/$ – see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.breast.2010.04.003

Biopsy procedure with 16-gauge core needle

The biopsy was guided by 8L-5 MHz linear array transducer (Acuson Sequoia 512, Acuson, Mountain View, CA, USA) and was performed with 16-gauge core needle biopsy (CR Bard, Inc., Covington, GA, USA) with 22-mm throw. Three to five core samples were obtained by three of our board-certified breast radiologists. Informed consent was obtained from all patients.

Evaluation between pathologic results with US images

CNB reporting in this study was performed by a dedicated breast pathologist and was based on recommended criteria, which consisted of the following categories[10,11]: B_1, normal tissue or unsatisfactory; B_2, benign; B_3, lesion of uncertain malignant or biologic potential; B_4, suspicious of malignancy; and B_5, malignant.

The pathologic result of CNB and the corresponding US image were reviewed by the three board-certificated breast radiologists in our institution. Then, the radiologists determined if the pathologic result was concordant with the US image.

If the pathologic results were accepted by the radiologists compared with the US image, the radiologists determined it 'concordance'. If the pathologic result was considered not acceptable compared with the US image, the radiologists determined it 'disconcordance'. 'Disconcordance' usually meant that the lesions were categorised BI-RADS 4a, 4b, 4c or 5 on the US image, while the pathologic result was B1–3. The three radiologists tried to get a consensus on the evaluation of the correlation between the pathologic result and US image. If one or more radiologists obtained the 'discordance' evaluation, the patient was recommended to have a further 10-gauge vacuum-assisted diagnostic biopsy.

Diagnostic biopsy procedure with 10-G VAB system

After evaluation between the pathologic results and US images, 26 patients with 28 lesions were given the 'discordance' evaluation. All these patients were recommended to have a further diagnostic biopsy with a 10-G VAB system. The largest diameter of the lesions was 0.5–1.5 cm (mean diameter ± standard deviation, 0.8 ± 0.8 cm).

The VACORA vacuum-assisted system (CR Bard, Inc., Covington, GA, USA) was used for the re-biopsy. The three board-certified breast radiologists in our institution performed all the excision procedures.

After local anaesthesia, the coaxial cannula was inserted through a 3-mm skin incision and advanced in front of the mass under the guidance of US, and then the core of the coaxial cannula was pulled out and the rotation probe was inserted into the mass or adjacent to the mass. As many as 3–5 samplings with negative pressure were taken. The removal site and probe tract were compressed for 10–15 min to control bleeding. Compression with an elastic bandage was needed for 24–48 h. Anti-inflammatory drugs were administered as needed.

Follow-up

All the lesions demonstrated to be benign after VAB were to be followed up for at least 1 year (mean time ± standard deviation, 14.2 ± 1.5 months). All the lesions demonstrated with VAB to be malignant tumours underwent subsequent surgery and the pathologic results from VAB and surgery were compared.

Statistical analysis

All analyses were performed using SPSS11.0, standard version (SPSS Inc, Chicago, IL, USA). All data were described as mean ± SD. The Fisher's exact test was used in the comparison of upgrade rate between category 4 and category 5 lesions. The Student's *t*-test was used in the comparison of the largest diameter between masses with pathologic upgrade and masses without pathologic upgrade. $P < 0.05$ was considered statistically significant.

Table 1
BI-RADS category and CNB findings of the lesions.

	BI-RADS 4a	BI-RADS 4b	BI-RADS 4c	BI-RADS 5	Total
B1	1	0	0	0	1
B2	2	3	3	2	10
B3	2	4	5	6	17
B4	12	36	45	12	105
B5	95	195	269	377	936
Total	112	238	322	397	1069

Results

BI-RADS category and CNB findings of all the 1069 lesions are shown in Table 1. The frequency of US imaging-histologic discordance in our study group was 2.6% (28/1069). Among the 28 lesions with discordant results, 21.4% (6/28) lesions were demonstrated to have upgrade in pathology diagnosis after VAB. BI-RADS category and VAB findings of the 28 lesions are depicted in Table 2. Category 5 lesions had a significant higher upgrade rate than that of category 4 lesions (Table 3).

The imaging size, BI-RADS categories and pathologic diagnosis of the lesions with histologic upgrade are shown in Table 4. The size of the lesions with histologic upgrade and without histologic upgrade were 0.5–1.0 cm (mean size ± standard deviation, 0.7 ± 0.4 cm) and 0.5–1.5 cm (mean size ± standard deviation, 0.9 ± 0.7 cm), respectively. There was no significant difference in lesion size between these two groups.

The subsequent surgery further demonstrated the diagnosis of VAB for all the lesions with histologic upgrade.

Discussion

It is reported that in approximately three of four patients, non-palpable breast lesions referred for surgical excision are benign.[12] The application of CNB has greatly decreased the necessity of surgery. Several studies have demonstrated that a surgical procedure can be avoided in patients with CNB benign lesions concordant with lesion characteristics on US or mammography.[13,14]

However, CNB has its own limitations. Many factors could affect the accuracy of CNB, such as small-sized (5 mm) lesions, dense fibrotic tissue resistant to needle traversing, deeply located lesions, lesion mobility and so on. CNB could have false-negative results or underestimated results, which might lead to a delay in the diagnosis of malignant breast tumours.[15–18] Studies have demonstrated that in lesions proved to be ductal carcinoma *in situ* (DCIS) from CNB, surgery revealed infiltrating carcinoma in 16–55.5%.[19,20]

Table 2
BI-RADS category and VAB findings of the lesions with ultrasound imaging-histologic discordance.

	BI-RADS 4a	BI-RADS 4b	BI-RADS 4c	BI-RADS 5	Total
B1	1	0	0	0	1
B2	2	1	3	2	8
B3	2	4	4	4	14
B4	0	0	0	0	0
B5	0	2	1	2	5
Total	5	7	8	8	28