The Clinicopathological Features of Breast Carcinoma Cases in Adiwaniyah Province in Iraq

Dr. Aws Kadhim Abdulabbas[1]
and **Dr. Khitam Yasir Hussein[2]**

M.B.Ch.B., F.I.B.M.S. (Histopathology)/ Ministry of Health- Aldiwanyah/ Aldiwanyah Teaching Hospital/ Aldiwanyah/ Iraq [1]

M.B.Ch.B., F.I.B.M.S. (Microbiology and Clinical Immunology)/ Ministry of Health-Aldiwanyah/ Aldiwanyah Teaching Hospital/ Aldiwanyah/ Iraq[2]

Abstract: In Iraq, invasive ductal carcinoma is common and the disease is frequently diagnosed in late stages making the prognosis of the tumor bad in a significant portion of affected women. The prognosis of breast cancer is determined by a long list of prognostic factors such as sage of the disease, grade of the disease, presence of lymphatic invasion, presence of distant metastasis, size of tumor, age of patients and many other characteristics. Treatment of the disease includes surgical removal, chemotherapy, radiotherapy and biological treatment. The treatment of disease depends on a number of modifying factors and of these factors is the immunohistochemical expression of estrogen receptors (ER), progesterone receptors (PR) and her2neu.

Aim of the study: The objective of the present cross sectional study was to give an account about estrogen receptor (ER), progesterone receptor (PR) and her2neu receptor immunohistochemical expression in Iraqi women with breast carcinoma in Adiwaniyah Province.

Materials and methods: Histopathological reports were retrieved from the archive of the central laboratories of Al Diwaniyah teaching hospital for the last 4 years. The duration of search was limited to the period January the 1st 2019 to January the 1st 2023. Information about clinical presentation, age, histopathological type, grade, number of lymph nodes, and immunohistochemical study were reported. Statistical description was based on reporting number, percentages, mean, range and standard deviation

Statistical package for social sciences (SPSS, Chicago, USA, IBM, version 26) was used to do statistical description and analysis and $p \leq 0.05$ was the level of significance.

Results: The research included reports of 39 women with beast carcinoma having an age range of 25 -85 years and a mean age of 53.31 ±15.96 years. The mean size of tumor mass was 3.24 ±1.34 cm with a range of 0.5 -8 cm. The frequency distribution of patients according to molecular classification was as following: there were 16 cases (41 %) of luminal A group, 8 cases (20.5 %) of luminal B group, 8 cases (20.5 %) of HER2/neu group and 7 cases (17.9 %) of basal like group. There was no significant difference in mean age, mean sixe of tumor, mean number of lymph nodes and mean number of involved lymph nodes ($p > 0.05$).

Conclusion: The most common molecular type was luminal A followed by luminal B and HER2/neu and lastly by basal like type. This molecular classification has no significant impact on clinicopathological characteristic of the disease.

Key words: Breast carcinoma, immunohistochemical, Iraq

Introduction

Malignant neoplastic disorders are considered the big challenge for every health system worldwide because of the substantial rates of morbidity and mortality in association with these disorders (1-3). In women, breast cancer is one of the most common malignant diseases encountered and it is associated with gloomy prognosis in a significant portion of women (4-6). From pathological perspective, breast cancer is not a single disease, but it is represented by a heterogenous group of malignant disease arising from variety of tissues (7). Some of these tumors are originating from soft tissues and are known sarcomas (8), some of them are attributed to monoclonal lymphoid tissue proliferation and are called lymphomas (9), others are originating from melanocytes and are known as malignant melanomas (10); malignant neoplasms of epithelial tissues are however by far the most common form of malignancy affecting the breast tissue (11).

Epithelial neoplasms affecting breast tissues can be benign such as fibroadenoma (12), whereas, malignant epithelial tumors can take different types of histological shapes, but, the basic tow of histological forms are the ductal and the lobular type (13). Those two types are either limited by the basement membrane (in situ type) or associated with stromal infiltration and breaching of basement membrane (invasive type). Therefore, malignant epithelial tumors of breast can be in situ ductal, in situ lobular, invasive ductal or invasive lobular carcinoma (14). The most common type of breast carcinoma is the invasive ductal carcinoma not otherwise specified (NOS) (15).

In Iraq, invasive ductal carcinoma is common and the disease is frequently diagnosed in late stages making the prognosis of the tumor bad in a significant portion of affected women (16-18). The prognosis of breast cancer is determined by a long list of prognostic factors such as sage of the disease, grade of the disease, presence of lymphatic invasion, presence of distant metastasis, size of tumor, age of patients and many other characteristics (19, 20). Treatment of the disease includes surgical removal, chemotherapy, radiotherapy and biological treatment (21). The treatment of disease depends on a number of modifying factors and of these factors is the immunohistochemical expression of estrogen receptors (ER), progesterone receptors (PR) and her2neu (22-24).

Estrogen receptor and progesterone receptor expression in breast cancer is so far the most useful predictive marker (25). ER and PgR are intercellular steroid hormone receptors and have been frequently demonstrated in breast carcinoma. ER and PR expression has been found in majority of cases of invasive ductal carcinoma (26). Tumors expressing ER and PR receptors show a good response to hormonal therapy and chemotherapy leading to a better prognosis, good survival, and less mortality (25).

Other than hormonal receptors, the most promising biomarker in breast cancer is HER2. This is a protein that is overexpressed in a minority of breast cancers and has prognostic as well as predictive value (25). Tumors expressing HER2 are histologically high grade, are most likely to metastasize, and have a worse prognosis (27). However, HER2 overexpression also predicts a good response to anti-HER2 agents, including trastuzumab and lapatinib (25).

Breast carcinoma with the same histologic type, grade, and stage may show different outcomes and different responses to therapy. Evaluation of prognostic and predictive biomarkers ER, PgR, and HER2 is recommended in every case of breast carcinoma. Immunohistochemistry (IHC) is the most widely employed method to determine the status of ER, PgR, and HER2 in formalin-fixed paraffin-embedded tissue samples of breast cancers (25).

The objective of the present cross sectional study was to give an account about estrogen receptor (ER), progesterone receptor (PR) and her2neu receptor immunohistochemical expression in Iraqi women with breast carcinoma in Adiwaniyah Province.

Materials and methods

Histopathological reports were retrieved from the archive of the central laboratories of Al Diwaniyah teaching hospital for the last 4 years. The duration of search was limited to the period January the 1st 2019 to January the 1st 2023. Information about clinical presentation, age, histopathological type, grade, number of lymph nodes, and immunohistochemical study were reported. There was no need for patients' consent because the study was retrospective; however, ethical approval was issued by the ethical committee of the health directorate. Statistical description was based on reporting number, percentages, mean, range and standard deviation Statistical package for social sciences (SPSS, Chicago, USA, IBM, version 26) was used to do statistical description and analysis and $p \leq 0.05$ was the level of significance.

Results

Clinical and pathological characteristics of women with beast carcinoma are demonstrated in table 1. The research included reports of 39 women with beast carcinoma having an age range of 25 - 85 years and a mean age of 53.31 ±15.96 years. The mean size of tumor mass was 3.24 ±1.34 cm with a range of 0.5 -8 cm. The mean number of surgically removed lymph nodes was 9.05 ±2.70 and the

range 5 -16 and the mean number of lymph nodes which are involved by malignant tumors was 2.31 ±2.17 with a range of 0-8. According to grade there were 6 (15.4 %) and 33 (84.6 %) cases of moderate differentiation and poor differentiation, respectively. Based on histological subtypes, there were 36 (92.3 %) and 3 (7.7 %), invasive ductal and invasive lobular cases, respectively.

Results of immunohistochemical investigations concerning estrogen receptors (ER) are show in table 2. Results of immunohistochemical investigations concerning progesterone receptors (PR) are shown in table 3. Results of immunohistochemical investigations concerning her2neu receptors are shown in table 4. The frequency distribution of patients according to molecular classification following the immunohistochemical staining of estrogen receptors (ER), progesterone receptors (PR) and her2neu receptors is shown in figure 1. There were 16 cases (41 %) of luminal A group, 8 cases (20.5 %) of luminal B group, 8 cases (20.5 %) of HER2/neu group and 7 cases (17.9 %) of basal like group.

Comparison of clinical and pathological characteristics of patients categorized according to results of molecular classification is shown in table 5. There was no significant difference in mean age, mean sixe of tumor, mean number of lymph nodes and mean number of involved lymph nodes ($p > 0.05$). The association of molecular classification to grade of tumor and histological type was also shown in table 5, but p-value could not be calculated because more than 20 % of cells have expected count of less than 5, thus, chi-square test was not carried out.

Table 1: Clinical and pathological characteristics of women with beast carcinoma

Characteristic	Result
Number of cases	39
Age (years)	
Mean ±SD	53.31 ±15.96
Range	25 -85
Size (cm)	
Mean ±SD	3.24 ±1.34
Range	0.5 -8
Number of LN	
Mean ±SD	9.05 ±2.70
Range	5 -16
Number of positive LN	
Mean ±SD	2.31 ±2.17
Range	0 -8
Grade	
II (Moderate)	6 (15.4 %)
III (Poor)	33 (84.6 %)

Histological type	
Invasive ductal	36 (92.3 %)
Invasive lobular	3 (7.7 %)

SD: standard deviation**; LN:** lymph nodes

Table 2: Results of immunohistochemical investigations concerning estrogen receptors (ER)

Characteristic	Result
ER	
None	10 (25.6 %)
Weak	2 (5.1 %)
Moderate	2 (5.1 %)
Strong	25 (64.1 %)
ERIS	
None	10 (25.6 %)
Weak	2 (5.1 %)
Intermediate	9 (23.1 %)
Strong	18 (46.2 %)
ERPS	
0	10 (25.6 %)
1/100	2 (5.1 %)
1/10	4 (10.3 %)
1/3	11 (28.2 %)
2/3	10 (25.6 %)
1	2 (5.1 %)

ER: estrogen receptors; **ERIS**: estrogen receptors intensity score; **ERPS**: estrogen receptors proportion score

Table 3: Results of immunohistochemical investigations concerning progesterone receptors (PR)

Characteristic	Result
PR	
None	17 (43.6 %)
Weak	1 (2.6 %)
Moderate	2 (5.1 %)

Strong	19 (48.7 %)
PRIS	
None	17 (43.6 %)
Weak	2 (5.1 %)
Intermediate	4 (10.3 %)
Strong	16 (41 %)
PRPS	
0	17 (43.6 %)
1/100	2 (5.1 %)
1/10	4 (10.3 %)
1/3	6 (15.4 %)
2/3	9 (23.1 %)
1	1 (2.6 %)

PR: progesterone receptors; **PRIS**: progesterone receptors intensity score; **PRPS**: progesterone receptors proportion score

Table 4: Results of immunohistochemical investigations concerning her2neu receptors

Characteristic	Result
Her2/Neo	
Negative	23 (59 %)
Equivocal (moderate staining)	1 (2.6 %)
Strong (complete staining)	15 (38.5 %)
IHC	
ER-PR	14 (35.9 %)
Her2/neu	3 (7.7 %)
Her2neu +ER	5 (12.8 %)
Triple negative	7 (17.9 %)
Triple positive	8 (20.5 %)
ER	2 (5.1 %)

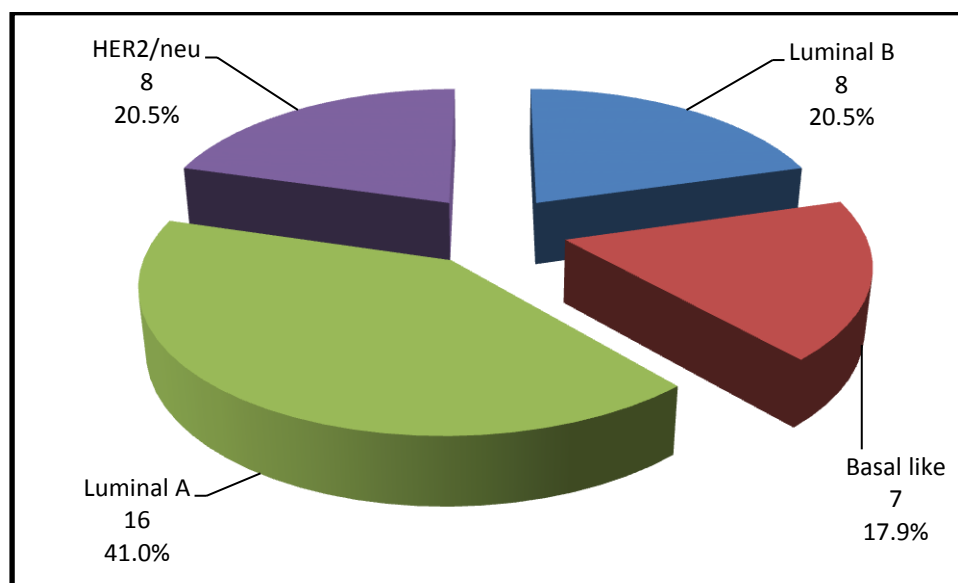**ER**: estrogen receptors; **PR**: progesterone receptors

Figure 1: Pie chart showing the frequency distribution of patients according to molecular classification following the immunohistochemical staining of estrogen receptors (ER), progesterone receptors (PR) and her2neu receptors

Table 5: Comparison of clinical and pathological characteristics of patients categorized according to results of molecular classification

Characteristic	Luminal B $n = 8$	Basal like $n = 7$	Luminal A $n = 16$	HER2/neu $n = 8$	p
Age (years)	48.75 ±18.99	59.29 ±17.44	54.81 ±14.27	49.63 ±15.63	0.548 O NS
Size (cm)	3.25 ±1.13	3.00 ±1.66	3.14 ±1.00	3.63 ±1.94	0.821 O NS
Number of LN	7.88 ±2.17	9.14 ±2.19	9.69 ±3.30	8.88 ±2.17	0.498 O NS
Number of positive LN	2.00 ±1.77	2.57 ±2.23	2.19 ±1.80	2.62 ±3.29	0.928 O NS
Grade					
II	1 (12.5 %)	1 (14.3 %)	1 (6.3 %)	3 (37.5 %)	---
III	7 (87.5 %)	6 (85.7 %)	15 (93.8 %)	5 (62.5 %)	
Histopathological type					
Invasive ductal	8 (100.0 %)	7 (100.0 %)	14 (87.5 %)	7 (87.5 %)	---
Invasive lobular	0 (0.0 %)	0 (0.0 %)	2 (12.5 %)	1 (12.5 %)	

Data were presented as mean ±standard deviation or number (percentage); **LN**: lymph node; **O**: one way ANOVA; **NS**: not significant

Discussion

Malignant disorders affecting breast is a common clinical problem seen daily in our health institutes. Reducing the mortality rate cause by that disease and improving the quality of life are the major aims of every health system dealing with this clinical problem. The diagnosis of the disease is becoming easier and faster because of the availability of clinicians with subspecialty of oncology and laboratory facilities to examine tissue biopsies and fine needle aspiration samples.

The real problem is with the prognosis of the disease and treatment approach. The late diagnosis of the disease is actually due to lack of proper screening tests to make early detection of suspicious lesions. The accurate classification of breast cancer lesions is an important determinant of type of surgical approach and chemo and radiotherapy. Previous well known approaches reside of the staging of disease clinically and pathologically. Evolution of approaches enrolled immunohistochemical technique in further categorization of cases of breast cancer and planning of type treatment based on the results of immunohistochemical study.

Breast cancer is currently classified molecularly into five groups: luminal A, luminal B, HER-2, basal, and normal breast-like. These subgroups may need to be further grouped together. A recent division of the HER-2 subgroup into three clinically distinct groups, one of which is said to exhibit particularly aggressive behavior, has been published. Due to these variations, efforts have been made to find variables that can explain variations in the prognosis of patients with HER-2 (28). Based on these research, it is anticipated that in the near future, the topic of prognosis differences despite therapy plans targeted with molecular indicators that offer data on tumor molecular identity, prognosis, and tailored treatment will become even more prominent. Possible causal processes were examined, for instance, based on HER-2 patients who relapsed after treatment or were resistant to treatment with monoclonal antibodies (Herceptin) targeting the extracellular domain (29-31).

A subset of HER-2 positive breast cancer patients with a poor prognosis have been shown to express p95HER2, a heterogeneous collection of HER2 carboxy-terminal fragments (30). The HER2 oncogene, 611-CTF, is one of these segments. Thus, it was determined that the status of the 611-CTF gene was definitely important for the development of p95HER2 positive cancers. Additionally, the production of the delta 16HER2 HER2 isoform, which encodes a receptor missing exon 16, is now acknowledged as one of the trastuzumab resistance mechanisms (32).

in our study, we found that the most common molecular subtype was luminal A in which ER and PR are positive and HER2/neu is negative, followed by luminal B in which all receptors are positive then HER2/neu type and lastly basal like type. These figures are in accordance with other previous reports and disagree with others (33). Indeed, in our study we found no correlation between clinicopathological characteristics and molecular classification. However, it should be better to correlate these molecular classes to response to treatment modalities, but data about such responses were difficult to collect.

Conclusion

The most common molecular type was luminal A followed by luminal B and HER2/neu and lastly by basal like type. This molecular classification has no significant impact on clinicopathological characteristic of the disease.

References

1. Mattiuzzi C, Lippi G. Current Cancer Epidemiology. *J Epidemiol Glob Health*. 2019;9(4):217-222. doi:10.2991/jegh.k.191008.001.
2. Wang B, He F, Hu Y, et al. Cancer incidence and mortality and risk factors in member countries of the " Belt and Road " initiative. *BMC Cancer*. 2022;22(1):582. Published 2022 May 25. doi:10.1186/s12885-022-09657-3.
3. Sung H, Ferlay J, Siegel RL, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin*. 2021;71(3):209-249. doi:10.3322/caac.21660.
4. Łukasiewicz S, Czeczelewski M, Forma A, Baj J, Sitarz R, Stanisławek A. Breast Cancer-Epidemiology, Risk Factors, Classification, Prognostic Markers, and Current Treatment Strategies-An Updated Review. *Cancers (Basel)*. 2021;13(17):4287. Published 2021 Aug 25. doi:10.3390/cancers13174287.
5. Smolarz B, Nowak AZ, Romanowicz H. Breast Cancer-Epidemiology, Classification, Pathogenesis and Treatment (Review of Literature). *Cancers (Basel)*. 2022;14(10):2569. Published 2022 May 23. doi:10.3390/cancers14102569.
6. Sisti A, Huayllani MT, Boczar D, et al. Breast cancer in women: a descriptive analysis of the national cancer database. *Acta Biomed*. 2020;91(2):332-341. Published 2020 May 11. doi:10.23750/abm.v91i2.8399.
7. Weigelt B, Geyer FC, Reis-Filho JS. Histological types of breast cancer: how special are they?. *Mol Oncol*. 2010;4(3):192-208. doi:10.1016/j.molonc.2010.04.004.
8. Lee JS, Yoon K, Onyshchenko M. Sarcoma of the Breast: Clinical Characteristics and Outcomes of 991 Patients from the National Cancer Database. *Sarcoma*. 2021;2021:8828158. Published 2021 Jan 21. doi:10.1155/2021/8828158.
9. James ER, Miranda RN, Turner SD. Primary Lymphomas of the Breast: A Review. *JPRAS Open*. 2022;32:127-143. Published 2022 Feb 20. doi:10.1016/j.jpra.2022.01.004.
10. He Y, Mou J, Luo D, Gao B, Wen Y. Primary malignant melanoma of the breast: A case report and review of the literature. *Oncol Lett*. 2014;8(1):238-240. doi:10.3892/ol.2014.2120.
11. Makki J. Diversity of Breast Carcinoma: Histological Subtypes and Clinical Relevance. *Clin Med Insights Pathol*. 2015;8:23-31. Published 2015 Dec 21. doi:10.4137/CPath.S31563.
12. Cerrato F, Labow BI. Diagnosis and management of fibroadenomas in the adolescent breast. *Semin Plast Surg*. 2013;27(1):23-25. doi:10.1055/s-0033-1343992.
13. Barroso-Sousa R, Metzger-Filho O. Differences between invasive lobular and invasive ductal carcinoma of the breast: results and therapeutic implications. *Ther Adv Med Oncol*. 2016;8(4):261-266. doi:10.1177/1758834016644156.
14. Malhotra GK, Zhao X, Band H, Band V. Histological, molecular and functional subtypes of breast cancers. *Cancer Biol Ther*. 2010;10(10):955-960. doi:10.4161/cbt.10.10.13879.
15. Fulga V, Rudico L, Balica AR, Cimpean AM, Saptefrati L, Raica M. Invasive ductal carcinoma of no special type and its corresponding lymph node metastasis: do they have the same immunophenotypic profile?. *Pol J Pathol*. 2015;66(1):30-37. doi:10.5114/pjp.2015.51150.

16. Al-Hashimi MMY. Trends in Breast Cancer Incidence in Iraq During the Period 2000-2019. *Asian Pac J Cancer Prev*. 2021;22(12):3889-3896. Published 2021 Dec 1. doi:10.31557/APJCP.2021.22.12.3889.

17. Mutar MT, Goyani MS, Had AM, Mahmood AS. Pattern of Presentation of Patients With Breast Cancer in Iraq in 2018: A Cross-Sectional Study. *J Glob Oncol*. 2019;5:1-6. doi:10.1200/JGO.19.00041.

18. Hashim HT, Ramadhan MA, Theban KM, Bchara J, El-Abed-El-Rassoul A, Shah J. Assessment of breast cancer risk among Iraqi women in 2019. *BMC Womens Health*. 2021;21(1):412. Published 2021 Dec 15. doi:10.1186/s12905-021-01557-1.

19. Cao SS, Lu CT. Recent perspectives of breast cancer prognosis and predictive factors. *Oncol Lett*. 2016;12(5):3674-3678. doi:10.3892/ol.2016.5149.

20. Phung MT, Tin Tin S, Elwood JM. Prognostic models for breast cancer: a systematic review. *BMC Cancer*. 2019;19(1):230. Published 2019 Mar 14. doi:10.1186/s12885-019-5442-6.

21. Nounou MI, ElAmrawy F, Ahmed N, Abdelraouf K, Goda S, Syed-Sha-Qhattal H. Breast Cancer: Conventional Diagnosis and Treatment Modalities and Recent Patents and Technologies. *Breast Cancer (Auckl)*. 2015;9(Suppl 2):17-34. Published 2015 Sep 27. doi:10.4137/BCBCR.S29420.

22. Onitilo AA, Engel JM, Greenlee RT, Mukesh BN. Breast cancer subtypes based on ER/PR and Her2 expression: comparison of clinicopathologic features and survival. *Clin Med Res*. 2009;7(1-2):4-13. doi:10.3121/cmr.2009.825.

23. Siadati S, Sharbatdaran M, Nikbakhsh N, Ghaemian N. Correlation of ER, PR and HER-2/Neu with other Prognostic Factors in Infiltrating Ductal Carcinoma of Breast. *Iran J Pathol*. 2015;10(3):221-226.

24. Pervaiz F, Rehmani S, Majid S, Anwar H. Evaluation of Hormone Receptor Status (ER/PR/HER2-neu) in Breast Cancer in Pakistan. *J Pak Med Assoc*. 2015;65(7):747-752.

25. Sohail SK, Sarfraz R, Imran M, Kamran M, Qamar S. Estrogen and Progesterone Receptor Expression in Breast Carcinoma and Its Association With Clinicopathological Variables Among the Pakistani Population. *Cureus*. 2020;12(8):e9751. Published 2020 Aug 14. doi:10.7759/cureus.9751.

26. Estrogen receptors, progesterone receptors and their correlation with respect to HER-2/neu status, histological grade, size of lesion, lymph node metastasis, lymphovascular involvement and age in breast cancer patients in a hospital in north India. Nabi MG, Ahangar A, Kaneez S. *Asian J Med Sci*. 2016;7:34.

27. Dayal A, Shah RJ, Kothari S, Patel SM. Correlation of Her-2/neu status with estrogen, progesterone receptors and histologic features in breast carcinoma. *APALM*. 2016; 3:476–483.

28. Staaf J, Ringnér M, Vallon-Christersson J, Jönsson G, Bendahl PO, Holm K, Arason A, Gunnarsson H, Hegardt C, Agnarsson BA, Luts L, Grabau D, Fernö M, Malmström PO, Johannsson OT, Loman N, Barkardottir RB, Borg A. Identification of subtypes in human epidermal growth factor receptor 2-positive breast cancer reveals a gene signature prognostic of outcome. *J Clin Oncol*. 2010;28:1813–1820.

29. Mukohara T. Mechanisms of resistance to anti-human epidermal growth factor receptor 2 agents in breast cancer. *Cancer Sci*. 2010;102(10):1–8. http://dx.doi.org/10.1111/j.1349-7006.2010.01711.x.

30. Parra-Palau JL, Pedersen K, Peg V, Scaltriti M, Angelini PD, Escorihuela M, Mancilla S, Sánchez Pla A, Ramón Y, Cajal S, Baselga J, Arribas J. A major role of p95/611-CTF, a carboxy-terminal fragment of HER2, in the down-modulation of the estrogen receptor in HER-2 positive breast cancers. *Cancer Res.* 2010;70:8537–8546. http://dx.doi.org/10.1158/0008-5472.CAN-10-1701.

31. Sperinde J, Jin X, Banerjee J, Penuel E, Saha A, Diedrich G, Huang W, Leitzel K, Weidler J, Ali SM, Fuchs EM, Singer CF, Köstler WJ, Bates M, Parry G, Winslow J, Lipton A. Quantitation of p95HER2 in parafin sections by sections using a p95-spesific antibody and correlation with outcome in a cohort of trastuzumab-treated breast cancer patients. *Clin Cancer Res.* 2010;16:4226–4235. http://dx.doi.org/10.1158/1078-0432.CCR-10-0410.

32. Sasso Marianna, Bianchi Francesca, Ciravolo Valentina, Tagliabue Elda. Manuela Campiglio HER2 splice variants and their relevance in breast cancer. *Journal of Nucleic Acids Investigation.* 2011;2:e9.

33. Al-Thoubaity FK. Molecular classification of breast cancer: A retrospective cohort study. *Ann Med Surg (Lond).* 2019;49:44-48. Published 2019 Dec 6. doi:10.1016/j.amsu.2019.11.021

34. Sharma JD, Khanna S, Ramchandani S, Kakoti LM, Baruah A, Mamidala V. Prevalence of Molecular Subtypes of Breast Carcinoma and Its Comparison between Two Different Age Groups: A Retrospective Study from a Tertiary Care Center of Northeast India. *South Asian J Cancer.* 2021;10(4):220-224. Published 2021 Dec 31. doi:10.1055/s-0041-1731905

35. Mohammed AA. The clinical behavior of different molecular subtypes of breast cancer. *Cancer Treat Res Commun.* 2021;29:100469. doi:10.1016/j.ctarc.2021.100469