Research Article

Epidemiology of Breast Cancer in a Single Institute in North India with High Incidence of Triple Negative Breast Cancers

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Abstract

Introduction: Carcinoma of breast is the most frequently diagnosed cancer in the most of the countries and is also the leading cause of cancer death. Breast cancer is the most common cancer in India with ASR incidence 24.7/100,000 and mortality 13.4/100.000. Triple Negative Breast Cancers (TNBC) are regarded as one of the malignant phenotypes, principally accounting for 12-25% of invasive breast cancers.

Material and Methods: Patients data was collected from hospital registry in our Institute Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala in Haryana from period 2015 to Dec 2018. All diagnosed cases of breast cancer were included in study. A total of 153 cases were registered. All patients had pathological diagnosis. Out of 153 patients 83 patients had IHC available.

Results: In this study 153 patients were reviewed. The median age of presentation was 50 years (range 30-85). Around 27% patients were younger than 40 years. 52% patients were in age group 40-60 while 20% were above age 60. Most of patients had tumor size less than 5cm (38%) while 33% patients had tumor size more than 5cm. Majority of patients presented with lump in breast followed by pain and discharge. complete IHC done revealed ER positivity in 13.7%, PR positivity 12.4% and HER2 Neu receptor positivity in 10%. In this study incidence of TNBC is 43%. Majority of patients had Intraductal Carcinoma (>90%). Pathologically 57% patients had grade III tumor while 35% were grade II tumor.
Incidence of TNBC is 43% in this study.

Conclusion: Breast cancer is the most common cancer in India. In our study it was observed that most of the patients were 40-60 years age. Majority of the patients had grade III tumor. Incidence of TNBC was found to be higher in our study. Larger data is required for conclusive results.

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Introduction

Worldwide, there are about 2.1 million newly diagnosed female breast cancer cases in 2018, which accounts for almost 1 in 4 cancer cases among women. Carcinoma of breast is the most frequently diagnosed cancer in the most of the countries and is also the leading cause of cancer death [1]. According to Globocan 2018 breast cancer is the most common cancer in India with ASR incidence 24.7/100,000 and mortality 13.4/100.000. Although genetic and hereditary factors, including a personal or family history of breast or ovarian cancer and inherited mutations (in BRCA1, BRCA2, and other breast cancer susceptibility genes), account for 5% to 10% of breast cancer cases, nonhereditary factors may be observed for international and interethnic differences in incidence. Migrants from low risk population to high risk population have increased incidence of carcinoma breast in successive population [2]. Countries with higher HDI have elevated incidence rates which is attributed to a higher prevalence of known risk factors and the elevated incidence rates are the consequence of a higher prevalence of known risk factors related to menstruation (early age at menarche, later age at menopause), reproduction (nulliparity, late age at first birth, and fewer children), exogenous hormone intake (oral contraceptive use and hormone replacement therapy), nutrition (alcohol intake), and anthropometry (greater weight, weight gain during adulthood, and body fat distribution); whereas breastfeeding and physical activity are known protective factors [3]. Incidence rates of breast cancer have been rising in South America, Africa, and Asia. Rise in incidence may be because of economic and social development, including late age of childbearing, having fewer children, greater levels of obesity and physical inactivity, and increases in breast cancer screening and awareness. Epidemiology of breast cancer across different population based cancer registries (PBCRs) in India shows increasing trends for incidence and mortality mainly due to rapid urbanization, industrialization, population growth and ageing affecting all parts of India [4].

Triple negative breast cancer (TNBC) is a recently identified biological variant with aggressive tumor behav¬ior and poor prognosis. Triple Negative Breast Cancers (TNBC) are regarded as one of the malignant phenotypes, principally accounting for 12-25% of invasive

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breast cancers. TNBCs lack expression of estrogen receptor (ER) and progesterone receptor (PR) and do not overexpress tyrosine kinase human epidermal growth factor receptor 2. The basal subset of TNBC is characterized by expression of basaltype cytokeratin 5 and cytokeratin 6 and high expression of epidermal growth factor receptor, and frequently exhibits aggressive clinical behavior. TNBCs most frequently occur in women with germline BRCA1 mutations and in premenopausal women of African descent [5,6,7]. TNBC accounts for approximately 12% to 17% of all invasive breast cancers in Western populations. TNBC occurs more frequently in younger women and is associated with higher histologic grade and more advanced disease. In North America, it is more frequently seen in women of African American ethnicity compared with other ethnic groups. Age-standardized 5-year breast cancer survival for Indian women diagnosed with breast cancer is 60% compared with 80% in Western countries. Whereas breast cancer incidence seems to be increasing in India, epidemiology of the disease is inadequately studied [8].

Methods

Patient's data was collected from hospital registry in our Institute Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR) Mullana, Ambala in Haryana from period 2015 to Dec 2018. All diagnosed cases of breast cancer were included in study. A total of 153 cases were registered. All patients had pathological diagnosis. Out of 153 patients 83 patients had IHC available. Descriptive analysis was done using SPSS v18.

Results

Age Group	Frequency	Percentage
30-40	42	27.5
41-50	50	32.7
51-60	30	19.6
>60	31	20.3
Total	153	100

Table 1: Patient characteristics

District		
Saharanpur	64	41.8
Yamunanagar	35	22.9
Ambala	18	11.8
Kurukshetra	11	7.2
Others	25	16.3
Total	153	100

T stage	Frequency	Percentage
T1	10	6.5
T2	48	31.4
T3	19	12.4
T4	35	22.9
Not Available	41	20.8
N stage		
N0	39	25.5
N1	37	24.2
N2	27	17.6
N3	10	6.5
Not Available	40	26.1

M stage		
M0	102	66.7
M1	12	7.8
Not Available	39	25
Stage Grouping		
IA	3	2
IIA	22	14
IIB	28	18.3
IIIA	18	11.8
IIIB	20	13.1
IIIC	9	5.9
IV	18	11.8

Table 2: Tumor characteristics

Nodal	Number	Percentage
Node Positive	54	35
Node Negative	31	20.3
Not Available	68	44.4
ER		
Positive	21	13.7
Negative	56	36.6
Not Available	68	44.4
PR		
Positive	19	12.4
Negative	58	37.9
Not Available	76	49.7
HER2		
Positive	15	9.8
Negative	61	39.9
Not Available		
Tumor Grade		
I	6	8.1
II	26	35.1
III	42	56.7

Table 3: Pathological characteristics

In this study 153 patients were reviewed (Table 1). The median age of presentation was 50 years (range 30-85). Around 27% patients were younger than 40 years. 52 % patients were in age group 40-60 while 20% were above age 60. Majority of patients were from District Saharanpur (41.8%) followed by Yamunanagar and Ambala, (22.9 and 11.8%) respectively. Most of patients had tumor size less than 5cm (38%) while 33% patients had tumor size more than 5cm. Majority of patients presented with lump in breast followed by pain and discharge. Most patients presented with cancer in left breast 57% compared to 43% in right breast. 59% patients were premenopausal and 5% patients had familial cancer. Clinically 50% patients had regional lymph node involvement, while 7% patients had distant metastasis. Pathologically 35% of patients had involved lymph nodes.(Table 2)

Patients who had complete IHC done revealed ER positivity in 13.7%, PR positivity 12.4% and HER2 Neu receptor positivity in 9.8%. In this study incidence of TNBC is 43%. Majority of patients had Intraductal Carcinoma (>90%). Pathologically 57% patients had grade III tumor while 35% were grade II tumor. (Table 3)

Discussion

According to GLOBOCAN 2018 Age standardized (world) Incidence and mortality rates for carcinoma Breast are 24.7 and 13.4 per 100,000 population. Carcinoma Breast is ranked number 1 cancer in India with Incidence rates of 162468 cases (15.46%) of total cancer burden with highest mortality rate (12.11%). Age-standardized 5-year breast cancer survival for Indian women diagnosed with breast cancer is 60% compared with 80% in Western countries [9]. Whereas breast cancer incidence seems to be increasing in the country, epidemiology of the disease is inadequately studied. Increasing urbanization and westernization associated with changing lifestyle and food habits has lead breast cancer to attain top position in all major urban registries. Among all the PBCR's top four places were occupied by Delhi with AAR 41.0 (per 100,000), Chennai 37.9, Bangalore 34.4 and Thiruvananthapuram District 33.7. Indian women having breast cancer are found a decade younger in comparison to western women suggesting that breast cancer occurs at a younger premenopausal age in India [10,11,12]. Studies suggest that the disease peaks at 40– 50 years in Indian women [13]. Our study also corroborates these findings where we observed that 60% patients were less than 50 years old. Trends for age distribution among different registries in India showed a peak relative proportion between 45 and 49 years in all registries except in north eastern registries where the peak is seen in even 10-year younger age group 35-39 [14]. Various studies have reported association of various risk factors with breast cancer in Indian women. Women have strong association of risk factors like breast-feeding, location (urban/rural) and increased BMI with breast cancer (P < 0.05) [15]. Protective effects include increased breast feeding, physical activity and living in rural areas which decreases the risk for breast carcinoma as compared to urban counterparts. Other risk factors observed were increased waist-hip ratio, obesity, increasing age, low parity (three or more pregnancies getting associated with a 40–50% reduction in risk (P < 0.01) [16,17,18]. Stage of disease at diagnosis is a critical determinant in breast cancer survival. Around 50% of breast cancer cases in India present at late stage (stage III and IV) [19]. Whereas in developed countries like the United States, only 12% of the breast cancer cases are diagnosed at an advanced stage [20]. In our study 42% of cases presented in late stages (III and IV) where as 34.3% in early stages. Age, axillary nodal status, tumour size, pathologic grade, and hormone receptor status are important prognostic and/or predictive factors [21-24]. In this study 35% of patients were axillary lymph node positive, where as 56.7% of patients had grade III disease. Various studies from Asian subcontinent has shown ER, PR hormonal status positivity in

range of 28% to 60% [25], where as in our study ER and PR positive were 13.7% and 12.4% respectively. Triple negative breast cancer (TNBC) is an aggressive subtype that is defined by lack of expression of ER and PR as well as absence of overexpressed or amplified HER2. TNBC accounts for approximately 12% to 17% of all invasive breast cancers in Western populations [26]. In our study 43% percent of cases were TNBC. TNBC occurs more frequently in younger women and is associated with higher histologic grade and more advanced disease. In North America, it is more frequently seen in women of African American ethnicity compared with other ethnic groups [27, 28, 29]. Prevalence of TNBC in India ranged from 27% to 35% across studies, with a summary estimate of 31% [30]. This is comparable to the prevalence seen in African American women and is more than twice the rate seen in white women [31, 32, 33, 34].

Conclusion

Breast cancer is the most common cancer in India. In our study it was observed that most of the patients were 40-60 years age. Majority of the patients had grade III tumor. Incidence of TNBC was found to be higher in our study. Larger data is required for conclusive results.

References

1.Bray F, Ferlay J, et al. Globocan Cancer Statistics 2018: Globocan Estimates of Incidence and Mortality Worldwide for 36 cancers in 185 Countries. CA: Cancer J Clin. 2018; 0:1-31.

2.Ziegler RG, Hoover RN, Pike MC, et al. Migration patterns and breast cancer risk in Asian-American women. J Natl Cancer Inst.1993;85:1819-1827.

3.Brinton LA, Gaudet MM, Gierach GL. Breast cancer. In: Thun MJ, Linet MS, Cerhan JR, Haiman CA, Schottenfeld D, eds. Cancer Epidemiology and Prevention. 4th ed. New York: Oxford University Press; 2018:861-888.

4.Malvia S, Bagadi SA, Dubey US, Saxena S et al. Epidemiology of breast Cancer in Indian women. Asia-Pac J Clin Oncol 2017; 13:289-295.

5.Foulkes WD, Smith IE, Reis-Filho JS: Triple-negative breast cancer. N Engl J Med 2010, 363:1938-1948.

6.Sorlie T, Perou CM, Tibshirani R, Aas T, Geisler S, Johnsen H, Hastie T, Eisen MB, van de Rijn M, Jeffrey SS, Thorsen T, Quist H, Matese JC, Brown PO, Botstein D, Lonning PE, Borresen-Dale AL: Gene expression patterns of breast carcinomas distinguish tumor subclasses with clinical implications. Proc Natl Acad Sci U S A 2001, 98:10869-10874 .

7.Dietze EC, Sistrunk C, Miranda-Carboni G, O'Regan R, Seewaldt VL: Triple-negative breast cancer in African-American women: disparities versus biology. Nat Rev Cancer 2015, 15:248-254.

8.Khokhar A: Breast cancer in India: Where do we stand and where do we go? Asian Pac J Cancer Prev 13:4861-4866, 2012.

9.Allemani C, Weir HK, Carreira H, et al: Global surveillance of cancer survival 1995-2009: Analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). Lancet 385:977-1010,2015

10.Chopra B,Kaur V, Singh K,VermaM, Singh S, Singh A.Age shift: breast cancer is occurring in younger age groups—is it true? Clin Cancer Investig J 2014; 3: 526–29.

11.Thangjam S, Laishram RS, Debnath K. Breast carcinoma in young females below the age of 40 years: a histopathological perspective. South Asian J Cancer 2014; 3: 97–100.

12.Sandhu D, Sandhu S, Karwasra R, Marwah S. Profile of breast cancer patients at a tertiary care hospital in north India. Indian J Cancer 2010; 47: 16–22.

13.Chopra B,Kaur V, Singh K. Age shift: Breast cancer is occurring in

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30

younger age groups: Is it true? Clin Cancer Investig J 2014; 3: 526–9.

14.Anonymous. National Cancer Registry Programme 2007—2011. Indian Council of Medical Research (ICMR), Bangalore,India 2013

15.Pakseresht S, Ingle G, Bahadur A et al. Risk factors with breast cancer among women in Delhi. Indian J Cancer 2009; 46: 132–38.

16. Dey S, Boffetta P, Mathews A, Brennan P, Soliman A, Mathew A. Risk factors according to estrogen receptor status of breast cancer patients in Trivandrum, South India. Int J Cancer 2009; 125: 1663–70.

17. Gajalakshmi V, Mathew A, Brennan P et al. Breastfeeding and breast cancer risk in India: a multicenter case-control study. Int J Cancer 2009; 125: 662–5.

18. Nagrani RT, Budukh A, Koyande S, Panse NS, Mhatre SS, Badwe R. Rural urban differences in breast cancer in India. Indian J Cancer 2014; 51: 277–81.

19. Chopra R. The Indian scene. J Clin Oncol. 2001;19:106S-11S.

20. Agarwal G, Ramakant P. Breast Cancer Care in India: The Current Scenario and the Challenges for the Future. Breast Care (Basel). 2008;3(1):21-7.

21. Kaul R, Sharma J, Minhas SS, Mardi K. Hormone Receptor Status of Breast Cancer in the Himalayan Region of Northern India. The Indian Journal of Surgery. 2011;73(1):9-12.

22. Ambroise M, Ghosh M, Mallikarjuna VS, Kurian A. Immunohistochemical profile of breast cancer patients at a tertiary care hospital in South India. Asian Pac J Cancer Prev. 2011;12:625-9.

23. Desai SB, Moonim MT, Gill AK, Punia RS, Naresh KN, Chinoy RF. Hormone receptor status of breast cancer in India: A study of 798 tumours. Breast. 2000;9:267-70

24. Shet T, Agrawal A, Nadkarni M, Palkar M, Havaldar R, Parmar V, et al. Hormone receptors over the last 8 years in a cancer referral center in India: What was and what is? Indian J Pathol Microbiol. 2009;52:171-4.

25. Sofi GN, Sofi JN, Nadeem R, Shiekh RY, Khan FA, Sofi AA, et al. Estrogen receptor and progesterone receptor status in breast cancer in relation to age, histological grade, size of lesion and lymph node involvement. Asian Pac J Cancer Prev. 2012;13(10):5047-52.

26. Foulkes WD, Smith IE, Reis-Filho JS: Triple-negative breast cancer. N Engl J Med 363:1938-1948, 2010

27.Boyle P: Triple-negative breast cancer: Epidemiological considerations and recommendations. Ann Oncol 23 (suppl 6):vi7-vi12, 2012

28. Brewster AM, Chavez-MacGregor M, Brown P: Epidemiology, biology, and treatment of triple-negative breast cancer in women of African ancestry. Lancet Oncol 15:e625-e634, 2014

29. Bauer KR, Brown M, Cress RD, et al: Descriptive analysis of estrogen receptor (ER)-negative, progesterone receptor (PR)-negative, and HER2-negative invasive breast cancer, the so-called triple-negative phenotype: A populationbased study from the California Cancer Registry. Cancer 109:1721-1728, 2007

30. Sandhu GS, Erqou S, Patterson H, Mathew a et al: Prevalence of triple negative breast cancer in India: systemic review and Meta analysis: J Glob 2016 Jun29; 2(6); 412-421.

31. Trivers KF, Lund MJ, Porter PL, et al: The epidemiology of triple-negative breast cancer, including race. Cancer Causes Control 20:1071-1082, 2009

32. Amirikia KC, Mills P, Bush J, et al: Higher population-based incidence rates of triple-negative breast cancer among young African-American women: Implications for breast cancer screening recommendations. Cancer 117:2747- 2753, 201.

33. Stead LA, Lash TL, Sobieraj JE, et al: Triple-negative breast cancers are increased in black women regardless of age or body mass index. Breast Cancer Res 11:R18, 2009.

34. Stark A, Kleer CG, Martin I, et al: African ancestry and higher prevalence of triple-negative breast cancer: Findings from an international study. Cancer 116:4926-4932, 2010.