ORIGINAL RESEARCH PAPER

Radio-Diagnosis

# "COMPARATIVE EVALUATION OF X RAY MAMMOGRAPHY WITH DYNAMIC CONTRAST MAGNETIC RESONANCE MAMMOGRAPHY IN FOCAL BREAST LESIONS"

**KEY WORDS:** Fibroadenoma, DCEMRI, Mammography, BIRADS.

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**ABSTRACT**

Evaluation of breast cancer has undergone a significant change in patients with advent of X ray Mammography, USG, DCE MRI, scintigraphy, PET which helps in early detection and intervention. X ray mammogram serves as the best screening tool. DCE MRI useful in dense breast, inconclusive mammogram in high risk patients and as screening tool BRCA 1, BRCA 2, Cowdens syndrome patients. The main of DCEMRI is distinguish benign and malignant lesions to prevent unnecessary invasive procedures and to conserve breast in breast carcinomas

## INTRODUCTION

Breast cancer is the common cause of cancer death among women. By the age of 85, women had a 12.5 percent lifetime probability of acquiring breast cancer .The high prevalence of breast cancer and the requirement for early treatment underscore the importance of precise and timely diagnosis.The goal of breast imaging is to determine whether a lesion is benign or cancerous. Breast cancer is currently detected by mammography, ultrasound and MRI.

Mammography is considered the best screening in the evaluation of the breast masses. Although various new modalities and techniques have emerged, none have substituted mammography. This is the known investigation of choice for screening of the breast as of now and is the only imaging technique that has a major effect on screening of the asymptomatic individuals for cancer and in diagnosing, staging & patient follow Up Schnall M D et all imply that including breast MRI into the pretreatment assessment of women considering breast conservation therapy should be considered.

In women with a genetic propensity to breast cancer, MRI appears to be more sensitive imaging modality than X ray mammography in identifying cancers.

When any two or one of the three parameters(DCEMRI ,MRS, DWI) was considered as positive for malignancy, the multi-parametric technique achieved 96.4 percent and 100 percent sensitivity, respectively. In addition, the data showed that combining DWI and MRS can help establish a definitive diagnosis of malignancy, especially in situations where DCEMRI is inconclusive.

For palpable lesions, both MRI breast and mammography have high sensitivity (90 percent for mammography and 95 percent for MRI), while MRI has a greater specificity (Mammography 30 percent and MRI 50 percent. For nonpalpable lesions sensitivity of X ray mammogram and MRI was 65% and 90%, the specificity was 25% and 50% respectively

### Aims & Objectives of the Study

1. To do the X ray mammography in all the patients that has been referring to the radiology department for suspicion of breast lesions
2. To conduct the Dynamic contrast enhanced MRI of breast in all the patients with breast lesions that are detected on mammogram.

## METHODOLOGY

In our study there are 50 female patients included who were referred to our radiology department GGH , kurnool for evaluation of breast lesions .patients were evaluated by x ray mammography and MR mammography.They were evaluated for detailed morphologic features according to BI-RADS lexicon in combination with dynamic kinetic signal intensity curves for characterization of lesions as benign or malignant.

### Imaging Techniques

This study is performed by the GE Alpha ST mammogram machine and Philips Ingenia 1.5 Tesla MR System with dedicated breast coil .

## RESULTS

The present study includes study of 50female patients with breast masses. Benign lesions are 32 in number and malignant lesions are 18 in number constituting 64% and 36% respectively.

MR Mammo is more sensitive in detecting the BIRADS V lesions (18) , when compared with X ray mammography (4); where as the lesions categorized as BIRADS IV were more in X ray mammogram (21) when compared with MRI Mammo (5) making it less sensitive for differentiating for BIRADS IV & V lesions.

**Table 1. MRI and Histopathological Diagnosis of focal breast lesions**

| MRI Diagnosis | Number of patients | Histopathological diagnosis | |
|---|---|---|---|
| Fibroadenoma | 21 | Firboadenomas | 19 |
| Phyllodes tumour | 2 | Phyllodes tumour | 01 |
| Fibrocystic disease | 6 | Fibrocystic disease | 09 |
| Duct ectasia | 3 | Duct ectasia | 03 |
| Malignancy | 18 | Invasive ductal cell carcinoma | 13 |
| | | Infiltrating ductal cell carcinoma | 05 |

**Table 2. BIRADS distribution of patients with focal breast lesions**

| BIRADS | MAMMOGRAPHY | MR MAMMO |
|---|---|---|
| BIRADS 2 | 15 | 18 |
| BIRADS 3 | 10 | 8 |
| BIRADS 4 | 21 | 6 |
| BIRADS 5 | 4 | 18 |

**Table 3. Types of kinetic curves in focal breast lesions**

| HISTOPATHOLOGY | TYPE I | TYPE II | TYPE III |
|---|---|---|---|
| BENIGN | 20 | 4 | 1 |
| MALIGNANT | 1 | 11 | 6 |

## CONCLUSIONS

In our study there are 50 female patients included who were referred to our radiology department GGH, kurnool for evaluation of breast lesions .patients were evaluated by x ray mammography and MR mammography. They were evaluated for detailed morphologic features according to BI-RADS lexicon in combination with dynamic kinetic signal intensity curves for characterization of lesion as benign or malignant.

In our study maximum incidence of benign breast lesions are in the age group of 31 – 40 years and malignant breast lesions are in the age group of 51- 60 years In our study 54% lesions are having well defined margins, 20% lesions are having ill defined margins, 26% lesions are having speculated margins . All malignant lesions (100%) are having spiculated margins (PPV 100%) .

In our study 16% lesions are round in shape which are benign in nature (NPV 100%) for malignancy , 20% lesions are oval in shape which are benign in nature (NPV 100%) for malignancy, 36% lesions are lobulated in shape, 28% lesions are irregular in shape. Most of the irregular shaped lesions are malignant in nature (86%).

In our study 43 lesions are showing enhancement in which 12% (5) lesions are showing homogenous enhancement pattern , 39%(17) are showing heterogenous enhancement pattern , 21% (9) are showing rim enhancement pattern, 28% (12) are showing non enhancing septae. All lesions with homogenous and non enhancing sepate are benign in nature . Most of the lesions with heterogenous enhancement 82%(14) are malignant. All lesions with non enhancing septae (PPV 100%) are benign in nature.

In our study kinetic curves has been done for all the enhancing lesions (43), in which 49% (21) lesions are showing Type I curve, 35% (15) are showing Type II curve , 16% (7) lesions are showing Type III curve. In Type I curve 95% are lesions are benign ,5% lesions are malignant, Type II curve 73% lesions are malignant, Type III curve 85 % lesions are malignant. These results were subjected to chi-square test which is showing significant association with p value 0.00001 and chi-square statistic is 23.5121 In our study focal breast lesions are diagnosed by DCE MRI breast based on morphological characteristics , enhancement patterns and kinetic curves are fibroadenoma 42% (21), phyllodes tumour 4% (2), fibrocystic disease 12% (6) , ductal ectasia 6% (3), malignant lesions 36%(18).

Histopathological confirmation is done in 50 patients . The proven lesions are fibroadenoma 38% (19), phyllodes tumour 2% (1), fibrocystic disease 18% (9) , ductal ectasia 6% (3), invasive ductal cell carcinoma 26% (13), infiltrating ductal cell carcinoma 10% (5). 6% (3) of the lesions are categorized as fibroadenomas in MRI breast are turned out to be fibrocystic disease. 4% (2) of lesions which are categorized as phyllodes tumour in MRI one of them have been turned out as fibroadenoma

### Summary

Our present study evaluated the comparison of x ray mammography with dynamic contrast MRI. The current study included 50 patients who has focal breast lesions were referred to the radiology department in a span of 2 years i.e., November 2019 to November 2021 which includes inpatients, outpatients and referral patients to the government general hospital, Kurnool medical college , Kurnool

The conclusions drawn from our study are

1. The maximum incidence of focal breast lesions are seen in 31- 40 years age group
2. Most of the lesions are benign (32) in out of 50 patients
3. Fibroadenomas are the most common type of lesions in our study patients
4. Invasive ductal cell carcinoma is the common malignancy in malignant lesions of our study population
5. All lesions with round and oval in shape are benign in nature in our study
6. All lesions with spiculated margins (PPV 100%) are malignant in our study
7. Most of the lesions (85%) with irregular margins are malignant in nature in our study
8. All lesions with nonenhancing septae are Fibroadenomas in our study (PPV 100%)
9. In 5 patients there is infiltration of underlying pectoralis muscle
10. In our study Type I curve 95% are lesions are benign ,5% lesions are malignant, Type II curve 73% lesions are malignant ,Type III curve 85 % lesions are malignant.
11. Addition of DCE MRI to x ray mammography helps in categorizing the BIRADS IV lesions to BIRADS V DCE MRI with kinetic curves assessment plays a major role in the characterization of variety of breast lesions which prevents the unnecessary biopsy

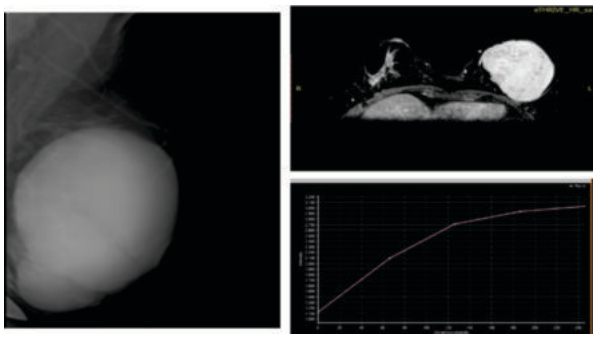

**Figure 1**: On Mammogram well defined oval soft tissue mass noted in left breast. On DCEMRI the mass is showing avid heterogenous enhancement and type I kinetic curve noted . On HPE it is diagnosed as phyllodes tumour

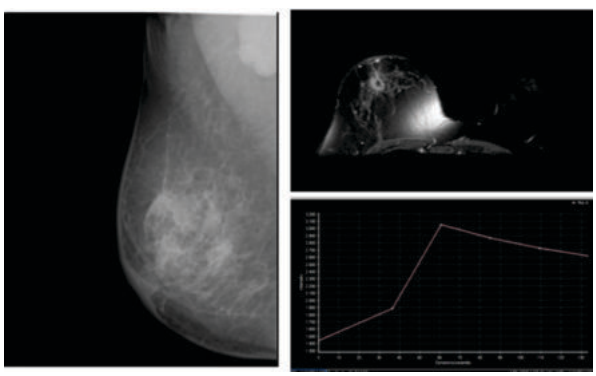

**Figure 2 :** On Mammogram there is spiculated mass noted in retromammary region of right breast and enlarged lymphnode in axillary region. On DCEMRI the mass is showing irregular rim enhancement and type III kinetic curve noted . On HPE it is diagnosed as Ductal cell carcinoma.

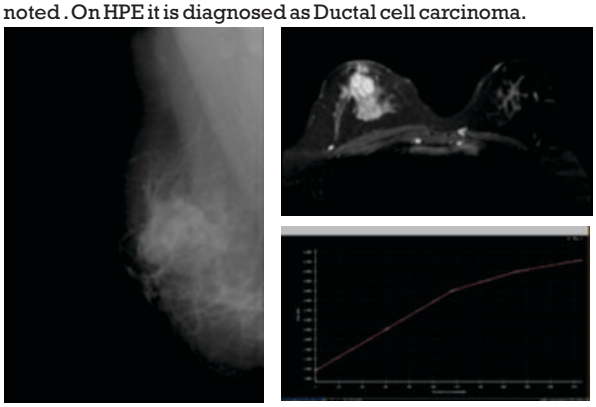

**Figure 3 :** On Mammogram there is well defined lobulated mass noted in retromammary region. On DCEMRI the mass is

showing homogenous enhancement with internal nonenhancing septae and type I kinetic curve noted. On HPE it is diagnosed as fibroadenoma.

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