

Accuracy of Core Biopsy without Image Guidance in the Tissue Diagnosis of Breast Lump

Md. Rashidul Hoq^{1*} Shahidul Islam Khan² Ahmed Sayeed³

ABSTRACT

Background: A breast lump is a localized swelling, protuberance, bulge or lump in the breast that feels different from the breast tissue around it or the breast tissue in the same area of the other breast. The aim of this study is to assess the accuracy/efficacy of the free hand percutaneous core biopsy without image guidance for the palpable radiologically suspicious breast lump.

Materials and methods: This is a retrospective cross sectional study based on reviewing the histopathological reports (59) of all patients of suspicious breast lump in a single center (By single surgeon, single pathologist). Study period was from July 2019 to June 2020.

Results: The absolute sensitivity of free hand core biopsy for diagnosis of Carmona palpable lesion was 98% and was statically significant ($p < .00$) and $t = 43.51$. 2% found Carcinoma and other breast diseases.

Conclusion: So considering the accuracy of tissue diagnosis of palpable suspicious breast lump is so high that image guidance is unnecessary.

Key words: Core biopsy; Image guidance; Tissue.

Introduction

A hollow-core needle ranging in size from 11 to 16 gauge is used to remove one or more pieces of breast tissue during a core-needle biopsy. The operator either directs the needle to a palpable lesion (Freehand biopsy) or employs an imaging approach to pinpoint the target lesion. Stereotactic radiography, ultrasonography and Magnetic Resonance Imaging (MRI) are some of the imaging modalities used. Automated guns and vacuum assistance are used to retrieve the biopsy samples. For core-needle breast biopsies, there is no consensus on which of these procedures is best in terms of accuracy and risk of injury. Breast cancer screening programs are designed to discover malignancies when they are still tiny and treatable. Biopsy of suspected abnormalities may be required for early detection. Core-needle procedures may be less effective in targeting the suspicious area

of breast tissue than open surgical biopsies. As a result, there's a chance they'll miss a cancerous tumor (A false negative biopsy). The proportion of all cancer cases detected by a diagnostic test is referred to as sensitivity (in this case, core-needle biopsy). A second biopsy is usually used in research studies to determine the sensitivity of core-needle biopsy (With the open surgical method) or clinical followup over time to detect cancers that were missed.

The research on the accuracy of core-needle breast biopsies have largely been of poor quality. Rather than prospective research, the majority of the investigations are retrospective chart reviews. The majority of them provide insufficient information about the patient populations. The size, location, and imaging properties of a lesion can all determine which breast biopsy technique is used. However, little information regarding these features has been included in research studies to establish their impact on biopsy accuracy.¹

The aim of this study is to assess the accuracy/efficacy of the free hand percutaneous core biopsy without image guidance for the palpable radiologically suspicious breast lump.

Materials and methods

This retrospective cross sectional study was carried out from July 2019 to June 2020 in Holy Family Red Crescent Medical College Hospital, Dhaka. Women aged 20 to 40 years with breast lump were selected for this study. Total 59 samples were collected purposively as per inclusion criteria.

1. Assistant Professor of Surgery
Holy Family Red Crescent Medical College, Dhaka.
2. Registrar of Surgery
Holy Family Red Crescent Medical College Hospital, Dhaka.
3. Professor & Surgical Oncologist
Managing Director
Dhaka Cancer and General Hospital Ltd, Dhaka.

*Correspondence : **Dr. Md. Rashidul Hoq**
Cell : +88 01711 31 21 58
Email : drhoq@yahoo.com

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Inclusion criteria

- In the tissue diagnosis of breast lump will be confirmed by core biopsy without image guidance
- Patients who will be agreed with and signed on consent paper
- Patients who agreed to do Core biopsy.

Exclusion criteria

- Patients who will not be confirmed by core biopsy without image guidance
- Patients who will not be agreed with consent paper.

All data were analyzed by descriptive and analytical statistics using SPSS (Statistical Package for Social Science) software for Windows Version 23 (SPSS Inc. Chicago, Illinois, USA). Results were presented by tables and graphs.

Results

The following Table I shows the clinical diagnosis of lump size. Among the 59 patients highest (5.08%) patients lump size was 3*3. The other size results are given below:

Table I Clinical diagnosis lump size

Lump Size (cm)	Frequency	Percentage (%)
2*3	2	3.39
2*2	1	1.69
<2	1	1.69
3*3	3	5.08
Ca breast post neo aduvant 3*3	1	1.69
Ca Rt breast 2*2	1	1.69
2.5cm*2 inflammatory Rt breast lump	1	1.69
Ca breast 4*4	1	1.69
Ca breast 3*3	2	3.39
Ca Rt breast 3*2	2	3.39
Fibroadenoma breast 2*2	1	1.69
Benign breast lump 3*4	1	1.69
Ca breast (Rt) 2*2	1	1.69
Chronic breast access 2*3	1	1.69
Ca breast (Rt) <2	1	1.69
Ca breast 4*4	1	1.69
5*3	1	1.69
3*4	1	1.69
Ca Rt breast 3*3	1	1.69
Ca Rt breast 4*4	1	1.69
Ca breast 5*5	1	1.69
Rt breast lump 2*2	1	1.69
Ca Rt breast 3*3	1	1.69
Ca Rt breast 6*8	1	1.69
Ca Rt breast 5*5	1	1.69
Ca Rt left breast 8*8	1	1.69
5*5	1	1.69
Fibrocystic disease 2*3	1	1.69

Lumpiness of Rt breast 2*3	1	1.69
Rt breast lump 3*4	1	1.69
Chronic inflammation 5*6	1	1.69
Chronic mastitis 3*3	1	1.69
Rt breast lump 1.5*1	1	1.69
Rt breast lump 5*6	2	3.39
Rt breast lump 5*4	1	1.69
Left breast lump 2*3	1	1.69
R breast lump 2*2	1	1.69
Rt breast lump	1	1.69
Ca Rt breast 6*6	1	1.69
Ca left breast 6*7	1	1.69
Mastitis 5*4	1	1.69
Mastitis 5*7	1	1.69
left breast lump 6*7	1	1.69
left breast lump 5*5	1	1.69
Left breast lump 6*6	1	1.69
Rt breast lump 5*9	1	1.69
Rt breast lump 6*5	1	1.69
Left breast subareolar lump 3*4	1	1.69
Left breast nodule 4*5	1	1.69
Left breast lump 2*2	1	1.69
left breast lump 5cm*6	1	1.69
Total	59	100

The following Figure-2 shows number of core tissue taken from the patients. Among the patient's number of core tissue 13 collected from highest (22.03%) which was multiple. On the other hand lowest number of tissue 1 collected from (1.69%) patients which was multiple small.

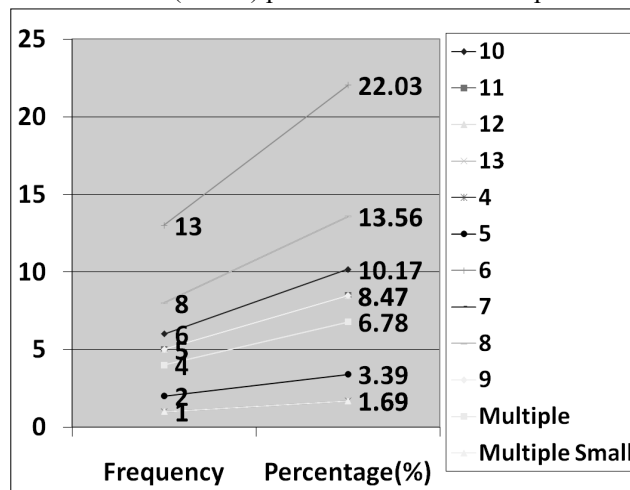


Figure 1 of core tissue taken

The following Table II shows the core tissue size. Among the patients highest (50.41%) had small core tissue size from 0.1 to 0.8 cm followed by 45.95% large core tissue size from 0.9 to 2.5 cm and 3.52% had total core tissue size. The details tissue size of patients is given below:

Table II Core tissue size

Largest core tissue size cm	Frequency	Percentage (%)	Small core tissue size cm	Frequency	Percentage (%)	Total core tissue size cm	Frequency	Percent (%)
0.9	1	0.88	0.1	8	7.08	1*07*02	1	0.88
0.9*0.2*0.2	1	0.88	0.2	13	11.50	1*08*03	1	0.88
1	6	5.30	0.2*0.2*0.1	1	0.88	1.2*0.2	1	0.88
1.1	1	0.88	0.3	8	7.08	1*0.7*0.2	1	0.88
1.2	3	2.65	0.3*0.2	1	0.88	-	-	-
1.3	5	4.42	0.4	4	3.54			
1.4	4	3.54	0.5	9	7.96			
1.5	11	9.73	0.6	4	3.54			
1.6	1	0.88	0.7	7	6.19			
1.8	1	0.88	0.8	1	0.88			
1*0.2*0.2	1	0.88	01*0.1	1	0.88			
1*0.2	1	0.88						
2	8	7.08						
2.1	2	1.77						
2.2	3	2.65						
2.3	1	0.88						
2.5	2	1.77						
Total	52	45.95		57	50.41		4	3.52

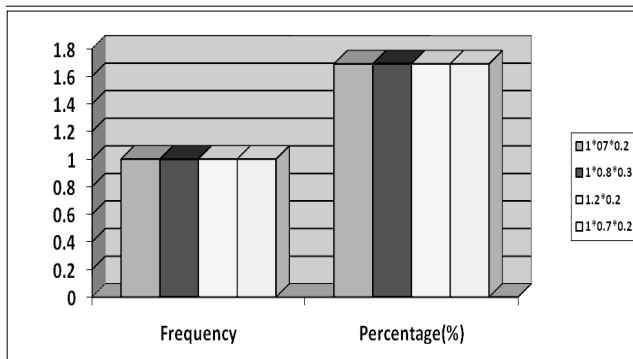


Figure 2 Total core tissue size

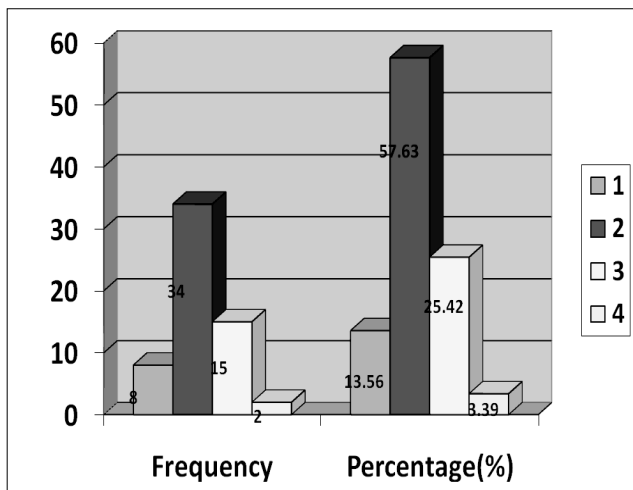


Figure 3 No of block prepared

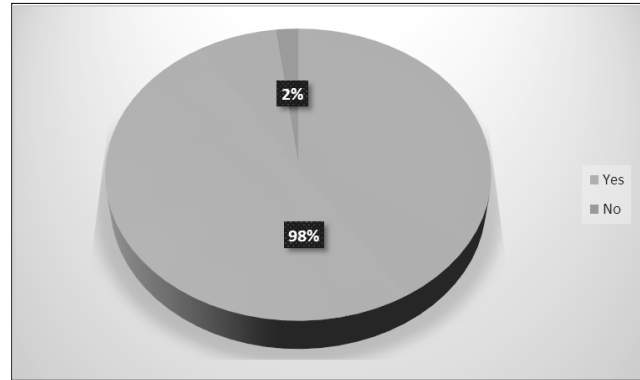


Figure 4 Accuracy of core biopsy without image guidance

Table III One-Sample Statistics

Variables	n	Mean	Std. Deviation	Std. Error Mean
Absolute sensitivity of free hand core biopsy for diagnosis of Carmona palpable lesion	59	1.0339	.18252	.02376

Table IV One-sample test

Variables	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Mean Difference	Upper
Absolute sensitivity of free hand core biopsy for diagnosis of Carmona palpable lesion	43.510	58	.000	1.03390	1.0815

Discussion

In our study we found accuracy of core biopsy without image guidance is 98% and absolute sensitivity of free hand core biopsy for diagnosis of carmona palpable lesion is statistically significant. There are five studies reported data on the accuracy of non-guided, i.e., freehand, core-needle biopsies performed with automated biopsy gun devices.²⁻⁶ The study fit a bivariate binomial model. The data had a low level of heterogeneity (I² = 6.95 percent). The summary negative likelihood ratio was 0.143, and the summary sensitivity was 85.8% (95 percent CI: 75.8 to 92.1 percent) (95 percent CI: 0.082 to 0.250). This ratio suggests that a woman with a pre-test likelihood of malignancy of 30% would have a 5.8% chance of developing cancer following a negative freehand core-needle biopsy. Because the average woman undergoing core-needle biopsy is characterized as BI-RADS 4 before the biopsy and such women have an estimated

overall prevalence of malignancy of 30%, a pre-test probability of 30% was chosen.⁷ For the same reason, they employed a 30% pre-test probability in the studies that follow. It's crucial to remember, however, that each woman's pre-test probability may differ from this estimate.

Underestimation rates were not reported in any of the investigations. We didn't do any sub-group or meta-regression analysis because there were only five studies.

Cusick et al. noted that smaller lesions (Less than 2 cm in diameter) were more likely to be misdiagnosed.⁸ In contrast, Barreto et al. commented that neither tumor size nor patient age affected the accuracy of the procedure. However, tumors located in the right breast were much more likely to receive false-negative diagnoses, perhaps due to the fact that the persons performing the biopsy procedures were right handed. Barreto et al. on the other hand, found that tumor size and patient age had no effect on the accuracy of the process, nevertheless, tumors in the right breast were substantially more likely to get false-negative diagnoses, possibly due to the fact that the biopsy technicians were all right-handed. Operator inexperience, according to Barreto et al was a major cause in misdiagnoses.⁹ Because the tumors in Barreto et al study's were all larger than 2 cm in diameter, the apparent divergence in results about the impact of tumor size on biopsy accuracy is likely attributable to this.

They gave the evidence's conclusions a low rating. The evidence base's quality was graded as Low (Median score 5.7) although its quantity, consistency and robustness were all deemed adequate.

Conclusion

So considering the accuracy of tissue diagnosis of palpable suspicious breast lump is so high that image guidance is unnecessary.

Disclosure

All the authors declared no competing interest.

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