

Original Research Article


A comparative study with clinico-pathological correlation between ultrasonography, mammography and fine needle aspiration cytology in evaluation of breast lumps in coastal population of Karaikal

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Abstract

Background: Breast cancer is the most common site-specific cancer in women and is the leading cause of death from cancer for women of age 40 to 44 year. It accounts for 33% of all female cancers and is responsible for 20% of the cancer-related deaths in women. However, the vast majority of the lesions that occur in the breast are benign. Aim of the study: To assess the effectiveness of FNAC, Ultrasonography, and Mammography in the evaluation of breast lumps by correlating to histopathology.

Materials and Methods: Patients attending Surgery Outpatient Department with breast-related complaints during the period from November 2017 to April 2019 were assessed using Triple assessment. Each patient was subjected to clinical examination, mammography, FNAC, Ultrasonogram and HPE, and the results analyzed.

Results: 40 patients were included in the study, with age ranging from 25 years to 60 years. The sensitivity, specificity, positive and negative predictive values of Clinical Examination was 87.5%,

93.75%, 77.77%, 96.77%; FNAC was 87.5%, 100%, 100%, 96.96%; Mammogram was 87.5%, 90.62%, 70%, 96.6%; and SG was 62.5%, 93.75%, 71.42%, 90.90% respectively.

Conclusion: In patients with a definite lump, Clinical examination and FNAC alone may be sufficient to rule out malignancy. A mammogram is needed in patients with no clinically palpable lump and to rule out multi-centric and multi-focal disease.

Key words

Fine Needle Aspiration Cytology, Histo-Pathological Examination Fibroadenoma, Benign phyllodes tumor, Fibrocystic disease.

Introduction

Breast lump is the clinical presentation of numerous breast diseases ranging from innocent benign cysts to malignant lesions. The distinction of benign from malignant is of paramount importance for patient care and proper management [1]. The first step in the evaluation of a breast lump is the clinical assessment. Although many times clinician can confidently make the diagnosis of a benign or malignant lesion, the possibility of mistake is always there even in experienced hands. Presently a wide range of diagnostic modalities is available for the evaluation of breast lump [2]. Conventional open biopsy, considered to be the gold standard for confirming the diagnosis, has significant morbidity, is costly and time-consuming. To overcome these issues, various biopsy techniques like Trucut needle biopsy, later, core-needle version vacuum-assisted biopsy (VAB) devices such as mammotome, image-guided advanced breast biopsy instrumentation (ABBI) and minimally invasive breast biopsy evolved. Notwithstanding their cost and limited availability, all-cause significant trauma to the patient and are not patient-friendly [3]. Misdiagnosed breast cancer accounts for the greatest number of malpractice claims for errors in diagnosis. Litigation often involves younger women whose physical examination and mammography may be misleading [4]. Two techniques that are currently available with excellent patient tolerability are mammography and fine-needle aspiration cytology. However, if employed alone the reliability of mammography and FNAC is only around 82% and 78%

respectively [5]. There are numerous reports that if the results of clinical assessment, ultrasonography, mammography, and FNAC are all combined, the accuracy of diagnosis reaches 100%. Furthermore, these techniques provide information on tumor size, number, extent, and grade preoperatively [6]. Thus there is a dire need for evolving a method for establishing the diagnosis preoperatively, which is cost-effective, least invasive and least disturbing to the patient, with accuracy comparable to open biopsy [7].

Materials and methods

This Prospective study was done in Patients attending outpatient department of general surgery at Vinayaka Missions Medical College and Hospital, Karaikal with breast-related complaints during the period from November 2017 to April 2019 were assessed using Triple assessment. Each patient was subjected to clinical examination, mammography, FNAC, Ultrasonogram and HPE, and the results analyzed.

Inclusion criteria

- Female patients between 25 to 60 years presenting with Palpable breast lump.

Exclusion criteria

- Lump associated with any changes in the skin like fungation, etc.
- Patients who underwent any other procedures like biopsy prior to visiting the OPD at Vinayaka Missions Medical College and Hospital, Karaikal.
- Patients were unreliable for follow up.

A proforma drafted for the study of all patients with breast complaints, like a lump, nipple discharge or retraction. The evaluation was done by history, clinical examination, mammography, Ultrasonography, FNAC, and HPE.

Results

The patients attending surgery OPD with breast-related complaints and who expressed consent for the study were involved and investigations were done as outlined in the method of study. 40 patients entered the study and all patients were subjected to all investigations. The results of the study are shown in the following tables. The sensitivity, specificity, positive and negative predictive values of each investigation was calculated individually. Highest Frequency of lump was in 31-40 years of age group. A maximum number of benign cases were in the age group of 31-40 years and malignant cases were in 51-60 years age group. Quadrant involvement is a specific feature of breast disease. In our study upper-outer quadrant was predominantly involved in 40% followed by diffuse/ multi quadrant involvement in 18% cases. Total Number of Benign cases in our study was 30 (75%). Most common age group was 31-40 years. Fibroadenoma was most common accounting for 44% of all breast lumps. Mammographic features of benign cases were dense Mammogram noted in 8(13%) cases so they were reported as inconclusive. The shape of Lesion was oval in 43% followed by a round in 17% than lobulated in 13%. All mammographically detected cases were hyperdense. Margins were well defined in 63% of cases, obscured in 7% and spiculated in 3.3% cases. Macrocalcifications was noted in 2 cases while 2 cases showed microcalcification. Ultrasonography findings of fibroadenomas were oval in 24 (54.54%) followed by round in 10 (22.72%) cases. Mass of size 1-3cm is present in 24 (54.54%) and 3-6 cm in 20 (45.45%) cases. 42 (95.45%) cases were hypoechoic, 2 (4.54%) case was isoechoic and 2(4.54%) case was hypoechoic. 38 (86.36%) cases had homogenous echotexture while 4 (9.09%) cases had

heterogeneous echotexture. All cases had smooth margins and L/AP ratio 1 or >1. Cases of breast abscesses were subjected to sonographic examination, most cases were characteristically shown to be irregularly shaped with ill-defined margins (85.71%), hypoechoic (85.71%), heterogeneous (100%) lesions with distal enhancement in most of the cases (42.85%). 14.28% Lesions were smooth, well defined, hypoechoic lesions with internal debris and Echoes. Lymph node enlargement was seen in 85.71% cases but fatty hilum of these lymph nodes was preserved indicating these are an inflammatory node. Only one lesion (14.28%) was falsely diagnosed as malignant and later proved to be inflammatory. Cysts were characterized in mammography by round (66%) to oval (33%), hyperdense (100%) lesions, smooth marginated (100%).

Out of 40 patients 30% belonged to age group 51-60 years. Majority of the patients presented with complaints of only Lump (85%), Lump with pain (12.5%) and Lump with discharge (2.5%). Benign diseases (80%) were more common than malignant (20%), of which fibroadenoma constituted 55% of cases. The sensitivity, specificity, positive and negative predictive values of each investigation was calculated individually. The clinical examination had the highest sensitivity (87.5%), FNAC had the highest specificity and positive predictive value (100%) for all palpable lesions. When a patient presents with a lump in the breast, Clinical examination and FNAC alone can distinguish benign from malignant lesions. Thus the accuracy of clinical examination (by an experienced hand) and FNAC alone reaches up to 100% without the need of a mammogram (**Table – 1 to 14**).

Discussion

Breast cancer is the commonest cancer in female worldwide & second commonest after cervical cancer in India. Early detection and screening can reduce breast cancer mortality around 18-29%. Breast ultrasonography plays a crucial role

in this setting. It is more age-specific than mammography for the Indian scenario where breast cancer incidence is a decade younger than the western population [8].

Table - 1: Age distribution in breast neoplasm.

| Age group (Years) | No. of cases | % |
|-------------------|--------------|------|
| 25-30 | 4 | 10 |
| 31-35 | 12 | 30 |
| 36-40 | 4 | 10 |
| 41-45 | 5 | 12.5 |
| 46-50 | 3 | 7.5 |

Table - 2: Distribution of cases based on clinical diagnosis.

| Clinical diagnosis | No. of cases | % |
|---------------------|--------------|------|
| Fibroadenoma | 20 | 50.0 |
| Fibrocystic disease | 7 | 17.5 |
| Phyllodes tumor | 4 | 10.0 |
| Carcinoma | 9 | 22.5 |
| Total | 40 | 100 |

Table - 3: Distribution of cases diagnosed by mammography.

| Mammographic Diagnosis (BIRADS) | No. of cases | % |
|---------------------------------|--------------|------|
| 1 | 1 | 2.5 |
| 2 | 24 | 60 |
| 3 | 5 | 12.5 |
| 4 | 4 | 10 |
| 5 | 6 | 15 |
| Total | 40 | 100 |

Table - 4: Distribution of benign and malignant cases on mammography.

| Lesions | Number of cases | % |
|-----------|-----------------|-----|
| Benign | 30 | 75 |
| Malignant | 10 | 25 |
| Total | 40 | 100 |

Table - 5: Distribution of benign and malignant cases in FNAC.

| Lesions | Number of cases | % |
|-----------|-----------------|------|
| Benign | 33 | 82.5 |
| Malignant | 7 | 17.5 |
| Total | 40 | 100 |

Sonography of the breast is an accurate imaging test in women 45 years or younger with breast symptoms and may be an appropriate initial

investigation ultrasound becomes a very important tool when a situation arises where mammogram could not differentiate a solid tumor from a cyst [9].

Table - 6: Distribution of cases diagnosed by ultrasonography.

| USG (BI-RADS) | No. of cases | % |
|---------------|--------------|------|
| 1 | 0 | 0 |
| 2 | 26 | 65 |
| 3 | 7 | 17.5 |
| 4 | 3 | 7.5 |
| 5 | 4 | 10 |
| Total | 40 | 100 |

Table - 7: Distribution of benign and malignant cases in USG.

| Lesions | No. of cases | Percentage |
|-----------|--------------|------------|
| Benign | 33 | 82.5 |
| Malignant | 7 | 17.5 |
| Total | 40 | 100 |

Table - 8: Distribution of cases based on histopathology.

| Histopathological diagnosis | No. of cases | % |
|-----------------------------|--------------|------|
| Fibroadenoma | 22 | 55 |
| Fibrocystic disease | 7 | 17.5 |
| Benign Phyllodes | 3 | 7.5 |
| DCIS | 1 | 2.5 |
| Invasive carcinoma | 7 | 17.5 |
| Total | 40 | 100 |

Table - 9: Distribution of benign and malignant cases on histopathology.

| Lesions | Number of cases | % |
|-----------|-----------------|------|
| Benign | 33 | 82.5 |
| Malignant | 7 | 17.5 |
| Total | 40 | 100 |

Table - 10: Comparison of diagnostic modalities with histopathology.

| Diagnostic Modalities | Benign | Malignant | Inconclusive | Total |
|-----------------------|--------|-----------|--------------|-------|
| Clinical Examination | 31 | 9 | - | 40 |
| Mammography | 29 | 10 | 1 | 40 |
| USG | 33 | 7 | - | 40 |
| FNAC | 32 | 7 | 1 | 40 |
| Histopathology | 33 | 7 | - | 40 |

Table - 11: Comparison of clinical diagnosis with histopathology.

| Clinical Diagnosis | Histopathological diagnosis | | Total |
|--------------------|-----------------------------|--------|-------|
| | Malignant | Benign | |
| Malignant | 7 | 2 | 9 |
| Benign | 1 | 30 | 31 |
| Total | 8 | 32 | 40 |

Table - 12: Comparison of mammographic diagnosis with histopathology.

| Mammographic diagnosis | Histopathological diagnosis | | Total |
|------------------------|-----------------------------|--------|-------|
| | Malignant | Benign | |
| Malignant | 7 | 3 | 10 |
| Benign | 1 | 29 | 30 |
| Total | 8 | 32 | 40 |

Table - 13: Comparison of USG diagnosis with histopathology.

| USG Diagnosis | Histopathological diagnosis | | Total |
|---------------|-----------------------------|--------|-------|
| | Malignant | Benign | |
| Malignant | 5 | 2 | 7 |
| Benign | 3 | 30 | 33 |
| Total | 8 | 32 | 40 |

Table - 14: Comparison of FNAC diagnosis with histopathology.

| Clinical Diagnosis | Histopathological diagnosis | | Total |
|--------------------|-----------------------------|--------|-------|
| | Malignant | Benign | |
| Malignant | 7 | - | 7 |
| Benign | 1 | 32 | 33 |
| Total | 8 | 32 | 40 |

In a study done by Michell MJI, et al. the triple assessment was concordant in 19 cases (54.28%) i.e. all the benign cases detected by the triple test were benign on final biopsy (100% specificity and NPV), all the malignant lesions detected by triple assessment turned out to be malignant on final biopsy (100% sensitivity and PPV [10]. The study shows that when Triple assessment is concordant, final treatment may have ensued without an open biopsy. In non-concordant cases, FNAC stands as single most important investigation. However, due to its false-negative results, other components of the triple test need

to be employed to enhance its efficacy and diagnostic yield [11]. Eberl MM, et al. had a series of 84 patients where they compared Mammogram, USG, FNAC, HPE by a scoring system. 81 were detected to have lumps of which 53 were malignant. They have found sensitivity and specificity of FNAC to be 92% and 83% respectively whereas in the present study they are 87% and 100% [12]. In a study done by Gao Q, et al. to compare the sensitivity and specificity of the traditional triple assessment of symptomatic breast lesions with contrast-enhanced dynamic magnetic resonance imaging, they found the sensitivity of each modality: clinical examination 84%, mammography 87.6%, fine-needle aspiration cytology 79.1%, and specificity : clinical examination 83.1%, ultrasound 88.9%, mammography 86.4%, fine-needle aspiration cytology 97%. The results of this study were similar to the results of the present study [13]. Globe K, et al. in a study to assess the accuracy of the "triple test" in the diagnosis of palpable breast masses in Saudi females, found that Physical examination showed 82.6% sensitivity, 97.3% specificity and 86.4% positive predictive value. Mammography showed 87.5% sensitivity, 97.3% specificity and 87.5% positive predictive value and fine-needle aspiration cytology (FNAC) showed 91.7% sensitivity, 100% specificity, and 100% positive predictive value in concordant cases (elements had either all malignant or all benign results). They concluded that the triple test was 100% accurate in the diagnosis of palpable breast lesions when all three elements were concordant [14]. A palpable mass in a woman's breast represents a potentially serious lesion and requires evaluation by history taking and physical examination. A solid lesion requires a firm diagnosis and this usually calls for removing the lesion for Histopathological examination. A positive result on cytology after aspiration is sufficiently accurate to justify one stage diagnosis and treatment. A negative or suspicious finding on FNAC is inconclusive and a radiological investigation is required [15].

Conclusion

In patients with definite mass, Clinical examination and FNAC alone may be sufficient to rule out malignancy and this may be cost-effective by avoiding a mammogram. But, FNAC results when negative or suspicious should be correlated with clinical examination and imaging findings to prevent false positives and false negatives. USG may be used instead of the mammogram to avoid the radiation due to a mammogram. USG is efficient as a method of choice to evaluate breast masses in young patients and to differentiate between solid and cystic masses. When Clinical Examination, FNAC, Mammography, and USG are concordant final treatment may be ensured without an open biopsy.

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