Original Article

Ultrasound Guided Core Needle Biopsy of Breast Lesions with Radio-Pathological Concordance / Discordance: A Medical Audit of Tertiary Care Breast Imaging Unit

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Abstract

Objective: To evaluate the results of core needle biopsies, its effectiveness in diagnosing breast cancers and to improve the standards of clinical care and efficient utilization of resources.

Methodology: A retrospective audit of core needle biopsy of breast lesions was done in Dow Institute of Radiology of Dow University of Health Sciences, OJHA campus with radiopathological concordance / discordance. All the patients who came for diagnostic ultrasound guided core needle biopsies of breast lesions from January 2021 to December 2021 were included in the study. Patients who were lost to follow up or with non-availability of laboratory data were excluded.

Results: Overall concordant results were found in 415 patients (91.6%). Of these 128 (90.1%) were concordant benign and 287 (92.2%) were concordant malignant. Discordant results were found in 38 patients (8.2%) with 24 discordant benign (7.7%) and 14 (9.85%) discordant malignant respectively.

Conclusion: Core needle biopsy is an effective and it is less invasive and cost effective than excisional or incisional biopsy for diagnosis.

Key Words: Breast lesions, Core needle Biopsy, Benign, Malignant

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Introduction

The majority of cancers diagnosed in women are breast cancer, which accounts for around 21% of all malignancies in women globally.[1] Pakistan has the highest incidence of breast cancer among Asian nations, with 1 in 9 women at risk of having the disease.[2] Core needle biopsy is minimally invasive, safe and cost-effective method of diagnosing breast lesions. It is an accepted standard method and has replaced fine needle aspiration and cytology (FNAC) in most of the countries.[3]

It is particularly important in non-palpable breast lesions. It provides an adequate amount of tissue for sampling and aids in accurate histological diagnosis. In uncertain cases and when the diagnosis is difficult, a core needle biopsy is mandatory. It provides detailed information about the invasiveness of the tumor, tumor grading, characteristics, tumor markers and immunohistochemistry. It can help saving a lot of expenses avoiding unnecessary surgical procedures in patients who had benign breast lesions diagnosed accurately by CNB. The use of CNB also lessens the propensity of complicated surgical procedures and minimizes patient stress.[4]

An audit is a tool to measure the quality of a medical practice in order to improve the quality of health care and improve its effectiveness with better utilization of the resources. The purpose of a medical audit is to provide feedback and to improve the overall quality. Auditing does not only give an idea about the performance of the diagnostic practice but also points out any need for corrective action.[5]

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In Pakistan, the incidence of breast cancer is rising, especially among young women. On a national or even provincial level, there is no effective method of screening and treating patients with breast cancer. The health management system of Pakistan is in ominous need to set a national level cancer database registry system that will provide the accurate prevalence and incidence of breast cancer patients. Affordable and accessible facilities will help in early detection and diagnosis of breast cancer that will improve patient's morbidity and mortality.

Karachi is the biggest city of our country and only few[4-5] hospital have proper breast cancer imaging units. Our hospital is the largest public sector breast imaging unit catering to a large mass of patients and providing quality services in imaging and diagnosing breast cancer at an affordable rates. So, the purpose of this study is to register breast cancer patients and to also help spread awareness among health officials and physicians regarding the availability of services that our hospital is providing. To evaluate the results of core needle biopsies, its effectiveness in diagnosing breast cancers and to improve the standards of clinical care and efficient utilization of resources.

Methodology

A retrospective audit of core needle biopsy of breast lesions was done in Dow Institute of Radiology of Dow University of Health Sciences, OJHA campus with radiopathological concordance / discordance. All the patients who came to Breast Unit of Dow Institute of Radiology for diagnostic ultrasound guided core needle biopsies of breast lesions from 1st January, 2021 till 31st December, 2021 were included in the study. Patients who were lost to follow up or with non-availability of laboratory data were excluded.

After receiving the patient's written consent, a women imaging radiologist with more than five years of expertise performed the core biopsy. Pre-procedure coagulation tests were not carried out unless the patient was on warfarin because they are not advised by current guidelines. Core biopsy was performed using a semi automated biopsy gun under local anesthesia. Three to four cores were taken and fixed in formalin bottles and sent for histopathology. Local pressure bandage were applied post procedure and analgesics were advised. A documented report with an image showing biopsy needle within the lesion is given to the patient.

Different study variables were assessed including clinical data (age, palpable or non-palpable mass); imaging data (lesion size, BIRADS classification); biopsy data (needle gauge, type of device used, immediate and late complications) and histological data of the CNB (type and grade of tumor). All the data was retrieved using HMIS and PACS and was recorded in a Performa. Statistical analysis was done using SPSS.

Results

Initially 475 patients were included, out of which 5 patients were lost to follow up and 9 patients had no laboratory data available, so they were excluded from the study. A total of 461 patients were included in the audit. Mean age of the patients were calculated to be 45 years with a range of 14-83 years. Core needle biopsies were performed in 219 (47.5%) patients in right breast and 242 (52.5%) patients in left breast. The average size of the lesion was found to be 2.45cm with the smallest lesion of 0.5cm and largest measuring 10.5cm in size.

Semi automated biopsy guns were used for core needle biopsies without any immediate or late complications in all the patients. These included 14G needles in 231(50.1%) patients, 16G in 101 (21.9%) and 18G in 129 (27.9%) of patients.

On histopathology, out of the 461 breast lesions, 311 lesions (67%) were found to be malignant and 142 lesion (31%) were benign respectively. In 8 patients (2%), the samples were inadequate and rebiopsy was advised. (Figure 1)

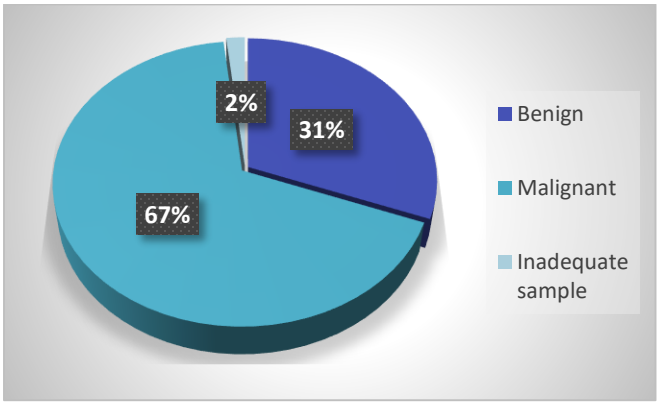

Figure 1. Histopathological results of Core Needle Biopsy of Breast lesions. (n=461)

Overall concordant results were found in 415 patients (91.6%). Of these 128 (90.1%) were concordant benign and 287 (92.2%) were concordant malignant. Discordant results were found in 38 patients (8.2%) with 24

discordant benign (7.7%) and 14 (9.85%) discordant malignant respectively. Figure 2

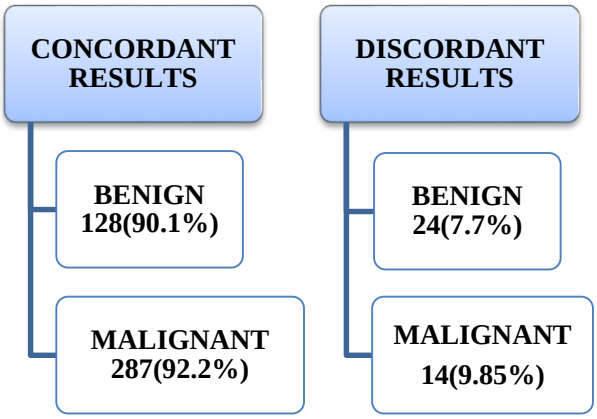

Figure 2. Radiopathological Concordance / Discordance (n=453)

The most common benign lesion was found to be Fibroepithelial tumors accounting of 51 (35.9%) of patients followed by chronic inflammation 22 (15.4%) and adenosis 21(14.7%). The most common malignant lesion was Infiltrating ductal carcinoma (IDC) Grade II accounting of 209 (67.2%) of patients followed by IDC grade II 62 (19.9%) and IDC Grade I 11(3.5%) respectively. Infiltrating lobular carcinoma was detected in 13 patients, invasive carcinoma in 7 patient and DCIS in 3 patients. The results are shown in Table I.

Table 1: Histopathological diagnosis of Biopsy proven Breast Lesions (n=453)

Benign	**n=142**	**%**
Fibroepithelial	51	35.91
Adenosis	21	14.78
Chronic Inflammation	22	15.49
Periductal Mastitis	7	4.92
Tuberculous Mastitis	3	2.11
Ductal hyperplasia	12	8.45
Benign breast tissue	14	9.85
Hamartoma	1	0.7
Papillary lesion	11	7.74
Malignant	**n = 311**	**%**
IDC I	11	3.54%
IDC II	209	67.20%
IDC III	62	19.94%
Invasive II	2	0.64%
Invasive III	5	1.61%
ILC I	4	1.29%
ILC II	7	2.25%
Mucinous	2	0.64%
DCIS	3	0.96%
Malignant Phyllodes	1	0.32%
Metastatic	1	0.32%
Spindle cell neoplasm	1	0.32%
Atypical Cell	3	0.96%

Discussion

Pre procedure coagulation profiles are costly and cause extra financial burden on patients. Multiple studies have demonstrated no relationship between abnormal coagulation profiles and bleeding in patients undergoing image guided breast biopsy.[6] Pre procedure coagulation tests are usually not recommended these days except for patients with any known coagulation disorder or on warfarin. [7] In our institution, pre procedure coagulation tests are not performed. Patients taking antiplatelet or anticoagulant drugs has been advised to stop the drug for at least 3 days prior to procedure. However, Melotti et al.[8] did not report any significant post procedure bleeding in patients on anti-platelets and anticoagulants. Bleeding is usually related to the size of the lesion and its vascularity. Some authors have also found bleeding incidence with larger gauge needles. No such incidence has been reported in this study.

In this study core biopsy specimens were taken using semiautomatic biopsy gun. An average of three to four cores was taken, preferably from the center of the lesion, avoiding the necrotic areas of the tumor. Mostly 14G needles were used and 16 and 18g needles were used in smaller breast lesions. In this study 14G needle were preferred for adequate sampling**.** Only 8 cases (2%) were reported to have inadequate sample and repeat biopsy was done. Five of these lesions were done with 18G needles and 3 with 16G needle. M. Tchaou et al. [9] demonstrated 1.9%, Rikabi A. and Hussain S. (10) 2.2% and Gukas ID et al. [11] found 3.6% inadequate specimens for histological diagnosis in their studies that required repeat biopsy.

In this study no significant early or late post procedure complications were recorded such as hematoma formation or local infection. Moderate local pain was seen in two patients likely related to ineffective local anesthesia and psychosomatic reaction in one patient. Our results are in concordance with the results of Brnić et al. [12]

Preoperative tissue sampling for definitive diagnosis prior to surgery in breast lesions is a standard protocol and is a routine practice in breast imaging units. Different studies have been done to evaluate the efficiency of trucut biopsy but the results are variable. OkoliChinedu et al. [13] found diagnostic accuracy of 94.44%, sensitivity 92.86%, and specificity 95.83% respectively. Another study conducted by M. Tchaou et al. [14] demonstrated high sensitivity of 97.5%, specificity 100%, PPV 100%, NPV 92.8% and DA of 98.1%, respectively.

Core biopsies help in definitive diagnosis and help in avoiding the need of repeat or incisional biopsy. With a definite radio pathological concordance for benign lesions, a large number of patients can be followed up without the need of surgical excision. For malignant lesions, proper treatment planning, immunohistochemistry can be done with. [15, 16]

In this study, 90% concordant results were obtained, of these 90.1% cases were concordant benign and 92.2% were concordant malignant. 8.2% of the patients had discordant results. Most of the discordant benign cases were of chronic infection, tuberculosis and periductal mastitis. 14 of the patients had discordant malignant findings with 5 patients were of infiltrating ductal carcinoma, 3 with infiltrating lobular carcinoma, 5 with DCIS and 1 case of malignant phyllodes.

Conclusion

In most of the developed countries, core biopsy has replaced fine needle aspiration for symptomatic and screen detected breast lesions. As compared to FNAC, the frequency of non-diagnostic or inadequate sample report is lower and it is less invasive and cost effective than excisional or incisional biopsy for diagnosis.

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