STUDY OF HORMONE RECEPTOR STATUS IN CARCINOMA BREAST

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ABSTRACT

BACKGROUND
Breast cancer is the most common cancer in women. The mortality due to this disease is decreasing in western countries, because of early detection and effective systemic adjuvant therapy. In India incidence is still increasing, therefore it is important to identify high-risk patient groups for whom adjuvant therapy is beneficial.

This study was carried out at our centre to find hormone receptor status of patients with carcinoma breast, as it could have significant implications on the management and prognosis.

MATERIALS AND METHODS
This descriptive study was conducted during a period of two years from 1st May 2012 to 30th April 2014 at Sri Aurobindo Institute of Medical Sciences, whereby 50 consecutive patients of diagnosed carcinoma of breast were admitted in the Department of General Surgery. A detailed clinical history was taken and thorough clinical examination was done and was subjected to surgery (Modified Radical Mastectomy) after routine investigations. The specimen sent for histopathology examination along with ER/PR/HER-2 receptor analysis by immunohistochemistry. The collected data was tabulated and analysed by using simple statistical methods.

RESULTS
In the present study, all 50 patients were female and the mean age of patients was 49.88, ranging from 21 to 78 years. 48% were pre-menopausal and 54% were post-menopausal. Right sided carcinoma breast was seen in 62% patients with upper outer quadrant lesions in 54% patients. Multicentric carcinoma was found in 6% patients. 40% patients were in stage 2B, 22% in stage 2a, 28% in stage 3a, 8% in stage 3b and 2% in stage 3c according to TNM staging. ER receptor was positive in 62% patients, PR receptor was positive in 54% of patients. HER-2 receptor was positive in 48% patients. Triple negative disease in 26% of patients. Infiltrating ductal carcinoma was found in 76% patients and 18% had intraductal carcinoma. We found 3 patients with lobular carcinoma.

CONCLUSION
In the present study, 90% patients were there in stage IIA to IIIA, i.e. presenting in advanced stage of the disease with 75% patients having diagnosis of infiltrating ductal carcinoma and 25% patients had triple negative disease indicating bad prognosis. Breast cancer is a heterogeneous disease with a wide spectrum of clinical, pathological and molecular features and application of targeted therapy has played an important role in breast cancer survival rate during the past two decades, so we conclude the assessment of ER/PR/HER-2 receptor is desirable in management of carcinoma breast patients in India.

KEY WORDS
Carcinoma Breast, Oestrogen and Progesterone Receptors.

BACKGROUND
The breast cancer is now the most common malignancy among Indian women.[1,2] The role of hormone receptor as prognostic and therapeutic tool is widely accepted. Clinical trial has also shown the surgical advantage for patient with receptor positive status by treatment with adjuvant hormonal or chemotherapeutic regimen.[3]

It is well known that strong ER positive cases benefit from endocrine therapy alone.[4] Patients with ER/PR positive tumour have a better prognosis than the patients with negative expression of ER/PR receptors.[5] Immunohistochemical analysis of these receptors is used for therapeutic and predictive purposes in routine breast cancer patient management.

Objectives of the Study
1. To study the clinical profile of the patients of Carcinoma breast with special reference to the ER, PR and HER-2 receptor status.
2. To study and implement the receptor status in the further management of patients after surgery.

MATERIALS AND METHODS
This descriptive study was conducted during a period of two years from 1st May 2012 to 30th April 2014 at Sri Aurobindo

Institute of Medical Sciences, whereby 50 consecutive patients of diagnosed carcinoma of breast were admitted in the Department of General Surgery. Detailed clinical histories were taken and thorough clinical examination was done and was subjected to surgery (MRM) after routine investigations. The specimens were sent for histopathology examination along with ER, PR and HER-2 receptor study by immunohistochemistry. Post-surgical treatment, i.e. chemotherapy, radiotherapy and adjuvant therapy were decided by histopathological reports and ER, PR and HER-2 receptor status. Patients with ER positive tumours were treated by tamoxifen along with chemotherapy in pre-menopausal women and aromatase inhibitors in post-menopausal women. Patients with HER-2 positive tumours were treated by monoclonal antibody known as trastuzumab (Herceptin). No adjuvant therapy is available for ER/PR/HER-2 negative (triple negative) tumours.[6,7]

RESULTS

Age Group (In Years)	No.	Percentage (%)
21-30	1	2.0
31-40	7	14.0
41-50	22	44.0
51-60	11	22.0
>60	9	18.0
Total	50	100.0
Table 1. Distribution of Patient according to Age		

In this study, we found 44% between (41 – 50 years), 22% (51 – 60 years) and 14% (31 - 40 years). Mean age in our study group is 49.88 years.

Menopausal Status	No.	Percentage (%)
Pre-menopausal	24	48
Post-menopausal	26	52
Total	50	100
Table 2. Distribution of Patient according to Menopausal Status		

In this study, we found 52% are from post-menopausal status and 48% cases are pre-menopausal status.

Site	No.	Percentage (%)
LIQ (Lower Inner Quadrant)	2	4.0
LOQ (Lower Outer Quadrant)	4	8.0
UIQ (Upper Inner Quadrant)	15	30.0
UOQ (Upper Outer Quadrant)	27	54.0
UOQ/ Central (Upper Outer Quadrant)	2	4.0
Total	50	100.0
Table 3. Distribution of Patient according to Site		

In this study, we found 54% cases in UOQ, 30% cases in UIQ, 8% cases in LOQ, 4% in LIQ and 4% central.

Side	No.	Percentage (%)
Left	19	38.0
Right	31	62.0
Total	50	100.0
Table 4. Distribution of Patient according to Side		

In this observation, we found 62% cases were on right side compared to left side 38%.

Number of Lesions	No.	Percentage (%)
One	47	94.0
Two	3	6.0
Total	50	100.0
Table 5. Distribution of Patient according to Number of Lesions		

In this observation, we found 94% cases had single lesion and rest 3% had two lesions.

Staging	No.	Percentage (%)
II A	11	22.0
II B	20	40.0
III A	14	28.0
III B	4	8.0
III C	1	2.0
Total	50	100.0
Table 6. Distribution of Patient according to Staging		

In our observation, we found 40% cases were stage IIB and stage IIIA 28%, stage IIA 22%, stage IIIB 8% and stage IIIc 2%.

	ER +ve	ER -ve	PR +ve	PR -ve	Her2 +ve	Her 2-ve
Number	31	19	27	23	20	30
Percentage	62.0	38.0	54.0	46.0	40.0	60.0
Total	50		50		50	
Table 7. Distribution of Patient according to ER, PR and HER-2 Status						

In this observation, we found 62% were ER positive and 38% were negative, 54% were PR positive and 46% negative and 40% were HER-2 positive and 60% negative.

Histopathology	Total	Percentage (%)
Infiltrating ductal CA	38	76.0
Intraductal CA	9	18.0
Lobular CA	3	6.0
Table 8. ER, PR, HER-2/ In Relation to the Histopathological Grade		

In this observation we found 76% were infiltrating ductal carcinoma, 18% were intraductal carcinoma and 6% were lobular carcinoma.

ER, PR Status	II A	II B	III A	III B	III C
ER- PR-	2	3	9	3	0
ER- PR+	0	0	2	0	0
ER+ PR-	2	2	1	1	0
ER+ PR+	7	15	2	0	1
Total	11	20	14	4	1
Table 9. ER, PR Status in relation to Staging					

In this study we found ER, PR positive 30%, more in stage IIB compared to ER, PR negative 18% in stage IIIA.

HER-2/ Status	II A	II B	III A	III B	III C
Negative	6	9	11	4	0
Positive	5	11	3	0	1
Total	11	20	14	4	1
Table 10. HER-2/ Status in relation to Staging					

In this study, we found HER-2 positive 22% more in stage IIB compared to HER-2 negative 22% in stage III A.

Age Group	ER- PR-	ER- PR+	ER+ PR-	ER+ PR+
21-30	0	0	0	1
31-40	1	0	0	12
41-50	4	2	2	6
51-60	8	0	4	1
>60	4	0	0	5
Total	**17**	**2**	**6**	**25**
Table 11. ER, PR Status according to Age Group				

In this observation we found ER, PR positive more in 31-40 years' age group as compared to ER, PR negative more in 51-60 years' age group.

Age Group	HER-2/ Negative	HER-2/ Positive
21-30	0	1
31-40	13	2
41-50	9	2
51-60	4	12
>60	4	3
Total	**30**	**20**
Table 12. HER-2/ Status according to Age Group		

In this observation, we found HER-2 negative cases belonged to 31 - 40 years' age group as compared to HER-2 positive cases belonged to 51 - 60 years' age group.

DISCUSSION

ER, PR and HER-2 have practical and vital implications in the diagnosis, management and prognosis in breast cancer. ER, PR and HER-2 negative (Triple negative) disease has the worst outcome. The selected cases were grouped according to ER, PR and HER-2 receptor positive and negative both the groups compared.

Total number of ER, PR and HER-2 receptor positive and negative cases- In our study we found 50% (25 out of 50) ER, PR positive cases of carcinoma breast and HER-2 positive 40% (20 out 50) and ER-PR negative 34% (17 out of 50) and HER-2 positive 28% (14 out of 50) ER, PR with HER-2 negative 26% (13 out of 50). Similar results have been reported by Slamon et al,[8] Borg et al in 1990,[9] Almasri and Hamad et al 2005.[10]

Age distribution of various ER, PR and HER-2 positive and negative cases - In our study we found ER-PR positive more in 31 - 40 years' age group. HER-2 positive more in 51 - 60 years compared to HER-2 negative more in 31 - 40 years' age group. Similar results have been reported by Bermon et al 2000 and Hamad et al 2005.

Pre- and post-menopausal status of ER, PR and HER-2 positive or negative cases- In our study, we found ER-positive more in pre-menopausal patients 38% (19 out of 50) and PR-positive more in pre-menopausal patients 30% (15 out of 50). ER-PR positive more in pre-menopausal 30% (15 out of 50), HER-2 positive 22% more in post-menopausal compared to HER-2 negative more in pre-menopausal 42%. Our findings did not correlate with McCann et al in 1991.[11]

Stage distribution of ER/PR and HER-2 positive and negative cases- In our county we found ER-PR positive belonged to stage II A 30% (17 out of 50) and ER-PR negative in stage III A 18% (9 out of 50). HER-2 positive belonged to stage II B 22% (11 out of 50). HER-2 negative belonged to stage III A 22% (11 out of 50) and rest belonged to stage II A and III B. Our finding correlates with finding of Krogerus et al 2001.[12]

Relationship between various histopathological form with ER, PR and HER-2 positive and negative cases- In our study, we found all cases of ER, PR and HER-2 positive group belonged to infiltrating duct carcinoma. Majority of ER-PR negative and HER-2 negative infiltrating duct carcinoma were 74% (37 out 50) and few cases of intraductal carcinoma were 18% (9 out of 50) and rest lobulated carcinoma of 8% (4 out of 50) were also found. Our findings correlate with Almasri and Hamad et al in 2005.[10]

CONCLUSION

Total number of ER, PR and HER-2 positive cases (Good prognosis) are 28% as compared to ER, PR and HER-2 negative cases 26% triple negative (Poor prognosis). ER-PR positive cases belonged to younger age group between 31- 40 years compared to ER-PR negative belonging to 51 - 60 years' age group. HER-2 positive were more in 51 - 60 years' age group compared to HER-2 negative more in 41 - 50 years' age group. ER, PR and HER-2 positive cases belonged to stage II A and II B as compared to ER, PR and HER-2 negative cases belonged to stage III A and III B. ER-PR positive and HER-2 negative cases mostly belonged to pre-menopausal age group compared to ER-PR negative and HER-2 positive belonged to post-menopausal status. Breast cancer is a heterogeneous disease with a wide spectrum of clinical, pathological and molecular features and application of targeted therapy has played an important role in breast cancer survival rate during the past two decades. So, we conclude the assessment of ER/PR/HER-2 receptor is desirable in management of carcinoma breast patients in India. However, as sample size is a limitation in this study, a larger study on a larger population would be necessary to draw statistically significant conclusions.

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