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Original Research Article

A RETROSPECTIVE STUDY ON CURRENT TRENDS IN INCIDENCE AND PROGNOSIS OF BREAST CANCER AT A TERTIARY CARE CENTRE, NELLORE, SOUTH INDIA

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Abstract

Background: Breast cancer is the most commonly diagnosed cancer among the women in India and the entire world. As per recent studies there is a significant rise in the breast cancer mortality in India. The prognosis of breast cancer depends on the stage of presentation. The aim of the study is to know the incidence, histological type and stage of presentation of breast cancer in our area. **Materials and Methods:** A total 158 cases of breast cancer were analysed retrospectively for a period of one year from January 2022 to December 2022 in a tertiary care centre, Nellore, South India. **Result:** Out of 158 cases the most common histologic variant is infiltrating duct cell carcinoma, seen in 81.53 % of cases. Most of the patients (87.34 %) were stage II at the time of presentation. 39.24 % were categorised as group III, with a predicted moderate long-term survival as per the NPI score. **Conclusion:** Breast cancer related mortality is increasing in India as the most of the cases are presenting late with high tumour grades. Conducting screening programmes and creating self-awareness may help in prompt cancer diagnosis and treatment thereby reducing the breast cancer related mortality among women.

INTRODUCTION

Breast is the most common site of malignancy in women world wide followed by colorectal and lung cancers. As per the Globocan data, 2.3 million new cases of female breast cancer were diagnosed in 2020 globally.[1] Globocan (2020) reveals the incidence of breast cancer is 13.5% of all cancer cases and 10.6% of all cancer related deaths in India.[2]

The current study was done:1)To know the burden of breast cancer in our region.2) To study the patterns of histopathological diagnosis of breast carcinoma occurring in recent times and 3)To predict the survival outcome based on prognostic factors using NPI. And also,to compare the trends observed in similar studies in other geographical areas of India.

The aim of our study is to know the incidence and predict the prognosis of breast cancer in patients attendinga tertiary care centre, Nellore, Andhra Pradesh, India. The data can be utilised in strengthening programmes for cancer awareness, screening and provide support to the women with risk factorsto reduce the cancer burden in India.

MATERIALS AND METHODS

A hospital based retrospective study on breast cancer was conducted in a tertiary carehospital, Nellore, Andhra Pradesh, Southern India, for a period of one year from January 2022 to December 2022. Institutional approval was taken. The data was analysed from the hospital medical records. All the details like name, age, sex, cancer diagnosis, morphological site, histological type, grade and stage of presentation according to Tumour, Node, Metastasis (TNM) classification are recorded. Tumour staging was reported using the TNM system adopted by UICC and the American Joint Committee on Cancer (AJCC). Tumour grading was done using the Nottingham modification of the Bloom-

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Richardson grading system. Nottingham prognostic index (NPI) score was applied to categorise the patients into four prognostic groups for the prediction of possible outcome.
All the observations were noted, tabulated and depicted graphically.

RESULTS

The current study is aoneyearretrospective study of breast cancers in a tertiary care centre, Nellore, AP, South India.A total of 158 breast cancers were diagnosed during thisperiod of time.

Age and sex: 0f the 158 cases of breast cancer studied, most of the patients are between 31years to 86 years of age. Peak incidence (28.48%) was seen in between 51 to 60 years of age followed by 24.68% in 41 to 51 age group and 21.56 % in the age group 61 to 70.

Histopathological pattern: Histopathological examination revealed Infiltrating Duct Cell Carcinoma – Not Otherwise Specified(IDCC – NOS)to be the most common histological pattern comprising 81.53% (129/158).Itis followed by InvasiveLobularcarcinoma-3.16% (5/158), Metaplastic carcinoma-3.16%(5/158) andPoorly differentiated Carcinoma-3.16 % (5/158). Other variants diagnosed are Mucinous carcinoma-2.53% (4/158), Neuroendocrine carcinomas-2.53% (4/158), Papillary carcinoma-1.26%(2/158),Invasive cribriform carcinoma- 0.63%(1/158),Malignant phyllodes-0.63% (1/158),Colloidcarcinoma-0.63 % (1/158)and comedo carcinoma 0.63% (1/158)(Table 1)(Figure 1).

Tumour size: In our study the size of tumours ranged from 1 to 12 centimetres in the widest diameter. Majority (60.11%) of the patients presented with tumours of sizes between 2- 5 cms and were classified as Stage 2 (pT2). 11.28% cases had tumour size ≤2 cm and were classified as Stage 1(pT1), while 28 cases (17.27%) of tumour size >5 cm and were classified as Stage 3 (pT3). Involvement of skin or chest wall was seen in 7 cases (4.43%) and are categorised as Stage 4 (pT4).

Tumour grade: Out of 158 cases, 138 patients (87.34%) presented with Grade II tumour as per the Nottingham modification of Bloom Richardson system. 12 cases (8.21%) showed Grade I tumours and 7 cases (4.42%) with tumours of Grade III are seen.

Lymph node Metastasis: In our study 76 cases (48.09%) showed no nodal involvement (pN0) and 82 cases (51.89%) showed metastasis in the lymph node. Among these, 49 cases (31.01%) were classified as pN1 with involvement of < 3 nodes, 21 cases (13.29%) were classified as pN2 and 12 cases (7.59%) as pN3.

NPI: The Nottingham Prognostic Index is calculated using the nodal status, tumour size, and histological grade for assessment ofpossible survival outcome. Using the Nottingham Prognostic Index, the predicted survival outcome of the 158 cases is categorised into four groups. 38 cases (24%) were categorised as category I, with excellent prognosis. 46 cases (29.11%) category II with good prognosis, 62 cases (39.24%)were categorised into III,with moderate prognosis.12 cases (7.59%)fall into category IV predicting poor prognosis.

Table 1: Histopathological variants of breast cancer in our study

S.NO	Histopathological Pattern	No of cases	%
1	Infiltrating duct cell carcinoma – no special type (IDCC-NST)	129	81.53%
2	Invasive lobular carcinoma	5	3.16 %
3	Metaplastic carcinoma	5	3.16%
4	Poorly differentiated carcinoma	5	3.16%
5	Neuroendocrine carcinoma	4	2.53%
6	Mucinous carcinoma	4	2.53%
7	Papillary carcinoma	2	1.26%
8	Phyllodes tumour	I	0.63%
9	Comedo carcinoma	I	0.63%
10	Invasive cribriform / apocrine carcinoma	1	0.63%
11	Colloid carcinoma	1	0.63%
	Total	158	100%

Table 2: Prediction of 10-year survival rates in patients with breast cancer as per NPI

NPI- Prognosis	Score	No of cases	Cancer specific predicted 10year survival.
I (Excellent)	**≤ 2.4**	38 (24.05%)	96%
II (Good)	**>2.4 - < 3.4**	46(29.11%)	93%
III (Moderate)	**>3.4 - < 5.4**	62(39.24%)	78%
IV (Bad)	>5.4	12(7.59%)	44%
		158	

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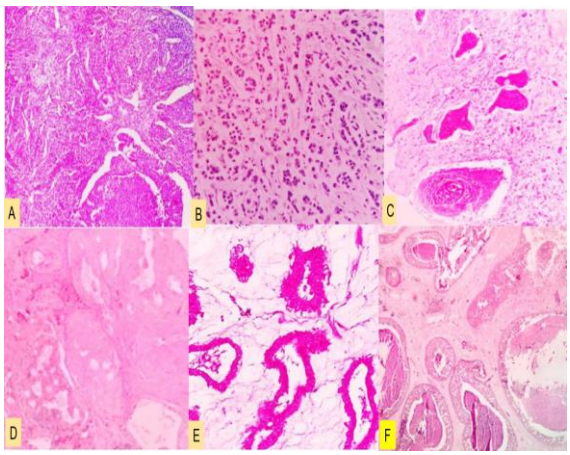

Figure 1: Microscopy of mastectomy specimens in low power showing, A. Invasive Duct Cell Carcinoma, B. Invasive Lobular Carcinoma, C. Metaplastic Carcinoma, D. Invasive Cribri form Carcinoma, E. Mucinous Carcinoma, F. Comedo Carcinoma

DISCUSSION

Recent studies in India revealed that breast cancer ranks first among the leading causes of death in women.[2] Of the 158 breast cancers diagnosed in our area, 99.36% were female patients and only one (0.63%) male was diagnosed with breast cancer during this period.

According to estimates of 2022 based on national cancer registry programme India, 27.3% of breast cancers in India are diagnosed before 40 years of age in femalesand 33% in 40-65 age groups.[3] In our study breast cancer does more common in the age group of 40- 60years constitute 53.18 % of cases. This is in agreement with the age incidence of breast cancer in other states of India. Jha etal found that breast cancer is commonest among women in the age group of 35-55 yrs in Bihar.[4] In the study done byAmitabh Kumar Upadhyay etal maximum (74.83%) cases are between 31- 60 years of age in Jharkand[5] while Bogarapu et al found 56.62% cases between 40–59 in Visakhapatnam.[6]

Even though the lifetime risk of developing breast cancer is more in developed countries compared to India, the breast cancer related mortality is high in India. Delayed detection and lack of proper cancer treatment facilities all contribute to the increased breast cancer mortality in women.

Patients with tumours size of< 1.5 cm in diameter or minimally invasive carcinoma have better long-term survival than those with larger tumours. The traditional prognostic classification developed by the Union for International Cancer Control (UICC) shows a decline in prognosis or chance of survival with an increase in the size of the primary tumour.[7] In our study among the patients with the tumour size more than > 5cms, 65.62 % of cases showed positive lymphnode metastasiswhereas it is 56.71% and 13.63% in patients with tumours of size 2-5cms and <5cmsrespectively.

Node negative tumours of less than 1 cm sizes have a 10 - year disease free survival rates of more than 90 %. Whereas it is 77 % for tumours greater than 2cms. Our study revealed negative axillary lymph nodes in 86.36%, 43.26%, and 34.37% of patients with tumours measuring < 2cms, 2 to 5cms and >5cms respectively.

The outcome for women with breast cancer depends on the biologic features of the carcinoma (the molecular or histologic type) and the stage of disease at the time of diagnosis. The most common histological pattern seen in our study is Invasive Ductal Carcinoma of No Special Type (IDC-NST) seen in 81.53% of cases which is similar to many studies in India. We also observed a slight increase in the occurrence of other uncommon histologic variants like Infiltrating Lobular Carcinoma, Metaplastic Carcinoma and Poorly Differentiated Carcinoma forming 3.16 % each. Mucinous carcinomas were seen in 2.54%. Histological variants like Medullary Carcinoma which have favourable outcome were found in < 1%.

Careful histological examination provides clinically useful prognostic information like the tumour grade and axillary lymph node metastasis. Tumour grade determines the aggressiveness of a tumourand is one of the most important prognosticfactors.[8] A higher tumour grade increases the possibility of recurrence and metastasis. In our area most of the patients (87.33%)presented with grade 2 breast tumours. This is similar to other studies in India suggesting alate presentation of the patients.Arecent report from an audit done by AIMS, New Delhi in more than 1000 patients observed that 83.7 % of patients presented with grade 2 tumours.[9] In the study from Bihar by VivekRathod et al., grade 2tumours (55.6%) predominatedgrade 3 (24.8%) .Studyonpatterns of breast cancer in 10 hospitals, Mumbai revealed that referral centres showed 80% of Grade 3 cancers, while in private clinics Grade 2 cancers were equal in number to Grade 3.[10]

In our area 8.22% of patientspresented with grade1 tumours where as it is 9.5% and 9.5-20% in studies by Rashmi Singhetal[11] and Rangrajan et al[12] respectively. The incidence of grade 1 tumour is lower in patients with low socio-economic status.[12] This data suggests that most of the patients in our area missed the initial screening and presented at an advanced stage. As most of our population is rural, lack of awareness, inadequate screening programmes and healthcare, unavailability of specialised cancer treatment centres nearby in the rural areas compared to urban and the differences in socioeconomic levels all contribute to advanced stage of presentation. In western population the patients with breast cancers are diagnosed early and have better prognosis due to early detection and initiation of treatment.

Lymphnode status like, the number and the level of locoregional nodes involved is incorporated in both the TNM staging system and Nottingham grading system.[13] The recurrence risk of breast cancer is higher in patients with more positive lymph nodes.[14]

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With no nodal involvement, the 10year disease free survival rate is 70 % to 80% which falls to 35 % to 40 % with involvement of one to three lymph nodes and to 10 % to 15 % when more than 10 nodes are positive.

In our study lymph nodes are not involved in35.44% and are classified as N0. Positive lymphnodes categorised as per TNM classification show N1(31.01 %), N2 (13.29%) and N3 (7.59 %). Lymphnode metastasis at the time of diagnosis is observed in18.98%of women with age below 50 years, compared to 33.54%in women aged above 50 years.

Presence of lympho vascular invasion is a poor prognostic factor for overall survival in women without lymph node metastases and a risk factor for local recurrence.[15] In the current study lympho vascular invasion at the time of diagnosis is observed in 69.62 % cases.

The Nottingham Prognostic Index is the most widely accepted prognostic index in predicting the prognosis and uses three prognostic factors – tumour size, histologic grade and lymphnode status.[16, 17] As it is based on traditional histopathological factors,it can be readily applied anywhere. It can be used for the assessment of possible survival outcome and allows the categorisation of patients into four different prognostic groups.[18] NPI is calculated as follows.

Nottingham Prognostic Index (NPI) = (size in cm x 0.2) + (lymphnode stage (1-3))+(grade (1-3))

Based on NPI, four prognostic categories are identified in our study–patients with score < 2.4 are categorised into Cat I, agroup with excellent prognosis; Cat II includes patients with scores >2.4 - < 3.4,having good prognosis; patients with scores of> 3.4 - < 5.4,are grouped as Cat III, moderate prognosis and Cat IV includes patients with scores over 5.4having bad prognosis. The 10year survival rates of these categories are predicted to be 96%,93 %, 78 % and 44% respectively. In our study out of 158 cases, 38cases (24.05%) were predicted to have excellent prognosis, 46 cases (29.11%) good prognosis, 62 cases (39.24 %) moderate prognosis, while 12 cases (7.59%) poor prognosis (Table 2).

Evaluation of these prognostic factors can be useful in counselling patients about the likely outcome.[19] As the incidence and prognosis of breast cancer varies in different demographic regions our study helps in understanding the pattern of breast cancer in our region.[20] This may help in improving the life expectancy of breast cancer patients by planning appropriate treatment.Global breast cancer initiative (GBCI) taken up by WHO aims at reducing breast cancer mortality among women by 2.5% per year globally between 2020 and 2040,which can be achieved by educating women about self-breast examination, organising screening camps, early detection and timely diagnosis and effective treatment.

CONCLUSION

Current trends in our area shows that the incidence of breast cancer is more among women of 40-65 years age group likeother parts of India and increase in number of cases being diagnosed in younger females also. Histopathology gives most valuable prognostic information in the form of NPI which includes tumour size, lymphnodal statusand tumour grade. Majority of the patients presented with advanced tumour grades leading to bad prognoses.T hese findings indicate the need for the early detection and intervention of breast cancers.As most of our population in India is rural, educating women about self-breast examination,conducting screening programmes therebyensuring early detection,rapid diagnosis and comprehensive cancer management may help inreducing the breast cancer mortality.

Conflict of Interest

"The authors declare that they have no potential conflicts of interest to disclose."

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