

Preface

Contemporary Issues in Breast
Cytopathology



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Guest Editor

Over the past few decades, substantial progress has been made in the diagnosis and treatment of breast cancer. Advances in breast imaging and emphasis on screening programs have led to the increased detection of in-situ lesions and small breast carcinomas. Minimally invasive and cost-effective diagnostic sampling procedures such as fine-needle aspiration biopsy (FNAB) and core needle biopsy (CNB) have almost replaced open surgical biopsies. Breast-conserving therapy and reconstructive surgery have enhanced cosmetic results, with a positive impact on the sexuality and self-image of patients with breast cancer.

Sentinel node biopsy provides a better alternative to the traditional axillary node dissection. The expanded role of radiotherapeutics and the widespread use of adjuvant and neoadjuvant chemotherapy have contributed to improved patient outcome. In addition, advances in molecular biology testing and recognition of predictive and prognostic factors have provided new opportunities for novel, effective, and individualized cancer therapy. Furthermore, the recent discovery of breast cancer susceptibility genes and the intensive efforts to identify risk factors may ultimately lead to the detection of precursor lesions and the prevention of breast cancer. More importantly, enhanced public awareness of breast cancer has resulted in increased funding for biomedical research, behavioral science, education, screening, treatment, and survivorship programs.

Above all, there has been a significant change in the fundamental concept of delivery of care to patients with breast cancer. Integrated care through

a multidisciplinary approach has been widely recognized by different specialists involved in caring for patients with this disease. As a result, large numbers of multidisciplinary breast health centers have been established around the world.

Pathologists have played a central role in the realization of the aforementioned progress. In fact, pathologists have for many years been partners in the study and management of breast cancer. Aside from providing diagnostic information, breast pathologists study the characteristics of a cancer, such as tumor size, lymph node metastasis, hormone receptor protein status, expression of oncogenes and tumor suppressor genes, and the rate of cellular proliferation, as well as other factors. This information has long been used clinically to identify those patients with both localized and metastatic breast cancer who are likely to respond to hormonal manipulation or chemotherapy.

In addition, as more breast cancer treatments aimed at molecular targets become available, breast pathologists have become central in the development, validation, implementation, and appropriate use of predictive testing to better treat patients with breast cancer. Furthermore, in the last few years, pathologists have gradually evolved from passive interpreters of biopsies and surgical specimens to active clinicians.

Similar to the traditional practice of surgical pathology, the discipline of cytopathology has played a major role in responding to these changing trends in breast health care. Pathologists have been engaged not only in interpreting but also in performing minimally invasive procedures such as FNAB, CNB, and ductal lavage. Minimally invasive diagnostic and therapeutic procedures have required a focused attention to the recognition of cytomorphology of the varied spectrum of breast disease. Attempts have also been made to optimize new technologies for the small sample size obtained from these minimally invasive procedures.

Minimally invasive procedures such as FNAB and CNB have reduced the number of open surgical biopsies for benign breast disease. These procedures have proved efficient in the diagnoses of malignant breast disease, and are reliable in providing prognostic/predictive information. FNAB is a time-challenged, convenient, cost-effective, and rapid procedure that is designed to remove the anxiety of a patient with a benign breast disease. With the availability of the bedside interpretation, the diagnosis of malignancy can accelerate plans for an optimal therapy.

CNB is more time-consuming, more invasive, and more expensive. It also shares limitations with FNAB. Sampling errors associated with inherent heterogeneity of breast lesions are serious concerns. In CNB, the rate of discovering carcinoma in situ in the follow-up surgical excision of a lesion previously diagnosed as atypical ductal hyperplasia is significant. In addition, it is not unusual to discover invasive lesions in lumpectomy or mastectomy specimens diagnosed as in-situ lesions by CNB. In CNB, fragmentation and small size of the specimen with an epithelial displacement may simulate pseudoinvasion and create a diagnostic challenge.

Despite the credibility of breast FNAB and CNB, the choice of procedure will ultimately depend on local practice considerations and the availability of an experienced pathologist interested in breast cytopathology. The National Cancer Institute guidelines recommending appropriate FNAB sampling technique, training requirements, uniform criteria for specimen adequacy, and radiologic pathologic correlation may assist in further acceptance of FNAB as a preferred diagnostic procedure, particularly in palpable breast lesions.

Aside from FNAB, breast cytomorphology has become an integral part of the practice of breast pathology. The use of imprint cytology for assessment of metastatic disease in sentinel lymph node biopsy is now a common practice. Lymphatic mapping with sentinel lymph node biopsy allows a detailed pathologic examination of the nodes most likely to contain metastatic tumor. This procedure is designed for a minimally invasive approach for tumor staging. Intraoperative detection of tumor metastasis will lead to a complete axillary lymph node detection in one surgical setting. Imprint cytology has shown superiority to frozen section, and is the procedure recommended by the College of American Pathologists and the panelists of the Philadelphia Consensus Meeting for Sentinel Node Biopsy. Imprint cytology has also been effectively used for assessment of breast lumpectomy margins as a complement to frozen section.

In addition, recent focus on early breast cancer detection and prevention has opened new ways to use minimally invasive procedures such as FNAB, nipple fluid aspiration, and ductal lavage for identification of high-risk individuals. Chemopreventive studies have already confirmed the value of cytomorphology as a risk predictor. Recognition of the cytomorphology of high-risk proliferative breast disease and premalignant lesions is an intriguing concept for identifying patients who may benefit from various risk-reduction modalities. Along with molecular biologic testing and the new innovative imaging, and surgical procedures such as ductoscopy, there will soon be an exciting opportunity for breast cytopathology to become an integral part of breast cancer research and preventions.

This issue of *Clinics in Laboratory Medicine* is designed to provide a panoramic overview of the opportunities and challenges associated with integration of breast cytopathology into clinical practice and breast cancer research. I hope that the changing culture of pathologists as clinician/scientists will continue to benefit our patients at large.

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