Original Research Article

Prospective Study of Correlation between Mammogram and Fine Needle Aspiration Cytology with Post operative Histopathology in Palpable Breast Lumps in a Tertiary Care Centre in Kerala

Dinulal PP[1], Abraham Joseph[2], Hafsa Salim[3], Ajmal Rahman KM[4]

[1]Assistant Professor, Department of General Surgery, KMCT Medical College, Manassery, Kozhikode, Kerala
[2]Assistant Professor, Department of General Surgery, KMCT Medical College, Manassery, Kozhikode, Kerala
[3]Assistant Professor, Department of General Surgery, KMCT Medical College, Manassery, Kozhikode, Kerala
[4]Lecturer in Neurosurgery, Government Medical College, Thrissur, Kerala

Abstract

Background: Breast cancer was found to be the second most commonly diagnosed cancer in females worldwide with 2.3 million new cases added each year; with more than half of the deaths in low and middle income countries. Every breast lesion is classically evaluated with triple assessment, i.e., clinical examination, imaging and needle biopsy. This study intends to evaluate the correlation between Fine needle aspiration cytology and mammogram with post excision standard histopathology examination.

Aim: To correlate the findings between fine needle aspiration cytology, mammogram and Histopathology examination of the Biopsies from palpable Breast Lumps and to evaluate the diagnostic accuracy of these three methods.

Objectives: To assess the diagnostic accuracy of the three methods in differentiating the benign and malignant lesions and to categorize the detected breast lesions according to BI-RADS.

Materials: 66 patients with lumps in the breast between 18 to 80 years ago were included. Patients willing to undergo preoperative evaluation and excision of lesion if indicated were included. Informed consent was taken. Patients were evaluated clinically and on mammogram or USG. A Fine Needle Aspiration Cytology was done in all indicated cases. The FNAC results were compared for correlation with postoperative histopathology results. The sensitivity, specificity, positive predictive value, negative predictive value and likelihood ratio of both were studied. Data was collected using study proforma, clinical examination and from case records and review of investigation reports.

Results: The total 66 patients had a mean age of 48.7 (Mean age: 48.70±14.30) and mean age among patients who have malignant disease was 59 and mean age among patients with benign disease was 33.7. Among the subjects with Breast symptoms 27 (41%) had benign breast disease and 39 (59%) had malignant breast disease. On clinical examination 27 (41%) had firm consistency on palpation and 39 (59%) patients had hard lesion on palpation? Among 4/66

patients (06%) had inadequate smears (C1) result; 06 patients (9%) had benign (C2) result; 23 patients (35%) had atypia probably benign (C3) smear; 33 patients (50%) had suspicious malignancy (C4) smear; and no patients had clear malignant (C5) result. Among 66 patients 0 patients had Category 0 result, no patients had Category 1 result, 02 patients (3%) had Category 2 lesion, 22 patients (33.3%) had category 3 lesion, 40 patients (60.6%) had Category 4 result; 2 out of 66 (3%) had Category 5 result; and no one had category 6 results.

Conclusions: The age of incidence of malignant disease and its prevalence was higher. Malignant disease of the Breast was higher than the benign disease in contrast with current literature. FNAC had 96.4% sensitivity, and 72% specificity, 84% Positive predictive value (PPV); 93% Negative predictive value (NPV); and 87% accuracy with a Positive likelihood ratio of 3.54 and a negative Likelihood ratio of 0.05. Mammogram was found to be having 100% sensitivity, and 89% specificity, 93% Positive predictive value (PPV); 100% Negative predictive value (NPV); and 96% accuracy with a Positive likelihood ratio of 9.1 and a negative Likelihood ratio of 0.

Keywords: Breast, Malignancy, Benign Tumour, Mammogram, FNAC and Phyllodes.

Background

Diseases of the breast constitute a significant proportion of surgical cases seen in both developed and developing countries requiring, distinguishing benign from malignant lesions before definitive treatment. Advanced screening and patient education programmes have permitted to diagnose increased number of Breast tumors [1]. Palpable mass, nipple secretion and pain are the commonest modes of presentation with imaging abnormalities; also seen in inflammatory diseases of the breast [2,3]. This produces anxiety in the patients and family members until they are reassured after thorough clinical examination and investigation [4,5]. Mammogram and Fine-needle aspiration cytology (FNAC) of lump are important tests to differentiate between benign and malignant lesion which cannot be delineated clinically. It reduces the number of open biopsies in patients presenting with breast lump [6,7]. FNAC of lump breast is a substitute to excision biopsy in majority of instances and can differentiate and delineate the nature of the disease in most of the instances [7]. A guideline has been established by The American College of Radiology (ACR) for the diagnosis of breast cancer called - the Breast Imaging Reporting and Data System (BI-RADS), [8]. In 1847, a French physician Kun proposed the use of a needle to secure cell samples from palpable tumors [9-10]. The present study was conducted to correlate the findings between fine needle aspiration cytology, mammogram and Histopathology examination of the Biopsies from palpable Breast Lumps and to evaluate the diagnostic accuracy of these three methods.

Materials

A Prospective, descriptive study was conducted at department of General Surgery in KMCT medical College Hospital, Manassery, Mukkam, Kozhikode, Kerala. The study population was subjects who presented with palpable breast lumps in the age group of 18 to 80 years. The study was conducted between August 2020 and July 2021. The sample size was calculated using the formula:

Sample size (n) = 4pq/d2,

Where, p = Prevalence

q = 1 – Prevalence

d = Precision is 5%

Prevalence is taken as 4.5% according to a study by Rocha PD *et al* [3,5]. Substituting in the sample size formula, a Sample size of 66 was obtained. An institutional committee approval was taken before the commencement of the study and an ethics committee approved consent form was used for all the patients.

Inclusion criteria Patients of Age groups between 18 to 80 years were included. Patients presenting with palpable breast lumps to surgery OPD, KMCT Medical College were included. Patients willing to undergo preoperative evaluation and excision of lesion if indicated were included.

Exclusion criteria: Male patients were excluded. Patients who were Pregnant were excluded. **Study procedure:** Informed consent was taken. Patients were evaluated clinically and on mammogram or USG. A Fine Needle Aspiration Cytology was done in all indicated cases. The FNAC results were compared for correlation with postoperative histopathology results. The sensitivity, specificity, positive predictive value, negative predictive value and likelihood ratio of both were studied. Data was collected using study proforma, clinical examination and from case records and review of investigation reports.

Statistical analysis

Demographic variables of women presenting with breast lump, mammographic grading of lesions according to BI-RADS, Aspiration Cytology findings were studied and summarized in frequency and percentage. The diagnostic utility of FNAC and mammogram were be evaluated (sensitivity, specificity, positive predictive value, negative predictive value and likelihood ratio were calculated). Data was collected and evaluated using statistical tools like Medcalc and SPSS.

Results

The mean age of patients was 48.7 (Mean age: 48.70±14.30) and mean age among patients who have malignant disease was 59 and mean age among patients with benign disease was 33.7. This showed a higher age of incidence among patients with malignant disease (Table 1).

Table 1: Shows the mean Age of patients (n-66).

	Mean Age in years
Mean Age of patients	48.70±14.30
Mean Age of Patients with benign disease	33.7±6.47
Mean Age of Patients with malignant disease	59.25±5.84

Post-Operative Histopathology Result: Among the 66 patients presented with breast symptoms 27 (41%) were diagnosed with benign breast disease and 39 (59%) were diagnosed with malignant breast disease. On clinical examination 27 (41%) had firm consistency on palpation and 39 (59%) patients had hard lesion on palpation? This correlated with percentage of malignancy in postoperative histopathology.

Laterality of the disease: Among 66 patients 42 patients (64%) had lesion on left breast and 24 patients (36%) had lesion on right breast. This correlates with the data which shows increased breast disease incidence of left breast.

Quadrant of Lesion in breast: Among 66 patients 36 patients (54%) had lesion in the upper outer quadrant and 09 (14%) had lesion in upper inner quadrant, 08 patients (12%) had lesion in lower outer quadrant, 08 patients (12%) had lesion in lower inner quadrant, and 05 patients (08%) had lesion in central (areolar) area. This shows higher incidence in upper outer quadrant which is in correlation with the current literature which shows higher incidence of breast lesions in upper outer quadrant of breast (Table 2).

Table 2: Quadrant of Lesion in breast (n-66)

	UOQ	UIQ	LOQ	LIQ	Central
Number of Patients (n)	36	9	8	8	5
Percentage of Patients (%)	54	14	12	12	8

(UOQ – Upper Outer Quadrant, UIQ – Upper Inner Quadrant, LOQ – Lower Outer Quadrant; LIQ – Lower Inner Quadrant).

FNAC Results: FNAC results were classified according to NHSBSP (National Health Service Breast Screening Programme) in to 5 categories. Among 66 patients 4 (6%) had inadequate smears (C1) result; 06 patients (09%) had benign (C2) result; 23 patients (35%) had atypia probably benign (C3) smear; 33 patients (50%) had suspicious malignancy (C4) smear; and no patients had clear malignant (C5) result (Table 3).

Table 3: Shows the FNAC Results in the study (n-66).

	C1	C2	C3	C4	C5
Number of patients	4	6	23	33	0
Percentage of patients (%)	6	9	35	50	0

(C1- Inadequate Smear, C2- Benign, C3-Atypia probably benign, C4- Suspicious of malignancy, C5- Malignant)

Mammogram results: Mammogram results were categorized according to BI RADS (Breast Imaging – Reporting and Data System) in to 0 to 6 categories. Among 66 patients 0 patients had Category 0 result, no patients had Category 1 result, 02 patients (3%) had Category 2 lesion, 22 patients (33.3%) had category 3 lesion, 40 patients (60.6%) had Category 4 result; 2 out of 66 (3%) had Category 5 result; and no one had category 6 result **(Table 4).**

Table 4: Shows the BIRADS Result (n-66)

BI-RADS Category	0	I	II	III	IV	V	VI
Number of patients	0	0	2	22	40	2	0
Percentage of Patients	0	0	3	33.3	60.6	3	0

(Category 0 - Needs further evaluation (by imaging), Category I – Negative, Category II - Benign finding, noncancerous, Category III - Probably benign finding, suggest: Category IV - Suspicious abnormality, Category V - Features are highly suggestive of malignancy, Category VI - Known - Biopsy proven carcinoma).

Surgery Undertaken: Among 66 patients 27 patients (41%) underwent excision of the lesion, and 37 patients (56%) underwent Modified Radical Mastectomy (MRM); 01 patient (02%) underwent Breast conservative surgery (BCS); and 01 patient (02%) who had recurrent large phyllodes tumor underwent simple mastectomy (Table 5).

Table 5: Shows the Surgical procedure performed on the subjects (n-66)

Surgery Done	Excision	MRM	BCS	Simple Mastectomy
Number of Patients (n)	27	37	1	1
Percentage of Patients (%)	41	56	2	2

(MRM – Modified Radical Mastectomy, BCS – Breast Conservative Surgery), MRM – Modified Radical Mastectomy, BCS – Breast Conservative Surgery)

Histopathology Reports: Among 66 patients 18 (27.3%) patients diagnosed with Fibroadenoma with histopathology and 05 (07.6%) had fibrocystic disease, 04 patients (06.1%) had histopathology consistent with Phylloids tumour; 37 patients (56.1%) had invasive ductal carcinoma- no special type (IDC NST); and 02 (03%) patients had metastatic invasive carcinoma (Table 6).

Table 6: Showed Post-Operative Histopathology reports (n-66)

	Fibroadenoma	Fibrocystic disease	Phylloids tumor	IDC NST	Metastatic Invasive Carcinoma
Number of patients (n)	18	5	4	37	2
Percentage of patients (%)	27.3	7.6	6.1	56.1	3.0

IDC NST – Invasive Ductal Carcinoma (No Special type), IDC NST – Infiltrative Ductal Carcinoma (No Special type)

Correlation of FNAC with HPE: Among 58 patients who had a FNAC result of C3 (atypia, probably benign) or higher, 55 patients (94.8%) had Malignant disease on postoperative histopathology, and 20 patients (05%) had benign disease and among 10 patient who had FNAC result of C2 (Benign) or less, 02 patients (20%) had malignant disease on postoperative histopathology and 08 patients (80%) had benign disease on postoperative histopathology (Table7).

Table 7: Showed the ccorrelation of FNAC with Malignancy in post-operative histopathology (n-66)

FNAC	Malignant	Benign
Positive (C3 or More)	55	3
Negative (C2 or lower)	2	8

Correlation of Mammogram with HPE: Among 43 patients, who had a BI RADS score of more than 03 (suspicious of malignancy) on Mammogram, 40 patients (93%) had malignant disease on postoperative histopathology and 03 patients (07%) had benign disease. Among 25 patients who had BIRADS score of 3 or less (Benign) no one had malignant disease on post-operative histopathology and all 25 had benign disease on Histopathology **(Table 8).**

Table 8: Showed the correlation of Mammogram with Post-operative histopathology (n-66)

BIRADS Score	Malignant	Benign
More Than 3	40	3
3 or less	0	25

Sensitivity and Specificity of Mammogram Mammogram showed that among 43 patients who had a BI RADS score of more than 3 (suspicious of malignancy) on Mammogram, 40 patients (93%) had malignant disease (true positives) on postoperative histopathology and 3 patients (7%) had benign disease (False Positive). Among 25 patients who had BIRADS score of 3 or less (Benign) 0 patients (False Negative) had malignant disease on post-operative histopathology and all 25 had benign disease (True Negative) on Histopathology (Table 9).

Table 9: Showed the Mammogram results (n-66)

	Malignant (Disease Present)	Benign (Disease Absent)
BIRARDS more than 3 (Test Positive)	40 (True Positive)	3 (False Positive)
BIRADS 3 or less (Test Negative)	0 (False Negative)	25 (True Negative)

Hence, it can be calculated from the above table that Mammogram had 100% sensitivity, and 89% specificity, 93% Positive predictive value (PPV); 100% Negative predictive value (NPV); and 96% accuracy with a Positive likelihood ratio of 9.1 and a negative Likelihood ratio of 0. Hence, it can be inferred that Mammogram is a very good preoperative investigation with excellent sensitivity, Negative predictive value and good Specificity and Positive predictive value (Table 10).

Table 10: Showed the Sensitivity, specificity, PPV and NPV value of Mammogram

	Sensitivity	Specificity	PPV	NPV	Accuracy	Positive LR	Negative LR
Mammogram	100	89	93	100	96	9.1	0

Sensitivity and Specificity of Fine Needle Aspiration Cytology (FNAC): In this study among 58 patients who had a positive for malignancy i.e., FNAC result of C3 (atypia, probably benign) or higher (Test Positive), 55 patients (94.8%) had Malignant disease on postoperative histopathology (True Positives), and 03 patients (05%) had benign disease (False Positives). and among 10 patient who had FNAC result of C2 (Benign) or less (Test Negative), 02 patients (20%) had malignant disease (False Negative), and 08 patients (80%) had benign disease (True Negative), (Table 11).

Table 11: Showed the FNAC Results in the study (n-66)

	Malignan (Disease Present)	Benign (Disease Absent)
FNAC C3 or higher (Test Positive)	55 (True Positive)	3 (False Positive)
FNAC C2 or lower (Test Negative)	2 (False Negative)	8 (True Negative)

Hence, regarding Fine needle aspiration cytology; it can be calculated from the above table that FNAC had 96.4% sensitivity, and 72% specificity, 84% Positive predictive value (PPV); 93% Negative predictive value (NPV); and 87% accuracy with a Positive likelihood ratio of 3.54 and a negative Likelihood ratio of 0.05. Hence, it can be inferred that FNAC is a good preoperative investigation especially when compared with other investigation and clinical findings is having

good sensitivity, fair Negative predictive value and poor Specificity and Positive predictive value (Table 12).

Table 2Sensitivity, Specificity and Predictive Values of FNAC

	Sensitivity	Specificity	PPV	NPV	Accuracy	Positive LR	Negative LR
FNAC	96.4	72	84	93	87	3.54	0.05

Discussion

Breast lumps are one of the commonest presenting problems to the Surgical Outpatient clinics among women of all ages, and the heightened anxiety associated with it is well established, even in older literatures [11]. Every breast lump is classically evaluated with triple assessment, i.e., clinical examination with radiological and histopathological evaluation, and combination of these yield best results [12]. This study aims to find individual predictive value of two commonly used techniques already in the armamentarium of surgeon, namely Mammogram and Fine Needle aspiration cytology. This study also aimed to evaluate likelihood ratios of each test. A total of 66 patients (n- 66) were included in the study with a mean age of 48.7 years (Mean age: 48.70±14.30) and mean age among patients who have malignant disease was 59 years and mean age among patients with benign disease was 33.7 years. This clearly showed higher age of incidence among patients with malignant disease. A study by Bidoli E, Virdone S *et al* [13] showed the mean age of 61.8 years. The mean age of 59 years among malignant breast lumps of this study correlated with the above study. Mean age among patients presented with benign disease was considerably lower (33.7 years) which also correlated with the current evidence. Christiana *et al* [14] also described earlier incidence of breast cancer among Indian population. Among the 66 patients 27 (41%) were diagnosed with benign breast disease and 39 (59%) were diagnosed with malignant breast disease which contradicted

with the current literature evidence that benign breast diseases are commoner than the malignant lesions [15,16]. A selective take up of only suspected malignant cases which were admitted in a Tertiary care Hospital during COVID pandemic may be the reason for this. Clinical evaluation showed 27 (41%) patients with firm consistency on palpation and 39 (59%) patients with hard consistency on palpation correlated with percentage of malignancy in postoperative histopathology. Hard on palpation, with movement along with breast tissue with no intrinsic mobility is one of the most important clinical signs in carcinoma of breast [17].

Laterality of the disease Among 66 patients 42 patients (64%) had lesion on left breast and 24 patients (36%) had lesion on right breast. This correlates with the data which showed increased breast disease incidence of left breast by Amer MH [18] who also proposed that in breast cancer with genetic predisposition the laterality was also affected [19].

Quadrant of the breast affected 36/66 patients (54%) had lesion in the upper outer quadrant which was in correlation with the current literature which showed higher incidence of breast lesions in upper outer quadrant of breast; often attributed to higher breast volume in upper outer quadrant in view of axillary tail as well. Rummel S, Hueman MT *et al* [20] also evaluated the prognostic implications of quadrant of primary lesion in breast cancer, and concluded that even though it is clear that

upper outer quadrant lesions are commonest, central lesions have poorer prognosis.

Histopathology Report 18/66 patients (27.3%) were diagnosed with Fibroadenoma on histopathology and 05 (07.6%) with fibrocystic disease, 04 patients (06.1%) with histopathology consistent with Phyllodes tumour; 37 patients (56.1%) had invasive ductal carcinoma- no special type (IDC NST); and 02 (03%) patients had metastatic invasive carcinoma. Invasive Ductal Carcinoma (NST) was the most common variety of IDC that constituted 40-75% of all invasive carcinomas of breast [21]. A recent study of Makki J also re-affirmed similar findings [22].

Fine Needle Aspiration Cytology Findings Fine needle aspiration cytology (FNAC) of the palpable breast masse, a well-accepted diagnostic technique has mostly replaced excision breast biopsy due to the following advantages [23]. It provided a sensitive, expedient and economical method of obtaining cytological material for examination [24]. False positive and false-negative results were major issues, requiring reconsideration of the specimen adequacy [25]. The false-negative cases are commonly due to poor sampling technique, poor tumor localization, and the presence of a well differentiated histology of the tumor [26]. Small tumor size and non-palpable breast lesions are also commonly associated with false-negative and aspirate inadequacy [27]. In this study FNAC findings were categorized according to NHSBSP (National Health Service Breast Screening Programme) in to 5 categories [28]. The results were as follows: Among 66 patients 04 (60%) had inadequate smears (C1) result; 06 patients (09%) had benign (C2) result; 23 patients (35%) had atypia probably benign (C3) smear; 33 patients (50%) had suspicious malignancy (C4) smear; and no patients had clear malignant (C5) result.

Inadequate smears are usually due to impalpable breast lumps, smaller lesions in deeper planes or poorly defined lesions [29]. In such lesions image guided FNAC or core needle biopsy are preferred over standard technique [30].

Correlation of FNAC with HPE: In this study among 58 patients who had a positive result for malignancy i.e., FNAC result of C3 (atypia, probably benign) or higher (Test Positive), 55 patients (94.8%) had Malignant disease on postoperative histopathology (True Positives), and 03 patients (05%) had benign disease (False Positives). And among 10 patient who had FNAC result of C2 (Benign) or less (Test Negative), 02 patients (20%) had malignant disease (False Negative), and 08 patients (80%) had benign disease (True Negative). In this study, FNAC had 96.4% sensitivity, and 72% specificity, 84% Positive predictive value (PPV); 93% Negative predictive value (NPV); and 87% accuracy with a Positive likelihood ratio of 3.54 and a negative Likelihood ratio of 0.05. Hence, it can be inferred that FNAC is a good preoperative investigation especially when compared with other investigation and clinical findings is having good sensitivity, fair Negative predictive value and poor Specificity and Positive predictive value. Hence FNAC have very high sensitivity 96.4%, which is correlating with available evidence. Rahman, Sikder *et al* conducted a study in Bangladesh and found FNAC was 97.2% [31]. In another systematic review by Wang *et al*, authors reviewed 12 articles (1802 patients) and concluded that FNAC have 74% (95% CI, 72%-77%). Chakrabarti, I proposes a combined approach to reduce the variations in the sensitivity of FNAC [32]. In this study specificity of FNAC (72%) was significantly lower than the current value in literature. This may be due to few inadequate smears in the sample, and low sample size. The significant false positive

cases may be due to ductal or lobular hyperplasia. This finding was also found in reports of fibrocystic diseases [33]. According to current literature false positive results usually occured at a rate of 1%. It varied in various studies from 0% to 2%. Rosa *et al* studied 1583 patients and false positive percentage was 0%[27]. Whereas in another study conducted by Ishikava *et al* in a population of 382 patients reported false positive percentage around 2% [34]. In this study positive Likelihood ratio of FNAC was 3.54 which showed the ability of FNAC to correctly predict the disease. But the positive likelihood ratio was significantly lower than other studies, but Negative Likelihood ratio is comparable to large studies. Yu YH, Wei *et al* [35] in a large meta-analysis and systematic review found that the FNAC in breast swellings positive likelihood ratio, 25.72 (95% CI, 17.35 to 28.13); negative likelihood ratio, 0.08 (95% CI, 0.06 to 0.11) in pooled data.

Mammogram

Mammogram results were categorized according to BI RADS (Breast Imaging – Reporting and Data System) in to 0 to 6 categories. Among 66 patients 0 patients had Category 0 result, no patients had Category 1 result, 02 patients (03%) had Category 2 lesion, 22 patients (33.3%) had category 3 lesion, 40 patients (60.6%) had Category 04 result; 02 out of 66 (03%) had Category 5 result; and no one had category 6 result. Among 43 patients who had a BI RADS score of more than 3 (suspicious of malignancy) on Mammogram, 40 patients (93%) had malignant disease on postoperative histopathology and 03 patients (07%) had benign disease. Among 25 patients who had BIRADS score of 3 or less (Benign) no one had malignant disease on post-operative histopathology and all 25 had benign disease on Histopathology. In this study Mammogram was having 100%

sensitivity, and 89% specificity, 93% Positive predictive value (PPV); 100% Negative predictive value (NPV); and 96% accuracy with a Positive likelihood ratio of 9.1 and a negative Likelihood ratio of 0. Hence, it can be inferred that Mammogram is a very good preoperative investigation with excellent sensitivity, Negative predictive value and good Specificity and Positive predictive value. These results are comparable to many other studies where Positive predictive value of BIRADS 4 lesions ranged between 16-52.7% and BIRADS 5 lesions ranged between 68-100% [34,35]. In our study Positive predictive value is 93%. In younger patients with denser breast, sono-mammogram was done, and its results were comparable with conventional mammogram. A recent study in 2008 by Rathore, Prathyush *et al* [36] comparing sono mammogram with X-ray mammogram concluded that Sono-mammogram is superior to conventional mammogram especially if combined with sono elastography. In this study Negative Predictive value was 100%, which is higher than most of studies. In a recent study by Zeeshan M, Salam B *et al* [37] calculated the diagnostic accuracy of digital mammography in detecting breast cancer to be 89.3%, with a sensitivity of 97%, a specificity of 64.5%, a positive predictive value of 89%, and a negative predictive value of 90.9%. The study showed positive likelihood ratio of 9.1 which is comparable with other studies. Kerlikowske K, Grady D, Barclay J *et al* [38] evaluated diagnostic accuracy in screening mammograms, which showed LRs ranged from 5.2 to 8.8 and did not vary with age of the patient. In this study Mammogram had higher sensitivity and specificity in comparison with FNAC, i.e., Mammogram showed 100% sensitivity, and 89% specificity, 93% Positive predictive value (PPV); 100% Negative predictive value (NPV) whereas FNAC showed 96.4%

sensitivity, and 72% specificity, 84% Positive predictive value (PPV); 93% Negative predictive value (NPV). This is similar to studies which show higher Sensitivity for Mammogram than FNAC [39]. But there are studies which showed less sensitivity and specificity of mammogram in comparison with FNAC like the study by Rahman, Zikder *et al*, [31] in which FNAC showed 97.22% sensitivity, 99.46% specificity, 97.220% PPV, 99.46% NPV and 99.095% accuracy. Mammography was found to be less sensitive, specific and accurate in the diagnosis of breast lump though there is highly significant correlation among them.

Importance of triple assessment

FNAC and mammogram can have False Negatives due to various reasons as discussed which may result in missing out a malignant lesion, in a potentially curable breast carcinoma. On the other hand, false positive diagnoses will result in over treatment which will cause undue morbidity with unwarranted physical and psychological distress to the patient. Hence the classical triple assessment is advised in all cases of breast lesions. The combined sensitivity and specificity of these tests are close to 100%. Various literatures correlate with this result. Martelli *et al* [40] concluded that sensitivity of triple assessment was 95% and positive predictive value was 100%. In another study Kaufman *et al* [41] concluded that sensitivity of triple assessment was 100% and negative predictive value was 100%[88]. Another study by Steinberg *et al*. concluded that concordance for triple test was 98.8%, specificity was 100% and sensitivity was 95.5%. Another study by Ahmad *et al*. concluded that the sensitivity of triple test was 100% and specificity was 100% [42].

Limitations of the Study: The present study was undertaken with a selective take up of only suspected malignant cases which were admitted in a Tertiary care Hospital during COVID pandemic with an inadequate sampling and low sample size.

Conclusions

The age of incidence of malignant disease and its prevalence was higher. Malignant disease of the Breast was higher than the benign disease in contrast with current literature. FNAC had 96.4% sensitivity, and 72% specificity, 84% Positive predictive value (PPV); 93% Negative predictive value (NPV); and 87% accuracy with a Positive likelihood ratio of 3.54 and a negative Likelihood ratio of 0.05. Mammogram was found to be having 100% sensitivity, and 89% specificity, 93% Positive predictive value (PPV); 100% Negative predictive value (NPV); and 96% accuracy with a Positive likelihood ratio of 9.1 and a negative Likelihood ratio of 0. This study reaffirms the importance of triple assessment to avoid false negatives and thereby missing of potentially curable malignant cases. Also combined use of these will avoid false positive diagnoses and overtreatment by means of unwarranted excisions and associated physical and psychological morbidity. Triple assessment has a sensitivity and specificity of close to 100%.

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