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Curative effect of docetaxel chemotherapy combined with zoledronate on breast cancer with osseous metastasis.

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Abstract

Objective: This study aims to analyse the clinical effect of docetaxel chemotherapy combined with zoledronate on patients with osseous metastatic breast cancer.
Methods: Sixty patients with osseous metastatic breast cancer treated in our hospital from January 2014 to May 2016 were randomly selected and divided into control (n=30) and observation groups (n=30). The control group was treated by docetaxel chemotherapy, whereas the observation group was treated by docetaxel chemotherapy combined with zoledronate. The clinical results were statistically analysed.
Results: The symptoms are relieved in 28 cases (93.3%) in the observation group, which is significantly higher than that in the control group (73.3%) (P<0.05). The inhibition rate of MCF7/ADM and MCF-7/S in the observation group is significantly higher than that in the control group (P<0.05). The post-treatment body pain is statistically different between the control and observation groups (4.49 ± 1.80 and 2.87 ± 1.62, respectively) (P<0.05).
Conclusions: The clinical treatment of docetaxel chemotherapy combined with zoledronate can relieve the body pain and increase the curative effect in patients. Docetaxel chemotherapy has promising applications.

Keywords: Zoledronate, Docetaxel, Breast cancer with osseous metastasis, Clinical effect.

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Introduction

Breast cancer is a frequently occurring disease with high fatality rate [1]. Patients with late-stage breast cancer have 76.0% rate of osseous metastasis, which causes different degrees of bone damage and pain and deteriorates the living standard of patients [2]. Docetaxel therapy is a common clinical treatment that can control the disease and relieve pains; however, its final results are unsatisfactory [3]. Our hospital recently adopted the combined docetaxel chemotherapeutics and zoledronate treatments to achieve significant effect. The information of patients with breast cancer in our hospital was analysed in the following text to evaluate the clinical effect of the proposed combined treatment.

Information and Method

General information

Sixty patients with osseous metastatic breast cancer treated in our hospital from January 2014 to May 2016 were randomly selected and divided into the control (n=30) and observation groups (n=30). The patients in the observation group have ages between 36 and 64 with an average of (50.3 ± 1.2). With regard to pain levels, 20 cases have level II, 8 cases have level III, and 2 cases have level IV of pain. The patients in the control group have ages between 37 and 65 with an average of (50.4 ± 1.1). In this group, 18 cases have level II, 9 cases have level III, and 3 cases have level IV pain. The observation and control groups show no statistically significant difference on their general information, including gender, age, and pain level (P>0.05).

Patients selection criteria

Inclusion standards: Patients were diagnosed with breast cancer based on pathological examination and were determined to suffer from osseous metastasis according to ECT and X-ray examination. The patients were assumed to have a 4-month survival period. The patients have normal examination indexes for their liver and kidney functions.

Exclusion standards: Patients with drug allergy, traumatic fracture 4 months before the treatment, and complications with relatively serious hyperglycemia and hypertension were excluded.

Methods

The control group was treated by docetaxel chemotherapy. In brief, 70 mg/m^2 docetaxel (Tianjin Hualida Bioengineering Co., Ltd., SFDA approval no.: H20061259) was intravenously injected to patients at the 1st, 9th, and 22nd d. The observation group was treated by docetaxel chemotherapy combined with zoledronate (Yangzhou Aosaikang Pharmaceutical Co., Ltd.). In particular, 4 mg of zoledronate was dissolved in 100 ml of

normal saline and intravenously injected to patients for 15 min every 3-4 w. Both groups were treated for 2 months.

Observation indexes

The clinical remission rate and pain relief of two groups were compared.

The evaluation standards of curative effect include complete remission, partial remission, no change, and progression. Complete remission refers to the complete disappearance of pains, focus degradation, and recovery of relevant indexes to the normal level. Partial remission refers to relieved pains and recovery of blood calcium level. No change indicates that the pain symptoms remain unimproved, and the above standards are not achieved. Progression refers to the intensified pains and development of new focus. The formula is: remission rate=complete remission rate+partial remission rate. Visual Analog Scale (VAS) was used as the pain evaluation standard. VAS is evaluated by 0-10 scores where 0 represents no pain and 10 represents acute pain.

The inhibition rate of drug-resistant cells was investigated, and the changes in the tumor cell indexes of the two groups were observed.

Statistical method

SPSS16.0 was used for data processing. Measurement data were expressed by ($\bar{x} \pm S$) and evaluated by t-test. Enumeration data were expressed by (n, %) and evaluated by Chi-square test. $P<0.05$ reflects statistically significant difference.

Results

Evaluation of clinical effect

The remission rates of the observation and control groups are 93.3% and 73.3%, respectively, indicating a statistically significant difference ($P<0.05$). Data are listed in Table 1.

Clinical pain evaluation

The body pain scores of the observation and control groups after the treatment are (2.87 ± 1.62) and (4.49 ± 1.80), respectively, indicating a statistically significant difference ($P<0.05$). Data are listed in Table 2.

Comparison of comprehensive curative effects between the two groups

The inhibition rates of MCF7/ADM and MCF-7/S of the observation group are significantly higher than those of the control group, revealing a statistically significant difference ($P<0.05$). Details are listed in Table 3.

Table 1. *Evaluation of clinical effects (n, %).*

Group	Cases	Complete remission	Partial remission	No changes	Progression	Remission rate
Control group	30	8	14	5	3	73.3% (22)
Observation group	30	15	13	2	0	93.3% (28)
χ^2						4.320
P						0.038

Table 2. *Clinical pain evaluation (scores, $\bar{x} \pm S$).*

Group	Cases (n)	Before	After
Control group	30	7.78 ± 3.10	4.49 ± 1.80
Observation group	30	7.80 ± 3.29	2.87 ± 1.62
T		0.024	3.664
P		0.981	0.001

Table 3. *Comparison of the inhibition rates of MCF7/ADM and MCF-7/S.*

Group	Inhibition rate of MCF7/ADM	Inhibition rate of MCF-7/S
Observation group	50.98 ± 0.62	0.201 ± 0.030
Control group	36.43 ± 0.052	0.072 ± 0.030
T	15.796	4.893
P	<0.05	<0.05

Discussion

The breast is composed of skin, fiber tissues, mammary glands, and fats. Breast cancer is a malignant tumor of the epithelial tissues in the mammary gland, which is an important organ to maintain the vital movement of human bodies [4]. *In-situ* breast cancer is non-lethal; however, breast cancer cells easily fall off because they have lost the characteristics of normal cells and are loosely connected. Free cancer cells can spread throughout the whole body *via* the blood or lymph, thereby inducing transformation and threatening lives. Breast cancer has become a common tumor that threatens the physical and psychological health of women [5]. According to China's annual reports of tumor registration, the 0-24 age group has the lowest morbidity of breast cancer. However, the morbidity

increases beyond 25 y old, reaches the peak within 50-54 y old, and declines gradually over 55 y old [6]. Family history of breast cancer is one of the identified major causes. Family history refers to some first-degree relatives (mother, daughter, and sister) developing breast cancer. Breast cancer is a type of tumor with high osseous metastasis. This phenomenon will induce acute pains and dysfunction, thus deteriorating the living standards and even threatening the life of patients. Chemotherapy is currently the dominant clinical therapy that mainly aims to control the disease and eliminate focus [7]. The final therapeutic effect of chemotherapy is unsatisfying due to abundant influencing factors. Therefore, the treatments for breast cancer must be explored and analysed.

As a relatively typical diphosphate, zoledronate can protect the necrotic head of femur and effectively relieve the body pains of patients, thus achieving the goal of pain relief. Furthermore, zoledronate can inhibit the bone resorption of damaged osteocytes, accelerate the apoptosis of damaged bone tissues, and enhance the movement of osteocytes, thus fundamentally preventing complications [7,8]. The combined treatment of docetaxel chemotherapy and zoledronate can meet the above demands and improve the living standards of patients. Previous studies have discussed the pain relief effect of zoledronate for the osseous metastasis of breast cancer, thereby indicating its outstanding effect [9,10]. This finding is in accordance with the results of this paper. To further evaluate the therapeutic effects of docetaxel and zoledronate, our hospital offered two different treatments to 60 patients with osseous metastasis of breast cancer. The remission rate of patients that received docetaxel chemotherapy is 93.3%, which is significantly inferior to that of patients receiving the combined treatment ($P<0.5$). This finding reveals that the combined treatment of docetaxel chemotherapy and zoledronate can improve the symptoms of patients and increase the curative effect for the disease. In comparison, the pain score of the observation group is significantly lower than that of the control group ($P<0.5$), indicating that the combined treatment can relieve pains and improve the living standards of patients.

Conclusion

The combined clinical treatment of docetaxel chemotherapy and zoledronate must be further studies to verify its effective pain relief and outstanding improvement of the curative effect.

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