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Original Article

Tru-Cut Biopsy versus Fine Needle Aspiration Cytology in Diagnosis of Early Breast Cancer

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ABSTRACT

Background: Breast lump is a common symptom among women, and it may be indicative of benign or malignant conditions. The clinical and histopathological profile of breast lumps can provide insights into the epidemiology and risk factors of breast cancer. This retrospective study aimed to investigate the clinical and histopathological characteristics of breast lumps in women.

Methods: We analysez 80 women who presented with breast lumps in the Dept of Surgery, Srinivas Institute of Medical Sciences and Research Centre. The patients' age, lump size, site of the lump, consistency, involved quadrant, skin changes, nipple discharge, nipple retraction, presence of pain, and axillary lymphadenopathy were recorded. The patients were divided into two groups: benign and malignant, based on histopathological examination.

Results: The ROC analysis findings suggest that both FNAC and TRUCUT Biopsy are effective in detecting malignant tumors. FNAC had an accuracy of 90.6%, sensitivity of 92.31% and specificity of 88.89%, while TRUCUT Biopsy had an accuracy of 97.2%, sensitivity of 100% and specificity of 94.34%. Both tests showed significant association with the study groups, with $p<0.05$. The AUC values for FNAC and TRUCUT Biopsy were 0.906 and 0.972, respectively, indicating that both tests have high accuracy in detecting malignant tumors. The 95% CI for the AUC values were 0.820 to 0.960 for FNAC and 0.908 to 0.996 for TRUCUT Biopsy.

Conclusion: Taking into account the benefits and limitations of both techniques, we argue that Tru-Cut should be preferred over FNAC for the diagnosis of palpable breast lumps with FNAC being reserved for definitely benign lesions. Freehand Tru-Cut detects more breast carcinomas as compared to FNAC in palpable breast lumps. and correctly categorizes borderline/ inadequate breast lumps on FNAC into benign & malignant categories, thus reducing indeterminate results and treatment delays. It can therefore be used as an alternative to open biopsy.

Key Words: *Breast lumps, Tru-Cut biopsy, FNAC, malignant tumors, diagnosis*

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INTRODUCTION

Breast lumps are very common, particularly among women of reproductive age. Over 25% of women are affected by breast disease in their lifetime, and the vast majority of these cases will present initially as a breast lump in the primary care setting. Breast lump have a wide range of causes, from physiological adenosis to highly aggressive malignancy. Although the majority of breast lumps present in adult women, children and men can also be affected. Indeed, male breast cancer is a well-documented condition and requires a considered index of suspicion for its timely diagnosis and intervention [1, 2].

Breast cancer is the most common type of cancer in women worldwide, with an incidence of approximately 12%, and therefore although the vast majority of breast lumps are benign, a thorough and structured approach is required in all cases. In general, the approach should follow the triple-assessment pathway of clinical examination, radiological imaging, and pathology analysis [3, 4].

According to the WHO, breast cancer is the leading cause of cancer-related deaths worldwide, with an estimated lifetime risk of 12% (3). Benign breast disease is often more common, affecting between 25% and 50% of adult women and accounting for 3% of general practitioners' encounters with female patients [5]. A majority of these cases may present initially with a new breast mass. It is crucial, therefore, for every clinician to have confidence in assessing and managing these patients, and a thorough, consistent approach will enable this.

Clinical examination of a breast lump is the first stage in the triple-assessment approach. Both breasts and axilla should be examined meticulously by the clinician, as well as carrying out a physical examination of other body systems as indicated by the history. Although it can be tempting to bypass the physical examination in favor of other, more

targeted investigation modalities such as mammography or sonography, the findings of the physical examination are crucial for effective diagnosis and management of breast disease [6]. Repeated studies have indicated that by combining all three assessments, optimal sensitivity and specificity can be achieved [4, 6].

The most common radiological tools for imaging breast tissue are mammography, ultrasound, and MRI.

Mammography is the first-line imaging for women over 40 who present with a new breast mass. Mammography is also helpful in screening asymptomatic women who fit their regional screening criteria. This process involves obtaining X-ray imaging in both a craniocaudal and mediolateral oblique plane to ensure imaging of all breast tissue. Mammography tends to have higher specificity and lower sensitivity than ultrasound in all cases [7]. Mammography can have negative findings in up to 15% of patients with breast cancer [8].

Ultrasound imaging is preferred to mammography in younger women and men as their breast tissue tends to be denser, with a much lower proportion of fatty tissue. This dense tissue impedes the accuracy of mammography and makes it more challenging to detect microcalcifications [8].

MRI can also be useful in the assessment of a new breast lump. It is not routinely used as it is more expensive with longer wait times but shows high sensitivity for detecting and delineating breast lump. It is the preferred modality for patients who have had previous breast augmentation surgery as the breast implants can distort the underlying parenchyma in mammography or ultrasound. It may also be a recommended approach for high-risk patients, such as those with known underlying BRCA mutations [9].

Imaging reports are standardized using a tool called BIRADS – Breast Imaging Reporting and Data System (fifth edition). This standard allows breast imaging to be described according to a certain structure: density of breast tissue, presence and location of a mass or lump, calcifications, asymmetry, and any associated features [10]. This classification system divides patients into categories 0 to 6, depending on the likelihood of malignancy in the obtained images.

The BIRADS system includes different classifications for lump depending on the imaging modality in question. In mammography, to be considered a mass, the lesion must be visible in two different projections, must have convex outer borders, and must be denser in the center than on the periphery [11]. In ultrasound, a mass requires visualization in two different planes. Lump are defined according to their shape, margin, and density. In terms of shape, a lump can categorize as round, oval, or irregular. Circumscribed margins are more apt to be benign, whereas microlobulated, indistinct, or spiculated are more likely to be malignant. The margin may also appear obscured. Lump density is compared to surrounding normal tissues - higher, equal, or lower - or may reflect fat within the mass [10].

Complete assessment of breast lump includes physical, radiological and tissue diagnosis. So the final step in diagnosing benign breast lesions and ruling out malignancy is tissue biopsy which can be closed i.e. Fine needle aspiration cytology (FNAC) &Tru-Cut biopsy or open (excisional & incisional biopsy) [12]. Mammography and ultrasound are noninvasive methods, which are used for breast examination, and has diagnostic value in both screening and detecting the disease cases. Most of the malignant lump are diagnosed by the cytology of FNAC or Tru-Cut before surgery, and definitive surgical treatment can be scheduled accordingly [13].

FNAC is one of the common tests used for the diagnosis of breast lump, whose success rate and diagnostic accuracy depends on physical examination and radiological studies, especially in small and impalpable lump [14]. It is a fast test, but not in the first line for screening. This test causes very few complications and, in rare cases, seeding or implantation may occur in the needle path [15]. FNAC can make over 30% of non-definitive diagnoses, 20% of definitive diagnoses, and over 10% of suspicious diagnoses, but does not diagnose malignancies [16]. The sensitivity (35% to 95%) and specificity (48% to 100%) of FNAC showed more variability and was generally lower compared with Tru-cut biopsy. In addition, its positive and negative predictive values have been reported to be 95%-100%. The false-positive and false-negative rates of the test are also between 1%-10% and often 1%-5% [17]. However, this method has some limitations, including difficulty in making a diagnosis of an in-situ, invasive cancer. In the case of tiny tumors, it also has low diagnostic accuracy [18].

Tru-cut biopsy has a higher sensitivity and specificity than FNAC. Tru-cut biopsy's sensitivity and specificity ranges from 85% to 100% and 86% to 100% respectively and diagnostic accuracy from 72.7%-100%. Over the past decades, Tru-Cut biopsy has been preferred over FNAC and is being used more frequently than FNAC for the diagnosis of breast lump [19, 20]. Tru-cut biopsy is a costly method and has been reported to be an inappropriate strategy due to failure in making an early diagnosis before surgery. It is also argued that the accuracy of this method is influenced by the operator's technical skills as well as the numbers and sizes of the samples taken. Although FNAC accuracy is also largely influenced by the operator's skill, it is faster, more cost effective, and less invasive, and causes fewer complications [21].

Taken together, with regard to the above-mentioned material and the results of the previous studies, there are still doubts and controversies about which of the two sampling methods should be considered as a diagnostic test for breast cancer [22].

Therefore, this study aimed to investigate the diagnostic accuracy of FNAC and Tru-cut biopsy as compared to the final histopathologic report in breast lumps.

AIMS AND OBJECTIVES:

1) To find out the diagnostic accuracy of Fine needle aspiration cytology and Tru-cut biopsy as compared to the final histopathologic report in breast lumps.
2) To correlate the diagnostic accuracy of Fine needle aspiration cytology and tru-cut biopsy in relation to mammography/ Sono mammography (BIRADS).

MATERIAL AND METHODS:

The study was conducted in the Department of General Surgery, Srinivas Institute of Medical Sciences and Research Center, over a period of 12 months. Subjects were recruited from patients presenting to General Surgery OPD, with a complaint of palpable breast lump after taking a written informed consent and approval from ethics committee.

Study design:

Type of study - Prospective observational follow up study
Sample size - Minimum 50 patients
Sampling method – Convenience sampling (Patient presented to the General Surgery with a complaint of palpable breast lump)

Selection of Subjects:

Inclusion Criteria -

1) Age between 18 and 70 years
2) Palpable breast lump

Exclusion Criteria -

1) Patient with inflammatory breast conditions
2) Patient who didn't underwent HPE

Study tools:

- Structured study instruments (case record forms, master charts) will be developed and used to generate data.
- A 10ml syringe bearing a 23-gauge needle (external diameter of 0.6mm) was used for FNAC
- A biopsy "gun" (BARD biopsy gun) of 14-gauge needle was used for Tru-cut
- BIRADS grading was used for the categorization of patients on the basis of Sono mammography

Study protocol:

A patient presenting to the outpatient or inpatient department with palpable breast lump was subjected to detailed clinical history and thorough physical examination was done. Data collection including age, address and clinical presentation with respect to site /size/ onset duration and progress of lump was done. History of previous illnesses, admission, surgeries and co-morbidities were noted. Family history for breast lumps were extracted. Clinical examination of lump with respect to exact location, size, consistency, fixity to skin/ deeper structures, nipple changes, presence of palpable axillary lymph nodes and examination of the opposite breast in case of unilateral lesions was done.

After obtaining an informed and valid consent from the patient, fine needle aspiration cytology and Tru-Cut biopsy from the breast lump were performed.

The procedure of FNAC for obtaining the specimen was explained to the patient. A 10ml syringe bearing a 23-gauge needle (external diameter of 0.6mm) was used. The lump was firmly but gently fixed between 2 fingers by the locating hand with slight stretching of the overlying skin. Using a betadine impregnated swab, the site to be aspirated was cleaned. Then the syringe was firmly fixed and made ready for inserting after removing air. Patient was informed prior to puncturing the skin. The needle was introduced into skin. With the needle at the anterior edge of the lump, negative pressure was applied. Multiple passes were made through the lesion, at varying angle of entry into the lump, slowly rotating the syringe without withdrawing the needle from skin. This was continued till a small droplet of fluid is visualized at the hub of the needle. After collecting aspiration fluid, needle was withdrawn from the skin. Then the specimen was expressed on a glass slide. In case of excess bleed from the aspirated site, procedure was interrupted and pressure was applied to prevent hematoma formation. Breast lesions were often deeper than they appear. If there was doubt about whether the lesion has been sampled, then re-aspiration using a longer needle was considered. Heavily blood stained aspirates were not considered representative of the lesion. The smear was fixed with 95% alcohol and later

stained with hematoxylin and eosin stain. The slides were then observed by senior pathologist under microscope and reported accordingly.

The patient's subsequently were subjected to Tru-cut biopsy using a biopsy "gun" (BARD biopsy gun) of 14-gauge needle after explaining the whole procedure. After administering Local Anesthesia, 2-3 mm stab incision was given over the breast lump and cannula was introduced. The inner trocar was thrust forward and at almost the same time the outer cutting cannula was thrust over the inner trocar filling the inside notch with the breast tissue specimen. This procedure was repeated till minimum 4 tissue specimens were collected. The specimens were then placed in a container filled with 10% neutral formalin. The slides were observed by different senior pathologist.

Following FNAC and Tru-Cut, the reports were informed to the patient and further line of management was decided on the basis of report. If the reports were suggestive of benign lesion then the patients were subjected to Excision biopsy/ lumpectomy. While in malignant cases patients were subjected to MRM, SM or BCS as per staging and further treatment plan. After surgery specimens were sent for histopathological confirmation

Statistical Analysis:

Data from the case record proforma was entered into Microsoft Excel spreadsheet version 2021 and analyzed using IBM-SPSS version 26. Normality of the data was determined using Kolmogorov–Smirnov test. Categorical data was expressed as frequency and proportion (percentages). Numerical data was represented with mean and standard deviation for parametric data, or median and IQR in case on non-parametric data. For determining the statistical correlation in categorical data, a Chi-square test or Fisher Exact test was applied. To calculate significant mean difference for normally distributed continuous data, a student t-test was applied, whereas, for non-normal continuous data, the non-parametric test of Mann-Whitney U was applied. To analyze the accuracy, ROC analysis was performed. P-value < 0.05 will be considered significant for all statistical comparisons

RESULTS

The study was conducted in the Department of General Surgery, Srinivas Institute of Medical Sciences and Research Center, over a period of 12 months. 80 Subjects were recruited from patients presenting to General Surgery OPD with a complaint of palpable breast lump after taking a written informed consent and approval from ethics committee. The findings and observations are presented in this section, in tabulated and graphical representations.

Histopathological findings showed that out of 80 subjects, 50 subjects had benign lumps and 30 subjects had Malignant lumps. The study variables are presented as comparisons between Benign and Malignant Lumps, as identified by Histopathological examinations.

In this study, the prevalence of breast lumps was highest in the age group of 38-47 years, with 18 (36.00%) cases being benign and 8 (26.67%) cases being malignant. The second highest prevalence was in the age group of 18-27 years, with 23 (46.00%) cases being benign and 1 (3.33%) case being malignant. In the age group of 28-37 years, 7 (14.00%) cases were benign and 9 (30.00%) cases were malignant. There was a significant association between age and the study groups ($p<0.05$). The mean age was 32±13 years in the benign group and 44±11 years in the malignant group, with a significant difference between the two groups ($p<0.05$).

The size of the lumps did not differ significantly between the benign (4±1 cm) and malignant (5±3 cm) groups ($p>0.05$). Out of 80 subjects, 45 (56.30%) had lumps in the left breast and 35 (43.80%) had lumps in the right breast, with a significant association between the site of the lump and the study groups ($p<0.05$).

The majority of the lumps (73.80%) were firm, 22.50% were hard, and 3.80% were soft. There was a significant association between the consistency of the lumps and the study groups ($p<0.05$). The most prevalent quadrant involved was the upper outer quadrant (43.80%), followed by the upper inner quadrant (21.30%) and the lower outer quadrant (15.00%). No significant association was found between the involved quadrant and the study groups ($p>0.05$).

Out of 80 subjects, 72 (90%) did not have any skin changes, while 2 (2.50%) had dimples and 6 (7.50%) had Peau' D Orange. There was a significant association between skin changes and the study groups ($p<0.05$). Nipple discharge was present in 5 (6.30%) subjects, all of whom had malignant lumps, and there was a significant association between nipple discharge and the study groups ($p<0.05$). Nipple retraction was present in 11 (13.80%) subjects, all of whom had malignant lumps, and there was a significant association between nipple retraction and the study groups ($p<0.05$).

Out of 80 subjects, 18 (22.50%) had pain over the lump and 62 (77.50%) did not have any pain. There was no significant association between the presence of pain and the study groups ($p>0.05$). Axillary lymphadenopathy was present in 24 (30%) subjects, all of whom had malignant lumps, and there was a significant association between axillary lymphadenopathy and the study groups ($p<0.05$).

Table No 1: FNAC findings

		HPE FINDINGS						
		BENIGN		MALIGN-ANT		TOTAL		
		N	%	N	%	N	%	P-VAL-UE
FNAC REPORT	Atypical epithelial hyperplasia	2	4.00%	2	6.67%	4	5.00%	0.0001
	Benign proliferative breast disease	6	12.00%	2	6.67%	8	10.00%	
	Duct ectasia	1	2.00%		0.00%	1	1.25%	
	Ductal carcinoma	2	4.00%	24	80.00%	26	32.50%	
	Fibroadenoma	33	66.00%		0.00%	33	41.25%	
	Fibrocystic breast disease	5	10.00%	1	3.33%	6	7.50%	
	Phyllodes	1	2.00%		0.00%	1	1.25%	
	Suspicious of malignancy		0.00%	1	3.33%	1	1.25%	

According to FNAC findings, the most prevalent finding was fibroadenoma, 33(41.30%), followed by Ductal Carcinoma, 26(32.50%), and Benign Proliferative Breast Disease, 8(10.00%). There was significant association between FNAC report and study groups, $p<0.05$.

As identified by HPE, there were 50 benign lumps, out of which FNAC reported, 48 (96%) lumps as benign. According to HPE, there were 30 malignant lumps, out of which FNAC reported 24(80%) lumps as malignant. Significant association was observed between FNAC findings and HPE findings, $p<0.05$.

Table No 2: Tru-Cut findings

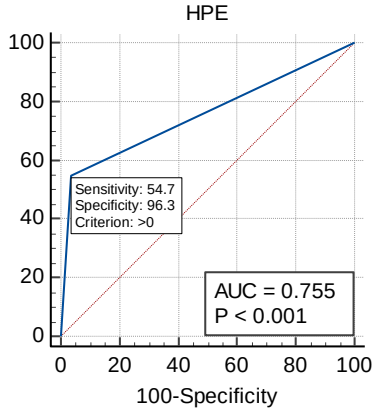
		HPE FINDINGS						
		BENIGN		MALIGNANT		TOTAL		
		N	%	N	%	N	%	P-VALUE
TRU-CUT BIOPSY	Atypical Ductal Hyperplasia	1	2.00%	1	3.30%	2	2.50%	0.0001
	Benign Pathology	0	0.00%	1	3.30%	1	1.30%	
	Dcis	0	0.00%	3	10.00%	3	3.80%	
	Fibroadenoma	41	82.00%	1	3.30%	42	52.50%	
	Fibrocystic Breast Disease	5	10.00%	0	0.00%	5	6.30%	
	Invasive Ductal Carcinoma	0	0.00%	24	80.00%	24	30.00%	
	Phyllodes	2	4.00%	0	0.00%	2	2.50%	
	Tubular Adenoma	1	2.00%	0	0.00%	1	1.30%	

According to Tru-Cut Biopsy, the most prevalent observation was Fibroadenoma, 42(52.50%), followed by, Invasive ductal carcinoma, 24(30.00%), and Fibrocystic Breast Disease, 5(6.3%). There was significant association between Tru-Cut biopsy findings and the study groups, $p<0.05$.

As identified by HPE, there were 50 benign lumps, out of which Tru-Cut Biopsy reported, all 50(100%) lumps as benign. According to HPE, there were 30 malignant lumps, out of which Tru-Cut biopsy reported 27(90%) lumps as malignant. Significant association was observed between Tru-Cut Biposy findings and HPE findings, $p<0.05$.

According to HPE findings, Fibroadenoma was the most prevalent 39(48.80%) diagnosis, followed by IDC, 28(35.00%) and Fibrocystic Breast Disease, 6(7.50%). Significant association was found between HPE findings and the study groups, $p<0.05$.

ROC ANALYSIS FOR DIAGNOSING MALIGNANCY BY SONOMAMOGRAPHY

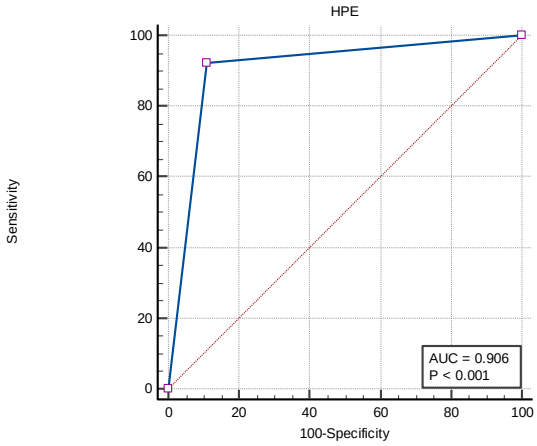


Area under the ROC curve (AUC)

Area under the ROC curve (AUC)	0.755
Standard Error [a]	0.0392
95% Confidence interval [b]	0.646 to 0.844
z statistic	6.512
Significance level P (Area=0.5)	<0.0001
Sensitivity	54.72
Specificity	96.30

ROC analysis showed that the accuracy of sonomamography in detecting, malignant tumours was 75.5%, AUC=0.755, 95% CI 0.646 to 0.844, p<0.05. The sensitivity was 54.72% and specificity was 96.30%.

ROC ANALYSIS FOR DIAGNOSING MALIGNANCY BY FNAC

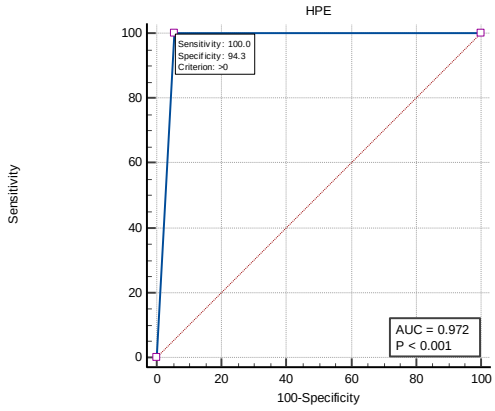


AREA UNDER THE ROC CURVE (AUC)

AREA UNDER THE ROC CURVE (AUC)	0.906
STANDARD ERROR	0.0393
95% CONFIDENCE INTERVAL	0.820 TO 0.960
Z STATISTIC	10.326
SIGNIFICANCE LEVEL P (AREA=0.5)	<0.0001
SENSITIVITY	92.31
SPECIFICITY	88.89

ROC analysis showed that the accuracy of FNAC in detecting, malignant tumours was 90.6%, AUC=0.906, 95% CI 0.820 TO 0.960, p<0.05. The sensitivity was 92.31% and specificity was 88.89%.

ROC ANALYSIS FOR DIAGNOSING MALIGNANCY BY TRU-CUT BIOPSY



AREA UNDER THE ROC CURVE (AUC)

AREA UNDER THE ROC CURVE (AUC)	0.972

STANDARD ERROR [A]	0.0189
95% CONFIDENCE INTERVAL [B]	0.908 TO 0.996
Z STATISTIC	24.959
SIGNIFICANCE LEVEL P (AREA=0.5)	<0.0001
SENSITIVITY	100.0
SPECIFICITY	94.34

ROC analysis showed that the accuracy of Tru-cut Biopsy in detecting, malignant tumours was 97.2%, AUC=0.972, 95% CI 0.908 TO 0.996, p<0.05. The sensitivity was 100%% and specificity was 94.34%.

DISCUSSION

Breast pathology is one of the most common pathologies encountered in routine practice. Not only the malignant lesions poses a major public health problem but also the benign lesions can contribute to the morbidity and their masquerade as malignancy can cause significant plight to the patients. The high incidence of breast malignancy, its relatively easy detection at an early stage, and effective treatment in the form of conservative surgery and chemotherapy had prompted a worldwide initiation of triple assessment including a clinical (palpation), radiologic (ultrasonography or mammography), and cytological (fine-needle aspiration cytology [FNAC]) assessment. Although a part of the triple assessment, in recent times, a gradual trend of increase in the rate of Tru-Cut biopsy is seen replacing the previously rampant occurrence of the FNAC. This gradual shift in the trend can be contributed by many factors although no study had yet conclusively proved a superiority of one procedure over the other. In this article, an effort is made to find out the reason of the shifting trend along with a comparative review analysis of these two procedures as depicted in the previous studies.

In recent times, the diagnosis of breast lesions has mostly become dependent on Tru-Cut biopsies with a gradual reduction in the rate of performing fine-needle aspiration cytology (FNAC). Both the procedures have their pros and cons and outsmart each other taking into account different parameters.

In the present study, breast lumps were most prevalent in the age group of 38-47 years. It was observed that in benign tumours the most prevalent age group was 38-47 Years, with 18(36.00%) and 9(30%) in the Malignant group. The mean age in the Benign group was 32±13 years and in the malignant group it was 44±11 years. There was significant difference in the mean age between the study groups, as p<0.05. Raza et al (111) in a study of 228 subjects observed that benign lesions and malignant lesions were most common in the age group of 31-40 years and 41-50 years respectively. In the present study breast cancer was more prevalent in the younger age group.

According to FNAC findings, the most prevalent finding was fibroadenoma, 33(41.30%), followed by Ductal Carcinoma, 26(32.50%), and Benign Proliferative Breast Disease, 8(10.00%). There was significant association between FNAC report and study groups, p<0.05.

As identified by HPE, there were 50 benign lumps, out of which FNAC reported, 48 (96%) lumps as benign. According to HPE, there were 30 malignant lumps, out of which FNAC reported 24(80%) lumps as malignant. Significant association was observed between FNAC findings and HPE findings, p<0.05.

In the present study, ROC analysis showed that the accuracy of sono-mamography in detecting, malignant tumours was 75.5%, AUC=0.755, 95% CI 0.646 to 0.844, p<0.05. The sensitivity was 54.72% and specificity was 96.30%.

Devolli-Disha E [23] in a study on 546 subjects concluded that sensitivity of sonomammography was 52.1% and specificity was 88.5%.

Zeeshan at al [24] observed sensitivity to be 64.5%and specificity to be 89.0%.

Lehman CD et al [25] conducted a retrospective study on 3,23,973 subjects and reported sensitivity to be 85.3 % and specificity to be 91.6%.

Tiwari et al [26] reported sensitivity to be 55.6% and specificity to be 97.7%.

According to Naeim et al [27] sensitivity of sonomammography in detecting malignant tumours was 64.4% and specificity was 77.78%

In the present study, ROC analysis showed that the accuracy of Tru-Cut Biopsy in detecting, malignant tumours was 97.2%, AUC=0.972, 95% CI 0.908 TO 0.996, p<0.05. The sensitivity was 100% and specificity was 94.34%. In the present study, ROC analysis showed that the accuracy of FNAC in detecting, malignant tumours was 90.6%, AUC=0.906, 95% CI 0.820 TO 0.960, p<0.05. The sensitivity was 92.31% and specificity was 88.89%.

Most of the other studies evaluated the agreement between two modalities for broad diagnosis of malignant and benign lesions and generally used histopathological outcomes as the gold standard for evaluation. In the present study, we also focused on this aspect. The sensitivity and specificity of FNAC and Tru-Cut for the detection of malignancy/borderline lesions in different studies and their comparisons with the present study are presented in the below.

Mitra et al [28] on comparing various parameters for FNAC and Tru-Cut reported absolute sensitivity (84.6% vs89.7%), specificity (72.4% vs 96.5%), PPV for C4/B4 (66.6% vs 100%), PPV for C3/B3(14.28% vs 0%), FNR (2.56%VS 0%), inadequate FNAC/B1 for cancer(00% vs 2.5%),suspicious rate(19.1% vs 4.4%) and diagnostic accuracy (79.4% vs 92.6%).On analyzing Z values of all parameters it was found to be statistically significant in specificity ($Z=2.56;p<0.01$), suspicious rate ($Z=27;p<0.01$) and diagnostic accuracy ($Z=2.45;p<0.01$).

According to Saha et al [29] FNAC showed sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were 69%, 100%, 100%, 38.1%, and 74% respectively in diagnosing carcinoma. Tru-Cut had sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of 88.3%, 100%, 100%, 53.3% and 86%.

Kamal et al [30] FNAC confirmed the diagnosis of breast carcinoma in 27 patients with sensitivity 89.65% and specificity 66.66%. True-cut biopsy confirmed the diagnosis of breast carcinoma in 29 patients with sensitivity 96.66% and specificity 100%.

Shah et al [31] In diagnosing breast carcinoma, FNAC depicted sensitivity of 70.8%, specificity of 96.2%, positive predictive value (PPV) of 94.4%, negative predictive value (NPV) of 78.1%, and diagnostic accuracy as 84% whereas Tru-Cut showed similar values as 87.5%, 100%, 100%, 89.7%, and 94% respectively.

In the present study, according to HPE, there were 30 malignant lumps, out of which FNAC reported 24(80%) lumps as malignant. FNAC could not detect 6(20%) subjects to be malignant. However, TRU-CUT biopsy reported 27(90%) lumps as malignant and missed only 3(10%) subjects.

This study concluded that TRU-CUT has higher sensitivity, specificity, and diagnostic accuracy than FNAC and therefore more accurate than FNAC in diagnosing breast carcinoma. Additionally, TRU-CUT gives a pathological tissue diagnosis which is mandatory for staging, treatment, and prognosis of breast carcinoma as compared to FNAC which gives the only cytological diagnosis. Despite the ability of TRU-CUT to provide a more detailed histological diagnosis with additional details on the receptor status, tumor grade, and lymphovascular invasion, FNAC is still useful as a simple, reliable, rapid, and economical method needing less advanced equipment and expertise in centers where facility for TRU-CUT is still not routinely available.

CONCLUSION

To conclude, taking into account the benefits and limitations of both techniques, we argue that Tru-Cut should be preferred over FNAC for the diagnosis of palpable breast lumps with FNAC being reserved for definitely benign lesions. Freehand Tru-Cut detects more breast carcinomas as compared to FNAC in palpable breast lumps. and correctly categorizes borderline/ inadequate breast lumps on FNAC into benign & malignant categories, thus reducing indeterminate results and treatment delays. It can therefore be used as an alternative to open biopsy.

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