ER & PR Status of Breast Cancer – A Single Center Study From Guwahati, North East India

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ABSTRACT *Aim of the study was to determine the hormone receptor status of the breast cancer patient who attended a tertiary level medical college hospital situated in Guwahati, North east India. Out of 45 breast cancer specimen, 38 numbers of specimen were available for immunohistochemical testing for ER/PR. The result of the study showed 26.3% cases were ER+/PR+, 23.7% cases ER+/PR-, 21.1% ER-/PR+ and 28.9% cases were ER-/PR-. The ER-/PR- cases were found to be high grade disease on histological evaluation. The ER/PR status of every breast tumour should be evaluated for IHC as ER/PR positive breast tumour has better prognosis and respond better to treatment.*

Introduction

Hormone receptors are the receptor protein found in normal breast cells. By attaching to the hormone receptors, estrogen and progesterone contribute to the growth & function of breast cell [1]. These hormones are necessary for the regulation and control of menstrual cycle, sexual development, pregnancy and childbirth. Even after menopause, women continue to have these hormones in their body. Like healthy breast cells, most of the breast cancer cells also possess these receptors and respond to the signals coming from these hormones. Knowing whether or not breast cancer cells have hormone receptors is an important piece of information for making treatment decisions. For hormone-receptor-positive breast cancer cells, hormonal therapy can be used to interrupt the influence of hormones on the cells' growth and overall functioning. A cancer is called estrogen-receptor-positive (or ER+) if it has receptors for estrogen. This suggests that the cancer cells, like normal breast cells, may receive signals from estrogen that could promote their growth. The cancer is progesterone-receptor-positive (PR+) if it has progesterone receptors. Again, this means that the cancer cells may receive signals from progesterone that could promote their growth. Hormonal therapy includes medications that either (i) lower the amount of estrogen in body or (ii) block estrogen from supporting the growth and function of breast cells. If the breast cancer cells have hormone receptors, then these medications could help to slow or even stop their growth. If the cancer is hormone-receptor-negative (no receptors are present), then hormonal therapy is unlikely to work [1]. Breast cancer patients with tumors that are estrogen receptor (ER)-positive and/or progesterone receptor (PR)-positive have lower risks of mortality after their diagnosis compared to women with ER- and/or PR-negative disease [2] . Testing for hormone receptors in breast tumour tissue is important tool for because the results help to decide whether the cancer is likely to respond to hormonal therapy or other treatments. Hence a hospital based study was carried out to determine the hormonal status of breast cancer cases attending a tertiary level medical facility in North East India.

Methodology:

The study was carried out for one year duration from August 2011 to July 2012 at Gauhati Medical College, a tertiary level referral hospital, Guwahati. A total of 150 cases attended SOPD with clinical presentation of breast lump of variable duration. All these cases underwent FNAC interpretation. Forty five cases were diagnosed to have breast carcinoma and advised histopathological correlation. Relevant clinical and pathological information (including duration of disease, age, tumour size, histological subtype, grade, nodal status) were recorded. Cases were subjected to immunohistochemistry for ER and PR on formalin fixed, paraffin embedded breast tumour tissue sections by using ready to use monoclonal antibody and HRP polymer detection system with 3'-3' diaminobenzidine hydrochloride (DAB) as the chromogen. Adequate tissue fixation in 10% neutral buffered formalin for 6-48 h was ensured. Paraffin sections (3-4 μm thick) with maximum invasive tumor component were selected for IHC. In all the cases, both H&E and IHC slides were reviewed using light microscopy and the percentage and intensity of nuclear immunostaining was assessed. All the tests were interpreted with negative and positive controls. Staining of the nuclei of the normal ductal epithelium was used as the internal control for ER and PR staining while interpreting the slides. ER or PR was considered positive if >1% tumor cell nuclei are immunoreactive and negative if finding of <1% tumour cell nuclei are immunoreactive [3] .

Results:

Out of 150 cases breast swelling, 45 cases were diagnosed to have malignant pathology. The biopsy interpretation of these tumours is described in Table 1. Out of 45 cases, 38 cases were available for hormone receptor studies by the help of immunohistochemistry. Twenty seven breast tumours were ER/PR positive and 11 cases were negative for both ER and PR. The hormone receptor status of the breast tumour is detailed in table 2.

Table 1: Pathological type of Breast cancer

Pathology	No of cases (n=45)	%
Invasive duct carcinoma	40	88.9%
Invasive Lobular Carcinoma	3	6.7%
Tubular carcinoma	1	2.2%
Medullary carcinoma	1	2.2%

Table 2: ER/PR status of Breast carcinoma

ER/PR Status	No. of Cases	%
Both ER/PR Positive	10	26.3%
ER Positive/PR Negative	9	23.7%
ER Negative/PR Positive	8	21.1%
Both ER/PR Negative	11	28.9%

Discussion:

Breast cancer represents one in four of all cancers in women. Its incidence has increased by more than 20%, while mortality has increased by 14%. Breast cancer is also the most common cause of cancer death among women (522,000 deaths in 2012) . In India, for decades together, cervical cancer was the most common cancer in women, but now breast cancer is the most common cancer in women accounting for 144,937 newly detected cases [4]. As per population based cancer registry data, location wise, Bangalore ranks the top most position in India (age adjusted incidence rate or AAR per 100,000 population being 36.6%) and in North-East region, Aizawl recorded maximum number of cases (30.3% in India) and Kamrup Urban district recording 22.8% [5]. The prognosis of breast cancer depends on several factors including ER/PR status. It is now well-established that ER positive tumors are associated with better overall survival compared to ER negative tumors [6]. Hence there is a necessity that the hormone receptor status must be evaluated in every breast cancer case. Asian Indian and Pakistani women in the US had more ER and PR negative tumors than their Caucasian counterparts. Invasive ductal carcinoma is the most common histology [7] In our study also revealed higher numbers (88.9%) of invasive duct carcinoma . Immunohistochemistry of thirty eight cancer cases revealed 71.1% of the breast cancer were ER and/ or PR positive where as 28.9% tumours were both ER /PR negative. Dunnwald et al (2007) observed that the higher relative risks of mortality associated with having an ER+/PR-, an ER-/PR+, or an ER-/PR- tumor relative to an ER+/PR+ tumor were consistently present across almost all tumor characteristics [6] . In a study from Kerala, the overall ER positivity was found to be 52.0% [8]. Overall ER positivity in the present study was 50.0%. The average ER positivity for white women in the US is 77% [9]. Studies done in India and in Indian emigrants have found ER positivity in Indian women to be 34.5% [10], 35.88% [11], 37.83% [12], 38.6% [13], 49.2% [14], 50.5% [15], and 55.1% [16]. In Kerala study showed that 41.5% of patients were PR positive while 55% of white women in the US are PR positive [9]. Other studies from India put PR positivity at 33.3% [13], 36.4% [10], and 42% [15]. In our study 47.3% cases were PR +. One study from North East India comprised of 972 cases of invasive breast carcinoma and triple negative breast cancer (ER, PR & HER 2 /neu) constituted 31.9% (310 cases) of total cases [17]. Our study did not include detection of Her2 neu protein. So we could not comment on the HER 2/ neu status of the breast cancer in the study group. However, it has been seen that the hormone receptor negative breast cancer cases were associated with high grade large tumour with high rate of node positivity.

Conclusion: Due to the cross sectional nature of the study, the cases could not be followed up. Many a case has been referred to cancer treatment hospital after surgical intervention. Due to resource constraint, only cancer cases were studied. So hormone receptor status of the benign breast lesion could not be commented. This is the limitation of the study. HER2/neu study was not carried out. So status of triple negative breast cancer remains unresolved. In a resource-limited setting like ours, it is not mandatory to evaluate the ER/PR status on regular basis. Assessment of hormone receptors for clinical management of breast cancer patients is strongly advocated to provide prognostic information and best therapeutic options . Given the limited treatment options for receptor negative breast cancer and poor prognosis, it is important to encourage screening and early diagnosis measures such as annual clinical breast exams for these women.

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