

# The Comparison of Immunohistochemistry Characteristics Between Breast Cancer Patients Under 35 Years Old and Above

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## Abstract

The increasing incidence rate of breast cancer in young women necessitates investigations of clinical and pathological features in this age group. Less hormone receptor expressions and more aggressive behavior have been discussed in very young breast cancer patients. In this study, pathological data of patients diagnosed with Invasive ductal carcinoma referred to Shariati hospital and Tehran cancer institute between 2015 and 2018 was evaluated in two groups: under 35 years old (Group 1) and above (Group 2). Each group contained 156 cases. Estrogen and Progesterone Receptor expression was reported in 62.8% and 63.5% of Group 1, in comparison to 77.6% and 74.4% in Group 2 (P value= 0.004 and 0.0038). Her2 expression was found in 41% of Group 1 and 21.2% of Group 2 (P value= 0.0001). Ki67 was reported as  $41.2 \pm 25.2$  in Group 1 and  $29.6 \pm 21.7$  in Group 2 (P value= 0.001). In conclusion, negative hormone receptor, positive Her2 expression, and higher proliferation rates are found in breast cancer patients under 35 years old.

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## Introduction

Breast cancer is the second most frequent cancer in women, just after skin cancer. The reported rate of breast cancer in women younger than age 35 is about 1.8% [1]. Breast cancers in young age have been shown to be more aggressive in biological behavior and have a high risk of systemic disease when diagnosed [1, 2]. Young breast cancer patients ( $\leq 45$  years old) are considered to express lower estrogen receptor (ER), higher human epidermal growth factor receptor 2 (HER-2), and to show higher grades [3].

## Objectives

In this study, we evaluate immunohistochemistry (IHC) features and other prognostic factors in very

young breast cancer patients ( $\leq 35$  years old) and compare them to older patients.

## Material and Methods

In this retrospective cross-sectional study, data of breast cancer patients admitted between 2015 and 2018 in two institutions, Shariati Hospital and Tehran Cancer Institute, was extracted. All cases of invasive breast cancer were included, while cases of pure carcinoma in situ were excluded. Data of IHC, Grade, Lymph vascular invasion (LVI), stage of disease, tumor size, and number of involved axillary lymph nodes were extracted and compared between two groups, Group I and Group II, representing patients less and more than 35 years old, respectively. Also, the Luminal classification of tumors was compared

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**Table 1:** Immunohistochemistry characteristics

	ER positive	PR positive	HER2 positive	Ki67 percentage rate
Group I <=35 year old	62.8%	63.5%	41%	41.2%
Group II >35 year old	77.6%	77.4%	21.2%	29.6%
P-value	0.004	0.038	0.0001	0.001

**Table 2:** Tumor size, Axillary lymph nodes, Grade and stage

	Tumor size (cm)	Number of Axillary LN involvement	Grade I	Grade II	Grade III	Stage I	Stage II	Stage III	Stage IV
Group I <=35 year old	3.39	2.6	3.9%	53.2%	32%	11.5%	41%	23.7%	6.5%
Group II >35 year old	3.03	2.28	16.7%	48.7%	17.9%	21.8%	42.3%	17.9%	1.7%
P-value	0.182	0.40	0.0004	0.4968	0.006	0.03	0.86	0.27	0.04

**Table 3:** Luminal classification

	Luminal A&B	HER2 enrich	Triple negative
Group I <=35 year old	66%	10.9%	23.1%
Group II >35 year old	78.2%	7.7%	14.1%
P-value	0.023	0.6	0.06

between the two groups. (Luminal A & B: hormone receptor positive and Her2 negative, Her2 enriched: hormone receptor negative and Her2 positive, triple negative: hormone receptor and Her2 negative).

## Results

A total of 312 patients were included in two numerically equal groups of 156 patients. The IHC features are shown in Table 1. Estrogen and progesterone receptor positivity was significantly higher in Group II. There was more Her2 expression in Group I. Ki67 was significantly higher in Group I. There was no significant difference between tumor size nor lymph node involvement in both groups. Higher tumor grade was significantly more in Group I and lower tumor grade was more in Group II. Stage IV and I of disease were more prevalent in Group I and Group II respectively. Lymph vascular invasion (LVI) rate was significantly higher in Group I (Table 2). There was missing data of grade and stage in 43 and 53 patients in Group I and II respectively. Luminal A & B cases were significantly more common in Group II. There were more triple negative breast cancer cases in Group I but it was slightly insignificant (Table 3).

## Discussion

Breast cancer in very young age seems to accompany poor IHC prognostic factors. It is more likely to be

ER and PR negative and Her2 positive. Ki67 rates and grade score are higher and LVI is more common [3]. This study reveals that very young patients are more diagnosed with stage IV breast cancer, and they are less likely to be in Luminal A&B classification. M. Colleoni et al. study showed less ER and PR, and more Her2 expression, higher grade and KI67 in breast cancer cases under 35 years old [4]. In a study by Asmerom Tesfamariam Sengal et al., ER negativity and higher tumor grades were more frequent in patients under 50 years old [5]. Ann H Partridge's study on 17,575 Stage I-III breast cancer cases, resulted that younger woman (under 40 years old) were diagnosed with high stage and grade of breast cancer and also showed higher rate of HER2 positivity [6]. A Sidoni study in Italy, revealed that breast cancer cases younger than 40 years old seem to have higher proliferation rate [7]. This cross-sectional study is limited to discuss about prognosis of very young breast cancer patients. Further studies to investigate local recurrence and survival will be more significant in determining that if younger age is accompanied with worst prognosis in breast cancer.

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