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Age-Specific Features of Breast Cancer in Georgia (Immunohistochemical Study)

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Breast cancer is a leading oncological disease among women in respect of early onset and frequency over the world. There is some relationship between age and tumor malignancy. Study goal was to determine age-specific features of breast cancer in Georgia. Operative and biopsy specimens are examined by general histology methods and immunohistological markers ER, PR, pS2, p53, CD31, Ki67, HER-2. Three age groups comprised: 39 patients aged 45 and less (reproductive age), 46 individuals aged 46-55 (pre-menopause age) and 29 patients over 55 (menopause age). Significant reciprocal correlation is revealed only between oncoprotein HER2, and steroid hormone receptors ER, PR, estrogen regulated protein pS2. Patients' age and tumor malignancy did not show significant correlation with immunohistochemical characteristics. Data obtained do not provide arguments for the expediency of age-dependent stereotyped approach to the treatment of breast cancer. Complex immunohistochemical study and elaboration of individual tactics and strategy of breast cancer treatment is crucial in every clinical case.

Key words: breast cancer, immunohistochemistry, age.

Introduction

Breast cancer is a leading oncological disease among women in respect of early onset and frequency over the world [3, 4, 5, 11]. Georgia does not make exclusion in this respect: 40.6 per 100 000 incidences of breast cancer have been registered in 2002 whereas in 2005 this index was increased up to 47.8 [2].

Successful treatment of breast cancer, especially at early stages of cancer development in leading countries is obvious. Five years clinical remission period after breast cancer treatment is about 70-72% in the USA and Western European countries [1, 4]. This index is much lower in Post-Soviet countries and does not exceed 25% [4]. Death rate from breast cancer is decreased by 24.9 - 38.3% in the USA and by 23.8 – 31.5% in EU during last 20 years due to implementation of screening programs and early diagnostics [5]. Use of immunohistochemical markers in cancer pathohistological diagnostics greatly contributed to elaboration of effective treatment strategy as long as this method helps to identify histological type of cancer, degree of malignancy and sensitivity to treatment.

With the exception of limited private initiatives, breast cancer screening is not put into practice in Georgia. Due to expensiveness of immunohistochemical methods they are carried out only in some clinics.

It is believed that combination of the round-up methods of breast cancer diagnostics (staining with hematoxylin-eosin) and immunohistochemical study (proliferation marker Ki67, steroid hormone receptors ER, PR and estrogen regulated protein pS2, as well as oncoprotein p53, homolog of epidermal growth factor HER-2 and marker of angiogenesis CD31) determines effective strategy and tactics of the treatment [6, 7, 9].

Goal: Study of the related expression of immunohistochemical markers of breast cancer in relation with age and tumor malignancy.

Material and Methods

Operative and biopsy specimens, collected in A. Gvamichava National Cancer Center of Georgia during 2004-2005 are examined by general histology method (hematoxylin-eosin) and immunohistochemical (IHC) markers as ER (estrogen receptor), PR (progesterone receptor), pS2, p53, CD31, Ki67, HER-2. In total 92 cases of breast cancer, all 7 markers were studied in 52 cases while 6 markers (with exception of HER-2) were examined in the rest of 40 cases. Three age groups comprised: 39 patients aged 45 and less (reproductive age), 46 individuals aged 46-55 (pre-menopause age) and 29 patients over 55 (menopause age).

Mono-and polyclonal antibodies (DAKO) were used in immunohistochemical studies. The LSAB+ (labelled streptavidin-biotin+) system and hromogen DAB+ were used to visualize antigen-antibody reaction on paraffin sections.

Cancer histological type and the degree of malignancy were determined according to World Health Organization breast cancer histological classification [15].

To assess the expression of ER(1D5), PR(1A6), Ki67(MIB), p53(DO-7), CD31 (jo7), pS2 (polyclon), HER-2 (polyclon) the specimens were scored by semiquantitative method — from "+" to "+++" [9]. Negativity of the immunohistochemical reaction was marked as "N".

SPSS version 8.0 for Windows was used for multifactorial correlation analysis.

Results and Discussion

Results obtained are shown in the table 1. More patients with high cancer grade were in I group. ER and PR expression levels were increased with age of women, but there was not found statistically significant correlation between age and cancer.

Significant reciprocal correlation is revealed only between oncoprotein HER-2, on the one hand, and steroid hormone receptors ER, PR, and estrogen regulated protein pS2, on the other hand, (Figs. 1, 2, 3). This results are in accordance with data of different investigators [8, 12, 13]. Patients' age and tumor malignancy did not show significant correlation with immunohistochemical characteristics.

Conclusion

Data obtained do not provide arguments for the expediency of age-dependent stereotyped approach to the treatment of breast cancer. Complex immunohistochemical study and elaboration of individual tactics and strategy of breast cancer treatment is crucial in every clinical case.

T a b l e 1. Number of cases (patients) with different degree in immunoexpression of markers (Ki67, ER, PR, pS2, p53, CD31, HER-2) according to the age group and grade of malignancy

Age group / Patient number	Grade	Ki67			ER				PR				pS2				p53				CD31			HER-2		
		+	++	+++	N	+	++	+++	N	+	++	+++	N	+	++	+++	N N	+	++	+++	+	++	+++	+	++	+++
I Group (< 45 age) 39 Patients	G1 – O (*n*)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	G2 – 17	–	11	5	3	4	1	–	3	5	9	–	4	6	7	–	–	10	5	2	–	10	7	1	1	5
	G3 - 22	–	6	16	1	6	5	–	7	4	5	6	13	6	3	–	–	5	10	7	–	9	3			20
II Group (45-55) 24 Patients	G1 - 9	3	6	–	–	1	4	4	–	2	3	4	–	2	3	4	9	–	–	–	–	2	7	–	–	–
	G2 - 10	2	8	–	2	5	3	–	2	3	5	–	4	4	2	–	7	2	1	–	–	3	7	–	3	7
	G3 - 5	–	5	–	2	3	–	–	2	3	–	–	3	2	–	–	–	5	–	–	–	2	3		4	–
III Group (≥ 56) 24 Patients	G1- 21	14	7	–	–	–	4	17	–	–	2	19	–	–	4	17	21	–	–	–	10	5	6			6
	G2 - 6	2	4	–	–	–	5	1	–	3	3	–	–	–	4	2	5	1	–	–	–	6	–		3	
	G3 - 2	–	–	2	–	–	1	1	–	2	–	–	–	2	–	–	–	2	–	–	–	–	2			2

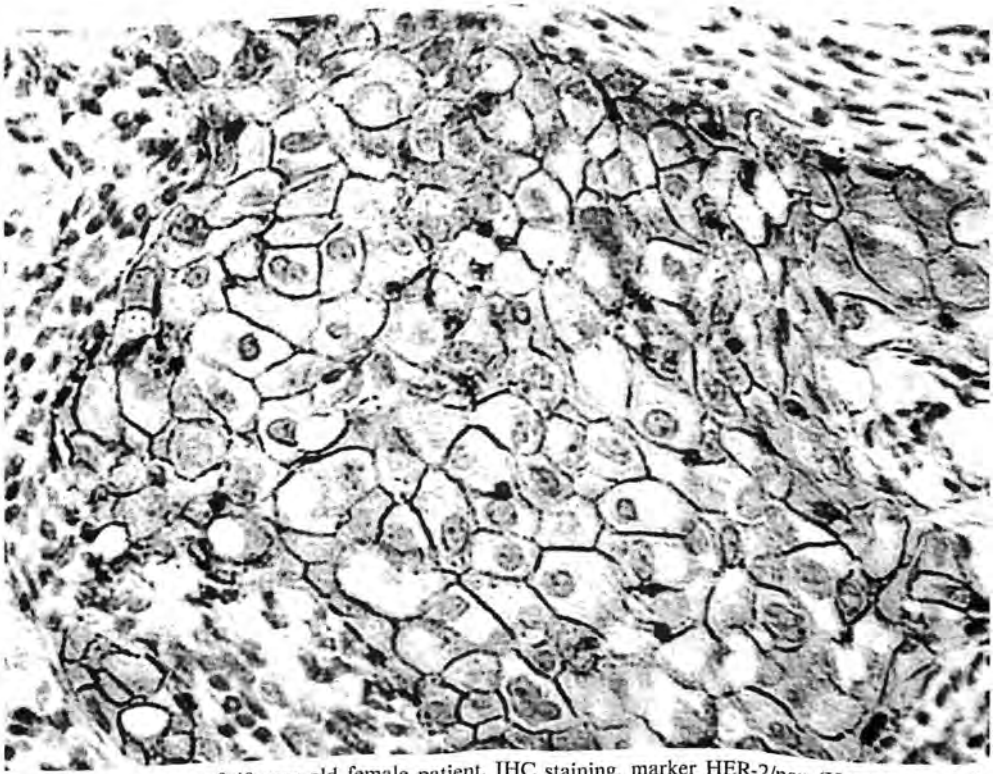

Fig. 1. Breast cancer of 40-year-old female patient. IHC staining, marker HER-2/neu (Hercept test 3+). ×400

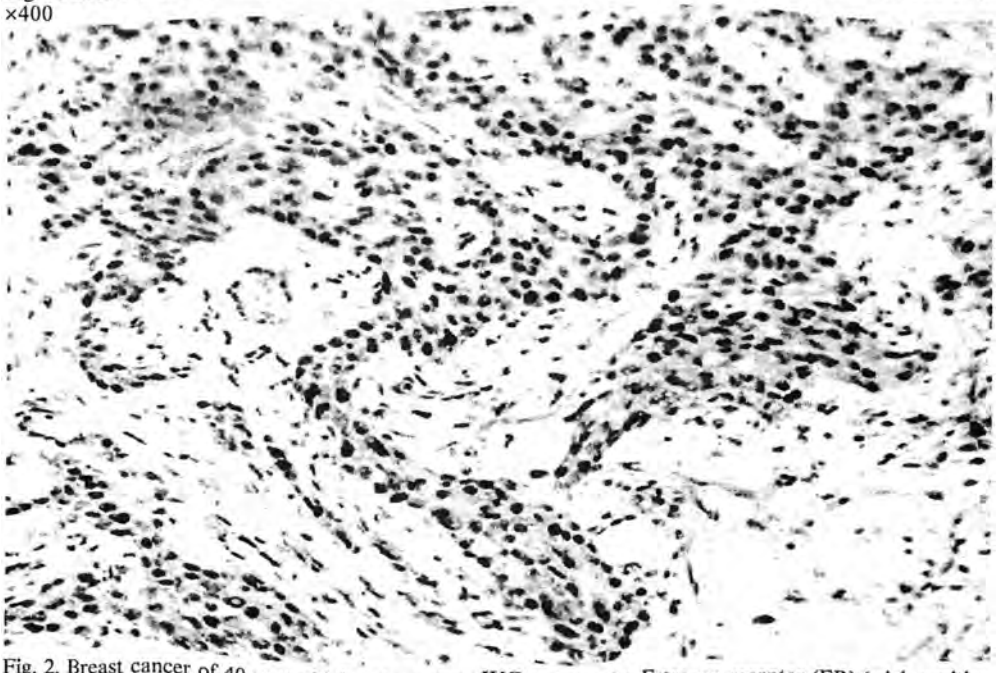

Fig. 2. Breast cancer of 40-year-old female patient. IHC staining for Estrogen receptor (ER) (wick positivity). ×100

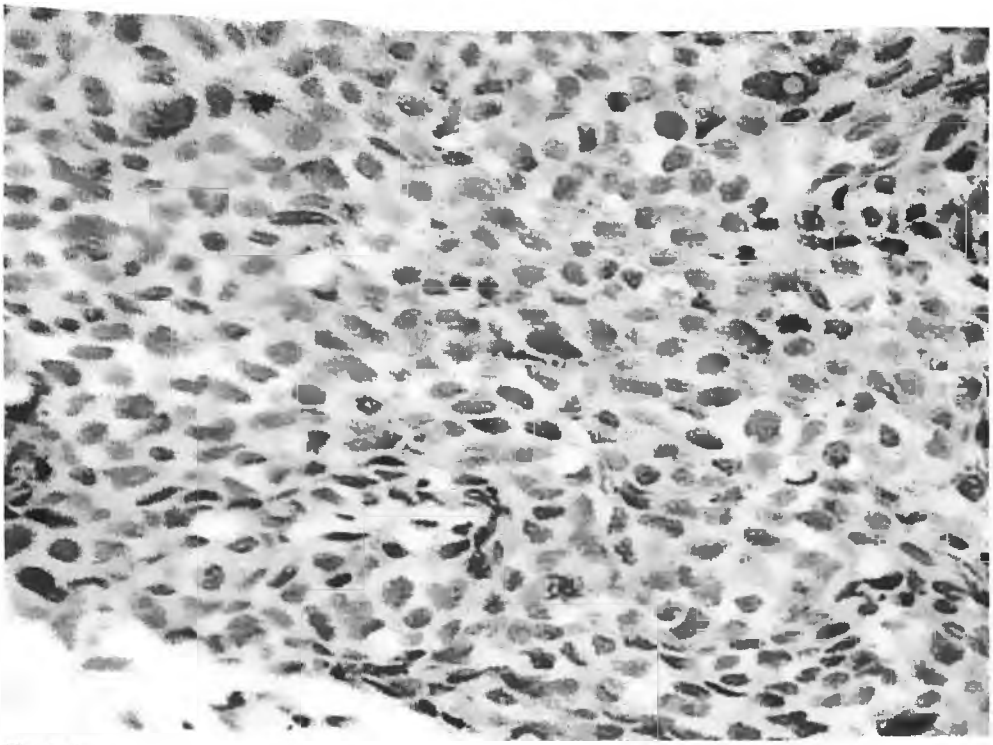

Fig. 3. Breast cancer of 40-year-old female patient. IHC staining for Progesterone receptor (PR) (negativity). ×400

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