Research Article

Clinicopathological profile of invasive ductal breast carcinoma in a government tertiary care center in eastern IndiaMrityunjay Pal¹, Saugata Ray², Priyanka Rani³, Gautam Prakash⁴, Raju Gupta⁵¹Assistant Professor, ²Associate Professor, ⁴Postgraduate student, Department of General Surgery, Midnapore Medical College, West Midnapore, 721 101, West Bengal, India³Postgraduate student, Department of Obstetrics and Gynecology, Vardhaman Mahavir Medical College, New Delhi, 110 029 India⁵School of Medical Science and Technology, Indian Institute of Technology, Kharagpur, West Midnapore, 721 302, West Bengal, India

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Corresponding author: **Gautam Prakash**. Email: gautamprakash27@gmail.com**ABSTRACT**

Introduction and Aim: There is an increasing incidence of breast cancer (BC) in our country. The study aimed to find out the demographic profile, clinical presentation, and management in patients treated for invasive ductal breast carcinoma (IDC) in a rural government teaching hospital and to study the association of sociodemographic factors with BC stage.

Materials and Methods: The study retrospectively analyzed 100 IDC females treated at Midnapore medical college, West Bengal, India from January 2017 to December 2019. The study included female patients of all ages diagnosed with IDC who had undergone surgery. Male BC, bilateral BC, other pathological types of BC were excluded.

Results: The mean age was 56.54±12.99 years. Sixty-seven cases were postmenopausal. Eighty-one cases were from rural areas. Seventy-three cases had education up to middle school. Eighty-six cases had a lower socioeconomic status. Ninety-eight cases had unilateral breast lump and only 2% had a nonpalpable breast lump. The left breast was more commonly involved. The mean tumour size was 4.33 cm. Ninety-eight cases underwent a modified radical mastectomy. Stage III was the most commonly observed BC and seen in 40 cases followed by stage II in 36 cases. Sixty-one cases had advanced BC. Liver metastasis was seen in 21 cases. Sixty-nine cases had axillary node (ALN) positivity. Sixty-eight cases had lymphovascular emboli (LVE). High-grade tumour was seen in 77%. High-grade tumour was more common in young women. Seventy three cases of tumours were estrogen receptor-positive (ER+) while 66% progesterone receptor-positive (PR+). Eighteen cases were human epidermal growth factor 2 receptor-positive.

Conclusion: High incidence of advanced BC is found in rural areas due to a lack of awareness and health infrastructure.

Keywords: Ductal breast carcinoma; ALN; LVE; mastectomy; estrogen receptors; progesterone receptors

INTRODUCTION

Varied clinicopathological features of breast cancer (BC) have been reported across India reflecting the urban-rural divide and varying socioeconomic status. BC incidence and mortality are rapidly growing worldwide. BC is a leading cause of cancer-related death among women worldwide. There are around 2.1 million new cases of BC in the year 2018 along with 0.62 million deaths. In India, 1.6 lakh newly diagnosed cases of BC with 0.87 lakh deaths were reported (1). The reasons for increase in newly diagnosed cases of BC are mainly due to aging population, improved cancer care facilities, easy availabilities of low-cost BC screening facilities. BC can be treated completely if detected in an early stage and requires a multimodality approach involving radiotherapy, chemotherapy, hormonal therapy for hormone-sensitive tumors along with mastectomy (2). Late-

stage BC is associated with low socioeconomic development, illiteracy, lack of BC awareness, lack of BC screening facilities, and lack of multidisciplinary treatment set up in rural areas (2). The purpose of our study was to describe the clinicopathological profile of BC in rural areas and to study the association of sociodemographic factors with the BC stage at diagnosis.

MATERIALS AND METHODS

This retrospective study was done on patients treated over three years at Midnapore medical college and hospital, West Midnapore, West Bengal, India, from January 2017 to December 2019 with the diagnosis of invasive ductal carcinoma (IDC) in our hospital. Institute ethical committee permission was taken before study. Inclusion criteria were female patients of all ages diagnosed as IDC who had undergone surgery. Exclusion criteria included pregnant females with BC, male BC, bilateral BC, other pathological types of BC, and patients who did not undergo surgery for BC.

Procedure: Clinicopathological diagnosis of IDC was made with detailed history, physical examination findings, metastatic workup by doing ultrasonography, chest, skull, and spine radiographs, computed tomography scan, and confirmed by tissue biopsy with histopathology and immunohistochemistry. Final TNM staging was done based on the American Joint Committee on Cancer (AJCC) 8th edition after clinico-histopathological reports. All patients of IDC were selected for a surgical management. All patients underwent preoperative anesthetic fitness followed by surgical intervention. The choice of surgery was mainly modified radical mastectomy and toilet mastectomy. Two drains were placed, one in the subcutaneous layer and the other in the axilla. Patients received chemotherapy in the radiotherapy department but were referred to a higher center for radiation therapy as it is not available at our center.

Data collection and statistical analysis

Data of these patients were collected and assessed from medical records department and recorded for epidemiology, demographic profile, clinical presenta-

tion, and surgical management, the operative procedure is done, postoperative care and clinical outcomes in terms of length of hospital stay (LOHS), morbidity, mortality, histopathological and immunotherapy reports. Statistical calculations were carried out using the Statistical Package for the Social Sciences software version 26.0 (SPSS-26.0, IBM, Chicago, USA). The numerical tool for the study variables applied was the Independent Sample Student t-test. The mean $\pm$ standard deviation, median, confidence interval (CI), mean difference (MD), degree of freedom(df), and P-value(P) were calculated. The non-parametric test was applied for categorical data. The statistical significance of associations between the various qualitative parameters was evaluated through the Chi-square test/Fisher's exact test (two-tail). Differences were considered significant when $P < 0.05$.

RESULTS

The study population constituted of 100 female IDC patients. The youngest patient was 27 years and the oldest was 82 years old. Table 1 shows the demographic profile of the study population.

Table 1: Demographic profile

S. No.	Variables	Total	ALN negative	ALN positive	P
I	Mean Age $\pm$ SD	56.54 $\pm$ 12.99	54.61 $\pm$ 14.74	57.41 $\pm$ 12.14	0.360
II	Marital status				0.78
	Unmarried	4	1	3	
	Married	80	26	54	
	Widowed	14	4	10	
	Divorced	2	0	2	
III	Menstrual status				0.416
	Premenopausal	33	12	21	
	Postmenopausal	67	19	48	
IV	Place of residence				0.023
	Rural	81	21	60	
	Urban	19	10	9	
V	Level of schooling				0.024
	Up to middle school	73	18	55	
	Above middle school	27	13	14	
VI	Socioeconomic status				0.404
	Lower	86	28	58	
	Middle	14	3	11	

*SD= Standard deviation, ALN=Axillary lymph node

The maximum age incidence was seen in the 45-54 years (26%). Only 7% were below the age of 35 years. Nearly 11% of cases were below 40 years while 30% of cases were above the age of 65 years. The overall mean age was 56.54 $\pm$ 12.99 years (CI=53.96-59.12). The mean age of cases with lymph node positivity was found to be 57.41 $\pm$ 12.14 years as compared to 54.61 $\pm$ 14.74 years in negative cases. 80% of females were married while only 4 females were unmarried. 67% were postmenopausal and 33% were premenopausal women. About 81% of patients were from rural areas while 73% of patients had schooling below the

middle level (class VIII). 86% of patients belonged to low socioeconomic status.

The incidence of BC was more commonly seen on the left breast (52%). Table 2 shows the clinico-surgical profile of the study population. Unilateral breast lump was found in 98 cases (98%) followed by axillary swelling in 20 cases (20%). Only 2% of patients had presented as axillary swelling only without any palpable breast lump. Ulcerative breast mass was found in 9 cases (9%).

S. No.	Variables	Total	ALN negative	ALN positive	P
I	Side				0.703
	Right	48	14	34	
	Left	52	17	35	
II	Presentation				0.013
	Lump	80	28	52	
	Axillary swelling only	2	2	0	
	Lump + Axillary swelling	9	1	8	
	Lump + Axillary swelling + Skin changes	9	0	9	
III	Surgery				0.338
	MRM	98	31	67	
	TOM	2	0	2	
IV	Complication				0.314
	MGS	7	1	6	
	Absent	88	30	58	
	Seroma	2	0	2	
	Wound infection	3	0	3	

*ALN=Axillary lymph node, MRM= Modified radical mastectomy, TOM= Toilet mastectomy, MGS= Marginal gangrenous skin flap

The median time lag between diagnosis and mastectomy was 23 days. Modified radical mastectomy was done in 98 cases (98%) while toilet mastectomy was done in 2 cases of ulcerative mass. Most of the patients (88%) did not develop any complication in the post-operative period. The most common post-surgical complication observed was marginal gangrenous skin flap (7%), wound infection (3%), and seroma formation (2%) as shown in table 2. All patients were discharged successfully, and no death was recorded

during the post operative period. The mean length of hospital stay post-mastectomy was 7.06 ± 1.51 days.

The stage III BC was the most commonly observed stage of presentation with 40 cases (40%) followed in decreasing order of frequency by stages II with 36 cases (36%), IV with 21 (21%) cases, and stage I with only 3 cases (3%). Table 3 shows the tumor staging of the study population.

Table 3: Tumour staging

S. No.	Variables	Total	ALN negative	ALN positive	P
I	Size $\pm$ SD (cm)	4.33 ± 1.51	4.11 ± 1.40	4.43 ± 1.56	0.310
II	T stage				0.201
	T1	10	3	7	
	T2	68	24	44	
	T3	13	4	9	
	T4	9	0	9	
III	N stage				0.000
	N0	28	26	2	
	N1	35	2	33	
	N2	22	3	19	
	N3	15	0	15	
IV	M stage				0.017
	Absent	79	20	59	
	Present	21	11	10	
V	Tumour stage				0.00002
	Stage I	3	0	3	
	Stage II	36	18	18	
	Stage III	40	2	38	
	Stage IV	21	11	10	

*SD= Standard deviation, ALN=Axillary lymph node

Of the 21 metastatic cases, 21 had hepatic and 4 cases had both hepatic and lung. One case was found to have skull metastasis. The mean age at presentation showed an increasing trend from stage IV to stage I. The mean was found to be 57.00 years for cases in stage III as compared to 53.33 years for cases in stage IV and was

found to be statistically significant ($P = 0.00002$). Sixty-nine percent of patients had tumour size between $>2-5$ cm. The mean tumour size was 4.33 ± 1.51 cm ($CI=4.05-4.66$). The mean tumour size showed an increasing trend from stage I to stage IV. The mean

tumour size was for stages I, II, III, and IV was 2 cm, 3.91 cm, 4.65 cm, and 4.75 cm respectively.

Histopathological confirmation of axillary lymph node positivity (ALN +ve) was observed in 69 cases (69%). Table 4 had shown the histopathological and immunochemistry profile of the study population. The mean tumour size of cases with lymph node positivity was found to be 4.43 ± 1.56 cm as compared to 4.11 ± 1.4 cm in negative cases. About 68% of cases were found to be associated with lymphovascular emboli. The differences were found to be statistically significant. The mean age of cases with lymphovascular emboli was found to be 53.22 ± 14.1 years as compared to 58.10 ± 12.2 years in negative cases. The mean tumour size of cases with lymphovascular invasion was

found to be 4.38 ± 1.5 cm as compared to 4.31 ± 1.5 cm in negative cases and was statically significant. About 69% patients had high grade (3+) tumour. The mean age of cases with Grade 1, 2, and 3 tumour was found to be 65.00 ± 15.55 years, 57.62 ± 12.28 years, and 55.84 ± 13.30 years respectively. Immunohistochemistry had reported Estrogen Receptor (ER+), Progesterone Receptor (PR+), and Human epidermal growth factor receptor (Her-2-neu 3+) rates in 73%, 66% and 18% respectively. The differences were found to be statistically significant for both ER(P=0.03) and PR(P=0.001). Both ER and PR positive tumors were seen in 74% of cases. The mean age of cases with ER+, PR+, Her-2-neu 3+ tumours was found to be 57.29 ± 12.88 years, 57.89 ± 12.25 years, and 60.28 ± 12.2 years respectively.

Table 4: Histopathological and immunochemistry profile

S. No.	Variables	Total	ALN negative	ALN positive	P
I	Tumour margin post mastectomy				0.663
	Negative	94	30	64	
	Positive	6	1	5	
II	Lymphovascular emboli				0.000
	Absent	32	20	12	
	Present	68	11	57	
III	Grade				0.086
	1	2	0	2	
	2	29	5	24	
	3	69	26	43	
IV	Estrogen receptor (ER)				0.030
	Negative	27	13	14	
	Positive	73	18	55	
V	Progesterone receptor (PR)				0.001
	Negative	34	18	16	
	Positive	66	13	53	
VI	Human epidermal growth factor 2 receptor (HER2)				0.228
	0	41	16	25	
	1	17	3	14	
	2	24	5	19	
	3	18	7	11	

*ALN=Axillary lymph node

DISCUSSION

The present research focuses on the estimation of IDC patients treated in a peripheral teaching hospital of the West Midnapore district, West Bengal, India. Age is an important risk factor and the incidence of BC risk increases as age advances, as is well documented in the literature (1-10). The commonest age group of BC incidence was 45–54 years (26%) and a similar finding has been observed in other studies (3). The mean age at presentation showed an increasing trend for the various stages and a similar finding has been observed in other studies (3). The mean age was 56.54 years which was similar to other studies (4,5). In our study, 67% of the cases were postmenopausal women which is in agreement with the other studies (3-7). A majority of the patients were found to be of rural areas and a similar finding has been observed in other studies (4,8). In our study, we found that those with lower than

middle school education level had presented with advanced BC. A significant association was seen in our study between BC and educational level. A low level of education and lack of health infrastructure lead to low rate of breast cancer screening in rural areas. This emphasizes the need for breast cancer awareness programs to be better implemented in rural areas.

Lump in the breast was the chief presenting complaint in a majority of the patients, similar observation had been reported in other studies (3,4,6,8). The left breast was more affected and is similar to other studies (4,8). The most common site of metastasis was the liver and a similar finding has been observed in other studies (3,8). A significant finding in our study is that 61% of the cases were advanced stage BC due to lack of cancer health services in rural areas and is similar to the other Indian and Asian studies where large and advanced tumours are common findings (3,4,6,7,8).

Multiple factors lead to advanced BC in Indian women, lack of access to health facilities, and limited availability and access to cancer health services. The majority of the patients underwent MRM and a similar finding has been observed in other studies (3,4,7,8). The high rate of MRM is mainly due to unacceptability of safety in conservative surgery, lack of radiotherapy unit in our institution, affordability of treatment, lack of regular follow up visits, and other compliance issues. The lymph node positivity rate, presence of lympho-vascular emboli, high-grade tumour, and hormonal receptor status findings in our study are consistent with other studies (4,5,7,9,10). The high-grade tumour was found to be more associated with a younger age group while ER+ and PR+ tumour was more commonly associated with older age women (4,5,7,9,10).

CONCLUSION

Breast cancer is a major disease burden in our country. With better clinical and diagnostic modalities, breast cancer in the early stage (stage I and II) is better treated with low morbidity and mortality and the economic burden is also low. But due to lack of education, low socioeconomic conditions and lack of awareness about BC in rural areas patients usually present in an advanced stage. Young age, advanced disease, high-grade tumour, triple-negative breast cancer was associated with poor prognosis and difficult to treat. So, emphasis should be put more on early detection of BC, and better availability of treatment at rural tertiary care centers. The study lacks follow up recordings of patients. So, long term complication and long-term clinical outcome of care could not be defined.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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