

The Essential Number of Ultrasound(US)- Guided Core Needle Biopsy in Diagnosis of Breast Cancer

Dr. Zahraa Abd Al-Kareem Mahmmod^{1*} and Dr. Kaswer Mousa Al-Tariahi²

Author's Information

1. M.B.Ch.B, Candidate of the Board of Medical Specialties, Department of Histopathology Al-Sadder Teaching Hospital, Najaf-Iraq.

2. Professor of pathology, department of pathology, university of Kufa, faculty of medicine.

*Corresponding author:

Dr. Zahraa Abd Al-Kareem Mahmmod.

zahabdkar22@gmail.com

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Abstract

Background: Breast cancer is the one of most common cancer among women worldwide, both in developed and developing countries and represent the second most common cause of cancer death in women age between 40-59.so the accurate preoperative tissue diagnosis is essential before definitive surgical treatment for breast cancer.

Objective: To detected the essential number of US- guided breast core biopsy in the diagnosis of breast cancer according to the percentage of core involvement by the lesion.

Method: 155 specimens from archive of AL sadder Teaching Hospital was collected,44 specimens were excluded from the study because they are fragmented and other insufficient data,166 specimens then divided to the benign, atypical and malignant. The malignant lesion then reviews to determine the percentage of each core involved by the malignant lesion.

Result: 70(66.03%) lesions were malignant, five (4.7%) were atypicaland31(29.2%) were benign. (53%) of two cores malignant lesion have (26_50%) involve of the cores and the percentage increase with increase the number of the cores.

Conclusion: US-guided core needle biopsy is more effective technique in diagnosis of breast lesion and find that two cores having a good percentage for reach to the diagnosis.

Keywords: Core needle biopsy, ultrasound, breast cancer, specimens.

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1. INTRODUCTION

Breast lesion in the women are common and consist of wide range of disease from benign include problem related to pregnancy and lactation, inflammatory condition, abscesses and non-neoplastic proliferative disorder to malignant(1). Breast cancer represent the most common malignant neoplasia and it's a one of important reason of cancer related deaths among women which account for 24% of new cancer cases and 15% of cancers death in women(2) ; the annual incidence of breast cancer in Iraq has increased significantly with an average incidence rate of 37.9/100000 in 2019. There are many risk factors for breast cancer such as, older age, female gender, contraceptive hormonal methods, benign breast lesions , late age of menopause , obesity , smoking and others(3). Screening, early detection and diagnosis of breast cancer play a crucial role in success of treatment of breast cancer(2). To diagnosis the breast lesion in general and breast cancer specially using mammography which is still the single best screening test for breast cancers(4), and to reach the histological diagnosis of breast lesion using a core-cut biopsy needle which is represent accurate preoperative tissue diagnosis before final surgical treatment for breast cancer(5). A core needle biopsy (CNB) is commonly used to provide the tissue specimens histopathologic assessment because of simple, Safe, low cost, tolerable, reduce morbidity from surgical intervention and making preoperative delineation of the treatment possible(6). So this method not only use for distinguish between benign and malignant lesion but also used for differentiating between an in situ lesion and invasive carcinoma, determining type of tumor, assessment of ER and PR receptor for immunohistochemistry staining and grading of tumor(7). For this reason the number of core is important to determine the type of pathology and most authors suggest that five core specimens per lesion are required for exact tumor classification, and other studies shown that three to four cores specimen is appropriate to obtain adequate results(8)., while a recent study show that a minimum of two strips are required to determine a diagnosis of malignancy, and four or more needed to realized complete concert of pathology parameters (ER, PR, HER₂, Ki67 Status and tumor grade) between core needle biopsy and surgically excised specimens(5). The aim of this study to

determine the essential number of core depended on the percentage of pathological lesion involved each core of previous diagnosis as breast cancer.

2. METHODOLOGY

This is gross section observational study about core needle biopsy of the breast in Al-Najaf female patient diagnosed as abreast disease and breast cancer with core biopsy in AL-Sadder Teaching Hospital, from December 2017 to November 2022 where collected 155 specimens from archive of AL Sadder Teaching Hospital whose referral from radiological department which done under US-guide core needle biopsy and all of these cases were handled, processed and stained with Hematoxylin and Eosin stain (H&E) according to specific protocols. A 44 spacemen out of 155 was excluded from the study because some of them fragmented and other insufficient data, 106 specimens then divided to benign (31) specimens and (5) specimen's atypical proliferation and the reminder (70) specimens were malignant, all this diagnosis histopathological previously, and review by two independent pathologists. Of the three defined histological categories, the first was assigned to malignant lesion (DCIS, infiltrative ductal, medullary, lobular and mucinous) (**Table 1**), The second category included atypical ductal hyperplasia, third category include benign lesion: fibroadenoma, area of Fibrocystic change, fat necrosis, intraductal papilloma and other benign lesion, these three categories tabulated according to number of core needle biopsy taken. A malignant lesion then reviews to determine the percentage of each core involved by the malignant tissue and the results were the tabulated and essential number of core required to make a diagnosis was determined for each case.

Statistical Analysis:

Overall and parameter specific diagnostic yield were calculated and comparison by using chi-squared test; the significance level was set at $p=0.05$.

Table 1 Histopathological Type of Breast Cancer in 70 Cases

Type of Breast Cancer	No.	%
IDC	55	78.6
ILC	9	12.9
DCIS	3	4.3
Carcinoma with medullary feature	2	2.9
Mucinous Carcinoma	1	1.4
Total	70	100.0

3. RESULTS

The specimen's referral from ultrasound guided core needle biopsy, range from two to six and more cores, in nineteen (17.92%) two cores were performing, in (33/106, 31.13%) three cores were performed, (42/106, 39.6%) four cores were performed. In six cases (1.8%) five cores were performing and in other six cases (1.8%) six and more cores performed (**Table 2**). The age of female patient range from 20-80 years (mean age 47), the benign and atypical lesion range from 20-70 years and the malignant lesion range from 30-80 years. The lesion then divided as benign, atypical and malignant according to the previous histopathological diagnosis at core biopsy of a total 106 lesions, 70 (66.03%) were malignant, five (4.7%) were atypical and 31 (29.2%) were benign(describing chart). The majority of benign lesion and atypical three cores biopsy having; (51.6%), (40%) respectively, while the majority of malignant cases are four cores having (44.28%)(**Table 2**). In the malignant cases (70/106, 66.03%) when classified according to number of core referral and review the percentage of each core involvement find that (53%) of cases send as two cores, the percentage of both core involvement (26-50%), while the percentage of core involvement in 3 cores rang from (51-100%) are 66.6% of cases; However, (51.6%) of cases have 4 core rang (51-75%) and (66.7%) of cases have 5 cores rang from (76-100%) and six and more cores find that (75%) of cases rang from (51-75%). So when needed appropriate amount of lesion. To reach diagnosis and to use for further investigation find that only (17.6%) of 2 cores cases have (51-100%) and (66.6%) of 3 cores cases have (51-100%) and (100%) in 5 Cores cases have (51-100%) and (100%) if 6 and more cases have (51-100%) (**Table 3**); But at the same time there is (53%) of tow cores cases having (26-50%) involve the core.

Table 2. Diagnostic Yield Per Number of Core

Diagnosis	No. of Core										Total
	2		3		4		5		6 & more		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Benign	2	6.5	16	51.6	10	32.3	3	9.7	0	0.0	31
Atypical	0	0.0	2	40.0	1	20.0	0	0.0	2	40.0	5
Malignant	17	24.3	15	21.4	31	44.3	3	4.3	4	5.7	70
Total	19	17.9	33	31.1	42	39.6	6	5.7	6	5.7	106

Table 3. Relationship between number of core and the percentage of core involvement by the lesion)

No. of cores	Total no. of cases	Percentage							
		0-25 %		26-50%		51-75%		76-100%	
		No.	%	No.	%	No.	%	No.	%
2 core	17	5	29.4	9	52.9	3	17.6	0	0.0
3 core	15	2	13.3	3	20.0	5	33.3	5	33.3
4 core	31	3	9.7	5	16.1	16	51.6	7	22.6
5 core	3	0	0.0	0	0.0	1	33.3	2	66.7
6 & more	4	0	0.0	0	0.0	3	75.0	1	25.0

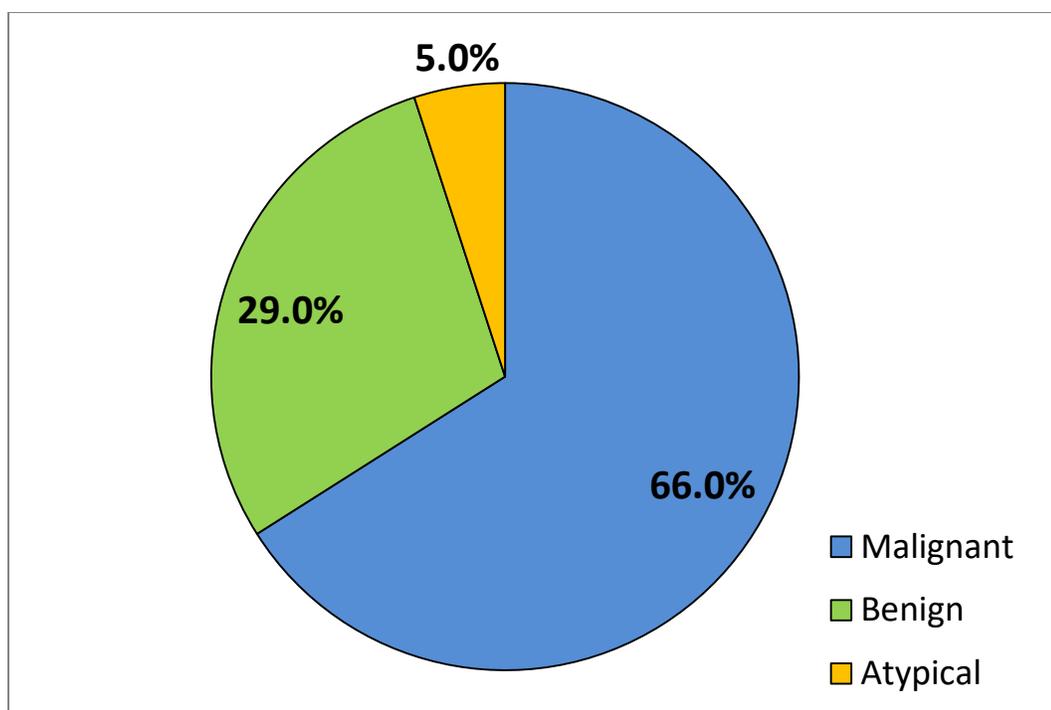


Figure 1. Describing Chart about the percentage of diagnostic category of breast lesion

4. DISCUSSION

Ultrasound guided breast biopsy is a cost-effective, an accurate and accepted alternative to open surgical biopsy(9), for diagnosis of breast lesion and avoid the patient to exposure to ionizing radiation of stereotactic guidance. The purpose of obtain a sufficient, but not more number of biopsy specimens to minimization of procedure time, patient discomfort and breast trauma. In comparison, fine-needle aspiration (FNA) which yield cytological specimen that the major problem in fact it is not capable of differentiated between DCIS and infiltrative carcinoma, mostly resulting in a DCIS over estimation rate(10); So there is a difference in management of DCIS and infiltrating carcinoma with respect to axillary lymphonodectomy which is a serious clinical problem. There are some of studies have addressed about how many core specimens are need to obtain a diagnosis some of them advised at least three cores per lesion to reach a high diagnostic yield(9), and other reported as equal or less than four biopsy was required(8); While the resent study show that two cores seem an optimal number in diagnostic purpose of identifying invasive or in situ disease while at least four cores biopsies are need to grade tumor(5). In view of the above about the

benefit of US - guided breast core biopsy in the diagnosis of benign and malignant breast and avoid of unnecessary of open surgery and its complication. Therefore, our study to determine the essential number of core to reach the definitive diagnosis and its sufficient if needed other investigation or graded of the tumor for this reason; depended on percentage of lesion involve the core and we found (53%) of two cores cases having (26-50%) involving of the cores by the lesion and the percentage increase with increase number of core and when McIlhenny et al. recommended by using at least four core biopsy(11) ,H.N.L and C.H.C. discordance and reveal that one core is sufficient for pathologic diagnosis and to use predictive and prognostic marker if contain invasive part except in certain in situation if small size ($\leq 1\text{cm}$), or heterogeneous tumor component ,so one core is not enough and need repeat biopsy if there is discordance between clinical, radiological and pathologic evaluation(12). Whereas Tae Sun show that 2 cores is sufficient for diagnosis and 4 cores used for pathological parameter (5). While in our study find that 2 cores are sufficient to diagnosis and have appropriated percentage involving the cores. To our knowledge, there is not yet universal standard regarding the number of specimens that are effective and economical. The main limitation of this study include its retrospective nature and the small sample size from single center. Well-designed studies with increase case number, better radio pathologic correlation and prospective design will be needed to validate the result.

5. CONCLUSIONS

Ultrasound-guided breast core biopsy is more effective technique in diagnosis of breast lesion and further management and prognostic of disease and the purpose of this study to detect effective number of CNBS for diagnosis and find that two cores have a good percentage for diagnosis and the percentage increase with increase number of core but to avoid unnecessary losing time for radiologist and pathologist and the anxiety for the patient, the two cores are sufficient.

Ethical Approval:

All ethical issues were approved by the author. Data collection and patients enrollment were in accordance with Declaration of Helsinki of World Medical Association , 2013 for the ethical principles of researches involving human. Signed informed consent was obtained from each participant and data were kept confidentially.

6. BIBLIOGRAPHY

1. Attah Edb: *human pathology, complete text for Africa Ibadan university press*2000:281 282 .
2. Merza N.M.H, Alqzweni A.A. *Assessment of Her2/Neu status by Silver Insitu Hybridization in Immunohistochemistry Equivocal Cases of Invasive Breast Cancer-Cross Sectional Study in a Sample of Iraqi Patient. JMSP 2022; 8(1):276-90 .*
3. Momenimovahed Z, Salehiniya H. *Epidemiological characteristics of and risk factors for breast cancer in the world. Breast Cancer Targets Ther. 2019;11:151.*
4. *World Health Organization . WHO|Breast Cancer. WHO; Geneva, Switzerland: 2021*
5. Sun T, Zhang H, Gao W, Yang Q. *The appropriate number of preoperative core needle biopsy specimens for analysis in breast cancer. Medicine. 2021;100:14(e25400).*
6. Sun C, Lu Q, Zhang X, Zhang Y, Jia S, Wang J, Zhu H, He W, Zhang Z. *Comparison between core needle biopsy and excisional biopsy for breast neoplasm. Medicine. 2021;100:34(e26970).*
7. Saha A, Mukhopadhyay M, Das C, Sarkar K, Saha AK, Sarkar DK. *FNAC Versus Core Needle Biopsy: A Comparative Study in Evaluation of Palpable Breast Lump. J Clin Diagn Res. 2016 Feb;10(2):EC05-8.*
8. Vega Bolivar A, Alonso-Bartolome' P, Ortega Garcia E, Garijo Ayensa F. *Ultrasoundguided core needle biopsy of non-palpable breast lesions: a prospective analysis in 204 cases. Acta Radiol 2005; 46:690–695 .*
9. Kirshenbaum K, Keppke A, Hou K, Dickerson M, Gajjar M, Kirshenbaum G. *Reassessing specimen number and diagnostic yield of ultrasound guided breast core biopsy. Breast J. 2012 Sep;18(5):464-9 .*
10. Pijnappel RM, van den Donk M, Holland R, Mali WPTHM, Peterse JL, Hendriks JHCL, Peeters PHM (2004) *Diagnostic accuracy for different strategies of image-guided breast intervention in cases of nonpalpable breast lesions. Br J Cancer 90: 595 – 600 .*
11. McIlhenny C, Doughty JC, George WD, Mallon EA. *Optimum number of core biopsies for accurate assessment of histological grade in breast cancer. Br J Surg. 2002 Jan; 89(1): 84-5 .*
12. Li HN, Chen CH. *Ultrasound-Guided Core Needle Biopsies of Breast Invasive Carcinoma: When One Core is Sufficient for Pathologic Diagnosis and Assessment of Hormone Receptor and HER2 Status. Diagnostics (Basel). 2019 May 13;9 (2) : 54 .*

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