UTILIZING IMMUNE SIGNATURES FOR BREAST CANCER SUBTYPING IN TREATMENT APPROACHES

Nguyen Thi Giang An
School of Education, Vinh University, Vietnam

ARTICLE INFORMATION
Journal: *Vinh University Journal of Sciences*
ISSN: *1859-2228*

Volume: 52
Issue: 2A
***Correspondence:**
nguyengianganbio@vinhuni.edu.vn

Received: 09 Febuary 2023
Accepted: 31 March 2023
Published: 29 May 2023

Citation:
Nguyen Thi Giang An (2023). Utilizing immune signatures for breast cancer subtyping in treatment approaches. ***Vinh Uni. J. Sci.*** *Vol. 52 (2A), pp. 68-79*
doi: 10.56824/vujs.2022a071

ABSTRACT
Breast cancer, a prevalent form of cancer in women, presents various categories that pose challenges in defining specific treatment approaches. Immunohistochemistry, a combination of immunology and histology, has made significant advancements in identifying specific surface receptors on cancer cells. This information serves as the basis for guiding appropriate treatment regimens and predicting prognosis for patients. A survey conducted on 75 tissue samples revealed the diversity of breast carcinoma types, with the infiltrative tubular form being the most common, accounting for 73.3% of cases. By utilizing immunoassay markers on these tissues, the expression rates of ER (estrogen receptor), PR (progesterone receptor), and Her2/neu were determined to be 29.2%, 52%, and 22.7%, respectively. Classification of breast cancer based on these markers showed that the ER/PR+HER2- group accounted for 24% of cases. The ER-/PR+HER2- group accounted for 18.7%, while the ER+/PR+HER2+, ER-/PR+HER2+, and ER-PR+Her2+ groups each represented 12% of cases. The ER-/PR-HER2+HER2+ group accounted for 8%, and a subgroup where all three markers were negative accounted for 22.7% of cases. Estrogen and progesterone expression showed a moderately positive correlation ($0 < r = 0.445 < 0.5$; $p < 0.05$). However, the expression of Her2/neu in ER-negative tumors did not show statistical significance ($p > 0.05$) and exhibited a reverse correlation with $r = -0.016$.

Keywords: Breast cancer; Immunohistochemistry; Her2/neu, ER/PR.

1. Introduction

Breast cancer is a prevalent and significant public health issue, both globally and in Vietnam [7]. According to the GLOBOCAN 2020 data, breast cancer affects over 2.2 million individuals worldwide, resulting in approximately 680,000 deaths. In Vietnam, breast cancer accounts for a substantial portion, representing 25.8% of all cancer cases among women, with over 21,500 new cases and 9,345 deaths [1]. Recent trends indicate a gradual increase in breast cancer incidence in Vietnam. For instance, Nguyen Ba Duc's study in Hanoi observed an increase from 20.3 per 100,000 women in 1998 to 29.7 per 100,000 during the period of 2001-2004. Similarly, another study by Nguyen Chan Hung in Viet Nam noted an increase from 151.4 per 100,000 in 2018 [7].

In cancer diagnosis, conventional histology utilizing HE staining is widely regarded as the gold standard. However, histological diagnosis solely based on cellular morphology and tissue structure may not account for variations in cell origins within tumors. Additionally, breast cancer is characterized by substantial diversity in cell types, each displaying distinct responses to drug treatments. Immunohistochemistry (IHC) merges the fields of immunology and histology to address these challenges. The IHC technique enables the determination of antigen expression or absence in tissues, assessment of antigenic status at the cellular level, and localization of antigens within cells. Presently, IHC has gained popularity and plays a crucial role in evaluating biomarkers in cancer, identifying cellular origins and tissue differentiation, and serving as a valuable tool for definitive cancer diagnosis, prediction of treatment response, and prognosis [15].

2. Materials and methods

2.1. Materials

Paraffin-embedded tissue samples stored at the Department of Pathology, Nghe An Oncology Hospital.

2.2. Histochemistry technique

The samples were prepared by embedding them in paraffin and then sectioned into 3 μm thick slices. These slices were mounted on slides and stained with hematoxylin and eosin (HE) (Sheehan D.C. and Hrapchak, 1980).

2.3 Histological classification

The classification of breast tumors was based on the 2019 WHO criteria. Histological grading of invasive tubular carcinomas according to Scraff Blom Richardson, improved by Elston and Ellis (1991).

2.4. Immunohistochemistry

The slides were prepared by cutting them to a thickness of 3μ and incubated overnight. The paraffin was subsequently removed using xylene and a series of alcohol solutions (70°, 90°, 100°). The antigen on the slides was exposed by subjecting them to a pH of 6 at a temperature of 90-95°C for 15 minutes. Endogenous peroxidase was reduced using a 3% H_2O_2 solution for 10 minutes. the primary antibody (ER, PR, HER-2) was then incubated on the slides for 60 minutes, followed by washing with TBS (Tris-buffered saline). The secondary antibody was incubated for 30 minutes, after which the DAB (3,3'-diaminobenzidine) solution was applied. The slides were washed again with TBS. Finally, hematoxylin staining was performed [4].

Evaluation of IHC staining results

** For ER, PR: Use monoclonal antibodies from mice. Evaluate the results according to the Allred score, based on the rate and intensity of tumor cells as follows:*

Level	Proportion score (PS)						Intensity score (IS)			
	0	1/100	1/10	1/3	2/3	1	Negative	Weak	Intermediate	Strrong
Score	0	1	2	3	4	5	0	1	2	3

Total score = PS + IS; Positive: total score > 0

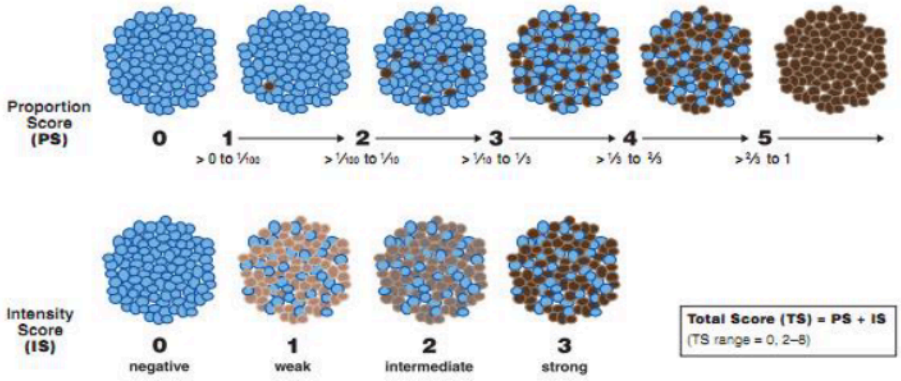

Figure 1: *Allred rating scale for ER and PR* [2]

How to evaluate Her2/neu receptor: Using polyclonal rabbit anti-human antibody. Evaluation according to Dako's criteria, based on the ability of tumor cell membrane to stain color. Positive samples have color capture intensity 2(+) and 3(+).

2.5. Statistical analysis

The data were analyzed using SPSS software

3. Results and discussion

3.1. Expression of ER, PR, Her 2/neu in histological types

Table 1*: Expression of markers ER, PR, Her 2/neu in different breast cancer types[10]*

Breast cancer types			IDC	TC	DCIS	Comedom	LCIS	ILB	Medullary	MC	Papillary	IMP
Marker	n		55	11	2	1	1	1	1	1	1	1
	%		73.3	14.7	2.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3
ER	(-)	n	33	6	2	0	1	1	1	0	1	1
		%	44.0	8.0	2.7	0.0	1.3	1.3	1.3	0.0	1.3	1.3
	(+)	n	22	5	0	1	0	0	0	1	0	0
		%	29.3	6.7	0.0	1.3	0.0	0.0	0.0	1.3	0.0	0.0
	$\chi^2(\delta\phi= 9)=7,84;\ \pi=0,550$											
PR	(-)	n	16	7	0	0	1	1	0	0	0	0
		%	21.3	9.3	0.0	0.0	1.3	1.3	0.0	0.0	0.0	0.0
	(+)	n	39	4	2	1	0	0	1	1	1	1
		%	52.0	5.3	2.7	1.3	0.0	0.0	1.3	1.3	1.3	1.3
	$\chi^2(\delta\phi= 9)=12,491;\ \pi=0,187$											
Her-2/ neu	(-)	n	38	9	1	0	1	1	1	0	1	0
		%	50.7	12.0	1.3	0.0	1.3	1.3	1.3	0.0	1.3	0.0
	(+)	SL	17	2	1	1	0	0	0	1	0	1
		%	22.7	2.7	1.3	1.3	0.0	0.0	0.0	1.3	0.0	1.3
	$\chi^2(\delta\phi= 9)=13,503;\ \pi=0,14$											

The results presented in Table 1 indicate that the most prevalent histological type of breast cancer is invasive ductal carcinoma (IDC), accounting for the highest percentage at 73.3%. Tubular carcinoma (TC) represents 14.7% of cases, while the remaining types have a lower occurrence at 1.3%.

Regarding the expression of ER, PR, and Her2/neu base on histological type, in IDC, ER+, PR+, and Her2/neu+ rates are 29.2%, 52%, and 22.7%, respectively. In TC, the rates of ER+, PR+, and Her2/neu+ expression are 6.7% (5 out of 11 cases), 5.3% (4 out of 11 cases), and 2.7% (2 out of 11 cases), respectively. Other histological types exhibit a low frequency of occurrence. Specifically, lobular and infiltrating lobular carcinoma types show a lack of expression for all three markers (ER, PR, and Her2/neu).

In this study, it was observed that histological types associated with a good prognosis, such as intraductal, cystic, myeloid, mucinous, and papillary carcinomas, exhibited expression of endocrine receptors. IDC, on the other hand, showed variations in tubular formation, morphological diversity of melanoma cells, and a higher degree of cell division compared to TC. However, the evaluation of endocrine receptor expression across different histological types and its independence and correlation were not assessed in this study. According to a study by Nguyen Sao Trung et al. (2004), histological types such as mucinous carcinoma (90% ER+), papillary carcinoma (75% ER+), and lobular carcinoma (higher ER+ rate, $p < 0.05$) demonstrated high expression of estrogen receptors. These types are typically associated with a favorable prognosis during treatment [8].

TC exhibited a low rate of Her-2/neu expression (2.7%), whereas IDC showed a relatively higher rate (22.7%). This finding aligns with the fact that approximately 20-30% of invasive breast cancer cases exhibit Her-2/neu overexpression. The high malignancy of TC may be attributed to excessive tumor cell proliferation and strong vascular invasion, which could explain the elevated expression of Her-2/neu in this histological type [3].

3.2. Expression of ER, PR and Her 2/neu according to histological grade

The study results shown in Table 1 show that among the common types of breast cancer, IDC has the highest prevalence. This type is relatively complex, so the expression level of molecular markers should be considered. The results are shown in Table 2.

Table 2: *Expression of ER, PR and Her 2/neu according to histological grade*

Histological grade			**Expression level (n =55)**					
			ER		**PR**		**Her-2/neu**	
			Negative	**Positive**	**Negative**	**Positive**	**Negative**	**Positive**
Grade I	n	15	10	5	6	9	12	3
	%	27.3	66.7	33.3	40.0	60.0	80.0	20.0
Grade II	n	40	23	17	10	30	26	14
	%	72.7	57.5	42.5	25.0	75.0	65.0	35.0
χ^2(df= 1)			0.144		1.725		0.790	
P			0.705		0.189		0.374	

The growth of mammary tissue is influenced by various hormones and growth factors, with ER playing a crucial role in promoting the growth of both normal and cancerous mammary tissue. ER acts as a survival factor for ER(+) cells and regulates cell differentiation. In this study, when analyzing the histopathology of patients with invasive ductal type, 27% had grade I and 72.7% had grade II. However, the correlation analysis between histology and the expression of ER and PR did not show a significant relationship between these factors ($0 < r = 0.083 < 0.25$, $p > 0.05$, as shown in Table 3.17). This lack of correlation may be due to the relatively small sample size in this study or the fact that the patients were detected at a stage when the cancer cells had already grown significantly. However, previous studies by Nguyen Sao Trung et al. (2004) and Dang Cong Thuan et al. (2011) have shown a strong association between positive ER expression and histology, with lower histology grades exhibiting higher rates of ER positivity and vice versa [14], [8].

Table 2 also indicates a positive correlation (r=0.79) between histological grade and Her-2/neu expression, although it did not reach statistical significance (p>0.05). However, previous research by Nguyen Sao Trung et al. (2004) has demonstrated a close relationship between these two factors. This may be explained by the fact that the surface receptor for Her2/neu is always expressed in normal humans, but over-amplification of the Her2/neu gene leads to overexpression of this receptor in cancer cells [13], [12].

3.3. Expression of ER, PR, Her-2/neu with lymph node metastasis

The status of lymph node metastasis reflects the level of danger in the tumor development stage. Predicting the possibility of metastases not only helps doctors choose the right treatment, but also brings vital benefits to the patient. Because ER, PR, Her-2/neu play a role in the formation, maintenance of survival and the ability to invade neighboring organizations. Therefore, it is necessary to evaluate the expression of these markers with the status of lymph node metastasis.

Table 3: *Expression of ER, PR, Her-2/neu with lymph node metastasis*

Lymph node metastasis status			**Expression level**					
			ER		**PR**		**Her-2/neu**	
			Negative	**Positive**	**Negative**	**Positive**	**Negative**	**Positive**
No metastasis	n	31	20	11	9	22	24	7
	%	41.3	26.7	14.7	12.0	29.3	32.0	9.3
1-2 nodes	n	11	4	7	3	8	8	3
	%	14.7	5.3	9.3	4.0	10.7	10.7	4.0
≥3 nodes	n	25	16	9	10	15	13	12
	%	33.3	21.3	12.0	13.3	20.0*	17.3	16.0*
No information	n	8	6	2	3	5	6	2
	%	10.7	8.0	2.7	4.0	6.7	8.0	2.7
r			0< r = 0.241< 0.25					
P			=0.049					

The results presented in Table 3 demonstrate the expression rates of ER, PR, and Her-2/neu in different groups of patients based on lymph node metastasis. In the group of patients without metastasis, the expression rates of ER, PR, and Her-2/neu were relatively low, with ER at 14.7%, PR at 29%, and Her-2/neu at 9.3%. However, in the group with metastasis to 1-2 lymph nodes, the expression rates slightly increased, with ER at 9.3%, PR at 10.7%, and Her-2/neu at 4%. The highest expression rates were observed in the group with metastasis to 3 lymph nodes, with ER at 12%, PR at 20%, and Her-2/neu at 16.0%.

While there is an increase in the expression rates of these markers in the group with higher lymph node metastasis, the correlation analysis shows that there is no significant correlation between the expression of ER and PR with the number of lymph node metastases (r ER = 0.21, r PR = -0.102, $p > 0.05$). This finding is consistent with the results of previous studies [6], [9], [16]. On the other hand, a positive and weak relationship is observed between the expression of Her-2/neu and the number of lymph node metastases, with a statistically significant correlation ($r = 0.24$, $p < 0.05$). This finding aligns with previous research conducted by Nguyen Sao Trung et al. (2004) [8].

3.4. Expression characteristics of markers ER, PR and Her 2/neu by IHC.

Table 4: *Expression characteristics of markers ER, PR and Her 2/neu*

Marker		**ER**			**PR**			***Her-2/neu***		
Expression characteristics		n	Rates %	Total	n	Rates %	Total	n	Rates %	Total
Negative		46	61.3	61.3	25	33.3	33.3	33	44	68
Positive	**1+**	17	22.7	38.7	20	26.7	66.7	18	24	32
	2+	7	9.3		12	16		7	9.3	
	3+	5	6.7		18	24		17	22.7	

The data presented in Table 4 provides information on the rates of positive expression for ER, PR, and Her-2/neu in breast cancer patients. Among the total of 75 cases analyzed, the ER positive rate was found to be 38.7% (29 out of 75). Within this group, 22.7% had a score of (1+), 9.3% had a score of (2+), and 6.7% had a score of (3+). The PR positive rate was 66.7% (50 out of 75), with 26.7% scoring (1+), 16.0% scoring (2+), and 24.0% scoring (3+). The Her-2/neu positive rate was 32.0% (29 out of 75), with 9.3% scoring (2+) and 22.7% scoring (3+).

Estrogen and progesterone receptors (ER and PR) play a crucial role in breast cancer as their expression status has significant implications for the clinical response to endocrine therapy. The quantification of ER and PR has been standardized, allowing for reliable assessment of their expression levels. Studies, such as the one conducted by Allred et al in 1998, have demonstrated a strong correlation between the expression of ER and the response to endocrine therapy. It was found that approximately 70% of patients with positive ER status responded favorably to endocrine therapy, whereas 85% of patients with negative ER status did not show a response to this type of therapy [2].

Compared with the research results on ER and PR in the country in recent years are summarized in the following table:

Table 5: *Results of staining ER(+), PR(+) of some domestic authors*

Authors	Year	ER+ (%)	PR+ (%)	Her/2neu (%)
Le Dinh Roanh	2001	60.7	61.7	39.8
Ta Van To	2004	59.1	51.4	35.1
Nguyen Sao Trung	2005	49.7	46.6	28.8
Dang Cong Thuan	2011	53.3	47.5	61.3
This research	**2020**	**38.7**	**66.7**	**32.0**

This result shows that the expression of ER is comparatively lower (38.7%), while PR shows a higher expression rate of 66.7%. On the other hand, the expression of Her-2/neu is higher, with a rate of 32.0%.

This result shows that the expression of the ER is lower than that of other authors' studies, the expression of the PR (38.7%) is higher (66.7%), and the expression of the ER is higher. Proximal Her/2neu receptor system (32%)

In breast cancer, the Her-2/neu receptor is known to be associated with increased expression of protein products on the cell surface. Approximately 20-30% of invasive breast carcinomas have been observed to exhibit overexpression of the Her-2/neu receptor [3]. The evaluation of Her-2/neu expression is typically performed using immunohistochemistry (IHC) techniques, which measure the number of Her-2/neu receptors present on the cell surface and detect overexpression of this receptor. Another commonly used method is fluorescence in situ hybridization (FISH), which detects gene amplification by measuring the number of copies of the Her2 gene in the tumor cell nucleus. Among these methods, FISH is considered to provide more accurate results for assessing Her-2/neu status. Research conducted by Doan Thi Phuong Thao in 2011 demonstrated a high concordance rate between IHC and FISH results for the Her-2/neu-negative and Her-2/neu-positive (3+) groups, with over 97% agreement. However, for the Her-2/neu-equivocal (2+) group, only 18.8% showed gene amplification when assessed by FISH. Therefore, in cases where the Her-2/neu-equivocal result is obtained by IHC, it is recommended to perform fluorescence in situ hybridization to further confirm the gene amplification status [5] .

3.5. Breast cancer subtyping based on expression of molecular markers

Based on the expression of molecular markers such as ER, PR and Her2/neu Adedayo A. Onitilo et al. in 2009 divided breast cancer into 4 main groups [9].

Table 6: *Classification of breast cancer based on the expression of ER, PR, Her-2/neu*

Markers	**Group 1** ER/PR (+) HER-2(+)			**Group 2** ER/PR(+), HER2 (-)			**Group 3**	**Group 4**
	(1A) ER^+, PR^+, $HER2^+$	(1B) ER^-/PR^+, $HER2^+$	(1C) ER^+/PR^-, $HER2^+$	(2A) ER^+/PR^+, $HER2^-$	(2B) ER^-/PR^+, $HER2^-$	(2C) ER^+/PR^- $HER2^-$	ER/PR^- $HER2^+$	ER /PR^- $HER2^-$
n	9	9	0	18	14	2	6	17

%	12	12	0	24	18.7	2.7	8	22.7
Total	24%			45,30%			8%	22.7

The results presented in Table 6 indicate that the most prevalent subgroup in this study was characterized by being ER and PR positive, while HER2 was negative (24%). Another subgroup consisted of cases where ER and HER2 were negative, while PR was positive (18.7%). The subgroups with ER+/PR+, HER2+; ER-/PR+, HER2+; and PR and HER2 positive, while ER was negative accounted for 12% each. The ER and PR negative, HER2 positive group accounted for 8%, and the group where all three markers (ER, PR, HER2) were negative represented 22.7% of the cases.

Among these subgroups, the ER/PR(+) HER2/neu(+) group (group 1) accounted for 24.0% of the cases. This subtype is characterized by the concurrent expression of both endocrine factors (ER and PR) and activation of the Her2/neu gene (Figure 1)

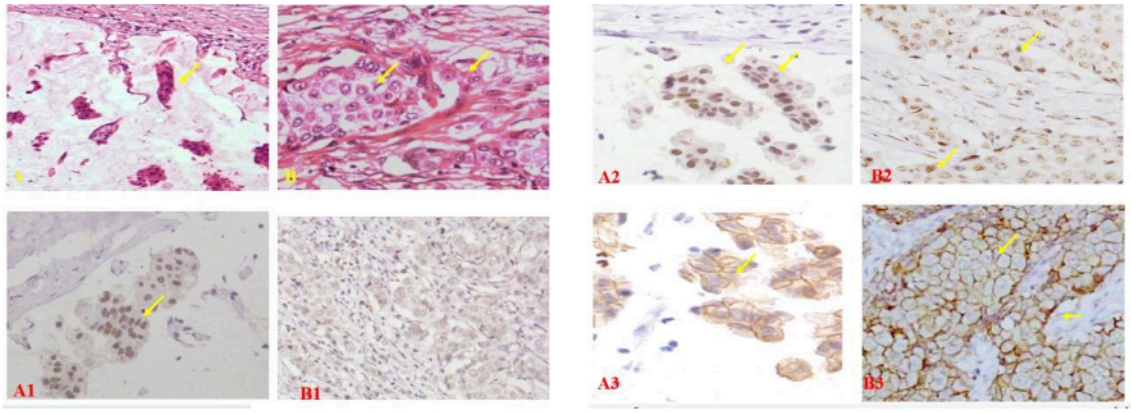

Figure 1: *H.E-stained breast cancer specimens and immunohistochemistry*

***(Note:** **A**: Tumor cells gather in small clusters, "swimming" in the pool of mucus.; **A1**:ER(2+). Multiply low color capture (3 points) with medium intensity (2 points), TS=5 points; **A2**:PR (2+). Multiply low color capture (3 points) with medium intensity (2 points), TS=5 points; **A3**:Her2/neu(2+). The cytoplasmic membrane is incompletely stained in more than 10% of tumor cells. **B**: Tumor cell nuclei are diverse in shape and size, disrupting the typical tubular structure; **B1**: ER(-). Tumor cells do not stain; **B2**: PR(2+).Multiply less color capture (3 points) with medium intensity (2 points), TS=5 points. **B3**: Her2/neu(3+). The plasma membrane is completely stained, darkening in more than 10% of tumor cells.)*

The general assessment reveals that subtypes of ER/PR(+), Her2/neu(+) can be observed across different histological types, but they are predominantly present in ductal adenocarcinoma, with a few cases in lobular structures exhibiting high differentiation, typically in grade II and III. These subtypes are often associated with lymph node metastasis. Combining the mitotic index Ki67 with the expression of these receptors can provide additional information for treatment decisions [5]. Due to the concurrent expression of endocrine receptors and the Her2/neu receptor, the treatment approach for patients with these subtypes requires a combination of endocrine therapy and chemotherapy. A study conducted by Adedayo A. Onitilo (2009) compared the treatment effectiveness of three therapies found that endocrine treatment yielded a response rate of

90.5%, radiation therapy reached 58.6%, while chemotherapy achieved only 68.1% [9]. Patients with lymph node metastases often exhibit overexpression of Her2/neu, which reflects a higher degree of differentiation and invasiveness of tumor cells. This subgroup is associated with a poorer prognosis.

3.6. Multivariate correlation study in breast cancer.

In this study, we have analyzed the linear relationship based on Pearson correlation coefficient (r) and p value to evaluate this correlation. In which, if r has a negative value, it shows a negative correlation, and a positive value shows a positive correlation. The results are shown in Table 7.

Table 7*:Multivariate correlation between markers with each other and with clinical factors*

Factors		ER	PR	Her2	Age	Tumor size	Lymph node metastasis	Histological type	Histological grade
ER	R	1	**0.445”**	-0.16	0.02	-0.120	0.21	-0.067	0.083
	P	0.000	**0.000**	0.889	0.989	0.323	0.869	0.659	0.545
PR	R	**0.445”**	1	1.121	0.05	-0.116	-0.102	-0.121	0.147
	P	**0.00**	0.00	0.3	0.658	0.338	0.412	0.300	0.284
Her2	R	-0.016	0.121	1	-0.08	0.015	0.241’	-0.053	0.145
	P	0.889	0.300	0.000	0.473	0.342	0.049	0.653	0.292
Age	R	0.02	0.05	-0.08	1	0.14	0.032	-0.55	0.005
	p	0.989	0.658	0.473	0.000	0.231	0.786	0.643	0.969
Tumor size	r	-0.120	-0.116	0.015	0.14	1	0.146	0.00	0.040
	p	0.323	0.338	0.342	0.231	0.00	0.210	1.00	0.732
Lymph node metastasis	r	0.21	-0.102	**0.241’**	0.032	0.146	1	-0.212	-0.191
	p	0.869	0.412	**0.049**	0.786	0.210	0.00	0.067	0.101
Histological type	r	-0.067	-0.121	-0.053	-0.55	0.00	-0.212	1	-0.615”
	p	0.659	0.300	0.653	0.643	1.00	0.067	0.000	0.000
Histological grade	r	0.083	0.147	0.145	0.005	0.040	-0.191	**-0.615”**	1
	p	0.545	0.284	0.292	0.969	0.732	0.101	**0.000**	0.000

The correlation between the expression of molecular markers shows that: Estrogene and progesterone have a moderate positive correlation ($0 < r = 0.445 < 0.5$; $p < 0.05$). ER was negatively related to Her-2/neu ($r = -0.016$). Her-2/neu is highly expressed in tumors with ER (-) and has lower expression in tumors with ER (+). PR is positively and negatively related to Her-2/neu. However, it is not statistically significant ($p > 0.05$).

The expression of ER(+)/PR(+), ER(+)/PR(-), and ER(-)/PR(+) is predictive of the response to endocrine therapy, particularly Tamoxifen. Patients with these receptor

combinations are more likely to benefit from endocrine therapy. In cases where there is no lymph node metastasis, endocrine therapy is considered a preferred treatment option.

Overexpression of Her-2/neu is associated with negative ER and PR status. Estrogen and progesterone hormones can inhibit the expression of Her-2/neu. Consequently, tumors with endocrine receptor expression are less likely to express Her-2/neu. This explains why many Her-2/neu-expressing tumors do not respond well to endocrine therapy [11]. The correlation between the expression of molecular markers and clinical factors has been established in several studies. Age, histological grade, and lymph node status have been shown to correlate with the expression of ER, PR, and Her-2/neu. However, in the present study, only Her-2/neu showed a positive correlation with lymph node metastasis (correlation coefficient $r = 0.241$, $p < 0.05$). It is important to note that the limited sample size of this study might have impacted the ability to confirm these correlations. Therefore, in addition to the classical prognostic factors, incorporating molecular markers can provide additional prognostic and therapeutic information. Overexpression of Her-2/neu indicates a poorer prognosis, and treatment options may include the use of a CAF regimen (cyclophosphamide, doxorubicin, 5-Fluorouracil) or targeted therapy with trastuzumab in combination with paclitaxel, cisplatin, and doxorubicin.

4. Conclusion

Based on the molecular markers analyzed using IHC, breast cancer can be classified into four subgroups. The subgroup with ER/PR(+) HER2(-) expression accounted for the highest percentage (45.3%). This subgroup had a PR positivity rate of 66.7%, ER positivity rate of 38.7%, and Her-2 positivity rate of 32.0%. The ER/PR(-) HER2(+) subtype accounted for 8%, while the ER/PR(-) HER2(-) subgroup accounted for 22.7%. These subgroups showed variations in terms of age at presentation, tumor size, histological type, and histological grade. Additionally, a high proportion of patients in these subgroups had lymph node metastasis (55.1%). These findings highlight the heterogeneity of breast cancer and demonstrate how these subtypes can influence the risk and prognosis of the disease. This study provides valuable molecular data to support improved treatment approaches. Longer-term studies can monitor patients' response to treatment and disease progression, which can further contribute to identifying additional risk factors for recurrence, metastasis, and treatment response.

Acknowledgement

We would like to express our sincere thanks to the staff of the Department of Pathology and the leaders of Nghe An Oncology Hospital for supporting us during this research.

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TÓM TẮT

SỬ DỤNG DẤU ẤN MIỄN DỊCH TRONG VIỆC ĐỊNH TYP UNG THƯ BIỂU MÔ TUYẾN VÚ

Nguyễn Thị Giang An
Trường Sư phạm, Trường Đại học Vinh, Việt Nam
Ngày nhận bài 09/02/2023, ngày nhận đăng 29/3/2023

Ung thư vú (UTV) là một trong những loại ung thư chiếm tỷ lệ cao ở phụ nữ và đa dạng về thể loại. Bởi thế, rất khó xác định được phát đồ điều trị cụ thể. Kỹ thuật hóa mô miễn dịch là sự kết hợp giữa miễn dịch và mô học.Thành tựu của nó đã giúp bác sĩ xác định được các thụ thể đặc trưng trên bề mặt tế bào ung thư. Đây chính là cơ sở để hướng phác đồ điều trị phù hợp và tiên lượng cho bệnh nhân**.** Kết quả khảo sát sát trên 75 mô bệnh phẩm cho thấy có sự đa dạng trong thể loại ung thư biểu mô tuyến vú nhưng phổ biến là thể lòng ống thâm nhập chiếm73,3%. Sử dụng các maker miễn dịch trên các mô bệnh phẩm này, kết quả sự biểu hiện của các marker ER, PR và Her 2/neu lần lượt là 29,2%, 52% và 22,7%. Phân loại ung thư vú theo bộ ba marker cho thấy, tỷ lệ bộ ba ER/$PR^{+}HER2^{-}$ chiếm 24%. Nhóm ER^{-}/PR^{+} $HER2^{-}$ chiếm 18,7%. Nhóm $ER^{+}/PR^{+}HER2^{+}$, nhóm $ER^{-}/PR^{+}HER2^{+}$ và nhóm $ER^{-}PR^{+}$ $Her2^{+}$ đều chiếm 12%. Nhóm ER^{-}/PR^{-} $HER2^{+}HER2^{+}$ chiếm 8%, Bên cạnh đó xuất hiện nhóm mà cả 3 marker đều âm tính chiếm 22,7%. Estrogene và progesterone có mối tương quan thuận vừa với nhau ($0< r=0,445 < 0,5$; $p < 0,05$). Her-2/neu biểu hiện với những khối u có ER âm tính nhưng chưa có ý nghĩa về mặt thống kê với $p>0,05$ (tương quan thuận nghịch với $r = -0,016$).

Từ khóa: Ung thư vú; hóa mô miễn dịch; Her2/neu; ER/ PR.