EFFECT OF QUADRANT LOCATION IN BREAST LUMP PROGNOSIS IN THE INDIAN SETUP- A CYTOMORPHOLOGICAL STUDY

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Abstract

Background: The role of the quadrant location in the prediction of the breast lesion prognosis has been a matter of research for a long time with no definitive results being reported.

Aim: To assess the prevalence of breast lesions in different quadrants, to assess the role of various Quadrant locations in breast lump prognosis, and to evaluate the breast lump nature by cytomorphological analysis.

Methods: An assessment of the quadrant location was done followed by a detailed physical, radiographic, and clinical examination. In all study subjects, lymph nodes, axilla, and bilateral nipple examination were done. FNAC was done for cytomorphologic examination following staining.

Results: Both fibroadenoma and IDCC were most common in lateral upper quadrant with 58.62% (n=34) and 70% (n=14) subjects. In 30% (n=6) subjects, IDCC was seen in medial upper quadrant. Fibroadenoma was seen in 10.34% (n=6) subjects in lateral lower quadrant, in 13.79% (n=8) subjects in medial upper quadrant, in 10.34% (n=6) subjects in central, and in 6.89% (n=4) subjects in medial lower quadrant.

Conclusion: Fibroadenoma and invasive ductal cell carcinoma are the most common benign and malignant lesions with the most common occurrence in the lateral outer quadrant and a better prognosis was seen in the upper lateral quadrant.

Key Words: Breast Lump, cytomorphological study, Fibroadenoma, Invasive duct cell carcinoma, Prognosis, quadrant location.

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INTRODUCTION

The breast being the glandular organ is largely influenced by the female hormones and is involved in different lumps and lesions in the breast. The lesions have a wide range and affect various age groups. These lesions can be inflammatory, benign, or malignant. The most common symptom of the breast lesion is lump presence and pain. The most common cancer reported in females globally is breast cancer with increasing incidence worldwide including in India.[1]

Nearly 100,000 cases of new breast cancer are being diagnosed every year in India alone. Earlier, it was considered that breast cancer only affects the well affluent females in India. However, recently, this thought has changed with the increased incidence of breast cancer in the rural population. Considering the data of the Indian Council of Medical Research-Population Based Cancer Registry of India (ICMR-PBCR), breast cancer incidence is nearly 30% in females residing in the Urban areas of the country.[2]

Reported breast cancer in Indian females is usually diagnosed in advanced stages in 50-70% of affected subjects. When breast cancer is not treated, in less than 20% of the females, a 5-year survival rate is reported by various studies. Hence, early diagnosis, screening, and detection are of prime importance for reducing mortality and morbidity in breast cancer subjects. The present study also focused on the quadrant location in breast cancer subjects on the breast lesion prognosis which is being assessed for various years. In malignant lesions, quadrant location is been considered vital in the coding guidelines of SEER (Surveillance Epidemio- logy End Results).[3]

Despite being researched for a long time, the tumor location significance in breast lesions is still unclear. For each quadrant location, lymphatic drainage is different. Hence, the differentiation of low-risk lesions from high-risk lesions can be misclassified based on the axillary node absence positivity. The range of calculated risk for the transformation of benign lesions to malignant is nearly 3% to 17%.[4] The present study focused on the risk range by additionally considering the location of the breast lesion by using FNAC (fine needle aspiration cytology) as a tool for diagnosis.

MATERIALS AND METHODS

The present cytomorphologic study was done to assess the prevalence of breast lesions in different quadrants, to assess the role of various Quadrant locations in breast lump prognosis, and to evaluate the breast lump nature by cytomorphological analysis. The study was done Department of General Surgery, Rama Medical College Hospital And Research Centre, Kanpur, Uttar Pradesh. The study population was comprised of the subjects of the Department of Obstetrics and Gynecology of the Institute.

The inclusion criteria for the study were subjects with the complaint of a breast lesion, or breast lump (Figure 1), and the subjects who were willing to participate in the study. The exclusion criteria for the study were subjects with secondaries in the breast, history of prior best lesion, history of previous treatment in the breast, and subjects who were not in the condition to give consent. After explaining the detailed study design, informed consent was taken from all the subjects in both written and verbal form.

The study included 146 females that were assessed for physical examination, radiographic imaging, and detailed clinical history was taken followed by assessing the quadrant location by vertical and horizontal measurement of the breast lesion (Figure 2 and 3) and bilateral examination of lymph nodes, axilla, and nipple. Using a 22-gauge needle, FNAC was done for all the lesions of the breast. Giemsa and hematoxylin and eosin staining were done followed by an assessment.

The collected data were subjected to statistical evaluation using SPSS version 20, Chicago Inc., USA. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$. The tests used were Chi-square, student t-test, and ANOVA.

RESULTS

The present cytomorphologic study was done to assess the prevalence of breast lesions in different quadrants, to assess the role of various Quadrant locations in breast lump prognosis, and to evaluate the breast lump nature by cytomorphological analysis. The study included 146 subjects from both genders. The demographic characteristics of the study subjects are listed in Table 1. The mean age of the study subjects was 38.4±6.28 years. Majority of the study subjects were in the age of 21-30 years with 32.87% (n=48) subjects followed by 19.17% (n=28) subjects in 31-40 years, 16.43% (n=24) subjects in <20 years, and 15.06% (n=22) subjects in 41-50 years. Majority of the lesions were in lateral upper quadrant with 46.57% (n=68) subjects followed by medial upper with 26.02% (n=38) subjects, 12.32% (n=18) in central region, 10.95% (n=16) in lateral lower, and 4.10% (n=6) in medial lower quadrant (Table 1).

On assessing the lesion distribution in the study subjects, among malignant lesions, the most common was Invasive duct cell carcinoma seen in

13.69% (n=20) study subjects followed by lobar carcinoma in 2.73% (n=4) subjects, medullary and metastatic carcinoma was seen in 1.36% (n=2) subjects each. Among benign lesions, most common lesion was fibroadenoma in 39.72% (n=58) subjects followed by gynecomastia in 12.32% (n=18) subjects, fibrocystic disease in 9.58% (n=14) subjects, and proliferative breast disease (PBD) with atypia in 5.47% (n=8) study subjects. In the non-neoplastic lesions, the most common lesion was chronic non-specific lesions in 4.10% (n=6) of study subjects followed by lipoma and granulomatous lesions in 1.36% (n=2) subjects each as shown in Table 2.

Fibroadenoma and invasive duct cell carcinoma were the most benign and malignant lesions in the study subjects. On assessing their quadrant-wise distribution, both fibroadenoma and IDCC were most common in the lateral upper quadrant with 58.62% (n=34) and 70% (n=14) subjects. In 30% (n=6) of subjects, IDCC was seen in the medial upper quadrant. Fibroadenoma has been seen in 10.34% (n=6) subjects in the lateral lower quadrant, in 13.79% (n=8) subjects in the medial upper quadrant, in 10.34% (n=6) subjects in the central, and in 6.89% (n=4) subjects in the medial lower quadrant as depicted in Table 3.

On assessing the histologic grading, staging, and coding of the FNAC samples in the study subjects, for Nottingham histologic scores of 3-5, BR grade was low, nuclear grade was 1/3,1/2, it was well-differentiated, the histologic grade was 1/3, I/III, I and SEER code was 1. For Nottingham's histologic scores of 6,7, the BR grade was intermediate, the nuclear grade was 2/3, it was moderately differentiated, the histologic grade was 2/3, and the SEER code was 2. In Nottingham histologic scores of 8,9, the BR grade was high, the nuclear grade was 2/3,3/3 was poorly differentiated, and the histologic grade was 3/3, III/III, III, and SEER code was 3. Also, for the score of 8,9, BR grade was high with a nuclear grade of 4/4, and the lesion was undifferentiated or aplastic with histologic grade of 4/4, IV/IV, IV, and SEER code of 4 as shown in Table 4.

Characteristics	Percentage (%)	Number (n)
Mean age (years)	38.4±6.28	
Age range (years)		
<20	16.43	24
21-30	32.87	48
31-40	19.17	28
41-50	15.06	22
51-60	5.47	8
61-70	5.47	8
71-80	1.36	2
>80	4.10	6
Lesion location (quadrant)		
Lateral upper	46.57	68
Lateral lower	10.95	16
Medial upper	26.02	38
Medial lower	4.10	6
Central	12.32	18

Table 1: Demographic characteristics of the study subjects

Lesion distribution	Subgroup	Percentage (%)	Number (n)
Malignant	Metaplastic carcinoma	1.36	2
	Medullary carcinoma	1.36	2
	Lobar carcinoma	2.73	4
	Invasive duct cell carcinoma	13.69	20
Benign	Atypical ductal hyperplasia	1.36	2
	Adenosis	2.73	4
	Phyllodes	2.73	4
	PBD with atypia	5.47	8
	Fibrocystic disease	9.58	14
	Gynecomastia	12.32	18
	Fibroadenoma	39.72	58
Non-neoplastic	Lipoma	1.36	2
	Granulomatous	1.36	2
	Chronic non-specific	4.10	6

Table 2: Lesion distribution in the study subjects

Quadrant	Fibroadenoma		Invasive duct cell carcinoma (IDCC)	
	%	**n=58**	**%**	**n=20**
Lateral upper	58.62	34	70	14
Lateral lower	10.34	6	0	0
Medial upper	13.79	8	30	6
Medial lower	6.89	4	0	0
Central	10.34	6	0	0

Table 3: Distribution of most common benign and malignant Lesion in different quadrants

Nottingham histologic scores	BR grade	Nuclear grade	Term	Histologic grade	SEER code
3-5	Low	1/3,1/2	Well-differentiated	1/3, I/III, I	1
6,7	Intermediate	2/3	Moderately differentiated	2/3, II/III, II	2
8,9	High	2/2, 3/3	Poorly differentiated	3/3, III/III, III	3
		4/4	Aplastic/ undifferentiated	4/4, IV/IV, IV	4

Table 4: Histologic staging and grading in a different quadrant

Fig 1: Rt breast with lump Lt Breast without lump

Fig 2: Vertical Measurement Fig 3: Horizontal Measurement

DISCUSSION

The present cytomorphologic study was done to assess the prevalence of breast lesions in different quadrants, to assess the role of various Quadrant locations in breast lump prognosis, and to evaluate the breast lump nature by cytomorphological analysis. The study included 146 subjects from both genders. The demographic characteristics of the study subjects are listed in Table 1. The mean age of the study subjects was 38.4±6.28 years. Majority of the study subjects were in the age of 21-30 years with 32.87% (n=48) subjects followed by 19.17% (n=28) subjects in 31-40 years, 16.43% (n=24) subjects in <20 years, and 15.06% (n=22) subjects in 41-50 years. Majority of the lesions were in lateral upper quadrant with 46.57% (n=68) subjects followed by medial upper with 26.02% (n=38) subjects, 12.32% (n=18) in central region, 10.95% (n=16) in lateral lower, and 4.10% (n=6) in medial lower quadrant. These demographic and disease characteristics of the study subjects were comparable to the studies of Darbre PD et al[5] 2005 and Sohn VY et al[6] in 2008 where authors assessed subjects with similar demographic and disease characteristics.

For the assessment of the lesion distribution in the study subjects, among malignant lesions, the most common was Invasive duct cell carcinoma seen in 13.69% (n=20) study subjects followed by lobar carcinoma in 2.73% (n=4) subjects, medullary and metastatic carcinoma was seen in 1.36% (n=2) subjects each. Among benign lesions, most common lesion was fibroadenoma in 39.72% (n=58) subjects followed by gynecomastia in 12.32% (n=18) subjects, fibrocystic disease in 9.58% (n=14) subjects, and proliferative breast disease (PBD) with atypia in 5.47% (n=8) study subjects. In the non-neoplastic lesions, the most common lesion was chronic non-specific lesions in 4.10% (n=6) of study subjects followed by lipoma and granulomatous lesions in 1.36% (n=2) subjects each. These results were consistent with the studies of Wu S et al[7] in 2014 and Selvakumaran S et al[8] in 2017 where authors reported similar lesion distribution in their subjects as in the present study. Fibroadenoma and invasive duct cell carcinoma were the most benign and malignant lesions in the

study subjects. On assessing their quadrant-wise distribution, both fibroadenoma and IDCC were most common in the lateral upper quadrant with 58.62% (n=34) and 70% (n=14) subjects. In 30% (n=6) of subjects, IDCC was seen in the medial upper quadrant. Fibroadenoma was seen in 10.34% (n=6) subjects in lateral lower quadrant, in 13.79% (n=8) subjects in medial upper quadrant, in 10.34% (n=6) subjects in central, and in 6.89% (n=4) subjects in medial lower quadrant. These results were in agreement with the studies of Singh SK et al[9] in 2016 and Goyal V et al[10] in 2005 were the most commonly involved quadrant was the lateral upper quadrant reported by the authors.

For evaluation of histologic grading, staging, and coding of the FNAC samples in the study subjects, for Nottingham histologic scores of 3-5, BR grade was low, the nuclear grade was 1/3,1/2, it was well-differentiated, the histologic grade was 1/3, I/III, I and SEER code was 1. For Nottingham's histologic scores of 6,7, the BR grade was intermediate, the nuclear grade was 2/3, it was moderately differentiated, the histologic grade was 2/3, and the SEER code was 2. In Nottingham histologic scores of 8,9, the BR grade was high, the nuclear grade was 2/3,3/3 was poorly differentiated, and the histologic grade was 3/3, III/III, III, and SEER code was 3. Also, for the score of 8,9, the BR grade was high with a nuclear grade of 4/4, and the lesion was undifferentiated or aplastic with a histologic grade of 4/4, IV/IV, IV, and SEER code of 4. These results were similar to the results of Chandawale S et al[11] in 2013 and Prakash HM et al[12] in 2011 where authors reported similar histologic findings in their studies as in the present study.

CONCLUSION

The present study concludes that Fibroadenoma and invasive ductal cell carcinoma are the most common benign and malignant lesions with the most common occurrence in the lateral outer quadrant and a better prognosis was seen in the upper lateral quadrant. However, the present study had a few limitations including small sample size, short monitoring time, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

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