



ORIGINAL ARTICLE / *Breast imaging*

Ultrasound features of retroareolar breast carcinoma

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KEYWORDS

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Nipple areolar complex;
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Abstract

Purpose: The goal of this study was to report the ultrasound features of retroareolar breast carcinoma (RABC).

Materials and methods: The ultrasound examinations of the breast of 53 women with RABC were reviewed. They had a mean age of 67.2 years \pm 13.4 (standard deviation [SD]) (range: 46–85 years). RABC were defined as carcinomas located less than 2 cm from the nipple on mammogram.

Results: Among the 53 RABC, 42 (42/53; 79%) were invasive ductal carcinomas, 6 (6/53; 11%) were invasive lobular carcinomas, 4 (4/53; 8%) were ductal carcinomas *in situ* and 1 (1/53; 2%) was intracystic papillary carcinoma. The mean size of RABCs was 22.5 mm \pm 8.2 (SD) (range: 7.2–54.8 mm). RABCs presented as a mass (53/53; 100%) with an irregular shape (44/53; 83%), a non-parallel orientation (37/53; 70%), non-circumscribed margins (50/53; 94%), a hypoechoic echotexture (46/53; 87%), posterior attenuation (45/53; 85%) and increased vascularity (37/53; 70%) on Doppler ultrasound.

Conclusion: On ultrasound, RABC have a presentation similar to that of breast carcinoma in other locations.

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The nipple is an important anatomic landmark routinely used for localization in breast ultrasound by measuring the lesion-to-nipple distance. However it is considered as a challenging region with special features and specific breast diseases [1–5].

Retroareolar breast carcinomas (RABC) account for 8% of all breast cancers and are considered more difficult to detect than cancers located elsewhere in the breast [3,6–9]. Contrary to clinical examination that is considered sensitive for the detection of retroareolar masses, RABC can be missed on mammogram and ultrasound [3,5]. Despite continuous and significant improvement in breast ultrasound that include the development of high frequency transducers, compound imaging and speckle reduction algorithms [4,10,11], the investigation of the retroareolar area with ultrasound remains challenging and can be affected by many artifacts [12].

The goal of our study was to report the ultrasound features of RABC.

Material and methods

Patients

This retrospective study was approved by our Institutional Review Board. The files of all women with breast carcinoma who had ultrasound-guided biopsy and metallic clip placement from January 2012 to December 2013 in our institution were reviewed in order to identify those with RABCs. A total of 967 women with breast cancers were initially identified. Women were excluded when the distance between the clip and the nipple was >2 cm. Women were included when they had mammogram and breast ultrasound prior to biopsy.

The study population ultimately consisted of 53 women with a mean age of 67.2 years \pm 13.4 (standard deviation [SD]) (range: 46–85 years).

Imaging protocol

Mammographic protocol

All mammograms were performed using a full-field digital mammography system (Selenia Dimensions, Hologic Inc., MA, USA). Standard craniocaudal and mediolateral oblique views were routinely obtained and additional views were obtained when needed.

Ultrasound technique

Breast ultrasound was performed to evaluate specific abnormalities discovered either at clinical examination, on mammograms or on breast magnetic resonance imaging (MRI) examination, as part of the initial work-up of women diagnosed with breast carcinoma, or as an adjunct to screening mammograms in women with heterogeneously or extremely dense breasts. The entire breast was scanned [12,13]. All included women had ultrasound-guided biopsy of breast lesions with metallic clip placement before surgery. A clip marker (Suros™, Argon Medical Device, Plano, TX, USA) was left within all biopsied lesions.

Ultrasound examinations were performed using a high resolution equipment (Aplio®, Toshiba Medical Systems,

Otawara, Japan) with high frequency (7.5–13 MHz) linear array transducers (PLT1204AX, Toshiba Medical System). B-mode, Doppler and strain elastography were routinely used during ultrasound examinations, particularly in order to help identify subtle lesions prior biopsy

Imaging analysis

Images were reviewed in a consensus reading by two radiologists specialized in breast imaging who were blinded to the final histopathological diagnosis. All post biopsy mammograms were reviewed to determine the location of the biopsied carcinoma relative to the nipple. The distance between the clip marker in the biopsied area and the nipple was measured by a radiologist. A cursor was placed between the clip marker (located within the lesion) and the nipple. A lesion was considered retroareolar when the distance between the clip marker in the biopsied lesion and the nipple was \leq 2 cm on mammogram (Fig. 1) [1,5,8]. The mammographic characteristics of breast lesions and breast parenchymal density were evaluated according to the BI-RADS lexicon [13].

Conventional ultrasound images were analyzed by two radiologists (R. F., B. M.) in consensus, and classified into appropriate categories according to the BI-RADS to indicate probability of malignancy. BI-RADS 3 indicated probably benign; BI-RADS 4A/4B/4C, low/moderate/high suspicion for malignancy; and BI-RADS 5, highly suggestive of malignancy [14].

Finally, ultrasound findings were correlated with the results of clinical examination and those of other imaging studies.

Statistical analysis

Data were entered in a spreadsheet program (Excel, Microsoft). Quantitative data were expressed as mean, SD and range. Qualitative data were expressed as raw numbers, proportions and percentages.

Results

Among the 53 RABC, 42 (42/53; 79%) were invasive ductal carcinomas, 6 (6/53; 11%) were invasive lobular carcinomas, 4 (4/53; 8%) were ductal carcinomas *in situ* and 1 (1/53; 2%) was intracystic papillary carcinoma. The mean size of RABCs was 22.5 mm \pm 8.2 (SD) (range: 7.2–54.8 mm).

Among the 53 RABCs, 29 (29/53; 54%) presented as palpable mass on clinical examination (14 associated with nipple inversion or retraction and 1 with nipple discharge), 17 (17/53; 33%) were initially mammographically detected (5 clusters of pleomorphic microcalcifications, 5 spiculated masses, 3 distortions, 2 focal asymmetries, 1 mass associated with a distortion and 1 mass associated with microcalcifications) (Figs. 2 and 3), 4 (4/53; 8%) were incidentally sonographically detected (without mammographic or clinical correlation), and 3 (3/53; 6%) were initially detected on MRI (1 mass and 2 non-masses) (Table 1).

On ultrasound, RABCs corresponded to masses (53/53; 100%) displaying the classic appearance of breast carcinoma with an irregular shape (44/53; 83%), a non-parallel

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