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Clinical study of trastuzumab combined with chemotherapy in the treatment of HER2-positive breast cancer

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Abstract: Objective: To evaluate the efficacy of trastuzumab combined with chemotherapy in patients with human epidermal factor receptor 2 (HER2) positive breast cancer. Methods: A total of 88 patients with HER2 positive breast cancer treated in our hospital from 2023 to January 2024 were selected. They were divided into two groups according to the random number table method: the control group44 cases, treated with chemotherapy) and the observation group (44 cases, treated with trastuzumab combined with chemotherapy). The efficacy, incidence adverse reactions, recurrence rate, metastasis rate, tumor marker levels, T lymphocyte subsets, estrogen receptor levels, and progesterone receptor levels before and after were compared between the two groups. Results: The efficacy of the observation group was higher than that of the control group, and the recurrence and metastasis rates were ($P<0.05$). There was no significant difference in the incidence of adverse reactions between the two groups ($P>0.05$). Before treatment there were no significant differences in tumor marker levels, T lymphocyte subsets, estrogen receptor levels, and progesterone receptor levels between the two groups ($P>.05$). After treatment, the tumor marker levels in the observation group were lower than those in the control group, and the T lymphocyte subsets, estrogen levels, and progesterone receptor levels were higher ($P<0.05$). Conclusion: Trastuzumab combined with chemotherapy has a high efficacy patients with HER2 positive breast cancer.

Keywords: Trastuzumab; Chemotherapy; Human Epidermal Growth Factor Receptor 2; Breast Cancer; Clinical

The occurrence of breast cancer is closely related to human epidermal growth factor receptor 2 (HER2), which is involved in the growth and of cells and tissues. Patients with HER2-positive breast cancer have more severe conditions and face greater clinical treatment challenges [1].Conventional chemotherapy can kill tumor cells, but it also kills normal cells in patients, severely affecting their immune function. Trastuzumab can target the HER2 receptor and significantly inhibit the growth of tumor cells [2].This paper will conduct relevant analysis on it.

1. Materials and Methods

1.1 General Information

A total of 88 patients with HER2-positive breast cancer treated in our hospital from January 2023 to January 224 were selected. The control group were all females, aged from 40 to 80 years, with an average age of (60.6±7.71) years. The observation group were all females, aged from 41 to 79 years, with an average age of60.13±6.74) years. There were no significant differences in the general data between the two groups ($p>0.05$ Informed participation. Inclusion criteria: First, all were confirmed by laboratory tests; Second, those with clear consciousness; Third, those with high compliance. Ex criteria: First, those allergic to the drugs used in this study; Second, those with other tumors; Third, those with mental illness

1.2 Methods

The control group received chemotherapy: oral tegafur (40 mg twice daily) for 2 weeks before chemotherapy, and intravenous infusion oforelbine tartrate injection (25 mg/m2 every 3 weeks). The treatment lasted for 18 weeks in total. The manufacturer of Tegafur is Jiangsu Hengrui Medicine Co., Ltd., with the national drug approval number H2013281. The manufacturer of Vinorelbine Tartrate Injection is Jiangsu Hansoh Pharmaceutical Group Co., Ltd., with the national drug approval H19990278.

The observation group was treated with trastuzumab (initial dose of 8 mg/kg intravenous infusion, followed by 6 mg/kg 3 weeks) combined with chemotherapy (as above). The trastuzumab was produced by Roche Shanghai, with the national drug approval number J2180073.

The treatment lasted for a total of 18 weeks.

1.3 Observation Indicators

Compare the two groups in terms of efficacy [3](① complete response = disappearance of target lesions and maintenance for at least 4 weeks ② partial response = reduction of at least 50% in the sum of the diameters of target lesions and maintenance for at least 4 weeks; ③ stable disease = reduction of 25-50% in the sum of the diameters of target lesions; ④ progressive disease = increase of at least25% in the sum of the diameters of target lesions), incidence of adverse reactions (① liver function abnormalities, ② gastrointestinal adverse reactions, ③ agulation function abnormalities, etc.), recurrence rate, metastasis rate, and levels of tumor markers before and after treatment (① carcinoembryonic antigen, ② cancer antigen 125, ③ cancer antigen 153), T lymphocyte subsets (① CD3 , ② CD4), receptor levels, and progesterone receptor levels.

1.4 Statistical Analysis

In this study, SPSS24.0 software was used for inter-group data analysis. For categorical variables, the data were presented in the of (%) and Chi-square test was used. For continuous variables, the data were presented in the form of () and t-test was used. When the obtained P was below the threshold of 0.05, there was a statistical difference between the groups.

2. Result

2.1 Comparison of clinical efficacy, recurrence rate, and metastasis rate between the two groups

Compared with the control group, the observation group had higher efficacy and lower recurrence and metastasis rates, P<0.05. See 1.

Table 1: Comparison of clinical efficacy, recurrence rate, and metastasis rate between the two groups (n/%)

Group	Complete remission	Partial remission	stable	Progress	Clinical efficacy	Recurrence rate	Transfer rate
observation group(n=44)	33(75.00)	8(18.18)	2(4.54)	1(2.27)	41(93.18)	1(2.27)	1(2.27)
control group (n=44)	25(56.82)	7(15.91)	8(18.18)	4(9.09)	32(72.73)	7(15.91)	6(13.64)
χ2value					6.5096	4.9500	3.8801
Pvalue					0.0107	0.0260	0.0488

2.2 Comparison of adverse reaction rates between two groups of HER2-positive breast cancer patients

There was no significant difference in the incidence of adverse reactions between the two groups, P>0.05. See Table 2

Table 2 Comparison of adverse reaction rates between two groups of HER2-positive breast cancer patients (n/%)

Group	Abnormal liver function	Gastrointestinal adverse reactions	Abnormal coagulation function	Incidence of adverse reactions
observation group (n=44)	2 (4.54)	2 (4.54)	3 (6.82)	7 (15.91)
control group (n=44)	3 (6.82)	3 (6.82)	2 (4.54)	8 (18.18)
χ2value				0.0804
Pvalue				0.7768

2.3 Comparison of Clinical Parameters Before and After Treatment Between the Two Groups

Before treatment, there were no differences in tumor marker levels, T lymphocyte subsets, estrogen receptor levels, and progesterone receptor levels between two groups, P>0.05; after treatment, compared with the control group, the tumor marker levels in the observation

group were lower, and the Tocyte subsets, estrogen receptor levels, and progesterone receptor levels were higher, P<0.05. See Table 3.

Table 3 Comparison of clinically relevant indicators before and after treatment in both groups (±s)

Group	Carcinoembryonic antigen(ng/mL)		Cancer antigen 125（U/mL）		Cancer antigen 153（U/mL）		CD3+（%）		CD4+（%）		Progesterone receptor（pmol/L）		Estrogen receptor（pmol/L）	
	before treatment	After treatment	before treatment	After treatment	before treatment	After treatment	before treatment	After treatment	before treatment	After treatment	before treatment	After treatment	before treatment	After treatment
observation group（n=44）	30.26±2.95	7.53±0.12	43.21±4.54	14.84±2.55	31.05±8.82	24.24±3.31	40.15±4.72	65.62±5.85	30.33±3.15	38.18±2.92	26.26±2.74	38.18±2.69	32.02±3.63	49.99±2.82
control group（n=44）	30.28±2.91	8.42±0.43	43.26±4.52	16.66±2.73	31.08±8.79	26.67±3.36	40.17±4.64	61.87±5.22	30.36±3.12	35.75±2.92	26.28±2.71	35.15±2.48	32.05±3.61	45.74±3.33
T value	0.0320	13.2239	0.0517	2.2316	0.0159	3.4175	0.0200	3.1726	0.0448	3.9033	0.0344	5.4933	0.0388	6.4605
P value	0.9745	0.0000	0.9588	0.0017	0.9873	0.0000	0.9841	0.0021	0.9643	0.0000	0.9726	0.0000	0.9691	0.0000

3. Discussion

Breast cancer is more common in women and in recent years, the patients are becoming younger and the number is increasing year by year. HER2 breast cancer is a type of breast cancer with high malignancy, and its clinical characteristics are: high recurrence rate, high metastasis rate, and poor prognosis[4].Trastuzumab is used in patients with HER2-positive breast cancer without damaging their normal cells, but it can kill cancer cells.astuzumab is a monoclonal antibody that inhibits the growth of cancer cells by acting on the HER2 protein region. Some scholars believe that truzumab, whether used alone or in combination with chemotherapy in patients with HER2-positive breast cancer, can improve their quality of life. Therefore, trastumab can be used as the first choice for patient treatment [5].In this study, the efficacy of the observation group was significantly higher than that of the control group, and there was no difference in adverse between the two groups. The above research results indicate the safety and high value of the trastuzumab combined with chemotherapy method. The results of this study that the recurrence rate, metastasis rate, and tumor marker levels in the observation group were lower than those in the control group, while the levels of T lymph subsets, estrogen receptors, and progesterone receptors in the observation group were higher than those in the control group. The reason for the above results is that truzumab not only inhibits HER2 protein expression and interrupts cell growth signals, but also suppresses the growth and proliferation of tumor cells. Although conventional chemotherapyimens can alleviate disease progression, they cannot significantly improve patient prognosis and have significant limitations. Relevant studies have shown that trastuzumab can activate the immune system enhance the body's immune response to tumors [5].It is noteworthy that the combination of trastuzumab and chemotherapy may cause myocardial cell damage in patients with HER2-positive breast cancer, requires increased vigilance.

In summary, the combination of trastuzumab and chemotherapy for HER2-positive breast cancer patients has high efficacy, does not increase adverse reactions to a single chemotherapy regimen, and can actively improve the patient's tumor marker levels, T lymphocyte subsets, estrogen receptor levels, and progesterone receptor levels.

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