

EFFECT OF BREAST CONSERVING SURGERY COMBINED WITH SENTINEL LYMPH NODE BIOPSY ON SERUM IL-6, IL-10 LEVELS AND PROGNOSIS OF PATIENTS WITH BREAST CANCER

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ABSTRACT

Objective: To explore the effect of breast conserving surgery combined with sentinel lymph node biopsy on serum interleukin-6 (IL-6), interleukin-10 (IL-10) levels and prognosis of breast cancer patients.

Methods: 118 patients with breast cancer admitted in our hospital from May 2017 to July 2018 were divided into control group and experimental group according to different treatment methods, 59 cases in each group. The control group was treated with traditional radical mastectomy combined with axillary lymph node dissection, while the experimental group was treated with breast conserving surgery combined with sentinel lymph node biopsy. The clinical indicators (operation time, intraoperative blood loss, extubation time, total drainage volume) of breast cancer patients in the two groups were observed and recorded. The quality of life scores (social function, role function, health function, physical function, emotional function), prognosis (recurrence rate, distant metastasis rate, survival rate) and complications were compared between the two groups after 6 months. Limb edema, subcutaneous effusion, skin flap necrosis) and serum levels of IL-6 and IL-10 before and 6 months after treatment.

Results: the operation time, blood loss, extubation time and total drainage volume in the experimental group were significantly lower than those in the control group ($P < 0.05$). After treatment, the serum levels of IL-6 and IL-10 in the two groups were significantly lower than those before treatment ($P < 0.05$), and the levels of serum IL-6 and IL-10 in experimental group were significantly lower than those in control group ($P < 0.05$). The scores of social function, role function and health function in experimental group were significantly lower than those in control group ($P < 0.05$); there was no significant difference in physical function and emotional function between experimental group and control group ($P > 0.05$). There was no significant difference in recurrence rate, distant metastasis rate and survival rate between the experimental group and the control group ($P > 0.05$). The total incidence of complications in experimental group was significantly lower than that in control group ($P < 0.05$).

Conclusion: breast conserving surgery combined with sentinel lymph node biopsy can effectively reduce the levels of serum IL-6 and IL-10 in patients with breast cancer, improve the quality of life of patients, reduce the risk of complications, and promote the recovery of patients. However, it has no significant impact on the prognosis and has high clinical application value.

Keywords: Breast cancer, breast conserving surgery, sentinel lymph node biopsy, IL-6, IL-10.

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Introduction

The incidence rate of breast cancer is second only to lung cancer. According to the data, the incidence rate of breast cancer worldwide accounts for 8% of the total incidence rate of systemic malignancies each year. The number of female deaths in this disease exceeds 200 thousand, which poses a serious threat to women's life and health and the prognosis

is very poor^(1, 2). With the continuous deepening of breast cancer research and the advancement of early evaluation methods, the demand for aesthetics and quality of life has been increasing. Its treatment mode has gradually changed from radical surgery to psycho social mode⁽³⁾. At present, breast conserving surgery has been recognized by internal and external clinical scholars. Sentinel lymph node biopsy surgery for breast cancer patients is beneficial to maintain the

shape of their breasts, and plays an important role in improving the clinical effects and quality of life of patients⁽⁴⁾. Many developed countries have adopted breast-conserving surgery combined with sentinel lymph node biopsy as a first-line treatment for breast cancer, showing good development prospects, and has become one of the mainstream directions of exploration in the professional field of breast cancer in my country⁽⁵⁾. Interleukin-6 (IL-6) has multiple biological activities, which can promote the secretion of inflammatory factors; In addition, it is related to the onset and progression of many types of tumors⁽⁶⁾. Interleukin-10 (IL-10) is an immune anti-inflammatory factor, mainly formed in monocytes, which has pleiotropic effects in immune regulation and inflammatory response⁽⁷⁾. In this study, we used breast-conserving surgery combined with sentinel lymph node biopsy to treat breast cancer patients, aiming to explore the effect of the combination of the two on the serum IL-6 and IL-10 levels and the prognosis of breast cancer patients.

Materials and methods

General information

A total of 118 breast cancer patients who were hospitalized in our hospital from May 2017 to July 2018 were enrolled.

Inclusion criteria:

- Age between 25 and 65 years;
- The same as the breast cancer diagnostic criteria in the 2011 "Regulations for the Diagnosis and Treatment of Breast Cancer";
- Preoperative stereotactic biopsy and diagnosis of breast Cancer;
- The diameter of the tumor is less than 5 cm;
- Inform patients about the research content and obtain informed consent;
- Approved by the ethics committee of our hospital.

Exclusion criteria:

- Exclude those with lesions invading the nipple and areola;
- Exclude those with contraindications to breast cancer surgery;
- Exclude those with cerebrovascular disease, neurological disease, and abnormal bone marrow hematopoietic function;
- Exclude People with severe liver and gallbladder disease. According to different treatment methods, 118 breast cancer patients were divided into control group and experimental group.

Among them, 59 patients in the control group had an average age of (52.21±6.82) years old, and 59 patients in the experimental group had an average age of (55.41±5.41) years old. The general data of breast cancer patients in the group were not statistically different after being tested by statistical software ($P>0.05$).

Method

• Intervention of traditional radical mastectomy combined with axillary lymph node dissection for the control group of breast cancer patients. According to the Berg axillary lymph node classification standard, the range of axillary lymph node dissection was defined, ranging from the anterior edge of the latissimus dorsi to the medial edge of the pectoralis minor. The drainage tube is indwelled and sutured. Breast-conserving surgery combined with sentinel lymph node biopsy for the experimental group of breast cancer patients, breast-conserving surgery: subcutaneous injection of 3 ml of 1% methylene blue (produced by Xiamen Huijia Biotechnology Co., Ltd.) in the areola area. The cancerous tissue and the 2 cm surrounding normal tissues that are visible to the naked eye are removed together. After rapid freezing, if the cutting edge is negative, breast conserving surgery should be performed; If the margin is positive, total mastectomy should be performed. Sentinel lymph node biopsy: the incision was made at the upper part of the breast and axillary fold, the subcutaneous tissue was separated, and the lymphatic vessels entered to explore the first blue stained lymph node. After rapid freezing, if it is negative, it should be sutured by conventional incision. If positive, sentinel lymph node biopsy should be performed and the incision should be sutured.

• Both groups of breast cancer patients received 4 ml of venous blood on the first day after admission and 6 months after the operation. After centrifugation, the serum was separated and stored in an ultra-low temperature refrigerator at -80°C for testing.

Observation indicators

• Observe and record the clinical related indexes of the two groups of breast cancer patients, including 4 indexes of operation time, intraoperative blood loss, extubation time, and total drainage volume.

• The serum levels of two groups of breast cancer patients were collected before treatment and 6 months after treatment, and the levels of IL-6 and IL-10 were measured by radioimmunoassay, and compared at the same time.

- After 6 months, the quality of life scores of the two groups of breast cancer patients were evaluated using the World Health Organization (WHO) quality of life scale, which mainly included 5 items: social function, role function, health function, physical function, and emotional function index.

- After 6 months, observe and analyze the prognosis of the two groups of breast cancer patients, mainly including the recurrence rate, the incidence rate of distant metastasis, and the recurrence rate.

- Observe and compare the occurrence of complications in the two groups of breast cancer patients over the past 6 months, mainly including upper extremity edema, subcutaneous fluid, and skin flap necrosis.

Statistical methods

All data analysis was processed by SPSS23.0. The measurement data of serum IL-6 and IL-10 levels of the two groups of breast cancer patients were expressed as ($\bar{x}\pm s$), and the independent sample t test was used for comparison between the two groups.

The recurrence rate, distant metastasis rate, recurrence rate and other count data of the two groups of breast cancer patients were all expressed in (n(%)). The comparison between the two groups was performed by the χ^2 test; $P<0.05$ was considered as a statistically significant difference.

Results

Comparison of clinical related indicators between the two groups of breast cancer patients

The operation time, intraoperative blood loss, extubation time, and total drainage volume of breast cancer patients in the experimental group were significantly lower than those in the control group ($P<0.05$). See Table 1.

Group	Operation time (min)	Intraoperative blood loss (mL)	Extubation time (d)	Total drainage volume (mL)
Control group	89.52±10.23	153.23±12.45	3.12±1.36	187.53±19.52
Experimental group	58.57±9.84	102.65±11.31	1.12±0.95	102.14±12.18
<i>t</i>	16.748	23.098	9.260	28.507
<i>P</i>	<0.001	<0.001	<0.001	<0.001

Table 1: Comparison of clinical related indicators between two groups of breast cancer patients ($\bar{x}\pm s$).

Comparison of serum IL-6 and IL-10 levels in the two groups of breast cancer patients

After treatment, the serum IL-6 and IL-10 levels of the two groups of breast cancer patients were

significantly lower than those before the treatment ($P<0.05$); and the serum IL-6 and IL-10 levels of the breast cancer patients in the experimental group were significantly lower than those in the control group ($P<0.05$). See Table 2.

Group	Time	IL-6 (pg/mL)	IL-10 ($\mu\text{g/L}$)
Control group	Before the treatment	19.18±3.01	41.63±4.43
	After treatment	11.00±1.63 ^a	37.13±3.29 ^a
Experimental group	Before the treatment	18.71±2.97	43.08±6.35
	After treatment	5.83±1.09 ^{ab}	30.36±2.32 ^{ab}

Table 2: Comparison of serum IL-6 and IL-10 levels in two groups of breast cancer patients ($\bar{x}\pm s$).

Note: Compared with before treatment, ^a $P<0.05$; compared with the control group after treatment, ^b $P<0.05$.

Comparison of the quality of life scores of breast cancer patients between the two groups

The social function, role function, and health function scores of the experimental group of breast cancer patients were significantly lower than those of the control group ($P<0.05$); the physical function and emotional function of the experimental group of breast cancer patients were not statistically different from the control group ($P>0.05$). See Table 3.

Group	Social function	Role function	Health function	Physical function	Emotional function
Control group	18.27±1.93	17.73±2.47	19.03±1.93	11.13±1.80	10.78±3.15
Experimental group	17.46±1.91	16.69±1.93	17.79±1.84	11.36±1.97	10.94±3.03
<i>t</i>	2.291	2.548	3.572	0.662	0.281
<i>P</i>	0.024	0.012	0.001	0.509	0.779

Table 3: Comparison of quality of life scores of two groups of breast cancer patients ($\bar{x}\pm s$).

Analysis of the prognosis of the two groups of breast cancer patients

Compared with the control group, the recurrence rate, distant metastasis rate, and survival rate of breast cancer patients in the experimental group were not statistically different ($P>0.05$). See Table 4.

Group	Recurrence rate	Distant metastasis rate	Survival rate
Control group	4 (6.78)	5 (8.47)	56 (94.92)
Experimental group	3 (5.08)	3 (5.08)	57 (96.61)
χ^2	0.152	0.536	0.209
<i>P</i>	0.697	0.464	0.648

Table 4: Analysis of the prognosis of the two groups of breast cancer patients (n (%)).

Comparison of the risk of complications between the two groups of breast cancer patients

The total incidence of complications of breast cancer patients in the experimental group was significantly lower than that in the control group ($P < 0.05$). See Table 5.

Group	Upper extremity edema	Subcutaneous fluid	Skin flap necrosis	Total incidence
Control group	15 (25.42)	3 (5.08)	1 (1.69)	19 (32.20)
Experimental group	1 (1.69)	1 (1.69)	0 (0.00)	2 (3.94)
χ^2				< 0.001
P				16.741

Table 5: Comparison of the risk of complications between the two groups of breast cancer patients (n (%)).

Discussion

At present, environmental pollution is increasing and people's living habits are changing. Women's breast cancer risk is gradually increasing and tends to be younger. Although there are reports showing that breast cancer has a certain pattern, its mechanism has not been explained⁽⁸⁾. Traditional radical mastectomy for breast cancer includes total mastectomy and axillary lymph node surgery. Although it can improve the clinical efficacy of the patient to a certain extent, this operation is more traumatic and the patient recovers slowly after surgery. It is easy to cause complications such as skin flap necrosis, and The trauma is large, which seriously threatens the quality of life; in addition, traditional radical mastectomy can cause the shape of the patient's breast to be damaged, which will affect the quality of the postoperative marriage⁽⁹⁾. Therefore, we need to find a way to effectively improve the prognosis and quality of life of breast cancer patients.

Relevant clinical reports have shown that sentinel lymph node biopsy can significantly reduce the scope of breast cancer surgery, reduce the risk of postoperative complications, and help preserve the shape of the axilla and improve the quality of breast preservation⁽¹⁰⁾. Another report has shown that 1% methylene blue can stain sentinel lymph nodes in blue, making them easy to find during surgery, which helps prevent surgery-related operations from damaging other normal tissues, and effectively reducing postoperative complications such as upper limb edema and subcutaneous effusion⁽¹¹⁾. Clinical research shows that breast conserving surgery has

high clinical application value, with the advantages of less trauma and faster postoperative recovery. Its combined with sentinel lymph node biopsy can effectively eliminate suspicious axillary lymph nodes and tumor tissue, and can significantly control the risk of postoperative recurrence⁽¹²⁾. Related reports in China show that breast conserving surgery plus sentinel lymph node biopsy can significantly enhance the clinical effect of breast cancer patients, and their quality of life is also improved. The effect of this method on the prognosis of breast cancer is similar to that of traditional radical mastectomy⁽¹³⁾. IL-6 is an important cytokine that can affect the proliferation of cancer cells, mainly produced in lymphocytes and activated vascular endothelial cells, which can control many types of cell functions and promote the secretion of inflammatory factors⁽¹⁴⁾. IL-10 is an immune anti-inflammatory factor, formed in monocytes and lymphocytes, which can improve the survival rate of B cells, promote proliferation and antibody formation, and has important significance in blocking the proliferation of cancer cells⁽¹⁵⁾.

In this study, we observed that the operative time, intraoperative blood loss, extubation time and total drainage volume in the experimental group were significantly lower than those in the control group ($P < 0.05$). This indicates that breast conserving surgery plus sentinel lymph node biopsy can significantly reduce the operative time, postoperative extubation time, and reduce total bleeding volume in patients with breast cancer. After testing serum levels of IL-6 and IL-10, we found that the levels of serum IL-6 and IL-10 in the experimental group were significantly lower than those in the control group ($P < 0.05$). It is indicated that breast conserving surgery plus sentinel lymph node biopsy can significantly reduce serum IL-6 and IL-10 levels in breast cancer patients and alleviate inflammatory response. In addition, the social function, role function, health function score and incidence of complications of breast cancer patients in the experimental group were significantly lower than those in the control group ($P < 0.05$). This indicates that breast conserving surgery plus sentinel lymph node biopsy can significantly enhance the quality of life and reduce the incidence of complications in breast cancer patients.

However, in this study, we did not find that breast-conserving surgery plus sentinel lymph node biopsy had a significant impact on the recurrence rate, distant metastasis rate, and survival rate of breast cancer patients.

To sum up, breast conserving surgery combined with sentinel lymph node biopsy can effectively reduce the serum IL-6 and IL-10 levels, improve the quality of life of patients, reduce the risk of complications, promote the recovery of patients, but have no significant effect on their prognosis, which has a high clinical value.

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