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Vacuum mammotomy under ultrasound guidance

E. Łuczyńska[1], P. Skotnicki[2], A. Kocurek[1], T. Pawlik[1], J. Anioł[1], K. Herman[2]

[1] Department of Radiology and Imaging Diagnostics, Oncology Center, Cracow, Poland
[2] Department of Tumor Surgery, Oncology Center, Cracow, Poland

Author's address: E. Łuczyńska, Department of Radiology and Imaging Diagnostics, Oncology Center, Cracow, Poland, Kraków, Garncarska 11, e-mail: dgn.ela@interia.pl

Summary

Background: Breast ultrasound is a non-invasive method of breast examination. You can use it also for fine needle biopsy, core needle biopsy, vacuum mammotomy and for placing the "wire" before open surgical biopsy.

Material/Methods: 106 patients (105 women and 1 man) aged 20–71 years (mean age 46.9) were treated in Cancer Institute in Cracow by vacuum mammotomy under ultrasound guidance. The lesions found in ultrasonography were divided into three groups: benign lesions (BI RADS II), ambiguous lesions (BI RADS 0, III and IVa), and suspicious lesions (BI RADS IV B, IV C and V). Then lesions were qualified to vacuum mammotomy.

Results: According to USG, fibroadenoma or "fibroadenoma-like" lesions were found in 75 women, in 6 women complicated cysts, in 6 women cyst with dense fluid (to differentiate with FA), and in 19 patients undefined lesions. Fibroadenoma was confirmed in histopathology in 74% patients among patients with fibroadenoma or "fibroadenoma-like" lesions in ultrasound (in others also benign lesions were found). Among lesions undefined after ultrasound examination (total 27 patients) cancer was confirmed in 6 % (DCIS and IDC). In 6 patients with complicated cysts in ultrasound examination, histopathology confirmed fibroadenoma in 4 women, an intraductal lesion in 1 woman and inflamatory process in 1 woman. Also in 6 women with a dense cyst or fibroadenoma seen in ultrasound, histopathology confirmed fibroadenoma in 3 women and fibrosclerosis in 3 women.

Conclusions: Any breast lesions undefined or suspicious after ultrasound examination should be verified. The method of verification or kind of operation of the whole lesion (vacuum mammotomy or "wire") depends on many factors, for example: lesion localization; lesion size; BI RADS category.

Key words: breast cancer • mammotomy • breast lesions

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Background

Breast cancer is the most common malignant tumor in women, both worldwide and in Poland. Ultrasound scan of the mammary gland is a non-invasive imaging method, which can be complementary to mammography and physical examination in elderly women, and in women below 30 years of age, pregnant or lactating is the primary method of breast diagnostics. Ultrasonography can be used to control fine needle biopsy, large core needle biopsy or mammotome biopsy, as well as "wire" placement before open surgical biopsy.

Materials and methods

The study was carried out in a group of 106 patients (105 females and 1 male), who underwent mammotomy in the Cracow Oncology Center in 2006. The mean age of the patients was 49.9 years (range 20–71, standard deviation 13.3 (fig. 1).

All US scans were performed in the Institute of Oncology in Cracow using a Logique 7 apparatus with a 12 MHz head. Changes visible on USG were divided into three groups – benign lesions (BI RADS II) (fig. 2), ambiguous lesions

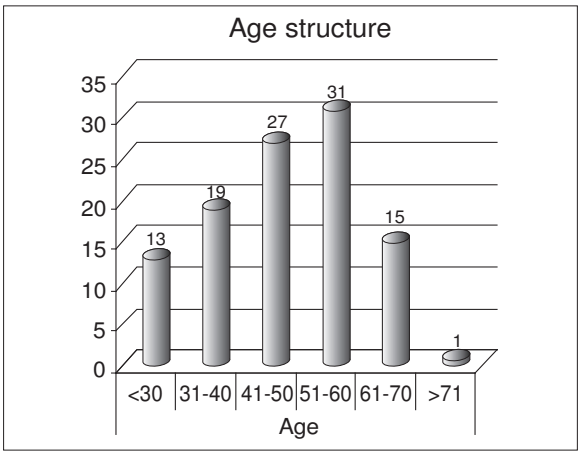

Figure 1. Age of examined patients.

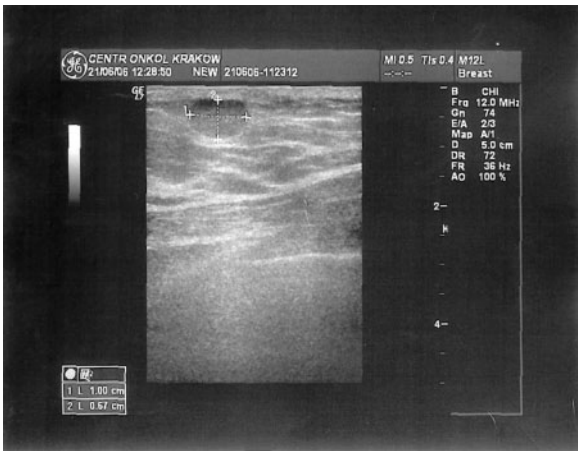

Figure 2. Benign lesion.

(BI RADS 0, III and IVA) (fig. 3) and suspicious lesions (IV B, IV C and V) (fig. 4). Then the lesions were qualified for mammotomy or open surgical biopsy according to:

1. localization,

2. BI RADS category,

3. size.

Results

In the group of 106 patients, 50 (47%) lesions were localized in the right breast, 56 (53%) in the left one (in some patients in both breasts). The most frequent localization was the external upper quadrant and the borderline between the external quadrants (both these localizations together accounted for 55% of lesions).

The mean lesion diameter was 10.56 mm (the smallest – 4 mm; the largest – 23 mm). On USG, there were 84 oval, well-delineated tumors, 20 polycyclic, well-delineated tumors, and 2 lesions without definite borderlines visible. The lesions were hypoechogenic or demonstrated mixed echogenicity pattern.

On the basis of USG, the diagnosis of fibroadenoma or fibroadenoma-like tumor was established in 75 cases, of complicated cysts with dense content to be differentiated with FA in 6, and ambiguous lesions in 19.

Among the patients with USG-based diagnosis of fibroadenoma or fibroadenoma-like tumor, FA was confirmed in 74%, in 4% hyperplasia was found, in 3% dysplasia benigna mammae, and 19% lesions defined as "others" (fig. 5). Among the lesions seen on USG as „ambiguous" (27 cases in total), 6% was malignant (DCIS and invasive carcinoma), 47% – fibroadenoma, 6% – intraductal hyperplasia, 13% – lesions defined as „others" (fig. 6). The term "others" included benign lesions, such as: fibrosis, adenosis, cysts and microcysts, calcifications and microclcifications, atrophy, ductal dilatation, fibrocystic degeneration, or no abnormalities (3 cases in the whole material).

USG revealed complicated cysts in 6 patients, whereas histopathology resulted in the diagnosis of fibroadenoma in 6 cases, intraductal hyperplasia in 1 and inflammatory reaction in 1. Also in 6 patients USG revealed cysts with dense content or fibroadenomas, and subsequent histopathology – fibroadenoma in 3 patients, and in 3 – fibrosclerosis.

Figure 3. Undefined lesion.

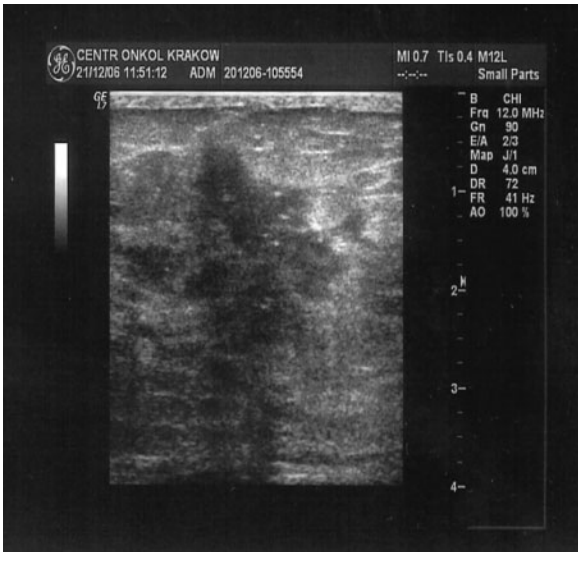

Figure 4. Suspicious lesion.

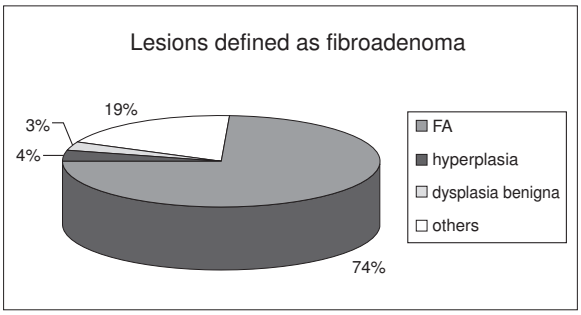

Figure 5. Comparison between lesions defined in ultrasound examination as fibroadenoma or "fibroadenoma-like" lesions with histopathology of these lesions.

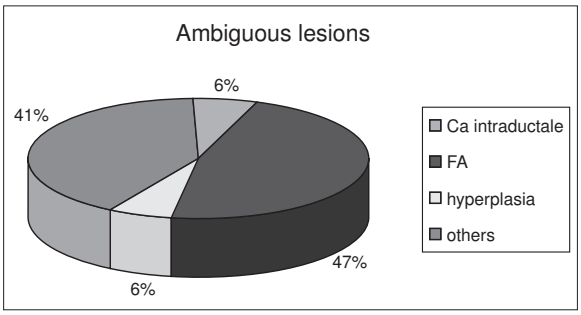

Figure 6. Lesions undefined in ultrasound examination in comparison with histopathology.

One man subjected to mammotomy was suspected to have gynecomastia, which was confirmed by histopathology.

Discussion

Ultrasonography is, in addition to mammography, one of the most important method of breast diagnostics.

The sensitivity of this technique depends on the experience of the physician, resolution of the apparatus and breast structure. This method plays a special role in the diagnostic of lesions in breasts characterized by glandular structure. USG can also be used to control thin and large core needle biopsy, as well as mammotome biopsy [1, 2, 3].

The most frequent benign lesions of the breast include fibroadenomas and cysts.

Fibroadenomas are the most frequently occurring tumors in women. They can be uni- or bilateral, sometimes multiple. They are visible on USG as well-delineated, hypoechogenic, in most cases homogeneous, tumors. Sometimes they are not homogeneous, especially long-course fibroadenomas, which may contain calcifications. Height-to-width ratio (H/W) is an important symptom differentiating benign lesions from the malignant ones. In benign lesions it is < 1, and in malignant ones > 1, i.e. each lesion developing transversely to the anatomical pattern of structures making up the mammary gland is a suspicious lesion [4, 5].

A cyst is a benign lesion filled with fluid. On USG it is non-echogenic, with well-distinguishable capsule with characteristic enhancement behind the posterior wall. Indications for invasive diagnostics include: presence of a solid structure in the cyst lumen, irregular thickening of the cyst wall, or obscured external contour.

Benign but ambiguous lesions, which may arouse suspicion of malignancy on USG, include: glandular lobular hyperplasia, inflammatory changes, abscesses, traumatic lesions, hematomas, postoperative scars, some fibroadenomas, lesions of radial scar type, necrotic adipose tissue, adenomatous foci, focal changes in diabetes

Lesions ambiguous on US images are characterized by obscured external contours, hypoechogenicity or mixed echogenicity patterns.

Suspicious (potentially malignant) lesions are characterized by:

1. low echogenicity (marked hypoechogenicity), often lower than echogenicity of adipose tissue,
2. irregular external contour,
3. highly echogenic, fringed halo, surrounding a hypoechogenic central part
4. thickened and shortened Cooper's ligaments,
5. distorted ductal course,
6. sometimes abnormalities of mammary gland architecture are only visible.

Benign lesions do not have to be verified. In practice, however, they are subjected to verification on the patient's request. Lesions ambiguous or suspicious on USG must be verified. The method of verification is dependent on many factors, including, among others, location of the lesion in the mammary gland, its size and diagnostic potential of the center [7, 8]. In any case of an ambiguous or suspicious breast lesion, the cooperation of a surgeon, radiologists and pathologist. The decisions concerning the management of individual patients are made by the whole team.

Conclusions

1. All breast lesions undefined or suspicious after ultrasound examination should be verified.
2. The method of verification or kind of operation of the whole lesion (vacuum mammotomy or "wire") depends on many factors, for example:

a. lesion localization
b. lesion size
c. BI RADS category.

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