

Vacuum-assisted large-core needle biopsy (VLNB) improves the management of patients with breast microcalcifications – Analysis of 1009 cases

B. Sigal-Zafrani ^{a,*}, K. Muller ^b, C. El Khoury ^c, P.C. Varoutas ^b,
C. Buron ^b, A. Vincent-Salomon ^a, S. Alran ^d, A. Livartowski ^b,
S. Neuenschwander ^c, R.J. Salmon ^d

on behalf of the Institut Curie Breast Cancer Study Group

^a Institut Curie, Department of Tumour Biology, 26 rue d'Ulm, 75248 Paris Cedex 05, France

^b Institut Curie, Department of Medical Information, 26 rue d'Ulm, 75248 Paris Cedex 05, France

^c Institut Curie, Department of Medical Imaging, 26 rue d'Ulm, 75248 Paris Cedex 05, France

^d Institut Curie, Department of Surgery, 26 rue d'Ulm, 75248 Paris Cedex 05, France

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Abstract

Aims: To evaluate the surgical management of patients who underwent VLNB for breast microcalcifications.

Methods: This retrospective study compared the histological results and the surgical procedures in two groups of patients, group 1: large-core needle biopsy $n = 1009$, and group 2: surgical biopsy $n = 270$.

Results: After VLNB, 54% patients were not operated on after stereotactic large-core needle biopsy, 42% underwent one operation, 4% underwent two operations and 0.2% underwent three operations. No surgery was performed for 95% of benign lesions. Multiples operations were necessary in 12% of patients with malignant lesions of VLNB group compared to 45% in the surgical biopsy group. The rate of underdiagnosis of borderline lesions and ductal carcinomas *in situ* was 16% by the large-core biopsy technique.

Conclusion: VLNB constitutes an alternative to surgical biopsy. This procedure avoids surgery for most benign lesions and reduces the number of surgical procedures in malignant lesions.

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Introduction

Generalization of mammographic detection as a result of organized screening campaigns or individual screening and improvement of mammography techniques have led to the demonstration of subclinical lesions, including microcalcifications. The BI-RADS classification¹ provides mammographic assessment upon six categories: 1 for normal mammography, 2 for benign findings, 3 for probably benign findings having less than 2% of malignancy probability, with short-term follow-up recommended, 4 indicates a lesion with higher probability of malignancy than category

3, category 5 for lesion highly suggestive of malignancy with more than 95% probability, and category 6 is a histologically proven cancer. Categories 4 and 5 lesions require tissue sampling and histological diagnosis. Guided surgical biopsy, usually performed under general anaesthesia, provides a definitive histological diagnosis. However, 50–70% of suspicious radiological images correspond to benign lesions.² Furthermore, as frozen section examination is not recommended for microcalcifications,³ a second operation can be necessary for margins re-excision in the case of positive margins of a malignant lesion and/or axillary dissection in the case of invasive lesion.

In this context, mammography-guided percutaneous biopsy techniques have been developed. In the presence of microcalcifications, vacuum-assisted large-core needle biopsy (VLNB) is considered to be a reliable alternative to surgical biopsy.^{4–14}

* Corresponding author. Tel.: +33 1 44 32 42 53; fax: +33 1 53 10 40 10.

E-mail address: brigitte.sigal@curie.net (B. Sigal-Zafrani).

¹ Head of Institut Curie Breast Cancer Study Group.

This retrospective study was designed to evaluate the performance of this technique since its introduction at Institut Curie and to measure its usefulness in the management of patients with microcalcifications.

Patients and methods

Patients

The study population comprised 1009 patients with no history of ipsilateral breast cancer who underwent VLNB for ACR IV–V microcalcifications. These patients were selected from the population of 1563 patients who underwent vacuum-assisted large-core needle biopsy with the Mammotome® 11G system between July 2000 and December 2003. Four hundred and forty-four patients with a suspicion of ipsilateral breast cancer recurrence were excluded as well as 52 cases because an invasive lesion was detected in another breast quadrant. Of the 1067 patients satisfying the selection criteria, 36 lost to follow-up and 22 with insufficient biopsy samples who subsequently underwent surgical biopsy were not included in the analysis.

This group of 1009 patients was compared to another group of 270 patients presenting the same selection criteria, who underwent diagnostic surgical biopsy over the same period according to the surgeon's preference or because of unfeasibility due to microcalcifications location or because of a waiting time for VLNB exceeding 45 days.

Quality control of biopsy specimens

A quality control procedure was set up at the time of introduction of this biopsy technique in our centre. Partial or complete removal of suspicious microcalcifications was verified on radiographs of biopsy specimens and on the mammography performed at the end of the biopsy procedure. The presence of microcalcifications was assessed on histological sections. Surgical biopsy was requested when biopsy specimens were not representative of the mammographic image. All cases were reviewed at a weekly radiology–pathology conference in order to confirm that this technique provided representative samples and to validate the reliability of the diagnosis. Surgical resection was recommended for high-risk histological lesions (atypical ductal hyperplasia, lobular neoplasia).

Biopsy technique

Biopsy was performed with the patients lying prone on a dedicated biopsy table (Mammotest; Fischer Imaging, Denver, Colorado) using a stereotactic 11-gauge vacuum-assisted biopsy device (Mammotome®, Ethicon Endo-Surgery). A minimum of 12 specimens was obtained per needle rotation and the total number of samples depended on the size of the cluster. Specimen radiography was performed for each case. At the end of the procedure, if all

calcifications were removed, a clip was placed in the biopsy site.

Analysis of management strategies

Data derived from this study were analysed by a specific tool (*Prométhée framework*) developed in our Institute¹⁵ allowing interconnection and cross-interrogation of the hospital's medical information systems. The management of the two groups of patients was analysed as a function of the initial histological results. Analysis of the overall management strategy and the various diagnostic and therapeutic procedures allowed comparison of the two management strategies in relation to microcalcifications from the first biopsy to the last diagnostic and therapeutic surgical procedure.

Results

Group of patients undergoing VLNB

Analysis of VLNB pathology revealed: benign lesions $n = 529$ (52%), high-risk lesions (atypical ductal hyperplasia and/or lobular neoplasia) $n = 157$ (16%), ductal carcinomas *in situ* or micro-invasive carcinomas $n = 237$ (24%) and invasive carcinomas $n = 86$ (8%).

Tables 1 and 2 summarize underdiagnosis rates and management as a function of the initial histological diagnosis established on VLNB.

Among the 529 patients with a benign histological diagnosis, 502 were not operated on. Twenty-seven patients were operated on for the following reasons: biopsy specimens were not representative of the mammographic image $n = 13$, the patient herself requested operation $n = 3$, surgeon decision $n = 5$, and particular benign lesion (radial scar or papillo-adenoma) justifying complementary surgical resection $n = 6$. The operative specimen demonstrated benign disease in 23/27 cases. In the four cases in which the biopsy was not representative of the mammographic image, surgical resection revealed ductal carcinoma *in situ*.

Among the 157 patients with a diagnosis of high-risk lesion, 116 were operated on and histological examination

Table 1

Analysis of underdiagnosis rates based on comparison between the initial diagnosis on vacuum-assisted large-core needle biopsy and the final diagnosis on the operative specimen

Initial diagnosis	Number of cases	Number of operated cases	Number of underdiagnoses
Benign	529	27	4 (15%)
High-risk lesion	157	116	19 (16%)
DCIS/micro-invasive	237	237	39 (16%)
Invasive carcinoma	86	86	0
Total	1009	466 (46%)	62 (13%)

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