

ORIGINAL RESEARCH

Diagnostic Accuracy of Ultrasound Guided Core Needle Biopsy in Various Breast Lesions

¹Rahul Yadav, ²Ummed Singh Parihar, ³Mohammed Arif, ⁴Dinesh Kumar Sharma

^{1,3,4}Resident, ²Senior Professor and Unit Head, Department of General Surgery, JLN Medical College, Ajmer, Rajasthan, India

Correspondence:

Dinesh Kumar Sharma

Resident, Department of General Surgery, JLN Medical College, Ajmer, Rajasthan, India

Email: dr.dineshsharma2012.ds22@gmail.com

ABSTRACT

Background: Breast cancer is the most common female cancer worldwide representing nearly a quarter (25%) of all cancers. Diagnosis of breast cancer is carried out by three medical members, the surgeon, who covers breast examination, the radiologist for mammography and ultrasound, and the pathologist for fine-needle aspiration cytology (FNAC) and core needle biopsy (CNB). Aim of present study is to assess the accuracy of ultrasound guided core needle biopsy in various breast lesions

Material & Methods: A hospital based prospective study done on 100 cases of various breast lesions reporting to the Surgery Department, J.L.N. Medical College and Associated Group of Hospitals, Ajmer, Rajasthan within study duration and eligible as per inclusion criteria were included in the study from January 2020 to December 2021. Then an ultrasound guided biopsy specimen is obtained by means of four successive insertions with different angulations of the needle into the core of the lesion. The quantity and quality of the material obtained is judged after immediate immersion of the specimen in fixative, and then specimen is sent to histopathology department. And the core needle biopsy report is compared with the excision biopsy report of the breast lump.

Results: Our results showed that the mean age was 38.79 ± 13.98 yrs (age range 18-75 yrs). On USG guided core needle biopsy and excision biopsy, 53% were found benign tumor, and 47% were carcinoma. Sensitivity is 100% and specificity is 100%. There was no false positive and false negative case present in this study.

Conclusion: We concluded that Ultrasound guided Core needle biopsy can be reliably used for preoperative diagnosis of breast lumps as the first diagnostic step with high sensitivity, specificity, and accuracy for both malignant and benign lesions. However, benign lesions, diagnosed this way, must be followed by frequent examinations.

Keywords: Breast lump, USG, Core needle biopsy, Lesions.

INTRODUCTION

Breast cancer is a leading cause of death and disability among women, especially young women, in low- and middle-income countries.¹

In many developing countries, the incidence of breast cancer is now rising sharply due to changes in reproductive factors, lifestyle, and increased life expectancy. Today, more than half of incident cases occur in the developing world.² Combined with still high case-fatality rates, this means that mortality from breast cancer is a leading cause of death among adult women in developing countries, as well as in the developed world.³

Breast cancer is the most common female cancer worldwide representing nearly a quarter (25%) of all cancers.⁴In India, although age adjusted incidence rate of breast cancer is lower (25.8 per 100 000) than United Kingdom (95 per 100 000) but mortality is at par (12.7vs17.1 per100 000) with United Kingdom.⁵

Diagnosis of breast cancer is carried out by three medical members, the surgeon, who covers breast examination, the radiologist for mammography and ultrasound, and the pathologist for fine-needle aspiration cytology (FNAC) and core needle biopsy (CNB).

Although fine needle aspiration cytology (FNAC) is the preferred initial diagnostic procedure in many breast centres,^{6,7} it is unreliable and prone to sampling errors. Surgical biopsy is the 'gold standard' for diagnosis, but due to the associated morbidity, interference with definitive surgery for cancer, high cost and cosmetic problems, it is not the initial biopsy method of choice.⁸

Percutaneous ultrasound and stereotactic guided breast core needle biopsy is widely used as a reliable alternative to surgical biopsy to obtain a histopathological diagnosis for imaginary visible suspicious breast lesions. Stereotactic guided percutaneous breast biopsy is mostly used for microcalcifications, while ultrasound guided biopsy is mostly used for masses and architectural distortions.⁹⁻¹¹

Trucut/Core needle biopsy, First described in 1982 by Perlinggren, Sweden. Tissue core biopsy has the advantage of allowing histologic rather than cytologic assessment and therefore pathologist are in a better situation to give a proper diagnosis. However, the procedure is more time consuming and the equipment required for both obtaining and processing the sample is more complex and costly than that used for aspiration cytology. Moreover, it may be possible to process and report aspirated samples more quickly, allowing assessment of the adequacy of the sample and in some situations diagnosis at the time of the initial outpatient visit. Aim of present study is to assess the accuracy of ultrasound guided core needle biopsy in various breast lesions

MATERIAL & METHODS

A hospital based prospective study done on 100 cases of various breast lesions reporting to the Surgery Department, J.L.N. Medical College and Associated Group of Hospitals, Ajmer, Rajasthan within study duration and eligible as per inclusion criteria were included in the study from January 2020 to December 2021.

INCLUSION CRITERIA

1. Patients age more than 18 years with breast lumps
2. Ultrasound visible breast lesions
3. Breast lump <5cm in size
4. All breast lumps which undergo for surgical excision

EXCLUSION CRITERIA

1. Patient age less than 18 years
2. Patient on Anticoagulants
3. Patient with Bleeding disorder
4. Previous surgery on target lesion
5. Breast lump >5cm in size

METHODS

Technique- on ultrasound visible breast lesions, after manual localization and immobilization of the lesion, under complete aseptic technique a 2% Lignocaine infiltrating anesthetic is administered, and the skin incision performed. Then an ultrasound guided biopsy specimen is

obtained by means of four successive insertions with different angulations of the needle into the core of the lesion. The quantity and quality of the material obtained is judged after immediate immersion of the specimen in fixative, and then specimen is sent to histopathology department. And the core needle biopsy report is compared with the excision biopsy report of the breast lump.

DATA COLLECTION

After obtaining permission from institution research board the present study was conducted at Department of Surgery, J.L.N. Medical College and Associated Group of Hospitals, Ajmer, Rajasthan, serving the urban and rural population of Ajmer. This study included 100 patients of various breast lesions by consecutive sampling. The detailed history of the patient i.e. age, sex, site and duration of involvement and other were recorded. In these case, relevant clinics pathological examination, routine laboratory investigations (TLC, DLC, ESR, peripheral blood smear examination) and radiological examination was done.

DATA COLLECTION & ANALYSIS

All information was entered into a pre-structured proforma and then transferred into Microsoft Excel sheet and then analyzed with help of Epi Info software of WHO-CDC. Results were analyzed with help of tables, diagrams, proportions, Mean, SD and appropriate tests of significance wherever applicable. $P < 0.05$ was considered as cut off for statistical significance.

RESULTS

Our study showed that mean age of cases was 38.79 ± 13.98 yrs with age range of 18-75 yrs. Maximum 29% cases were of 36 – 45yrs age followed by 23% of 26 – 35 yrs whereas minimum 3% were of >65yrs followed by 10% of 56 – 65 yrs age. 61% study population was resides in rural areas whereas 39% study population were urban (table 1).

Table 1: Demographic profile of cases

Demographic Profile	Number (N=100)	Percentage
AGE (YRS)		
18 – 25	21	21%
26 – 35	23	23%
36 – 45	29	29%
46 – 55	14	14%
56 – 65	10	10%
>65	3	3%
Mean \pm SD	38.79 ± 13.98	
Residence		
Rural	61	61%
Urban	39	39%

In our study, maximum 58% cases had lump of right breast followed by 37% of left breast whereas minimum 2% had lump & pain right breast followed by 3% cases with lump & pain left breast as chief complaint. Mean duration of complaints was 219.5 ± 161.75 days. 33% had retracted nipple whereas rest 67% had normal or protruded nipples. Out of total 100 cases 3 had bloody discharge (table 2).

Table 2: Distribution of cases according to Chief complaint, duration, and site of lump

Characteristics	Number	Percentage
Chief Complaint		
Lump Left Breast	37	37%
Lump Right Breast	58	58%
Lump & Pain Left Breast	3	3%
Lump & Pain Right Breast	2	2%
Duration (Days)		
Mean±SD	219.5 ± 161.75	
Nipple		
Retracted	33	33%
Protruded	67	67%
Site Of Lump		
Upper Outer	45	45%
Upper Inner	30	30%
Lower Outer	19	19%
Lower Inner	3	3%
Upper Outer & Upper Inner Both	3	3%

In our study, maximum 45% cases had lump in upper outer quadrant followed by 30% in upper inner whereas minimum 3% in lower inner and Upper outer & upper inner both followed by 19% in lower outer quadrant (table 2).

Maximum 56% cases had smooth surface lump whereas 44% had bosselated surface. According to margin 55% had well defined margin whereas rest 45% had ill defined margins. According to consistency, maximum 49% had firm followed by 39% hard whereas minimum 12% had stony hard lump (table 3).

Table 3: Distribution of cases according to characteristic of Lump

Characteristic		Number	Percentage
Surface	Smooth	56	56%
	Bosselated	44	44%
Margin	Well defined	55	55%
	Ill defined	45	45%
Consistency	Firm	49	49%
	Hard	39	39%
	Stony hard	12	12%

On USG guided core needle biopsy 53% were found benign tumor, out of them maximum 47% were fibroadenoma whereas minimum 1% each Fat necrosis, chronic inflammatory pathology and Ductal hyperplasia were observed. Out of 47% cases of breast carcinoma, maximum 42% were invasive carcinoma whereas minimum 5% Carcinoma in situ. Invasive carcinoma includes 38% infiltrating ductal carcinoma, 2% infiltrating lobular carcinoma, 1% of both and 1% squamous cell carcinoma (table 4).

Table 4: Distribution of cases according to USG guided Core needle Biopsy

Diagnosis	Number	Percentage
Fibroadenoma	47	47
Benign phyllodes tumor	3	3
Fat necrosis	1	1
Chronic inflammatory pathology	1	1
Ductal hyperplasia	1	1

Carcinoma in situ	5	5
Invasive carcinoma of breast	42	42
Total	100	100

In the present study the diagnostic accuracy of trucut biopsy is 100% sensitivity and specificity is 100%. There was no false positive and false negative case present (table 5).

Table 5: Distribution of cases according to Excision Biopsy

Excision biopsy	USG guided Core needle Biopsy		Sensitivity	Specificity	PPV	NPV
	Benign	Malignant				
Benign	53	0	100%	100%	100%	100%
Malignant	0	47				

DISCUSSION

Diagnosis of breast cancer is carried out by three medical members, the surgeon, who covers breast examination, the radiologist for mammography and ultrasound, and the pathologist for fine-needle aspiration cytology (FNAC) and core needle biopsy (CNB).

Mean age of study population was 38.79 ± 13.98 yrs with age range of 18-75 yrs in our study. Similarly ChineduOkoli (2020)¹² and CholatiWiratkapun et al. (2012)¹³ found mean age was 40.12 ± 13.81 years & 50 ± 9.6 years respectively. As the breast cancer is more prevalent in younger age group and one of the most common cancer occur in female in india, the age distribution was justified.

In our study, maximum 61% cases were rural whereas minimum 39% cases were urban. Our hospital is a tertiary care referral centre with drainage of cases from the city as well as from rural areas, justifying the distribution of cases.

In our study, maximum 58% cases had lump of right breast followed by 37% of left breast whereas minimum 2% had lump & pain right breast followed by 3% cases with lump & pain left breast as chief complaint. Similarly, Agrawal Kapil H et al. (2012)¹⁴ found that all the 123 cases (100%) presented with lump in the breast. Breast pain along with lump was present in 23 cases. It reinforces the need for health education regarding the early warning sign of cancer and also about the importance of screening of breast cancer because early detection can be done by BSE (Breast Self-Examination) and clinical examination. Histopathological examination was used in all cases (100%) as a diagnostic tool.

Maximum 61% cases were presented to us within 6 months of duration whereas minimum 6% presented after 1 yr of duration. Mean duration of complaints was 219.5 ± 161.75 days. Similarly, JojoVattappallil Joseph et al. (2019)¹⁵ found mean duration of symptoms was around 300 days. The awareness and dilemma about breast cancer in our region the patients with lump presented late.

In our study, 33% had retracted nipple, 45% cases had lump in upper outer quadrant whereas minimum 3% in both lower inner, 44% had bosselated surface, 45% had ill-defined margins, 53% were mobile. 92% were negative for lymph nodes, Whereas JojoVattappallil Joseph et al. (2019)¹⁵ found that out of 150 patients 132(88%) patients presented with breast lump, maximum 106(70.6%) patients had lump on the right side, and maximum 72(48%) patients had lump in the upper outer quadrant of the breast. Twelve(8%) patients presented with blood stained nipple discharge without any lump.

On USG guided core needle biopsy 53% were found benign tumor and 47% cases of breast carcinoma. Out of benign maximum 47% were fibroadenoma whereas minimum 1% each Fat necrosis, chronic inflammatory pathology and Ductal hyperplasia were observed. Out of carcinoma, maximum 42% were invasive carcinoma whereas minimum 5% Carcinoma in situ. Invasive carcinoma includes 38% infiltrating ductal carcinoma, 2% infiltrating lobar carcinoma, 1% of both and 1% squamous cell carcinoma.

CholatipWiratkapun et al. (2012)¹³ found that the CNB results showed 334 breast cancers (46%), 28 high-risk lesions (5%) and 367 benign lesions (50%). Four (1%) lesions were categorized as inconclusive.

Mohammad Motamedolshariati et al. (2014)¹⁶ during a 2.5 year study period, identified 4 patients with breast cancer out of 30 patients who underwent CNB and definitive surgery, concordance rate was 100% for histological type.

ChineduOkoli et al. (2020)¹² in their study found that on pathological examination of the CNB revealed that malignant lesions accounted for 40% (n=40) of CNB diagnosis, high-risk lesions accounted for 6.0% (n=6), and benign lesions accounted for 45 (n=45). Indeterminate cases were seen in 9.0% of CNB diagnosis

In the present study the diagnostic accuracy of trucut biopsy is 100%, sensitivity is 100% and specificity is also 100%. There was no false positive and false negative case present in this study.

Various studies have been done to determine the efficacy and usefulness of tru-cut biopsy; and the results vary. However, various authors have differing opinions on which method is better and there is no consensus in their recommendations. Trucut biopsy removes a narrow cylinder of tissue that is submitted for both cytologic and architectural analysis of tissues. Our result are in close approximation of workers (SyedaRifaat et.al 2010¹⁷, Mohammed Bdour et.al 2008¹⁸ and karimian F et al 2008¹⁹)

Hero K. Hussain et al (2000)²⁰ found that imaging-guided core biopsy is a safe and reliable means of obtaining sufficient tissue to make a confident histologic diagnosis of malignant pediatric tumors in a high percentage of patients.

CholatipWiratkapun et al. (2012)¹³ found that the difference between US-guided CNB results and surgical excision findings or follow-up results was 0.861 (p-value < 0.001). The CNB false negative rate and sensitivity for malignant lesions was 4% (14 out of 348) and 96% (334 out of 348), respectively.

Mohammad Motamedolshariati et al. (2014)¹⁶ found that the concordance rate of core needle biopsy was 100% for histological type, 66.6% for histological grade.

OkoliChinedu et al (2020)¹² found that the diagnostic accuracy, sensitivity, and specificity were 94.44%, 92.86%, and 95.83% respectively. The procedure was well accepted and all the patients were willing to accept a repeat CNB and would recommend it.

Thus as per our and other studies our results were comparable, the core needle biopsy is well accepted and safe with higher specificity, sensitivity.

CONCLUSION

We concluded that Ultrasound guided Core needle biopsy can be reliably used for preoperative diagnosis of breast lumps as the first diagnostic step with high sensitivity, specificity, and accuracy for both malignant and benign lesions. However, benign lesions, diagnosed this way, must be followed by frequent examinations.

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