

# Role of Imaging Techniques in Evaluating Mastalgia at a Tertiary Care Hospital

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**Abstract- BACKGROUND:** Breast pain may be cyclic or non-cyclic,focal or diffuse. Cyclic pain is thought to be due to hormonal changes, is usually bilateral and more in the upper and outer quadrants.Non-cyclic,focal pain is due to breast diseases,mostly benign. Role of imaging techniques like mammography and ultrasonography, in palpable breast lumps have been proven, however their role in cases of mastalgia alone is still a matter of research.

This study was to determine the value of breast imaging in patients with localised or diffuse pain in the breasts with no palpable abnormalities.

**MATERIALS AND METHODS:** This prospective, cross-sectional ,observational study was conducted in 96 patients suffering from mastalgia after informed consent. Females in the age group of 15-65 years suffering from mastalgia, in absence of pregnancy, palpable lump,nipple discharge,family history of carcinoma breast,hormonal pill use or history of breast implant, were included.After taking menstrual history and asking about type of pain, diffuse or focal,cyclic or non-cyclic and thorough breast examination, breast imaging was offered according to age. Those less than 40 years underwent sonomammogram while those above 40 years, mammography.Radiological appearances were classified on the basis of Breast Imaging Reporting And Data System(BIRADS).

**RESULTS:** 96 patients fulfilling the inclusion criteria underwent radiological imaging. Mean age was 31.9±5 years. Mastalgia was non cyclic in 33(34.3%) and cyclic in 63(65.6%), unilateral in 72(75%) and bilateral in 24(25%). 40 women were parous(41.6%) and 46 nulliparous(47.9%).Imaging findings were normal/negative in 64(66.6%), benign in 20(20.8%), probably benign in 7(7.29%), suspicious in 4(4.16%) and only 1(1.04%) female it was malignant. The p-value was 0.0403 in those with BIRADS 2 and 0.0438 in those with BIRADS 4. Both these findings are statistically significant (p<.05).

**CONCLUSION:** Breast imaging, either sonomammography or mammography, helps in evaluating females suffering from only mastalgia and a normal report helps in reassuring them. Usually no abnormalities are detected in the painful areas. Benign radiological findings do not have major consequence and prevalence of malignancy is very low. However biopsy should always be done in suspicious cases.

**Index Terms-** Mastalgia, Mammography,Sonomammography, BIRADS

## I. INTRODUCTION

Female breasts undergo physiological changes, beginning at puberty[1].After 30 years , the process of involution begins in most females, particularly the nulliparous ones. Fat content increases, so the female breast tissue becomes less dense. Glandular changes lead to fibrosis, microcyst formation and adenosis.

Of the various breast diseases, painful breasts or mastalgia have been reported since 1829[2].

Around 65% of the women in the age group of 30-50 years visit their doctor for mastodynia in western population[3]. Mastalgia, in the absence of any lump and in younger women is a rare symptom of breast cancer[4]. Unilateral, intense and constant breast pain is more likely to be due to cancer [5].Mastalgia or breast pain may be cyclic or non-cyclic, focal or diffuse. Quantifying breast pain is often difficult due to variability from person to person [6-7].

Cyclic pain is thought to be due to hormonal changes. It is obvious in the secretory phase, i.e. premenstrually and resolves after the onset of menstruation.15% of premenopausal women on combined oral contraceptive pills and 20% of postmenopausal women on hormonal replacement therapy experience similar pain. In such patients, pain is usually bilateral and more in the upper and outer quadrants[8].

Non-cyclic breast pain may be due to trauma, post-surgical, mastitis, duct ectasia, cyst or rarely breast cancer. Breast cancer causes pain in only 1.2-6.7% of cases[9]. Tietze syndrome, epigastric pain and angina pectoris may mimic mastalgia and should be ruled out.

There may be mechanical problems that may cause mastalgia like ill-fitting undergarments and big breasts.

Increasing awareness and fear of breast cancer often leads to gynaecological consultation. Mastalgia also affects the quality of life in many females[9]. Breast screening procedures i.e sonomammography and mammography is useful tools in detecting breast cancer early[10].

Ultrasonography of breast helps in ruling out any pathology and reassuring the patient[11]. Mammography is very

sensitive in detecting breast carcinoma[12]. However it is less useful in women less than 35 years due to dense breast tissue in younger women.

Though the role of imaging techniques in women with palpable breast lumps have long been established, the value of breast imaging is not well known in those with mastalgia only. In our set-up, many patients consult gynaecologists for any problem related to their breasts, and there is no study in our state to assess the efficacy of imaging techniques in mastalgia without any palpable abnormalities. With this thought in mind, this study was carried out, to assess the utility of breast imaging techniques in patients suffering from mastalgia alone and to allay the fear of breast cancer in them.

## II. AIMS AND OBJECTIVES

To assess the role of breast imaging techniques in women suffering from mastalgia alone, in whom there were no palpable abnormalities.

## III. MATERIALS AND METHODS

A prospective cross-sectional observational study was conducted in the Department of Obstetrics & Gynecology, IGIMS, Patna in collaboration with Department of Radiology, IGIMS, Patna between October 2016 to September 2017, after getting approval from Institutional Ethics Committee.

96 female patients suffering from mastalgia were enrolled after informed consent according to inclusion and exclusion criteria.

### *Inclusion Criteria*

Age 15-65 years  
Mastalgia

### *Exclusion criteria*

Pregnancy  
Palpable lump  
Nipple discharge  
Carcinoma breast  
H/o breast implant  
H/o OCPs or HRT

All consenting women, suffering from mastalgia, after taking menstrual history and asking about type of pain - nagging or stinging, diffuse or focal, cyclic or non-cyclic and thorough breast examination, were offered breast imaging.

Breast imaging was in the form of Mammography or Sonomammogram. Those less than 40 years underwent sonomammogram while those above 40 years underwent mammography. Ultrasonography was performed using Samsung USG machine with frequency of 8-13 Hz. The mammography machine used was Siemens NOVA3000. Radiological appearances were classified on the basis of Breast Imaging Reporting And Data System (BIRADS).

### *Breast Imaging and Reporting Data System (BIRADS) Categories:*

0. Assessment incomplete, Need additional imaging evaluation / review prior studies for comparison.
1. Negative/normal, continue routine screening.
2. Benign finding, continue routine screening.
3. Probably benign finding (<2% malignant), initial short interval follow up suggested.
4. Suspicious abnormality (2 – 95% malignant), biopsy should be considered.
5. Highly suspicious of malignancy (>95%), appropriate action should be taken, (Biopsy and treatment, as necessary).
6. Known biopsy-proven malignancy, treatment is pending, assure that treatment is completed.

Main outcome to be assessed was the presence of any abnormal radiological finding and its nature if any. Fine Needle Aspiration Cytology was done in those with BIRADS 3 and above. Statistical analysis was done for descriptive statistics like mean of age and numbers. Percentage along with p-value for normal and abnormal findings was calculated using regression statistics (ANOVA).

## IV. OBSERVATIONS

Of the 96 patients enrolled in the study, 70 underwent breast imaging, by ultrasonography and 26 by mammography, depending on their age. Figure I depicts distribution of patients according to their age. The mean age of the patients in the study was 31.9±5 years.

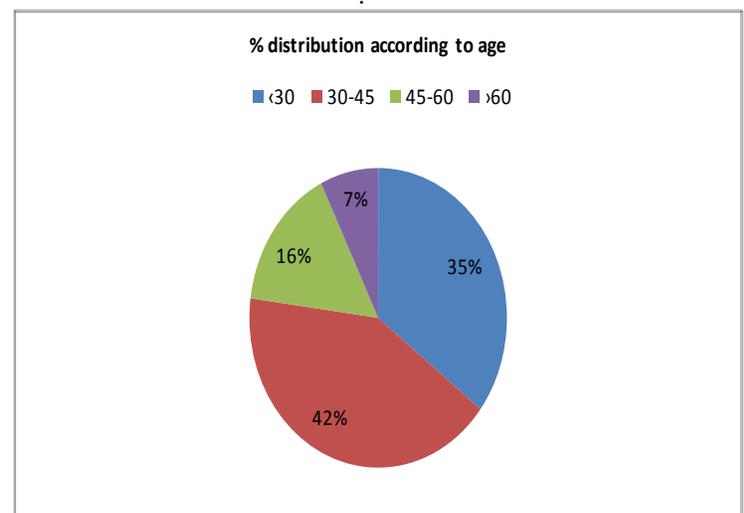


FIGURE 1

Table I shows that among 96 patients 33 had non cyclic mastalgia (34.3%) whereas in 63 it was cyclic (65.6%). 40 women were parous (41.6%) and 56 were nulliparous (58.4%). In 72 (75%) females, pain was unilateral, while 24(25%) were suffering from bilateral pain.

**TABLE I**

PARITY	CYCLIC MASTALGIA(63)	NON-CYCLIC MASTALGIA(33)
Nulliparous(56)	40	16
Parous(40)	23	17

Imaging findings were normal or negative in 64(66.6%), benign in 20(20.8%), probably benign in 7(7.2%), suspicious in 4(4.16%) and only in 1(1.04%) it was malignant (Fig-II). BIRADS 2 and 0.0438 in those with BIRADS 4. Both these findings are statistically significant (p<.05) (Table II & III).

Using regression statistics, p value were calculated according to BIRADS. The p-value was 0.0403 in those with

**TABLE II**

	<30 yrs	30-45 yrs	45-60 yrs	>60 yrs	P-VALUE
NORMAL	26(76.4%)	27(67.5%)	8(53.3%)	3(42.8%)	0.295
BENIGN	8(23.5%)	7(17.5%)	4(26.6%)	1(14.2%)	0.040*
PROBABLY BENIGN	0	4(10%)	2(13.3%)	1(14.2%)	0.876
SUSPICIOUS	0	2(5%)	1(6.6%)	1(14.2%)	0.043*
MALIGNANT	0	0	0	1(14.2%)	1

**TABLE III**

RADIOLOGICAL FINDING	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
BIRADS 1	-0.028634	0.203968	-1.403868	0.2954938	-0.116395	0.0591258
BIRADS2	3.733333	0.77316	4.828662	0.040313*	0.406690	7.059976
BIRADS3	0.22857	1.29929	0.175919	0.876557	-5.36183	5.818979
BIRADS4	2	0.433012	4.618802	0.043817*	0.136896	3.863103
BIRADS5	2.56395E-1	1.154700	2.22045E-1	1	-4.968275	4.96827

FNAC was performed in those with BIRADS 3 and above. One patient with heterogenous, ill defined hypoechoic lesion, who was 34 years old, had positive FNAC findings and was referred to general surgeon for further evaluation and carcinoma in situ was diagnosed on biopsy.

Of the 20 patients with benign findings, 8 had fibrocystic disease of breast, 5 had fibroadenoma and 3 had cysts. 2 each had lymphadenitis and ductal ectasia (FigIII).

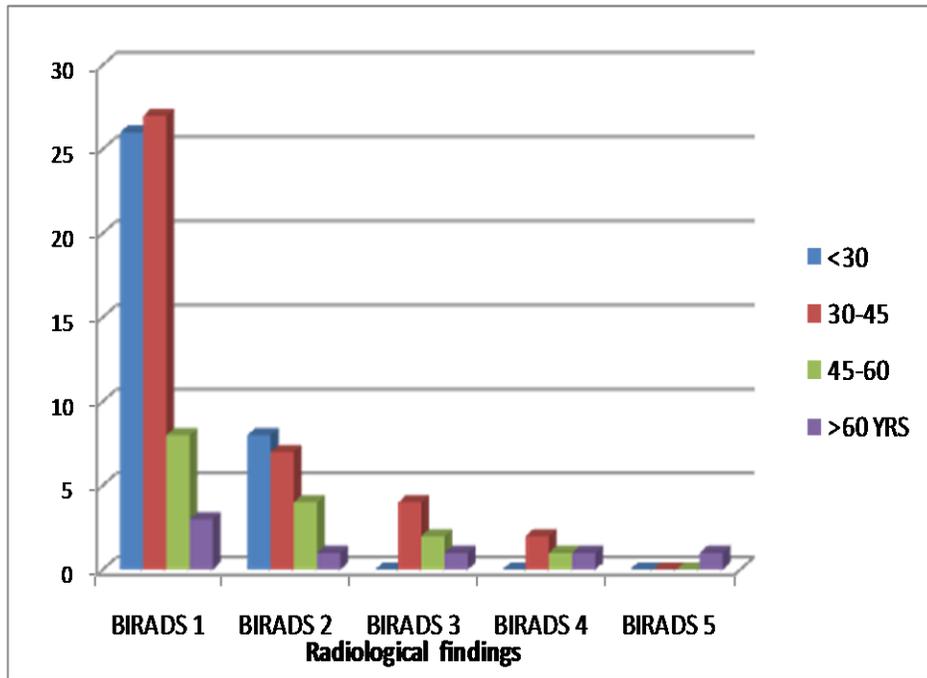


FIGURE 2.

### V. DISCUSSION

Mastalgia is a common symptom females often complain of. Gynaecological consultation is rising due to increasing awareness among the female population regarding cancer of the breast. As breast cancer is one of the commonest cancers among females, women suffering from pain in breasts seek early consultation. Fear of cancer leads to a lot of anxiety and depression. Though a thorough history and meticulous clinical examination most of the times point towards no cause or a benign lesion like fibroadenoma is detected, most of the females opt for breast imaging to feel more assured. Breast imaging recommendations are made according to their age, the presence or absence of a lump and the nature of breast pain. The combined value of mammography and sonography in focal breast pain without palpable breast lesion is 100%[13]. Triple test, which includes, physical examination, mammography and biopsy is commonly practiced in those with palpable lumps[14]. Those without palpable lumps, similar to our study, undergo

sonomammography if they are <40 years and mammography if they are >40 years. The present study is one of earliest in evaluating the role of various imaging techniques in females suffering from mastodynia without any palpable lump in our part of the country. This study proved to be statistically significant in patients with BIRADS 2 and BIRADS 4.

Most of the females in our population prefer to be examined by female doctors, hence compared to western countries; most females of mastalgia seek consultation from a female gynaecologist. With widespread availability of trained radiologists and good-quality imaging equipments, breast imaging procedures are commonly offered. Due to cost-effectiveness, they are often opted by the patients. The combined negative predictive value of mammography and sonomammography in focal or diffuse breast pain without a palpable mass is very high[15]. In this study, prevalence of breast cancer was 1.04%. Locker et al have reported a prevalence of breast cancer as 2.4%[15]. The frequency of breast cancer by Saba et al is 1.1%[16], which corresponds to our study.

Study	Normal	Benign	Probably benign	Suspicious	Malignant
Present study	66.6%	20.8%	7.04%	4.16%	2.08%
Nazneen et al	65.1%	24.5%	6.8%	2.2%	1.1%
Mebrahtu G et al	72.4%	25.7%	1.9%	-	-

Noureen S et al	38.1%	45%	15.5%	-	1.4%
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Mastalgia is less reported in Asian women[17]. Diffuse breast pain is less serious than focal breast pain[18]. The most important feature which was noticed in this study is that pain can be an early symptom of cancer of breast as opposed to previous thought that pain is the last symptom in any cancer. However, interpretation of such cases should be done very cautiously, without evoking fear amongst the patients.

In our study, 66.6% females complaining of mastodynia, had normal or negative radiological finding. Most of them were young, premenopausal women. 20.8% of them had benign lesions on imaging. The commonest benign finding was that of fibrocystic disease of breast found in 8 women i.e. 40%. Similar findings have been reported by Khanzada et al[19]. Fibrocystic diseases are more common in premenopausal women[20]. In our study too, 6 out of the 8 women (75%) suffering from fibrocystic disease of breast were <30 years of age.

Mammary duct ectasia clinically mimics invasive carcinoma[21]. In our study, 2 (10%) females had ductal ectasia. Benign cyst <3mm were found in 3 (15%). Fibroadenoma was detected in 5 women (25%). Two (10%) had lymphadenitis on imaging. Fine needle aspiration cytology was done in all these cases to confirm their benign nature.

The limitation of this study was selection bias, as those with family history of breast carcinoma, or palpable breast lump were not enrolled for this study. Also, sample size was small, so the results do not reflect the findings in the general population. Follow up was not done.

However the study was able to justify the usefulness of imaging techniques in mastalgia and allay the fear of breast cancer in young women. Role of biopsy in suspicious cases cannot be undermined and it should not be delayed so as to achieve early diagnosis of cancer and thereby improve the prognosis.

## VI. CONCLUSION

Breast cancer is a deadly disease which is responsible for increasing number of deaths among females. Mastalgia is a common symptom amongst females. Due to the increasing awareness and fear of breast cancer, early consultation is sought nowadays. Breast imaging, either by sonomammography or mammography, helps in evaluating females suffering from mastalgia and a normal report helps in reassuring the patient as well as the clinician.

Conflict of interest: None

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