Original Article

A study on the role of receptor (ER,PR,HER-2/neu) in patients of carcinoma breast

Dr Imtiyz Ahmed[1], Dr Nida Fatima[2], Prof. Tariq Mansoor[3], Dr Pankaj Singh[4]

[1]Senior Resident,Department of General Surgery,UPUMS, Saifai, Etawah, UP

[2]Senior Resident,Department of Anesthesia,UPUMS, Saifai, Etawah, UP

[3]Ex-Professor & Chairman,Department of General Surgery,JNMC, AMU, Aligarh

[4]Assistant Professor, Department of General Surgery,UPUMS, Saifai, Etawah, UP

Corresponding author: Dr Pankaj Singh

Assistant Professor,Department of General Surgery,UPUMS, Saifai, Etawah, UP

Abstract:

Objective: To evaluate the expression of HER-2/neu, estrogen receptor (ER) and progesterone receptor (PR) in breast carcinomas.

Methods: This was a prospective hospital based study conducted on patients of carcinoma breast. The study population comprised of patients who were diagnosed to have carcinoma breast on the basis of preliminary Trucut biopsy/ open biopsies, and subsequently underwent surgery for the disease. All patients who had undergone previous chemo or radiotherapy were excluded from the study. A total of 72 patients were included in the study.

Results: About one third of patients were between 41-50 years of age (30.6%). TNM stage IIIB was among in 30.6% patients and IIIA was in 25%. Tumor grade III was among more than half of patients (61.1%). Infiltrating ductal carcinoma was among 88.9% patients. ER and PR was positive in 41.7% and 25% patients respectively. ER-/PR- was among 54.2% patients. HER2neu was positive in 22.2% of the patients. Luminal A and B was in 36.1% and 13.9% patients respectively.

Conclusion: Breast cancer in Indian patients has been found to be histologically aggressive, presents at a younger age, and is less likely to be susceptible to conventional hormonal and targeted antibody treatment. Detecting and treating this increasingly important cause of mortality is an enormous challenge.

Keywords: Breast cancer, Estrogen receptor, Progesterone receptor

INTRODUCTION

Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in females worldwide, accounting for 23% (1.38 million) of the total new cancer cases and 14% (458,400) of the total cancer deaths in 2008 (Jemal et al, 2011). About half the breast cancer cases and 60% of the deaths are estimated to occur in economically developing countries. Breast cancer has surpassed cervical cancer as the leading cause of cancer death even among females in economically developing countries, a shift from the previous decade (Jemal et al, 2011). Breast cancer survival has been linked to histologic type, grade, hormone receptor status, stage of the disease, appropriate treatment and genetic predisposition (Azizun-Nisa et al, 2008).

Ovarian steroids are necessary for normal breast development. Effect of hormonal factors on breast cancer is well documented (Pritchard, 2013). Estrogen is an important mitogen exerting its activity by binding to its receptor (ER) and found in 50-80% of breast cancers. Human epidermal receptor-2/neu (HER-2neu) gene amplification which occurs in 15-25% of breast cancers has been associated with a poor prognosis because of lower response to hormonal therapy and chemotherapy. HER-2/neu positive breast cancer predicts response to anti-HER-2/neu antibody (Azizun-Nisa et al, 2008).

Breast carcinoma in India presents at younger age than Western population. The prevalence of ER, PR and HER-2/neu expression in India has been reported to be 36.5%, 31.7% and 2.4%, respectively. Fifty percent tumors are "triple" negative (estrogen receptor, progesterone receptor, HER/neu negative). Estrogen receptor (ER) and progesterone receptor (PR) positivity decreases with increase in tumor grade and a significant association has been detected between tumor size and ER positivity (Rao et al, 1013). The frequency of positivity and the level of ER and PR increase with age, reaching their highest levels in postmenopausal women

(Masood, 2000). The presence of hormone receptors (ER and PR) in the tumor tissue correlates well with the response to hormone therapy and chemotherapy (Barnes and Hanby, 2011).

The objective of this study was to evaluate the expression of HER-2/neu, estrogen receptor (ER) and progesterone receptor (PR) in breast carcinomas.

MATERIAL AND METHODS

This was a prospective hospital based study conducted on patients of carcinoma breast. The study was approved by the ethical committee of the Institute. The consent was taken from each patient before including in the study. The study population comprised of patients who were diagnosed to have carcinoma breast on the basis of preliminary Trucut biopsy/ open biopsies, and subsequently underwent surgery for the disease. All patients who had undergone previous chemo or radiotherapy were excluded from the study. A total of 72 patients were included in the study.

Methods

All patients were subjected to detailed clinical evaluation. History was obtained regarding the onset and duration of disease, size and progression of lump, any associated swelling in the axilla or contralateral breast and axilla. Details of age, parity, and menopausal status were noted. Multipara was defined as any woman who has given birth 2 or more times. A woman who has given birth 5 or more times was called a grand multipara. History of symptoms (e.g., jaundice, boney pain, breathing difficulty, hemoptysis etc.) suggestive of the possibility of metastatic disease was also elicited.

All the subjects underwent a meticulous general examination along with a detailed examination of both breasts, axillae and cervical regions.

All the subjects either underwent a core biopsy, or surgical intervention in the form of breast conserving surgery, or modified radical mastectomy procedure. The surgical specimens were then subjected to a detailed histopathological evaluation. All the subjects either underwent a core biopsy, or surgical intervention in the form of breast conserving surgery, or modified radical mastectomy procedure. The surgical specimens were then subjected to a detailed histopathological evaluation. Histopathological evaluation and immunohistochemical staining was studied by standard methods (Elston CW, Ellis, 1991; NCCN Clinical Practice Guidelines in Oncology, 2013).

Statistical analysis

Descriptive statistics are presented in form of frequencies and percentages.

RESULTS

About one third of patients were between 41-50 years of age (30.6%). 2-4 parity was among more than half of patients (63.9%). Postmenopausal women were 54.2%. Tumor size 2-5 cms was in 65.3% patients Lymph node involvement was in 56.9% patients (Table-1).

Table-1: General profile of patients

General profile	No. (n=72)	%
Age in years		
21-30	9	12.5
31-40	21	29.2
41-50	22	30.6
51-60	13	18.1
61-70	7	9.7
Parity		
0	4	5.6
1	2	2.8
2-4	46	63.9
>4	20	27.8
Menopausal status		
Premenopausal	33	45.8
Postmenopausal	39	54.2
Tumor size		
2-5 cms	47	65.3
>5 cms	25	34.7
Presence of Lymph node involvement	41	56.9

TNM stage IIIB was among in 30.6% patients and IIIA was in 25%. Tumor grade III was among more than half of patients (61.1%). Infiltrating ductal carcinoma was among 88.9% patients (Table-2).

Table-2: Distribution of stage and grade in carcinoma breast

	No. (n=72)	%
TNM stage		
IIA	16	22.2
IIB	16	22.2
IIIA	18	25.0
IIIB	22	30.6
Tumor grade		0.0
Grade I	7	9.7
Grade II	44	61.1
Grade III	21	29.2
HPE type		0.0
Infiltrating ductal carcinoma	64	88.9
Lobulor carcinoma	7	9.7
Basal type	1	1.4

ER and PR was positive in 41.7% and 25% patients respectively. ER-/PR- was among 54.2% patients. HER2neu

was positive in 22.2% of the patients. Luminal A and B was in 36.1% and 13.9% patients respectively (Table-3).

Table-3: Distribution of receptors in carcinoma breast

Receptors	No. (n=72)	%
ER		
Positive	30	41.7
Negative	42	58.3
PR		
Positive	18	25.0
Negative	54	75.0
ER-PR combination		
ER+/PR+	16	22.2
ER+/PR-	14	19.4
ER-/PR+	3	4.2
ER-/PR-	39	54.2
HER2neu		
Positive	16	22.2
Negative	56	77.8
Sub-type of carcinima		
Luminal A	26	36.1
Luminal B	10	13.9
Triple negative	27	37.5
HER2neu overexpression	9	12.5

DISCUSSION

In our study out of the 72 females patients, 33 (45.8%) patients were premenopausal and 39 (54.2%) patients were postmenopausal.

Tumour size is one of the important prognostic parameter. In the present study the maximum number of patients 47(65.3%) had a tumour size 2-5 cms. The findings of this study is lower than the study by Azizun-Nisa et al (2008) (88%) and Ambroise et al (2011) who found tumer size 2-5 cms in 88% and 91.6% patients respectively.

Majority of patients in the present study had locally advanced breast carcinoma i.e. stage III tumour; out of which maximum number of patients 22 (30.6%) were in stage IIIB followed by 18 (25.0 %) cases in stage IIIA , 16 (22.2 %) cases in stage IIB and 16(22.2%) cases of stage IIA.

In this study, grade 2 carcinoma was present in majority of patients (61.11%), followed by grade 3 (29.2%), and grade (9.7%). The results of our study are in concordance with several other studies (Azizun-Nisaet al, 2008; Ambroise et al, 2011).

In the present study, it was found that majority (88.8%) of patients had infiltrating/invasive ductal carcinoma followed by lobular carcinoma in 9.7% and basal type carcinoma (1.4%). These findings are similar to the study done by Iqbal et al (2014) who found 93% invasive ductal cancer and 6.7 % invasive lobular cancer and 5.5% other histological types i.e. ductal carcinoma in situ etc. In the present study axillary lymph node metastasis was present in 40(55.6%) patients. This finding is inconsistent with Huang et al (2005).

The demonstration in recent years that ER-positive and ER-negative cancers have a fundamentally different natural history has led to the development of newer terminologies and treatment strategies. In the present study, 58.3% were ER-, and 41.7% patients were ER+. Fifty four patients (75.0%) were found to be PR-negative and 18(25.0%) were PR+ positive. Azizun-Nisa et al (2008) showed ER+ in 32.7% and PR+ in 25.3%.

In this study, out of 72 cases 56 (78.0 %) patients were HER-2/neu negative and 16 (22.0 %) patients were HER2neu positive. Lal et al (2005) showed 26.89% and Ambroise et al (2011) showed 27.10% positivity respectively which correlated with our study.

CONCLUSION

Breast cancer in Indian patients has been found to be histologically aggressive, presents at a younger age, and is less likely to be susceptible to conventional hormonal and targeted antibody treatment. Detecting and treating this increasingly important cause of mortality is an enormous challenge.

REFERENCES

Jemal A1, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global Cancer Statistics. Ca Cancer J Clin. 2011;61:69–90

Azizun-Nisa, Bhurgri Y, Raza F, Kayani N. Comparison of ER, PR and HER-2/neu (C-erb B 2) reactivity pattern with histologic grade, tumor size and lymph node status in breast cancer. Asian Pac J Cancer Prev. 2008;9(4):553-6.

Pritchard KI. Endocrine therapy: is the first generation of targeted drugs the last? J Intern Med. 2013;274(2):144-52.

Rao C, Shetty J, Kishan Prasad HL. Morphological profile and receptor status in breast carcinoma: An institutional study. J Cancer Res Ther. 2013;9(1):44-9.

Masood S. Assessment of prognostic factors in breast fine-needle aspirates. Am J Clin Pathol.2000;113(5 Suppl 1):S84–96.

Barnes DM, Hanby AM. Oestrogen and progesterone receptors in breast cancer: past, present and future. Histopathology. 2001;38(3):271-4.

Elston CW, Ellis IO. Pathological prognostic factors in breast cancer. I. The value of histological grade in breast cancer: experience from a large study with long-term follow-up. Histopathology. 1991;19(5):403-10.

NCCN Clinical Practice Guidelines in Oncology: Breast Cancer. V 3.2013. National Comprehensive Cancer Network. Available at http://bit.ly/jOuSUf.

Azizun-Nisa, Bhurgri Y, Raza F, Kayani N. Comparison of ER, PR and HER-2/neu (C-erb B 2) reactivity pattern with histologic grade, tumor size and lymph node status in breast cancer. Asian Pac J Cancer Prev. 2008;9(4):553-6.

Ambroise M, Ghosh M, Mallikarjuna VS, Kurian A. Immunohistochemical profile of breast cancer patients at a tertiary care hospital in South India; Asian Pacific J Cancer

Prev.2011; 12: 625-629.

Iqbal J, Abukhatir M, Shafi AA, Alyahya GM, Alharthi BN. Hormone receptor status of breast cancer in patients of different age groups, lymph node status histological type and tumor grade, an experience at King Fahad Medical City, Riyadh. Pak J Surg 2014; 30(4):296-300.

Huang HJ, Neven P, Drijkoningen M, Paridaens R, Wildiers H, Van Limbergen E, et al. Hormone receptors do not predict the HER2/neu status in all age groups of women with an operable breast cancer. Ann Oncol. 2005;16(11):1755-61.

Lal P, Tan LK, Chen B. Correlation of HER-2 status with estrogen and progesterone receptors and histologic features in 3,655 invasive breast carcinomas. Am J Clin Pathol. 2005; 123(4):541-6.