



RETROSPECTIVE STUDY OF HORMONE RECEPTOR STATUS IN BREAST CANCER PATIENTS IN A TERTIARY HOSPITAL OF NORTH EAST INDIA

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ABSTRACT Breast cancer is the most common cancer in women in India. Hormone receptor status with ER/PR and HER2neu is routinely done in patients with breast cancer. We have done a single institutional retrospective study with the aim to evaluate ER/PR and HER2neu receptor status in breast cancer patients at the State Cancer Institute in Northeast India. Data of total 120 cases were collected for a period of one year. Breast cancer is common in middle age group of rural area in premenopausal women with infiltrating ductal carcinoma the commonest histological type. Our data shows 45% were positive for ER, 37.5% for PR and 27.5% for HER2neu. Triple negative constitute about 34.16%. Hormone receptor positive status in breast cancers is low as observed in our study when compared to west but comparable to other studies done over Indian population. Triple-negative breast cancer is prevalent in a large proportion of patients in Northeast India.

KEYWORDS : cancer, breast, receptor, her2neu

INTRODUCTION

The incidence of breast cancer is increasing in the developing world due to increasing life expectancy, increasing urbanization and adoption of the western lifestyle¹. In India, for decades cervical cancer was the most common cancer in women but now breast cancer is the most common cancer in women.^{1,2}

In 2018, 1,62,468 new cases and 87,090 deaths were reported for breast cancer in India.³ Breast cancer is no longer seen as a single disease but rather a multifaceted disease comprised of distinct biological subtypes with diverse natural history, presenting a varied spectrum of clinical, pathologic and molecular features with different prognostic and therapeutic implications.⁴ Hormone receptors are proteins found within and on the surface of certain cells throughout the body, including breast cells. For hormone receptor-positive breast cancer cells, hormonal therapy can be used to interrupt the influence of hormones on cell growth and functioning⁵. Breast cancer patients with tumours that are estrogen or/and progesterone receptor positive have a lower risk of mortality after their diagnosis compared to women with estrogen and/or progesterone negative disease⁶. Estrogen receptor positivity predicts response to endocrine therapy such as antiestrogen (tamoxifen) and trastuzumab therapy for her2 neu overexpression⁷.

We have a single institutional retrospective study with the aim to evaluate the ER, PR and Her2neu receptors status in breast carcinoma patients in Northeast India.

METHODOLOGY

We carried out a retrospective study of a one-year duration from January 2018 to January 2019 at State Cancer Institute, Gauhati Medical College, a newly established cancer institute for treatment and research of cancer. All women attending the cancer institute from Northeast India and diagnosed with invasive breast cancer (on core biopsy or lumpectomy or BCS and mastectomy) comprised the primary study population. All these cases were subjected for immunohistochemistry (ER/PR/HER 2 neu). Relevant clinical and pathological information (including age, tumour size, histological type, grade and node status) were recorded. All cases were subjected to IHC on formalin fixed, paraffin embedded tissue sections by using ready to use monoclonal antibody and HRP polymer detection system with 3-3 diaminobenzidine hydrochloride (DAB) as the chromogen. Positive control was included in each case using endometrium or adjoining normal breast tissue. In all the cases both H&E and IHC slides were reviewed using a light microscope and the percentage and intensity of nuclear immunostaining were semiquantitatively

assessed. Assessment of ER/PR was considered positive if >1% tumour cells nuclei are immunoreactive. Assessment of her2neu immunohistochemical staining was scored from 0 to 3+ using FDA approved hercept test guidelines into the following categories: 0-no immunostaining, 1- Weak incomplete membranous staining in any proportion of tumour cells, 2-complete membranous staining Either nonuniform or weak in at least 10% of tumour cells, 3- uniform intense staining in 30% of tumour cells (0&1+ is negative, 2+ is equivocal, and 3+ is positive).

In cases where her2 neu was equivocal were excluded as data as further confirmation of her 2 status by FISH was not available in all the cases

RESULTS

A total of 120 cases of invasive breast cancer were studied during one year period. The age of the subjects were ranged from 18 to 70 years with a mean age of presentation of 49.12 years. The maximum number of patients were in the age group of 30-50 years. Breast cancer was found to be more common in premenopausal women with 59.1% than postmenopausal women of 40.8%. The occurrence of cancer in the left breast was commoner than right breast amounting to 55% and 45% respectively. Of the total patient population, urban population was 46.6% compared to 53.3% of rural population. Infiltrating ductal carcinoma(nos) was the most common type (92.5%) followed by infiltrating lobular carcinoma (5.8%). Other variants were one case each of spindle cell carcinoma and mucinous carcinoma. The clinical and pathological characteristics are described in table 1.

IHC evaluation of tumors showed 45% cases were ER positive, 37.5% cases were PR positive and 27.5% cases were her2/neu positive. Overall hormonal positivity was 51.6% and 34.16% of cases were triple negative in our study. The hormone receptor status is described in table 2

Table 1- clinical and pathological characteristics of the cases-

Characteristics	cases(%)
Age	
<30	7(5.8)
30-50	73(60.8)
>50	40(33.3)
Background	
Urban	56(46.6)
Rural	64(53.3)

Menstrual status	
Pre-menopause	71(59.1)
Postmenopause	49(40.9)
Histopathology	
Infiltrating ductal carcinoma	111(92.5)
Infiltrating lobular carcinoma	7(5.8)
Others	2(1.6)

Table2- Receptor status of breast tumours

Type of receptor	positive		negative	
	Case	(%)	case	(%)
ER	54	45	66	55
PR	45	37.5	75	62.5
HER2/neu	33	27.5	87	72.5
Triple negative	41	(34.16)		

DISCUSSION-

According to Globocan 2012, India along with the United States and China collectively accounts for almost one-third of the global breast cancer burden. With progress in technology, new molecular methods are giving awareness into biology of breast cancer and opening new way for developing therapeutic strategies and predict the outcome⁷. Biomarkers can be prognostic, predictive, or both. If a patient's tumor expresses ER and/or PR, we can predict that this patient will positively benefit from endocrine therapy. HER2/neu expression is associated with poor prognosis however, it also predicts that a patient will more likely benefit from anthracycline and taxane-based chemotherapies and therapies that target HER2/neu (trastuzumab).

Our study analyzed 120 cases of breast cancer. The ER, PR, HER2 neu status, clinical and pathological characteristics were studied. The mean age of our patients was 49.12 years and peak prevalence was found in the age group of 30-50 years which was similar to the previous study done in this region. Sharma M et al⁸ in their study found the mean age of 49 years and Gogoi et al⁹ found the mean age of presentation to be 44.6 years in their study. 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}. In our study breast cancer is common in premenopausal women when compared to postmenopausal women amounting to 59.1% and 49.9% respectively. Similar findings were observed by Gogoi et al⁹.

It has observed that 53.3% of subjects belongs to rural areas in comparison to 46.6% of urban areas. usually it is noticeable that the incidence used to be less in rural areas¹². However, it is observed in the trends that the incidence is comparatively more in the rural areas and this observation may be associated with reasons such as low educational status, lack of awareness regarding the disease, lack of medical facilities for diagnosis. Similar findings are noticed in the studies conducted by other authors^{13,14,15}. Infiltrating ductal carcinoma (NOS) was found in 92.5% of the patient was the major histological type of breast cancer. Similar findings were noted by Victor J et al¹⁶, Carey et al¹⁷, and Somali et al¹⁸. The incidence of ER and PR in our present study is 45% and 37.5% which is lower than western studies¹⁹ but consistent with other studies done on Indian patients. Desai et al.²⁰ in 2000 obtained a low incidence of ER (23.6%) and PR (42.1%) in a study done at Tata Memorial Hospital, India. Col V Dutta et al²¹ in 2006 in a study done in New Delhi also found ER (30.66%) and PR (42.66%) positive compared to Western values. Sharma et al⁸ published from Regional Cancer of Northeast India showing ER+ 58% and PR+ 49% after excluding TNBC category so the actual statistical calculation would be lower than the above figures. Gogoi et al⁹ in their study from north east India found ER+ in 40.62%, PR+ 35.77%.

HER2 neu positivity was present in 27.5% of our cases, was found to be comparable to most of the Indian and Western studies. In western studies, these values ranged from 17% to 27%²². In two studies by Gogoi et al⁹ and Sharma et al⁸ found HER 2 neu to be 18.69% and 32.5% respectively. Vaidyanathan et al²³ found a figure of 43.2% positivity by IHC in contrast to our findings. 34.16% of our cases are triple negative. Prevalence of TNBC in India ranged from 27% to 35% across studies, with a brief estimate of 31%.²⁴ Sharma et al⁸ published from the Northeastern region found 31.9%. This is comparable to the prevalence seen in African American women and is more than twice the rate seen in white women^{25,26}. Because TNBC is known to be more aggressive than other breast cancer subtypes, higher prevalence of TNBC could be a contributing factor to the high mortality rate of patients with breast cancer in India.²⁴

CONCLUSION

Hormone receptor positive status in breast cancers is low as observed in our study when compared to the western population but comparable to other studies done over the Indian population. HER2 neu expression is similar compared to western and Indian studies. Also, triple negative breast cancer is prevalent in a large percentage of patients in people of northeast India. With limited treatment options for receptor-negative breast cancer and poor prognosis, an integrative approach including awareness programmes preventive measures and screening programmes for early detection are vital for reducing both incidence and mortality.

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