Core Biopsy as Alternative to Fine-Needle Aspiration Biopsy in Diagnosis of Breast Tumors

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Key Words. Core biopsy · Palpable breast lesions

ABSTRACT

In spite of the widespread use of cytological smears for diagnosis of breast cancer lesions, many surgeons are still reluctant to accept the cytological report as the only criterion for performing definitive surgery. Modern surgical strategy requires a preoperative planning of the surgical treatment, possible through the use of core biopsy, which provides a diagnosis based on tissue specimens, thus permitting the study of both the architectural and cytological patterns. The authors report their five-year experience with this technique and evaluate its diagnostic usefulness and ability to reduce intraoperative biopsy procedures. The histological examination of 92 palpable breast lesions, clinically and mammographically detected, was performed with core biopsy, and diagnosis was confirmed with the surgical sample in 80 cases. A definitive histological diagnosis was obtained with core biopsy in 90% of cases. Only nine cases required confirmation with frozen section diagnosis at the time of definitive surgery. The sensibility of core biopsy was 92%, specificity and predictive value of positive result were 100%, and diagnostic efficiency was 86%. This study confirms the usefulness of systematic use of core biopsy for definitive preoperative diagnosis of breast cancer; the simplicity, safety and low cost of this method also make ultrasound-guided core biopsy applicable to nonpalpable lesions.

INTRODUCTION

Even the widespread use of the cytological approach for diagnosis of smears obtained with ultrasound-guided fine-needle aspiration (FNA) from palpable and nonpalpable breast lesion masses has not achieved a consistent improvement in the presurgical decision-making process by the surgeon. The progress in patient medical education and the more frequent use of mammography have permitted a marked increase in the number of tumors detected, and, in particular, the number of small lesions, thereby increasing the use of FNA procedures and also the quantity of suspicious lesions [1, 2]. However, for fear of overtreatment, many surgeons are reluctant to accept cytology reports, often ambiguous and lacking in standardization of terminology, as a basis for definitive diagnosis [3]. Together with the uncertainty on the part of the surgeon, there is also the stress of the patient who must face and accept a pathology often considered incurable without the psychological support of a physician who has definitely decided on the most appropriate surgical option. In fact, tissue specimens still provide a level of certainty for diagnosis of malignancy which is greater than that obtained with FNA [4], and a definitive diagnosis and surgical resolution of infiltrating breast cancer can be achieved preoperatively only by core biopsy or open biopsy during surgery; thus, diagnosis of a cytologically, clinically, and radiographically suspicious lesion is often resolved by examination of intraoperative frozen sections. However, the high costs involved, the psychological discomfort of the patient who faces an operation whose extent and mutilating effects are unknown at the moment of surgery, and the eventual intrinsic errors of frozen section biopsy render this procedure controversial [3]. Obviously, a correct preoperative evaluation of the surgical treatment results in a less stressful situation for both the surgeon and patient and must be considered the ideal condition for modern therapeutic strategy [5], also because it permits the eventual use of preoperative adjuvant therapy [4].

The core biopsy of palpable breast lesions, based on the histological study of tissue specimens, can provide...
reliable information to guide the surgeon, as demonstrated by our five-year experience. The aim of our study, therefore, was to evaluate the effectiveness of core biopsy for preoperative diagnosis of breast cancer and its capacity to reduce frozen section procedures.

MATERIALS AND METHODS

From 1990 to 1995, a consecutive series of 87 women (range, 29-80 years) and four men with a median age of 65 years (range, 40-81 years) from the Surgical Division of San Giacomo’s Hospital were enrolled in the study. After a positive clinical examination for palpable lesions, mammography, sonography, and core biopsy were systematically performed. Mammography and sonography were also performed for five patients with a negative clinical examination but considered at high risk because of age (>40 years) in addition to either familial history of breast cancer (two cases), gynecological cancer (one case), or previous or synchronous contralateral breast cancer (two cases). Not all patients were subjected to diagnostic follow-up at the same hospital. The population generally represented subjects from an outpatient clinic of a general surgery division.

The core biopsy was always performed by the same experienced surgeon (FS) using a Tru-cut with an 18-gauge needle. After manual localization and immobilization of the lesion, a 2% charbocain (Astra-Milano) infiltrating anesthetic was administered, and the skin incision was performed. A biopsy specimen was obtained by means of two successive insertions with different angulations of the needle into the lesion core. An eventual third pass was performed according to the quantity and quality of the material obtained as judged by immediate immersion of the specimen in fixative and the evaluation of the physical characteristics (consistency, color, specific weight). Ultrasound-guided needle biopsy (7.5 MHz linear transducer with a coaxial biopsy guide) was used when lesions were difficult to locate manually, as in the cases of macromastia or deep prefascial mass localization. The sample was fixed in 10% buffered formalin for a maximum of 48 h, paraffin-embedded, and then cut in serial sections (minimum 10) of 5 microns. Sections were stained and examined with a light microscope to define the histopathological diagnosis according to Azzopardi’s classification [6] of preneoplastic and neoplastic lesions. The diagnostic accuracy was determined with the use of surgical specimens as standard.

The sensitivity, specificity, predictive value, and diagnostic efficiency of core biopsy were evaluated by means of the theory of predictive value statistical analysis [7, 8]. After evaluation of results by a team composed of a radiologist, a clinician, and a pathologist, the patient was presented with the advantages and disadvantages of each treatment and subsequently decided on the definite therapeutical treatment (informed consent).

The surgical procedures utilized were Halsted’s mastectomy for advanced cancer, especially in case of adherence to the pectoral muscle fascia, and the modified Patey’s procedure, quadrantectomy, and the segmentary resection in the remaining cases.

RESULTS

At clinical and/or instrumental examination, 92 lumps were detected in 91 patients (one patient in both breasts). Mass dimension ranged from less than 1 cm in 17 cases, to 1 to 2 cm in 39 cases, and to more than 2 cm in the remaining cases. Mammography was performed in all cases and was positive for malignancy in 36 cases, negative in 11, and suspicious in 45 cases. Moreover, microcalcifications were found in 11 cases. Biopsy, manually performed in 73 cases and ultrasound-guided in 18 cases, was histologically negative for malignancy in 14 cases and positive for infiltrating and non-infiltrating neoplasia in 76 and 2 cases, respectively. Patient compliance was good, and the procedure was without complications except for a slight local pain.

With core biopsy diagnostic support, a definite diagnosis was achieved in 82 cases, thus permitting an immediate decision regarding treatment in 90% of patients. Only 10 cases showed diagnostic discordance between clinical and pathological evaluation. The interval between diagnosis and the surgical procedure was 7-16 days. A total of 79 patients were subjected to surgery in our institute, yielding a total of 80 surgical samples (14 Halsted’s and 54 Patey’s procedures, 11 quadrantectomies, and 1 segmentectomy were performed). In all cases, the site of needle insertion, indicated by a skin tattoo performed at the moment of the core biopsy, was removed with the intraoperative excision. The preoperative core biopsy diagnosis was that of infiltrating carcinoma in 65 cases, noninvasive carcinoma in two cases, and negative or inconclusive in 13 cases. Intraoperative frozen section was requested by the surgeon in nine cases: in two lesions, because the core biopsy diagnosis was positive for infiltrating carcinoma in 65 cases, noninvasive carcinoma in two cases, and negative or inconclusive in 13 cases. Intraoperative frozen section was requested by the surgeon in nine cases: in two lesions, because the core biopsy diagnosis was that of noninfiltrating carcinoma, and in seven, due to discordance between mammography and core biopsy diagnosis. In all but one (a dysplastic nodule suspicious at mammography), the intraoperative examination showed an infiltrating neoplasia.

The correlation between core biopsy and the definitive diagnosis is reported in Table 1; the 80 lesions are subdivided into three groups according to the preoperative core biopsy diagnosis. Histological examination of these surgical specimens demonstrated 69 infiltrating ductal tumors, three lobular infiltrating tumors, and one intracystic papillary...
carcinoma. No malignant pathologies were found in seven cases, confirming the core biopsy diagnosis; two of these cases were fibroadenomas, four were exclusively dysplastic lesions, and one showed a chronic phlogistic process. With regard to sequelae due to the core biopsy procedure, a focal hemosiderin was observed in 24 cases, but no presence of fibroblastic reaction, fresh hemorrhage, or large hematomas destroying or replacing the entire lesion was noted.

The sensitivity of core biopsy was 92% (67/73), specificity was 100%, the predictive value of a positive result was 100%, and the diagnostic efficiency was 86%. The core biopsy negative diagnosis was contradicted by the intraoperative frozen section in only six cases for which intraoperative biopsy was requested; in three of these discordant cases, an atypical ductal epitheliosis (a dysplastic lesion often surrounding a carcinoma) was diagnosed at core biopsy. In the remaining three cases, the surgeon indicated particular difficulties in obtaining adequate material for diagnostic evaluation during core biopsy; one case presented a deep prefascial mass localization, and two cases were scirrhus carcinomas with a fibrohyaline component which resisted the penetration of the Tru-cut.

**DISCUSSION AND CONCLUSION**

Although several studies have demonstrated a high degree of diagnostic accuracy in breast cancer with aspiration cytology [9, 10], its role in the management of breast lesions is still controversial [11]. Many surgeons are reluctant to consider positive cytology results as the only criterion for performing definitive surgery [1, 12-14] since no distinction is possible between infiltrating and noninfiltrating lesions. **Masood** [1] and **Smith** [13] use surgical biopsy to confirm cytologically negative and suspicious cases and directly operate only on those cases with positive cytologic diagnosis. On the contrary, **Ciatto** [12] requires histological confirmation for suspicious and positive aspirations and does not treat either negative cases or eventual false negatives.

The diagnostic “triple test,” including clinical diagnosis, cytology, and mammography [15], even if concordant, can only be theoretically considered completely satisfactory for a valid support in the decision-making process because it does not resolve the above-mentioned problem of diagnostic differentiation between infiltrating and noninfiltrating lesions [4]. Moreover, the diagnostic protocols reported in the literature vary considerably [1, 12, 13]; some require histological confirmation (surgical biopsy) of suspicious and negative aspirates before surgery, while others use lumpectomy, and still others require intraoperative biopsy for cases not clearly defined preoperatively. Consequently, intraoperative biopsy is called upon to resolve an increasing number of diagnostic doubts and ill-defined diagnoses, determining the possibility of false positives due either to the alterations of frozen sections or to the presence of atypical or suspicious lesions from the wide field of dysplastic and preneoplastic breast pathologies [16, 17]. In a special chapter dedicated to overdiagnosis of malignancies, **Azzopardi** [6] asserted that with frozen biopsies, overdiagnoses exceed underdiagnoses with understandable human and legal consequences. In addition, **Tinnemans et al.** [18] reported two false positive diagnoses in 253 mammographically guided biopsies examined by frozen section. An analogous study by **Bianchi et al.** [19] reported three false positives in 672 cases.

In our study, no false positives were obtained with the core biopsy technique, but there were six false negatives due to sampling errors. Of these six cases, two were small tumors due to the problem of inadequate material or unsatisfactory sample representativeness, and three were due to the well-known heterogeneity and mixture of dysplastic and neoplastic cells in breast carcinomas. The remaining case can be attributed to the intrinsic characteristics of the mass (deep localization). As reported by **Zarbo** [20], these problems of sampling are common for both core biopsy and fine-needle aspiration, and false negatives ranging from 2% to 18% have been reported in the literature for cytological diagnosis [21]. Moreover, an incidence of unsatisfactory fine-needle aspirates ranging from 1.7% to 34.5% has been
published [22, 23]. The erroneous evaluation of aspirates from suspicious cases of malignancy can be attributed to insufficient quality and quantity of biological material [15].

Other studies have demonstrated the validity of core biopsy for diagnosis, both in breast tumors [24-26] and in other organs [27, 28]. Moreover, Vaccari [29] states that tissue samples should not be replaced by cytological material when biopsies can be performed easily and without contraindications. It was this consideration which prompted us to substitute both FNA and open biopsy for core biopsy in our protocol; if the patient has to be subjected to a traumatic invasive technique for a correct definitive diagnosis, then core biopsy is to be preferred as it is minimally invasive and offers numerous advantages. It is easily performed, less expensive, provides a definitive diagnosis, and furnishes ample material for ulterior studies [4]. Moreover, this procedure is safe and often furnishes a precise diagnosis of the histological tumor type and its aggressiveness, thus providing information useful to the surgical decision-making process. In addition, no major complications for the patient were noted nor was mechanical displacement of epithelial tumoral cells, destruction of lesions, or massive hemorrhage observed, as previously described by Lee [30]. Our choice was also made to eliminate the psychological stress due to the deferment of diagnosis to the moment of surgery, which is shared by both surgeon and patient, as the insecurity of the surgeon regarding treatment choice is transformed into anxiety in the patient who begins to doubt the professional adequacy of the physician.

Ciatto [12] has demonstrated that FNA can bypass the use of frozen sections in 70% of cancer cases, whereas in our series, intraoperative biopsy was avoided in 88% of cases, including those cases which presented difficulties with the core biopsy procedure because of the well-known technical limits. In agreement with other authors [14, 31], our experience has also demonstrated the importance of the physician in this technique; in fact, the surgeon who performed the clinical and biopic procedures was always the same (FS).

The sensitivity of the mammographic examination was very poor. Mammography was judged reliable in 50% of lesions larger than 2 cm, while for smaller lesions (up to 1 cm), the percentage of positivity decreased to 35%. This result is probably due both to the diverse skill of the radiologist and to the heterogeneity of mammographic instruments. This study confirms the usefulness of a systematic use of core biopsy for diagnosis of breast cancer, even if good quality clinical, radiological, and histological examinations together are also important to obtain optimum results [32]. In his cytological study, Palombini [33] reports that the best results are obtained by a continuity of operations, such as palpation, aspiration, smear, and evaluation, which are performed by the same investigator. Moreover, Barrows [14] feels that in all areas of breast cancer management, it is extremely important that effective lines of communication be established between the surgeon and pathologist. Already in 1933, Stewart [34] had stated that the diagnostic reliability of aspiration cytology depends on the “meeting of minds” between the clinician and pathologist.

The sensitivity, specificity, positive predictive value, and diagnostic efficiency obtained in our study by core biopsy were comparable to those reported in literature using aspiration cytology [7]. The high diagnostic accuracy of core biopsy obtained in our series of palpable lesions, in addition to its simplicity and safety, might also offer a new management strategy for patients with nonpalpable lesions with the use of ultrasound-guided core biopsy. Moreover, core biopsy permits a preoperative knowledge of the histological type and prognostic parameters (receptorial status, proliferative activity, ploidy, and expression of oncogenes and antioncogenes such as c-erbB-2 and p53) routinely used in the planning of surgical and eventual neoadjuvant treatment. The core biopsy was well tolerated by patients, easy to perform, relatively inexpensive and suitable for use in outpatient clinics. With ultrasound-guided techniques [35], it can be considered a safe alternative both to lumpectomy and intraoperative biopsy, which should be avoided in nonpalpable lesions.

ACKNOWLEDGMENT

The authors are grateful to Ms. Paulene Maselli Campagna for her assistance in the preparation of the manuscript.

REFERENCES