# Cytopathology in Focus: What breast cytology brings to rapid assessment clinics

How to offer same-day diagnosis


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May 2021—During the past several years, significant changes have occurred in the approach to the diagnosis and follow-up of patients with breast cancer. The scattered and fragmented breast health services have been replaced by patient-centered clinical breast units and rapid assessment breast clinics all over the world.[1,2]

Pioneered and implemented in European countries, rapid assessment breast clinics are designed to effectively assess symptomatic women with palpable breast lesions by fine-needle aspiration biopsy (FNAB). This approach reportedly has made early treatment planning possible for patients diagnosed with malignancy. More importantly, the prompt preliminary diagnosis has been associated with alleviation of anxiety for those patients with benign breast disease.[3,4]

Studies have shown that up to 87 percent of patients of rapid assessment breast clinics do not have cancer. Thus, there is no doubt that these clinics provide an incredibly important service in identifying those patients who do not need cancer therapy.[5] The reports on the efficiency of rapid assessment breast clinics have shown a high level of patient satisfaction, improved delivery of care, and a reduction in the level of patient stress.[6]

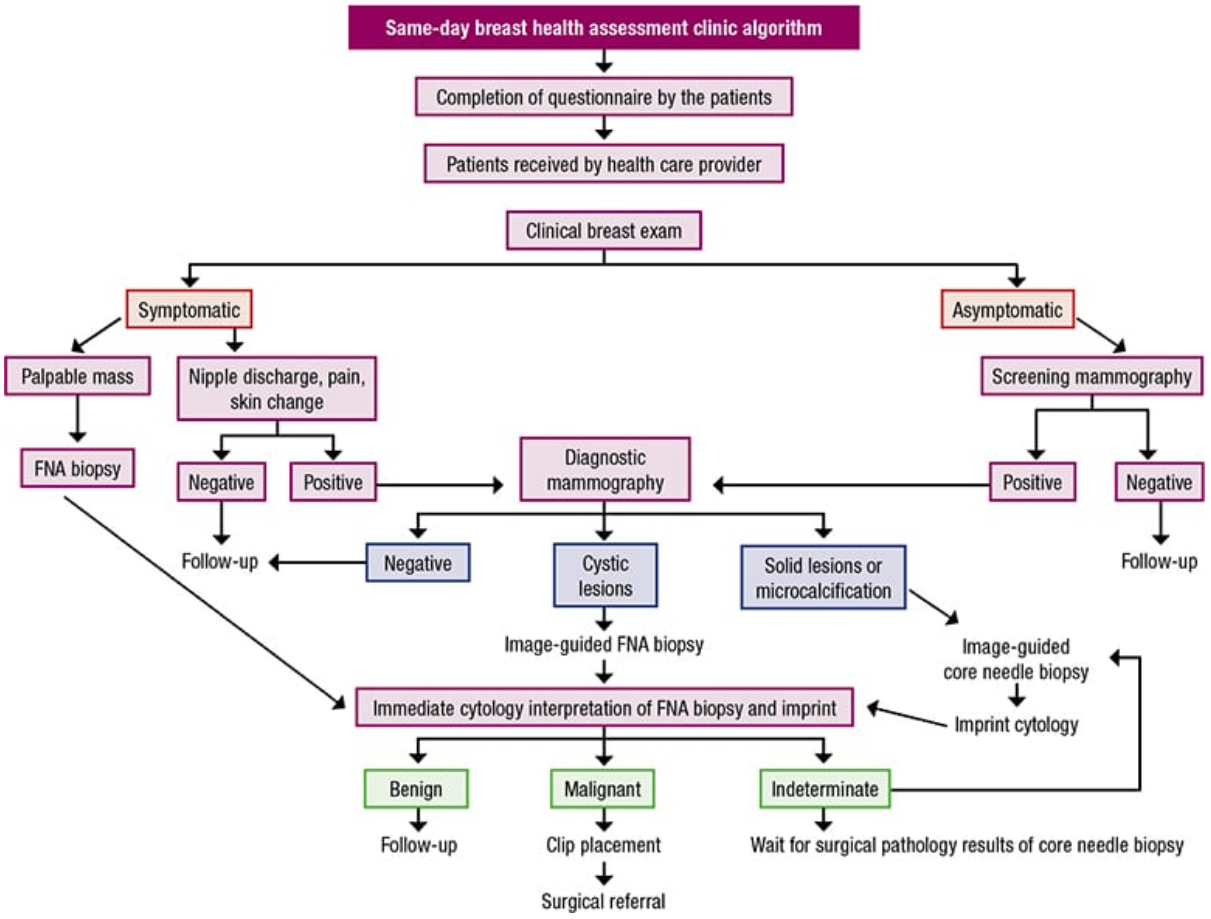
To implement a successful rapid breast assessment clinic, it is critically important to secure the coordinated efforts of radiologists and pathologists so the right sampling procedure can be selected for patients. Aside from FNAB, a rapid assessment breast clinic must also consider the use of imprint cytology when the diagnosis of breast FNAB is equivocal, resulting in a follow-up core needle biopsy. In addition, the use of breast imprint cytology can be considered for effective immediate interpretation of image-detected biopsies.[7] This approach will bring a benefit to the use of core needle biopsy in providing the same-day diagnosis. This is of particular importance since core needle biopsies are not amenable to immediate diagnosis, which rapid assessment clinics intend to provide[8-10] (**figure**).

Rendering a pathology diagnosis by core needle biopsy requires 24 to 48 hours for fixation and tissue processing. In contrast, imprint cytology can be prepared in a few minutes by touching a biopsy sample on a glass slide, staining the imprint smear, and giving a preliminary diagnosis to the patient shortly after the biopsy procedure is completed. Imprint cytology is also helpful in assessing the adequacy of biopsy samples, minimizing the need for extra samples and repeated core needle biopsy procedures.[8]

The diagnostic accuracy of imprint cytology results depends on several factors, including the interpretive skills of the cytopathologist and the quality of the core biopsy, the imprint smears, and the staining. The reported average sensitivity and specificity indices for imprint cytology of core needle biopsy are 93 percent and 92 percent, respectively.[11-15]

In a retrospective review of our experience with imprint cytology of image-detected core needle biopsy, we identified 437 cases. The cases were from both palpable and nonpalpable breast lesions with reported BIRAD ≥4. The results of imprint cytology were blinded for comparison to the histopathology diagnosis. The majority of our patients (65 percent) had benign breast lesions with high accuracy (98 percent) for imprint cytology. On the other hand, the accuracy of imprint cytology for malignant breast lesions was 95 percent. A few cases (five percent) were considered as indeterminate. These cases included papillary lesions with atypia and atypical proliferative breast disease, i.e. atypical ductal hyperplasia versus low-grade ductal carcinoma in situ. In these cases, we refrained from making a definitive diagnosis and advised the patients to wait for the final pathologic diagnosis by

core needle biopsy. Overall, the results of our study with positive and negative predictive values of 91 percent and 97 percent, respectively, and 95 percent diagnostic accuracy confirmed the value of imprint cytology for the immediate interpretation of core needle biopsies.[7]




Providing an accurate diagnosis by FNAB or imprint cytology obtained from a core needle biopsy requires in-depth understanding of the complexity associated with the cytologic interpretation of the spectrum of disease entities in breast pathology. These include borderline breast disease such as atypical proliferative breast lesions, atypical ductal hyperplasia, low-grade ductal carcinoma in situ, lobular neoplasia, and flat epithelial atypia. Other lesions, such as papillary, fibroepithelial, mucinous, and sclerosing radial scar and the status of invasion, may also pose diagnostic difficulty.[16-18]

There is no doubt that, compared with FNAB, core needle biopsy has now become the preferred minimally invasive sampling procedure. However, there are more similarities than differences between those two procedures, with a defined role for each of these procedures. It may be necessary to optimize the criteria for selecting the appropriate sampling procedure on an individual basis, refine protocols for follow-up management, and assess the long-term outcome of each procedure.[19,20]

Cost should influence the decision on the use of FNAB versus core needle biopsy. This is particularly important in countries of limited resources where FNAB may be the only affordable procedure to sample a lesion.[21,22] This alone underscores the significance of maintaining the integrity of FNAB as a valid diagnostic procedure for palpable breast lesions. In contrast, core needle biopsy can be used in image-detected abnormalities with microcalcifications, indeterminate FNAB findings, and malignancies where breast sampling by FNAB cannot guarantee stromal invasion.

Aside from providing a diagnosis, FNAB continues to play a role in assessing the presence or absence of metastatic tumor in sentinel lymph node biopsies and in assessing the surgical margins of lumpectomy samples. In addition, the role of FNAB samples in providing the Masood cytology index as a morphologic risk factor in early breast

cancer detection and prevention research has already been established.[23-25] Considering the above-stated reasons, breast cytology will remain an integral component of diagnostic cytopathology. This underscores the significance of providing sufficient training for our pathology residents and fellows so they can contribute to the effective use of breast cytology in clinical practice and breast cancer research.


1. Winchester DP, Kaufman C, Anderson B, et al. The National Accreditation Program for Breast Centers: quality improvement through interdisciplinary evaluation and management. *Bull Am Coll Surg.* 2008;93(10):13–17.
2. Gabel M, Hilton NE, Nathanson SD. Multidisciplinary breast cancer clinics. Do they work? *Cancer.* 1997;79(12):2380–2384.
3. Association of Breast Surgery @ BASO, Royal College of Surgeons of England. Guidelines for the management of symptomatic breast disease. *Eur J Surg Oncol.* 2005;31(suppl 1):1–21.
4. Frost MH, Arvizu RD, Jayakumar S, Schoonover A, Novotny P, Zahasky K. A multidisciplinary healthcare delivery model for women with breast cancer: patient satisfaction and physical and psychosocial adjustment. *Oncol Nurs Forum.* 1999;26(10):1673–1680.
5. Toomey DP, Cahill RA, Birido N, et al. Rapid assessment breast clinics—evolution through audit. *Eur J Cancer.* 2006;42(17):2961–2967.
6. Harcourt D. Same-day diagnosis of symptomatic breast problems: psychological impact and coping strategies. *Psychol Health Med.* 1999;4(1):57–71.
7. Masood S, Feng D, Tutuncuoglu O, et al. Diagnostic value of imprint cytology during image-guided core biopsy in improving breast health care. *Ann Clin Lab Sci.* 2011;41(1):8–13.
8. Carmichael AR, Berresford A, Sami A, Boparai R. Imprint cytology of needle core-biopsy specimens of breast lesion: is it best of both worlds? *Breast.* 2004;13(3):232–234.
9. Green RS, Mathew S. The contribution of cytologic imprints of stereotactically guided core needle biopsies of the breast in the management of patients with mammographic abnormalities. *Breast J.*

2001;7(4):214–218.
10. Oikonomou V, Fotou M, Zagouri F, et al. Imprint cytology of vacuum-assisted breast biopsy specimens: a rapid diagnostic tool in non-palpable solid lesions. *Cytopathology.* 2008;19(5):311–315.
11. Jacobs TW, Silverman JF, Schroeder B, Raza S, Baum JK, Schnitt SJ. Accuracy of touch imprint cytology of image-directed breast core needle biopsies. *Acta Cytol.* 1999;43(2):169–174.
12. Qureshi NA, Beresford A, Sami S, Boparai R, Gosh S, Carmichael AR. Imprint cytology of needle core-biopsy specimens of breast lesions: is it a useful adjunt to rapid assessment breast clinics? *Breast.* 2007;16(1):81–85.
13. Farshid G, Pieterse S. Core imprint cytology of screen-detected breast lesions is predictive of the histologic results *Cancer.* 2006;108(3):150–156.
14. Jones L, Lott MF, Calder CJ, Kutt E. Imprint cytology from ultrasound-guided core biopsies: accurate and immediate diagnosis in a one-stop breast clinic. *Clin Radiol.* 2004;59(10):903–908.
15. Klevesath MB, Godwin RJ, Bannon R, Munthali L, Coveney E. Touch imprint cytology of core needle biopsy specimens: a useful method for immediate reporting of symptomatic breast lesions. *Eur J Surg Oncol.* 2005;31(5):490–494.
16. Masood S, Rosa M. Borderline breast lesions: diagnostic challenges and clinical implications. *Adv Anat Pathol.* 2011;18(3):190–198.
17. Masood S, Frykberg ER, McLellan GL, Scalapino MC, Mitchum DG, Bullard JB. Prospective evaluation of radiologically detected fine-needle aspiration biopsy of nonpalpable breast lesions. *Cancer.* 1990;66(7):1480–1487.
18. Sidawy MK, Stoler MH, Frable WJ, et al. Interobserver variability in the classification of proliferative breast lesions by fine-needle aspiration: results of the Papanicolaou Society of Cytopathology study. *Diagn*

*Cytopathol.* 1998;18(2):150–165.
19. Masood S. Core needle biopsy versus fine needle aspiration biopsy: are there similar sampling and diagnostic issues? *Clin Lab Med.* 2005;25(4):679–688.
20. Masood S, Loya A, Khalbuss W. Is core needle biopsy superior to fine-needle aspiration biopsy in the diagnosis of papillary breast lesions? *Diagn Cytopathol.* 2003;28(6):329–334.
21. Masood S, Rosa M, Kraemer DF, Smotherman C, Mohammadi A. Comparative cost- effectiveness of fine needle aspiration biopsy versus image-guided biopsy, and open surgical biopsy in the evaluation of breast cancer in the era of Affordable Care Act: a changing landscape. *Diagn Cytopathol.* 2015;43(8):605–612.
22. Vargas HI, Masood S. Implementation of a minimal invasive breast biopsy program in countries with limited resources. *Breast J.* 2003;9(suppl 2):S81–S85.
23. Cox C, Centeno B, Dickson D, et al. Accuracy of intraoperative cytology for sentinel lymph node evaluation in the treatment of breast carcinoma. *Cancer.* 2005;105(1):13–20.
24. Bakhshandeh M, Tutuncuoglu SO, Fischer G, Masood S. Use of imprint cytology for assessment of surgical margins in lumpectomy specimens of breast cancer patients. *Diagn Cytopathol.* 2007;35(10):656–659.
25. Masood S. Expanding role of breast cytopathology as a risk predictor. *Adv Anat Pathol.* 2001;8(5):255–263.

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