Breast lesions of uncertain malignant potential (B3 lesions) diagnosed at stereotactic guided vacuum-assisted biopsy in asymptomatic population: clinical importance.

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Purpose

A varying proportion of breast needle core biopsies has borderline findings (B3 lesions of uncertain malignant potential) (1), heterogeneous as to their pathological and prognostic characteristics but with the common denominator of an associated risk with breast cancer (2,3).

Many authors suggest that a B3 report should prompt surgical excision for histological confirmation (4-8), but such a policy exposes to an excess of unnecessary surgical procedures as the positive predictive value (PPV) of B3 for carcinoma is in the range of 30% (9,10).

PPV is not the same for all B3 cases. It varies with subcategories, being as high as 50-60% in presence of atypia (atypical ductal hyperplasia (ADH) or LIN) and substantially lower (in the range of 20%) for lesions showing no atypical cells (papillary lesions, phyllodes tumor, radial scar, mucocele-like lesions, columnar cell lesions) (11-14). The purpose of this study is to assess the accuracy of stereotactic Vacuum Assisted breast Biopsy (VAB) and determine which groups of lesions contains the highest risk for malignancy.
Methods and Materials

From February 2002 through February 2011, 981 consecutive stereotactic biopsy were performed for mammographic abnormality, non-palpable and US-occult with an 11-gauge vacuum-assisted device (VAB). Lesions with B3 diagnosis lesions that underwent surgical excision or imaging follow-up at least for 1 years were included in this study.

**B3 definition**
The "borderline histology" or "B3 category" includes atypical ductal hyperplasia (ADH), lobular intraepithelial neoplasia (LIN) (including atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS)), papillary lesions, radial scar/complex sclerosing lesion, mucocele-like lesion, columnar cell lesions.

The **B3 lesions with atypia associated** are ADH, LIN, papillary lesions combined with atypia, radial scar combined with atypia, mucocele-like lesion combined with atypia, flat epithelial atypia. The **B3 lesions without atypia associated** comprise papillary lesions combined, radial scar, mucocele-like lesion, columnar cell change.

**Methods**
Each pre-biopsy mammogram was analyze to categorize lesions according to mammographic lesion pattern (mass with or without associated microcalcifications or microcalcifications alone) and BI-RADS category (categories 3-5). The radiologist performing the biopsy recorded the maximum mammographic lesion diameter and the number of tissue samples obtained during biopsy of each lesion, the presence or absence of calcifications on specimen radiographs of each calcified lesion related to coaxial rotation (1°, 2°, 3°, 4°, 5° turns: fanning outwards).

**B3 lesions management**
After VAB, patients underwent either excision or clinical and mammographic follow-up. The decision to excise the directional vacuum-assisted biopsy site was predicated on the findings at vacuum-assisted biopsy (particularly the presence of B3 lesion with atypical hyperplasia), on individual operator/patient preference based on prior reported studies or lack of confidence in reconciling mammographic findings with those of vacuum-assisted biopsy (or both).

The final outcome was based on surgical histology or follow-up.

Imaging features, procedure related factors and histological diagnosis of cases with and those without underestimation were compared (anaysis with Fisher exact test; p significant value<0.05).
Results

Of 981 VAB, histology revealed 193 B3 lesions namely lobular neoplasia (29), atypical ductal hyperplasia (25), papillary lesion (29), columnar cell lesions (64), radial scar (36), mucocele-like lesion (10).

The radiological pattern was masses in 10 cases (5%), focal architectural distortion in 6 cases (3%) and microcalcifications in 177 cases (92%) (Fig 1).

![Fig. 1: Mammographic appearance in B3 lesions. The most of cases were depicted as microcalcifications: radial scar (a), mucocele like-lesion (b), columnar cell lesions (c), atypical lobular hyperplasia (d).](image)

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As regard BIRADS, lesions were categorized as highly suspicious for malignancy (BI-RADS 5) in 8 case (4%); suspicious for malignancy (BI-RADS 4b) in 31 cases (16%);
indeterminate (BI-RADS 4a) in 54 cases (28%); probably benign (BI-RADS 3) in 100 cases (52%).

Mammographic lesion size ranged from 2 to 25 mm. The lesion diameter was < 5 mm in 58 (30%) cases, from 5 to 10 mm in 88 (46%) cases, from 11 and 20 mm in 42 (22%) cases and > 20 mm in 5 (2%) cases.

The exact number of specimen varied from patient to patient; it was < 11 in 10 cases (5%), ranged from 11 to 20 in 127 cases (66%) and > 20 in 56 cases (29%). In 170/177 (96%) cases performed for the evaluation of calcifications, the calcifications were present on specimen radiographs.

**Surgical excision**

After VAB, 107 patients underwent a subsequent surgical biopsy. The open biopsy rate after B3 VAB finding was 55%.

The patient who underwent surgical excision had atypical B3 lesions (Fig.2) or lack of microcalcifications in specimen or lack of confidence in reconciling mammographic findings with those of vacuum-assisted biopsy.
Fig. 2: B3 lesion with atypia. Magnified retroareolar right craniocaudal mammogram (a) and mediolateral mammogram (b) of 25 mm- coarse calcification focus. The percutaneous biopsy obtained 16 cores from three coaxial probe rotation. At the specimen radiograph (14 cores in c), presence of calcifications is observed in 6/16 specimens (arrows in c). The VAB histology was papillary lesion with focal atypia associated. Woman was referred to surgery.

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At final histology, 73/107 (66%) had the same diagnosis on excision as on VAB, 26/107 (25%) had no residual disease and 7/107 had malignancy (7%). One patient was diagnosed at the same time with LIN in the opposite breast and choosing bilateral mastectomy. Overall, at excision 7 were upgraded to ductal carcinoma (4-DCIS, 3-IDC). The original indication for biopsy in all 7 of these cases was the presence of calcifications (BI-RADS 5 in 1 case, BI-RADS 4 in 5 cases and BI-RADS 3 in 1 case). The VABB diagnosis was LIN in 3 cases and flat epithelial atypia in 4 cases.

The underestimation rate of all B3 was 3.6% (7/193). The B3 lesion-specific underestimation rate 10.3% (3/29) for lobular neoplasia and 8.1% (4/49) for flat epithelial atypia. There was no underestimation in the cases of B3 lesions without atypia (p=0.01).
Follow-up
After VAB was performed, 94 patients were followed with clinical and imaging examination. The patient who underwent mammographic follow-up had B3 lesions without atypia in 59/94 cases (Fig.3) and B3 lesions with atypia in the remaining 35/94 cases.

Fig. 3: B3 lesion without atypia. Magnified right mediolateral mammogram (a) and craniocaudal mammogram (b) show scattered fibroglandular breast tissue with small microcalcification focus (4 mm in size) and mild level of suspicion. At the specimen radiograph (14 cores in c), presence of calcifications is observed in 4/17 specimens (arrows in c). The VAB histology was radial scar without atypia and woman underwent imaging follow up.

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The decision to followed rather than excise the 35 cases of atypical B3 lesions was due to following considerations:
1) in 11 cases the entire calcifications lesions were completely removed by the inner coaxial rotation specimen;
2) in 14 cases the lesion size measuring < 10 mm that were not excised; one patient was diagnosed at the same time with cardiac stroke;

3) the other 10 patient was elderly and unfit for surgery. The 94 patients with radiologic follow-up (ranging from 1-9 years at the time of the current study, with a mean follow-up of 3 years) were all stable.
Fig. 1: Mammographic appearance in B3 lesions. The most of cases were depicted as microcalcifications: radial scar (a), mucocele like-lesion (b), columnar cell lesions (c), atypical lobular hyperplasia (d).

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Conclusion

Overall, the VAB underestimation rate for B3 lesions is 3.6%. The histological verification by excisional biopsy in all B3 cases leads to an over-treatment in the remaining 96.4% of cases. The need of balance between the risk of under-estimation of malignant B3 or over-treatment of benign B3 must lead to a closer examination of the heterogeneous group defined as B3. In fact, the malignant potential is very different according to the lesion histology.

When VAB finding is B3 with histological atypia (ductal/flat/lobular) the possibility of underestimation of malignancies is inherent in the nature of the lesions and it puts an excisional biopsy indication, while a VAB survey of B3 lesions without atypia (e.g radial scar or papillary lesions) allow follow-up.

The surgical excision of B3 without atypia is not routinely necessary provided that: 1) careful radiographic-pathologic correlation is performed; 2) large sampled tissue (>12 cores); 3) small size lesion (<10 mm).
References


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