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Original Research Article

A Retrospective Study Breast Pain in Women with Mammography and Ultrasound

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Abstract

Aim: To study the breast pain in women with mammography and ultrasound.

Materials and Methods: A Retrospective study was conducted in the Department of Radiodiagnosis, Patna Medical College and Hospital, Patna, Bihar, India from January 2019 to December 2019. Study participants were all women with palpable and nonpalpable breast lesions detected on clinical examination/self-breast examination and referred for MG and women in high-risk groups (family history of breast cancer, previous history of breast cancer and disease such as fibrocystic disease, and excessive exposure to ionizing radiation, and history of endometrial, ovarian, or colonic carcinoma). A total of 53 patients were studied. Study tools were MG machine (Digital MG Novation DR. SIEMENS) and USG machine (WIPRO G E Healthcare Ultrasound LOGIC–P5).

Results: The sensitivity, specificity, PPV, and negative predictive value (NPV) of MG in detecting carcinoma breast are 77.77%, 97.72%, 87.5%, and 95.55%, respectively. USG independently detected six patients as suspicious of breast carcinoma and missed four lesions, which were subsequently proved as carcinoma. USG falsely detected one patient as suspicious lesion, which proved benign in other studies. The sensitivity, specificity, PPV, and NPV of USG in detecting carcinoma breast are 55.55%, 97.72%, 83.33%, and 91.48%, respectively. Two malignant lesions which were occult in MG due to dense breast parenchyma and were detected in USG. The four cases of carcinoma breast which could not be picked up in USG were diagnosed by MG. The correlation coefficients of MG alone (0.792), USG alone (0.631), and MG and USG combination (0.884) with FNAC are all positive, and P values are significant of all the modalities, which signify that all are the effective diagnostic procedures of detecting breast malignancy, but among the three procedure, the combination of MG with ultrasonography shows the strongest correlation (correlation coefficient = 0.884) with the finding of FNAC.

Conclusion: We therefore conclude that with the combination of two noninvasive procedures, MG and ultrasound; we can almost achieve the accuracy of the FNAC in detecting breast malignancy.

Keywords: Breast, Abnormalities, Mammography, Ultrasound, Cytology.

Introduction

Breast pain, also known as mastalgia, is a common complaint among women and can significantly impact quality of life. It is often categorized into cyclical and non-cyclical types. Cyclical mastalgia is associated with the menstrual cycle, whereas non-cyclical mastalgia has no such correlation and may result from various etiologies including musculoskeletal issues, trauma, or underlying breast pathology. Despite its prevalence, breast pain is rarely associated with malignancy, yet it prompts considerable anxiety and often leads to imaging evaluations to rule out breast cancer . [1-3] Mammography and ultrasound are the primary imaging modalities used in the evaluation of breast pain. Mammography is particularly effective in detecting calcifications and subtle changes in breast tissue density that might indicate malignancy. It is recommended as the initial imaging test in women over 40 years old or in those with a significant family history of breast cancer. [4-9] However, mammography has limitations, especially in younger women with dense breast tissue, where its sensitivity is reduced. Ultrasound, on the other hand, is an excellent adjunct to mammography, especially in women with dense breasts or localized pain. It is highly effective in distinguishing between cystic and solid masses and in evaluating palpable abnormalities that are not visible on mammography. Ultrasound can also guide fine-needle aspiration or biopsy of suspicious lesions, facilitating a quicker diagnosis . Recent studies have explored the diagnostic efficacy of mammography and

ultrasound in women presenting with breast pain. The psychological impact of breast pain on women should not be underestimated. Anxiety associated with the fear of breast cancer can significantly affect mental health and quality of life. Imaging plays a crucial role in alleviating this anxiety by providing reassurance when no malignancy is detected. However, it is essential for healthcare providers to balance the benefits of imaging with the potential harms of overdiagnosis and unnecessary biopsies . [9-12]

Materials and Methods

A Retrospective study was conducted in the Department of Radiodiagnosis, Patna Medical College and Hospital, Patna, Bihar, India from January 2019 to December 2019. Study participants were all women with palpable and nonpalpable breast lesions detected on clinical examination/self breast examination and referred for MG and women in high-risk groups (family history of breast cancer, previous history of breast cancer and disease such as fibrocystic disease, and excessive exposure to ionizing radiation, and history of endometrial, ovarian, or colonic carcinoma). Ulcerated and fungating breast growth was excluded because MG is not possible. Pregnant women, moribund patients and proven cases of malignancy, and male patients were also excluded from the study. A total of 53 patients were studied. Study tools were MG machine (Digital MG Novation DR. SIEMENS) and USG machine (WIPRO G E Healthcare Ultrasound LOGIC–P5). MG was performed in a stand type Siemens Novation, which is a radiographic stand to radiograph the patient in a standing or sitting position in combination with mammographic X-ray tube assembly with compression paddle. Mediolateral oblique and craniocaudal images were obtained and assessed carefully. USG was performed on a Logic P-5 (GE) real-time scanner with a hand-held linear electronic array transducer. The transducer could be operated in the frequency range of 7.5 MHz. Parameters studied were (a) On MG, the site of the lesion, margin of the lesion, surrounding halo, clustered microcalcification, surrounding parenchymal distortion, and thickening of the skin. (b) On USG, the size, shape, margins, echo texture, homogeneity of internal echoes, lateral shadowing, posterior effect, calcification, infiltration across tissue space, and surrounding fat were studied. Data were collected and statistically analyzed, and suitable test of significance was applied.

Results

The study included 53 women, of which 45 were from Hindu, five from Muslim, and three from Christian. Among the patients, 25 patients complained of mobile breast lump, 12 patients suffered from breast pain, five patients felt lump, three patients complained of nipple discharge, and nipple retraction and lump with fever were the complaints of two patients each. Among the diagnosed cases of the carcinoma breast, age of one patient is between 30 and 40 years, three patients are within 41–50 years group, two patients are between 51 and 60 years group, and three patients belong to 61 and above group. Among the 53 patients, MG individually detected eight lesions and missed two lesions of carcinoma breast, which was subsequently detected in USG and conformed in FNAC. One of the 8 patients detected for suspicious lesions in MG, subsequently proved benign in USG and FNAC. The sensitivity, specificity, PPV, and negative predictive value (NPV) of MG in detecting carcinoma breast are 77.77%, 97.72%, 87.5%, and 95.55%, respectively. USG independently detected six patients as suspicious of breast carcinoma and missed four lesions, which were subsequently proved as carcinoma. USG falsely detected one patient as suspicious lesion, which proved benign in other studies. The sensitivity, specificity, PPV, and NPV of USG in detecting carcinoma breast are 55.55%, 97.72%, 83.33%, and 91.48%, respectively. Two malignant lesions which were occult in MG due to dense breast parenchyma and were detected in USG. The four cases of carcinoma breast which could not be picked up in USG were diagnosed by MG. In 22 FNAC proven cases of fibrocystic diseases, MG alone detected 18 cases and USG alone detected 21 cases. Combined approach detected all the cases correctly. In 16 FNAC proven cases of fibroadenomas, MG alone detected 12 cases, USG alone detected five cases, and combined approach detected 15 cases. Of three benign cysts, MG detected two cases, however, USG detected all correctly. In two cases of infective pathology, MG detected one case correctly and one case was suspicious (false positive); however, USG correctly diagnosed those two cases. In our study population, 83.01% of breast lesions were benign, and of them, 77.27% were diagnosed by MG alone and 72.72% were diagnosed by USG alone. When these modalities were combined, 97.72% of the lesions were diagnosed. The correlation coefficients of MG alone (0.792), USG alone (0.631), and MG and USG combination (0.884) with FNAC are all positive, and P values are significant of all the modalities, which signify that all are the effective diagnostic procedures of detecting breast malignancy, but among the three procedure, the combination of MG with ultrasonography shows the strongest correlation (correlation coefficient = 0.884) with the finding of FNAC.

Table 1: Demographic and Religious Distribution of Patients

Characteristic	Number of Patients (n=53)	Percentage (%)
Gender		
Female	53	100
Religion		
Hindu	45	84.9
Muslim	5	9.4
Christian	3	5.7

Table 2: Patient Complaints

Complaint	Number of Patients (n=53)	Percentage (%)
Mobile breast lump	25	47.2
Breast pain	12	22.6
Felt lump	5	9.4
Nipple discharge	3	5.7
Nipple retraction	2	3.8
Lump with fever	2	3.8

Table 3: Age Distribution of Diagnosed Carcinoma Breast Cases

Age Group (Years)	Number of Patients (n=9)	Percentage (%)
30-40	1	11.1
41-50	3	33.3
51-60	2	22.2
61 and above	3	33.3

Table 4: Diagnostic Performance of MG and USG

Diagnostic Method	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
MG	77.77	97.72	87.5	95.55
USG	55.55	97.72	83.33	91.48

Table 5: Detection of Benign Lesions by MG and USG

Lesion Type	Number of Cases (FNAC Proven)	Detected by MG Alone	Detected by USG Alone	Detected by Combined Approach
Fibrocystic diseases	22	18	21	22
Fibroadenomas	16	12	5	15
Benign cysts	3	2	3	3
Infective pathology	2	1 (1 false positive)	2	2

Table 6: Correlation Coefficients with FNAC Findings

Diagnostic Method	Correlation Coefficient
MG alone	0.792
USG alone	0.631
MG and USG combination	0.884

Discussion

Patients with palpable breast masses commonly present for imaging evaluation. Unfortunately, false-negative mammographic findings in the setting of a palpable breast mass have been estimated at between 4% and 12%. [10-12] Therefore, malignancy cannot be excluded when mammographic findings of a palpable mass are negative. USG is used as an adjunct to MG to further evaluate palpable masses, especially in women with mammographically dense breasts. USG often detects cysts or solid lesions that are obscured on the mammogram by the surrounding fibroglandular tissue and can reduce the number of surgical biopsies required when cysts are identified. It was found from the literatures that MG and USG are well-established diagnostic modalities for the breast. They have high diagnostic yield but is not 100% sensitive and specific. [13,14] MG when combined with USG can yield very significant improvement in sensitivity and specificity for diagnosing different

breast lesions, and our study strongly supports this evidence. The value of combined mammographic and sonographic imaging in symptomatic patients has been studied previously. Moss et al. [15] reported a sensitivity of 94.2% in 368 patients. Shetty et al. [16] reported a sensitivity of 100%. Barlow et al. [17] reported a sensitivity of 87%. Their findings are comparable with present findings - sensitivity of 100% in case of malignant lesions and case detection rate of 97% in cases of benign lesions. In our study, we estimated correlation coefficient and P value using Spearman's Rho test, and this statistical finding leads us to the conclusion that with the use of the combination of the two noninvasive procedures (i.e., MG + ultrasound); we can almost achieve the accuracy FNAC in detecting breast malignancy. Although USG is not considered a screening test, it is more sensitive than MG in detecting lesions in women with dense breast tissue. Moss et al. [15] reported that sonography increased cancer detection by 14% in symptomatic patients who were evaluated with both MG and sonography. Georgian-Smith et al. [18] in a retrospective analysis of 293 palpable malignant lesions reported that sonography detected all cancers; 18 (6.1%) of these 293 cancers were mammographically occult. In this study, two patients (22.22%) of nine are diagnosed cancer in USG, which was occult in MG.

Conclusion

The MG and ultrasound are individually effective diagnostic modalities for detection of breast pathologies. In our study, detection of breast carcinoma is higher in MG in comparison to USG; however, the accuracy of detection of breast carcinoma significantly improves when MG was combined with USG. Our study also reveals that in comparison to MG, USG is better modality for detecting lesions in mammographically dense breast. This study confirms that the MG and ultrasound (USG) when combined have significantly higher sensitivity and NPV than observed for a single modality in detecting the both benign and malignant lesions of the breast. We therefore conclude that with the combination of two noninvasive procedures, MG and ultrasound; we can almost achieve the accuracy of the FNAC in detecting breast malignancy.

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