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Research Article

Incidence and Histopathological Spectrum of Breast Malignancies in Women Aged Below and Above 40 Years: A Tertiary Care Hospital–Based Study

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Abstract

Introduction: *Breast cancer is one of the most common cancers affecting women comprising 22 % and 30 % of all female cancers in the world and in India respectively. Approximately 7 % of women diagnosed with breast cancer are below the age of 40 years.*

Aim: *To find the incidence of various breast malignancies in women less than 40 yrs as well as more than 40 yrs of age and to categorise these lesions histologically based on specific types, grade, stage and presence/absence of intraductal/intralobular component.*

Materials and methods: *Retrospective study of 240 histologically diagnosed cases of malignant breast tumours in the Dept of Pathology, Civil Hospital (BJ Medical College), Ahmedabad from Jan 2010 to Dec 2012. Formalin fixative was used and the slides were stained with Hematoxylin and eosin.*

Results: *Out of the total 240 cases of malignant breast lesions, 170 cases occurred in women above 40 yrs whereas 70 cases occurred in women less than 40 yrs of age. Invasive ductal carcinoma- Not otherwise specified (NOS) was the commonest malignancy with a total of 218 cases (90%); 63 cases(26.3%) occurring in women under 40 yrs. 32 cases showing in situ component were present. Most of the tumours were of BR grade – III and TNM Stage IIIA.*

Conclusion: *In the present study, Carcinoma of breast in young patients is typically Invasive ductal carcinoma (NOS) but with higher tumour grade. Breast cancers in young women have more aggressive features, tend to be diagnosed at a later age and have inferior outcomes3. Prognostic factors like grade and tumour stage play a crucial role in determining patient's survival.*

Keywords: *Breast cancer, Invasive ductal carcinoma, BR grade, TNM stage.*

Introduction

Breast cancer begins in breast tissue, which is made up of glands for milk production, called lobules, and the ducts that connect the lobules to the nipple. Remainder of the breast is made up of fatty, connective and lymphatic tissue[7].

Most common malignancy worldwide and in India is Invasive ductal carcinoma – not otherwise specified. Majority of in situ carcinomas are DCIS – about 85 % ; LCIS being less common than DCIS with about 10% , rest have characteristics of both DCIS and LCIS or have unspecified origins[4].

The seriousness of invasive breast is strongly influenced by the stage of the disease. Two commonly used staging systems available are – TNM classification[8] (Tumour size, Nodal status, Metastasis) and SEER summary stage system[4] (Surveillance, Epidemiology and End results). TNM staging is commonly followed in clinical settings.

The tumours are graded by Modified Bloom Richardson grading system [9,10]. In this the tubule formation, nuclear pleomorphism and mitotic activity are taken into account and each given is a score of 1 to 3 giving a total upto 9 and graded accordingly as Grade I, II or III.

Many of the known breast cancer risk factors such as age, family history, early menarche and late menopause are not modifiable. However other factors associated with increased breast cancer risk, including post menopausal obesity, use of hormonal estrogen and physical inactivity are modifiable[4].

Breast cancer risk factors, clinical outcomes, and tumour biology are somewhat different in the subgroup of women below 40 years suggesting that the breast cancer in young women represent a distinct entity[17-19]. Younger women have a lower rate of ductal carcinoma in situ, likely due to detection bias (women in this age range do not typically have screening mammograms)[17]. Tumours also tend to be of a higher histological grade in young women and more likely to have local recurrences, to be diagnosed at a more advanced stage and to have an inferior 5 year survival compared to their older premenopausal counterparts[17-19].

Most reports on risks of young age breast cancer come from western countries with small proportion of young patients[21-23]. Some of these studies suggest that the negative prognostic influence of young age is thought to be related to the less favourable tumour characteristics as presented by young women[20].

Materials and Methods

This was a retrospective study to find the incidence of various breast malignancies below and above 40 years of age and to categorise the various lesions histologically based on type, grade, stage and presence/absence of in situ component. A total of 240 histologically diagnosed cases of breast malignancies in the Dept. of Pathology, civil hospital, Ahmedabad were considered for the study. Time period was from January 2010 to December 2012 spanning 2 years.

Fixative used was 10 % buffered neutral formalin. Paraffin embedded blocks were used and the slides were stained with hematoxylin and eosin stain.

Modified Bloom Richardson's grading and TNM classification staging (5th edition of American Joint Committee on Cancer classification) were used for categorising the tumour characteristics.

Results

A total of 240 cases of histologically diagnosed breast malignancies in the study period were considered for analysis. The patients were categorised as those below 40 yrs and those above 40 yrs and the various characteristics evaluated. The following results were obtained:-

Total cases - 240

AGE GROUP	< 40 yrs	%	>40 yrs	%
CASES	70	***29.2 %***	170	70.8 %

70 cases (29.2%) occurred in patients below 40 yrs as compared to 170 cases(70.8%) above 40 yrs of age.

Histological diagnosis of various breast malignancies:

DIAGNOSIS	<40 yrs	%	>40 yrs	%	TOTAL	%
Invasive Ductal Carcinoma	***63***	***26.3 %***	***156***	***65 %***	***219***	***91.3 %***
Medullary Carcinoma	2	0.8 %	5	2.1 %	7	2.9 %
Invasive Lobular carcinoma	1	0.4 %	3	1.3 %	4	1.7 %
Malignant Phylloides	3	1.3 %	1	0.4 %	4	1.7 %
Stromal sarcoma	1	0.4 %	2	0.8 %	3	1.2 %
Colloid carcinoma			2	0.8 %	2	0.8 %
Matrix producing Carcinoma			1	0.4 %	1	0.4 %
TOTAL	70	29.2 %	170	70.8 %	240	100 %

The commonest malignancy was Invasive ductal carcinoma - Not otherwise specified(NOS) in both <40 yrs(26.3 %) as well as in >40 yrs(65%). Second commonest was medullary carcinoma in women >40 yrs but malignant phylloides in case of women < 40 yrs of age. Invasive lobular carcinoma constituted about 1.7 % of total cases, most of them occurring in women >40 yrs of age. There were also 2 cases of colloid/mucinous carcinoma and 1 case of matrix producing carcinoma in women >40 yrs.

Out of the 3 stromal sarcomas, 2 were primary stromal sarcoma and 1 was periductal stromal sarcoma respectively.

Differentiation characteristics of Invasive Ductal Carcinomas-NOS tumours:-

Differentiation	<40 yrs	>40 yrs	TOTAL CASES
Well differentiated	4	9	13
Moderately differentiated	27	57	84
Poorly differentiated	***32***	***90***	***122***
TOTAL	63	156	219

Most of the Invasive ductal carcinomas were poorly differentiated both in women <40 yrs(14.6%) and above >40 yrs(41.1%) followed by moderately differentiated(38.4%) and well differentiated tumours(5.9%).

Modified Bloom Richardson's grading of tumours:-

Mod. BR grade	<40 yrs	>40 yrs	TOTAL
I	4	10	14
II	29	55	85
III	33	101	134
TOTAL	66	166	232

Most of the breast malignancies belonged to modified BR grade III in both <40 yrs women (14.2%) and >40 yrs women (43.5%). Women < 40 yrs also showed a higher incidence of Modified BR grade II constituting 12.5% of the total cases.No grading was done in 8 cases since they were either stromal sarcomas or malignant phylloides.

Tumour characteristics (TNM criteria):-

Women < 40 yrs of age

Tumour size/ nodal status	N_0	N_1	N_2	N_3	TOTAL
T_1	3	1	NIL	NIL	4
T_2	7	13	19	2	***41***
T_3	3	6	8	4	21
T_4	NIL	NIL	NIL	NIL	NIL
TOTAL	13	20	***27***	6	66

In women < 40 yrs of age, most tumours belonged to T2 and N2 with size ranging from 2cm to 5 cm and more than 4 lymph nodes involved respectively.

Women > 40 yrs of age

Tumour size/ nodal status	**N_0**	**N_1**	**N_2**	**N_3**	**TOTAL**
T_1	8	5	2	1	16
T_2	49	31	33	8	***121***
T_3	5	5	7	6	23
T_4	1	1	3	1	6
TOTAL	***63***	42	45	16	166

In women > 40 yrs, most tumours belonged to T2 with size ranging from 2 cm to 5 cm, but N0 with no evidence of nodal metastasis. There were also 6 cases of T4(chest wall/skin involvement – Paget's disease)encountered in women > 40 yrs of age.

Staging of tumours:-

STAGE	**< 40 YRS**	**>40 YRS**	**TOTAL**	**%**
I	3	8	11	4.7 %
II A	9	***54***	63	27.2 %
II B	17	38	55	23.7 %
III A	***26***	42	68	***29.3 %***
III B	8	14	22	9.5 %
III C	3	10	13	5.6 %
IV	NIL	NIL	NIL	NIL
TOTAL	66	166	232	100 %

Overall, Stage III A tumours were common (29.3 %) and also in women < 40 yrs (11.2%). However in women >40 yrs, Stage II A tumours were common(23.3%).

IN SITU component:-

Associated In situ component (DCIS) were present in 32 cases and their corresponding subtypes are given below:-

DCIS type	<40 yrs	>40 yrs	TOTAL
COMEDO	5	12	17
SOLID	3	2	5
CRIBRIFORM	1	1	2
TOTAL	9	15	24

COMBINATION TYPES

DCIS type	<40 yrs	>40 yrs	TOTAL
COMEDO & CLINGING	1	2	3
SOLID & COMEDO	2	0	2
CRIBRIFORM & MICROPAPILLARY	0	1	1
COMEDO & MICROPAPILLARY	0	1	1
SOLID & CRIBRIFORM	0	1	1
TOTAL	3	5	8

The predominant DCIS type in both the age groups was Comedo type (68.8%) followed by solid and cribriform types. There were 8 cases in which more than one type of DCIS occurred; comedo and clinging type was the commonest followed by solid and comedo.

There was one case in which solid type of DCIS was associated with lobular cancerization.

Paget's disease:-

There were 6 cases in which Paget's disease was present which were associated with comedo and solid type of DCIS,

2 cases in women < 40 yrs

4 cases in women > 40yrs

Neuroendocrine differentiation:-

There were 9 cases which showed evidence of neuroendocrine differentiation, 2 cases in women <40yrs and 7 cases in women > 40 yrs.

Discussion

The incidence of breast cancer is rising in India and is now the second most commonly cancer diagnosed in women after cervical cancer. There is no worldwide consensus on age boundaries for the definition of "young" age breast cancer. In the literature, the cut-off point of young age varies and has been set at age 30,35, 40 and 45. As a consequence, variation in disease management may occur in patients of similar age[20].

In the present study, breast malignancies in women < 40 yrs of age accounted for 29.2 % of the total cases. In one of the studies by Anders CK et al[5], incidence of breast cancer in women < 40 yrs was found to be 7 %. Other studies from western countries[18,26] also showed the incidence of breast malignancies in women < 40 yrs to be less than 10 %. Thus the incidence of breast malignancies in young women is higher by about three times in the present study.

Incidence of breast malignancies in women <35 yrs in the present study was 10 % (24 cases). This was comparable to a study by Kounteya Sinha et al[2] from AIIMS who found the incidence to be 8 %. In the present study, 46 cases (19.2%) occurred in women between 36 – 40 yrs of age indicating a high risk transition group.

Invasive ductal carcinoma - not otherwise specified (NOS) was the commonest malignancy in both younger women and in women >40yrs of age constituting 26.3 % and 65 % respectively (Total - 91.3 %). This was comparable to studies by Jimor S et al1 and Grethe Albrektsen[27] et al who found similar results. Medullary/Mucinous carcinomas, Invasive lobular carcinomas, Stromal sarcomas, Malignant phylloides tumour also occurred in differing frequencies in the present study which was comparable to a study by Ferranti C et al[28].

Most of the tumours in the present study were poorly differentiated (<40 yrs – 14.6 % ; >40yrs – 41.1%). This is because younger women do not typically undergo breast cancer screening and tend to present at a later stage which may be attributable to high risk factors like hormone receptor negativity (ER/PR negativity) and occurrence of genetic factors like BRCA 1/2 . This is comparable to a study by Gadjos et al(2000)[29].

Most of the breast malignancies in younger women in the present study belonged to Modified BR grading of Grade III (14.2%). Grade III was also the commonest in women >40 yrs (43.5 %). This was comparable to a study by Jimor S et al1 who showed similar results.

In women <40 yrs, most tumours were of size 2 to 5 cm (T2) – 62.1 % with involvement of more than 4 lymph nodes (41 %) – N2. Also Stage III A(11.2%) was common in this age group as compared to >40 yrs in whom Stage II A(23.3%) was common. This is because of the occurrence of highly aggressive tumours in younger women associated with poor survival.

In the present study, Comedo DCIS was the commonest in <40 yrs as well as >40 yrs followed by solid and cribriform types. Similar results were obtained by Muhammad Kamil Sheikh et al[30].

Lymphovascular invasion was seen in about 48.8 % of the cases (60% of women <40 yrs) which may have an impact on poorer prognosis of the younger patients. 6 cases of Paget's disease of nipple associated with DCIS and Invasive ductal carcinoma- NOS were noted.

Out of the 70 cases of breast malignancies in younger women, 10 patients had a positive family history of occurrence of breast tumours either in parent or first degree relative.

The histological characteristics of the tumours in our series of young patients showed features of biological aggressiveness as corroborated by TNM staging, grade, and lymphovascular invasion and therefore might be expected to result in poorer survival of the young patients in our study.

The relatively higher incidence of breast malignancies in women below 40 years observed in this study compared to Western literature suggests demographic, genetic, and environmental differences in the Indian population. Younger women in this cohort frequently presented with larger tumour size, higher histological grade, and greater lymph node involvement, all of which are known adverse prognostic factors.

The predominance of invasive ductal carcinoma (NOS) across both age groups reinforces its status as the most common histological subtype of breast cancer. However, the higher proportion of poorly differentiated tumours and Modified Bloom–Richardson Grade III lesions in younger women reflects more aggressive tumour biology, possibly linked to hormonal receptor negativity and genetic predisposition such as BRCA mutations.

The frequent association of lymphovascular invasion and advanced TNM stage in younger patients further explains their poorer prognosis. These findings stress the importance of integrating histopathological parameters with clinical staging to guide personalized management strategies.

The presence of associated DCIS, particularly comedo type, in a significant number of cases suggests a possible window for early detection if appropriate screening measures are implemented. The occurrence of Paget's disease and neuroendocrine differentiation, though less common, further highlights the morphological heterogeneity of breast malignancies encountered in routine practice.

Clinical Applications and Implications of the Study

The findings of the present study have important clinical, pathological, and public health implications. The higher proportion of breast malignancies occurring in women below 40 years of age, along with their presentation at higher tumour grade and advanced TNM stage, suggests that breast cancer in younger women represents a biologically aggressive subset requiring heightened clinical vigilance.

Histopathological parameters such as tumour grade, lymph node involvement, lymphovascular invasion, and presence of associated ductal carcinoma in situ (DCIS) are critical prognostic indicators and should be routinely emphasized in pathology reporting, as they directly influence treatment decisions and patient management.

The predominance of Stage III disease in younger women highlights limitations in current screening practices and underscores the need for increased breast awareness, clinical breast examination, and risk-based screening strategies in high-risk younger women.

From a public health perspective, these findings emphasize the need for age-specific breast cancer awareness programs and early diagnostic interventions to improve survival outcomes.

Conclusion

Breast carcinoma in women below 40 years of age is predominantly invasive ductal carcinoma (NOS) with higher tumour grade, advanced stage at diagnosis, and aggressive histological features. These characteristics contribute to poorer prognosis in younger patients. Radiographic diagnosis in this population is challenging because of increased breast density[3].

Histopathological factors such as tumour grade, TNM stage, lymphovascular invasion, and associated DCIS play a crucial role in determining patient outcome and should be meticulously evaluated. Early detection and targeted screening strategies are essential to reduce morbidity and mortality associated with breast cancer in young women.

However tumour characteristics are the only relevant factors when deciding on disease management and treatment intensity.

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