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Analysis of Status and Risk Factors of Disease Progression in Female Breast Cancer Patients in Liuzhou, China

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Abstract: Objective To analyze the current status and disease progression of breast cancer patients in a hospital in Liuzhou, to explore their influencing factors, and to provide reference for breast cancer treatment and prognosis. **Methods** Patients with primary breast cancer diagnosed in the clinical pathway of a hospital in Liuzhou 2022 were selected as study subjects. The patients were divided into different subgroups by collecting various clinical indicators, comparing and analyzing the differences in lipid and pathological characteristics, and further analyzing the relationship between the observed indicators and disease progression through correlation analysis and logistic regression. **Results** The 226 breast cancer patients included were aged between 24 and 78 years, with a median age of 50 years, 124 (54.9%) were menopausal and 102 (45.1%) were not. The percentage of patients with body mass index (BMI), blood glucose, and blood pressure at normal levels before treatment were 55.31%, 90.71%, and 71.24%, respectively. Four lipid indices were found: TC: 5.33 ± 1.03 mmol/L, TG: 1.17 (0.73, 1.69) mmol/L, HDL-C: 1.46 ± 0.34 mmol/L, LDL-C: 2.30 (1.60, 3.50) mmol/L. Pathological stage II (46.0%), histology II (75.6%), tumor T2 stage (55.3%), armpit lymph node negative status (62.8%), Luminal B (37.6%), and no disease progression (83.1%) had the highest percentage. The results of the multifaceted analysis showed that molecular typing and pathological staging were risk factors for disease progression in breast cancer patients (OR 3.165, 19.053, $P < 0.05$, respectively); lipid indexes could not be considered as independent risk factors for disease progression yet ($P > 0.05$). **Conclusion** There is no exact correlation between lipid indices and pathological features and disease progression, molecular typing and pathological staging may be relevant risk factors influencing the progression of the disease, and this study provides a basis for personalized treatment and prognosis of breast cancer patients.

Keywords: Breast Cancer; Disease Progression; Pathological Features; Risk Factors.

1. Introduction

Breast cancer is a common invasive tumor [1], which is one of the most prevalent diseases in the female population, and seriously damages the physical and mental health of women. According to the latest 2020 global cancer burden analysis report released by the International Agency for Research on Cancer (IARC) of the World Health Organization [2], breast cancer has officially replaced lung cancer as the first cancer among malignant tumors in women worldwide. Some studies have shown that the annual new cases of breast cancer worldwide are about 1.15 million, accounting for 23% of all female tumor patients; the death cases are about 410,000, accounting for 14% of all female tumor patients [3]. In China, new cases and deaths of breast cancer are on the rise, and the disease burden of breast cancer is becoming more and more prominent. The data of Globocan2020 show that the number of new cases of female breast cancer in China is 416,371, and the number of deaths of breast cancer is 117,174 [4]. The latest issue of national cancer statistics released by the National Cancer Center (NCC) in 2023 suggests that the number of breast cancer incidence ranks fifth among malignant tumors in the country, and even more so, it is the first in the incidence spectrum of female malignant tumors and the fifth in the death spectrum of female malignant tumors in China. The occurrence and development of breast cancer and its prognosis are affected by a variety of factors, such as age, menstrual status, body mass index (BMI), estrogen level, dietary structure and other factors [5]. Undoubtedly, it is particularly important to determine the pathology characteristics of breast cancer and explore the associated risk factors affecting the progression of the disease. Some scholars [6] have learned from the literature review of the current studies on the correlation between lipids and breast cancer at home and abroad that most of the studies still believe that dyslipidemia has a certain impact on the occurrence, development and even prognosis of breast cancer, and accordingly, the level of lipids can be regarded as one of the predictive indicators for the progression of patients, conditions. At present, there are still controversies about the conclusions of the studies on lipids and breast cancer, therefore, in order to clarify the risk factors of breast cancer progression, the present study focuses on the survey of breast cancer patients in the Breast and Thyroid Surgery Department of a hospital in Liuzhou, to grasp the distribution characteristics of patients, and try to explore the influencing factors of the disease progression of breast cancer patients in order to provide help for the prognosis of breast cancer patients.

2. Information and Methods

2.1. Subject of the Study

The study subjects were selected from all hospitalized patients who were diagnosed with primary breast cancer and received standardized clinical treatment (including surgery, chemotherapy, new auxiliary chemotherapy, radiotherapy, endocrine therapy, targeted therapy, and traditional Chinese medicine) in the Breast and Thyroid Surgery Department of a hospital in Liuzhou in the clinical pathway of 2022, of which a total of 255 hospitalized patients met the inclusion criteria, and were excluded in strict accordance with the exclusion criteria, and a total of 226 patients were included in this study.

2.2. Case Inclusion and Exclusion Criteria

2.2.1. Case Inclusion Criteria

(1) Pathologically confirmed diagnosis and standardized clinical treatment at this institution and postoperative pathological diagnosis of primary breast cancer;

(2) The patient's clinical pathology data were complete and lipid profiles of the patient prior to the first treatment could be obtained.

2.2.2. Case Exclusion Criteria

(1) Men with breast cancer;

(2) Pregnant or lactating women;

(3) Patients who have taken or injected drugs affecting blood lipids before treatment;

(4) Stage IV patients diagnosed with distant metastases at the start of treatment;

(5) Patients with other malignant tumors or personal history of malignant tumors;

(6) Patients with other incomplete clinical data after admission.

2.3. Clinical Pathology Data Collection

Clinical data of eligible patients were collected and compiled, including patients' age before the first treatment, body mass index (BMI), menstrual status, blood pressure, blood glucose, four lipid indices (TC, TG, HDL-C, and LDL-C), pathological data (maximum tumor diameter, armpit lymph node status, TNM stage, pathological stage, molecular typing, and histology grading status), four immunohistochemistry indicators [nuclear value-added antigen (Ki-67), Estrogen Receptor (ER), Progesterone Receptor (PR), Human Epidermal Growth Factor Receptor 2 (HER- 2)] and clinical parameters such as disease progression after treatment (whether recurrence or distant metastasis occurred after treatment).

2.4. Test Methods and Reference Ranges for Relevant Indicators

2.4.1. Lipid Testing and Reference Ranges

Before the first treatment, serum specimens were collected from patients in the fasting state, and a fully automated monitoring system was used for the routine determination of blood lipids in a hospital in Liuzhou. The reference ranges of the relevant indexes were based on the appropriate levels given in the Chinese Guidelines for Lipid Management (2023 Edition) [7]: total cholesterol (TC): < 5.20 mmol/L, triglyceride (TG): < 1.70 mmol/L, high-density lipoprotein (HDL) cholesterol (HDL-C): ≥ 1.00 mmol/L, and low-density lipoprotein (LDL) cholesterol: < 3.40 mmol/L.

2.4.2. TNM Staging, Histology Grading, and Molecular Typing

Referring to the diagnostic criteria for pathological features of breast cancer in China's Breast Cancer Diagnosis and Treatment Guidelines (2022 edition) [8] to determine the various pathological features of the patients: (1) histology grading: invasive carcinoma of the breast was graded according to the presence or absence of glandular ducts formation, nuclear polymorphic, and genetics counts, and classified into grades I, II, and III; (2) TNM and pathological staging in this study, TNM clinical staging (AJCC 8th edition) was used to classify patients into stage 0, I, II and III; (3) molecular typing: according to the 2020 edition of the Chinese Society of Clinical Oncology guidelines for the diagnosis and treatment of breast cancer, breast cancer was classified into four molecular typing according to the expression of four immunohistochemistry indexes in immunohistochemistry, as follows: Luminal A, Luminal B, Her-2 over-expression, and basal-like (triple-negative).

2.5. Statistical Methods

In this study, the required clinical indicators were collected and organized according to the exclusion and inclusion criteria using Excel, and then statistically analyzed using SPSS 26.0 statistical software. The general characterization of the measurement data was expressed in the form of mean ± standard deviation ($\bar{x} \pm s$) or median and upper quartile spacing M (P25, P75), and independent samples t-tests or non-parametric tests were selected for inter-group comparisons; the general characterization of the count data was expressed in relative numbers or constitutive ratios, and the test of variance was performed by chi-square analysis or exact probability test. Correlation analysis took Pearson correlation or Spearman rank correlation for testing; Logistic regression was used to analyze the influencing factors of patients' disease progression. $P < 0.05$, the difference was considered statistically significant.

3. Results

3.1. Basic Patient Profile and General Characterization

A total of 226 patients were included, with a minimum age of 24 years old, a maximum age of 78 years old, and a median age of 50 years old, of which 124 patients were menopausal before the first treatment and 102 were not. Body mass index (BMI) ranged from 16.20 to 33.80 kg/m2, with 125 patients (55.31%) in the normal range, 67 patients (29.65%) overweight, and 26 patients (11.50%) obese. Systolic blood pressure ranged from 90 to 197 mmHg, higher than China's systolic blood pressure standard in a total of 65 cases; diastolic blood pressure ranged from 43 to 115 mmHg, higher than China's diastolic blood pressure standard in a total of 32 cases, in summary, the total number of patients diagnosed as hypertensive was 65 cases (28.76%). In this study, the patients' blood glucose ranged from 3.20 to 14.62 mmol/L, of which 205 patients (90.71%) had normal fasting blood glucose. The maximum diameter of the tumors ranged from 0.6 to 14 cm, and their M (P25, P75) was 2.3 (1.6, 3.5) cm. Lipid indices: TC ranged from 3.07 to 8.33 (5.33 ± 1.03) mmol/L, TG ranged from 0.32- 5.42 mmol/L, HDL-C ranged from 0.72 to 2.85 (1.46 ± 0.34) mmol/L, and LDL-C ranged from 0.93 to 5.84 mmol/L. A total of 118 patients (52.2%) were diagnosed with hyperlipidemia. Pathological

characteristics of all patients: pathological stage II (46.0%), histology grade 2 (75.6%), tumor stage T2 (55.3%), armpit lymph node-negative status (62.8%), Luminal B type (37.6%), and no progression (83.1%) were the highest in percentage. (Table 1)

Table 1. General characterization of clinical indicators in breast cancer patients (n=226)

Feature	$\bar{x} \pm s$	M (P_{25}, P_{75})	Composition ratio (%)
Age	-	50 (44, 58)	-
BMI (kg/m^2)	-	23.10 (21.10, 25.60)	-
Systolic blood pressure (mmHg)	-	127 (116, 143)	-
Diastolic blood pressure (mmHg)	-	76 (70, 84)	-
Blood sugar (mmol/L)	-	4.94 (4.62, 5.43)	-
TC (mmol/L)	5.33 ± 1.03	-	-
TG (mmol/L)	-	1.17 (0.73, 1.69)	-
HDL-C (mmol/L)	1.46 ± 0.34	-	-
LDL-C (mmol/L)	-	3.01 (2.45, 3.66)	-
Lesion diameter (cm)	-	2.30 (1.60, 3.50)	-
Menstrual state			
Menopause	-	-	54.9
Non-menopausal	-	-	45.1
Tumor staging			
Phase T1	-	-	31.9
Phase T2	-	-	55.3
Phase T3	-	-	12.8
Armpit lymph node status			
Positive	-	-	37.2
Negative	-	-	62.8
Pathological stage			
Phase 0-I	-	-	33.2
Phase II	-	-	46.0
Phase III	-	-	20.8
Molecular typing			
Luminal A	-	-	33.6
Luminal B	-	-	37.6
HER2 over-expression	-	-	16.8
Triple negative	-	-	11.9
Histology grading			
Grade I-II	-	-	80.0
Grade III	-	-	20.0
Disease progression			
Recurrence or distant Metastasis	-	-	16.4
No progress	-	-	83.6

3.2. Comparative Analysis of Patients' Clinical Indicators between Different Disease Progressions

Statistical analysis showed that the larger the diameter of the lesion, the presence of armpit lymph node metastasis, and the more severe the pathological stage, the more likely the patient's condition would progress; Luminal B patients were more likely to progress than Luminal A patients, and the difference was statistically significant ($P < 0.05$), whereas there was no statistically significant difference in the comparison of the other clinical indexes between groups ($P > 0.05$). (Table 2)

Table 2. Comparison between lipids in breast cancer patients with different disease progression

Indicator	Disease progression (n=37)	No progress (n=189)	t/Z/χ^2	*P*
Age	50.43 ± 11.45	51.31 ± 10.04	-0.695	0.487
BMI (kg/m^2)	23.56 ± 3.53	23.67 ± 3.37	-0.335	0.737
Systolic blood pressure (mmHg)	130.03 ± 21.79	130.16 ± 18.80	-0.510	0.610
Diastolic blood pressure (mmHg)	76.92 ± 10.32	76.94 ± 11.94	-0.125	0.900
Blood sugar (mmol/L)	5.35 ± 1.87	5.15 ± 0.88	-0.756	0.450
TC (mmol/L)	5.56 ± 1.16	5.29 ± 1.00	-1.356	0.175
TG (mmol/L)	1.42 ± 0.75	1.32 ± 0.83	-1.222	0.222
HDL-C (mmol/L)	1.46 ± 0.32	1.47 ± 0.35	-0.021	0.884
LDL-C (mmol/L)	3.25 ± 1.04	3.03 ± 0.84	-1.272	0.203
Lesion diameter (cm)	2.58 ± 1.48	4.00 ± 2.91	-3.391	0.001
Menstrual state				
Menopausal	20 (20.3)	104 (103.7)	0.012	0.913
Non-menopausal	17 (16.7)	85 (85.3)		
Armpit lymph node status				
Positive	25 (13.8)	59 (70.2)	17.508	< 0.001
Negative	12 (23.2)	130 (118.8)		
Pathological stage				
Phase 0-I	3 (12.3)	72 (62.7)	37.034	< 0.001
Phase II	13 (17.0)	91 (87.0)		
Phase III	21 (7.7)	26 (39.3)		
Molecular typing				
Luminal A	6 (12.4)	70 (63.6)	10.644	0.014
Luminal B	22 (13.9)	63 (71.1)		
HER2 over-expression	4 (6.2)	34 (31.8)		
Triple negative	5 (4.4)	22 (22.6)		
Histology grading				
Grade I-II	22 (25.6)	122 (118.4)	3.079	0.079
Grade III	10 (6.4)	26 (29.6)		

3.3. Comparison of Lipids between Different Pathology Features

Pathological characteristics with differences in Outcome 2.2 were grouped to analyze the differences in lipid indices between subgroups, and the results were as follows:

3.3.1. Comparison of Lipids between Different Tumor Sub-periods

The results showed that TC levels were higher in T1 and T2 patients than in T3 patients, and the difference was statistically significant ($P < 0.05$), while the difference was not statistically significant when comparing between T1 and T2 ($P > 0.05$); and the difference of the remaining indexes was not statistically significant between the different subgroups ($P > 0.05$). (Table 3)

Table 3. Comparison between various clinical indicators in breast cancer patients with different stages

Indicator	Phase T1 (n=72)	Phase T2 (n=125)	Phase T3 (n=29)	Z/F	*P*
TC (mmol/L)	5.32 ± 1.04	5.45 ± 1.00	4.86 ± 1.02	3.969	0.020
TG (mmol/L)	1.31 ± 0.85	1.37 ± 0.86	1.22 ± 0.52	0.151	0.927
HDL-C (mmol/L)	1.48 ± 0.39	1.49 ± 0.32	1.33 ± 0.30	2.653	0.073
LDL-C (mmol/L)	2.99 ± 0.82	3.18 ± 0.89	2.84 ± 0.92	3.858	0.145

3.3.2. Comparison of Lipids between Different Armpit Lymph Node Statuses

The results showed that there was no statistically significant difference in the patients' lipid indices between different armpit lymph node conditions ($P > 0.05$). (Table 4)

Table 4. Comparison various clinical indicators of armpit lymph node status in breast cancer patients

Indicator	Armpit lymph node metastasis (n=72)	No armpit lymph node metastasis occurred (n=125)	Z/t	*P*
TC (mmol/L)	5.46 ± 1.06	5.25 ± 1.01	2.271	0.133
TG (mmol/L)	1.38 ± 0.74	1.31 ± 0.86	1.498	0.134
HDL-C (mmol/L)	1.47 ± 0.38	1.46 ± 0.32	0.008	0.930
LDL-C (mmol/L)	3.18 ± 0.89	3.01 ± 0.87	1.362	0.173

3.3.3. Comparison of Lipids between Different Molecular Typing

The results showed the following: TC levels were statistically significant between molecular types, with Luminal B patients having higher TC levels than Luminal A patients ($P < 0.05$), and there was no statistically significant difference in TC levels between the remaining groups ($P > 0.05$). The differences in the remaining indicators were not statistically significant between the different molecular typing ($P > 0.05$). (Table 5)

Table 5. Comparison between clinical indicators of different molecular staging of breast cancer patients

Indicator	Luminal A (n=76)	Luminal B (n=85)	HER2 over-expression (n=38)	triple negative (n=27)	Z/F	*P*
TC (mmol/L)	5.10 ± 0.86	5.55 ± 1.07	5.33 ± 1.15	5.29 ± 1.07	8.069	0.045
TG (mmol/L)	1.39 ± 1.01	1.44 ± 0.78	1.10 ± 0.51	1.18 ± 0.59	5.563	0.135
HDL-C (mmol/)	1.41 ± 0.30	1.47 ± 0.37	1.52 ± 0.38	1.48 ± 0.29	0.963	0.411
LDL-C (mmol/)	2.86 ± 0.81	3.21 ± 0.88	3.18 ± 0.93	3.08 ± 0.91	2.431	0.066

3.4. Correlation Analysis between Clinical Indicators

Analysis of the results: there was a positive correlation between molecular typing and histology grading; there was a positive correlation between disease progression and armpit lymph node status, lesion diameter, and pathological stage, and there was a positive correlation between lesion diameter and pathological stage, and there was a positive correlation between armpit lymph node status, lesion diameter and pathological stage, and the differences were statistically significant ($P < 0.05$). (Table 6)

Table 6. Spearman's correlation coefficients between disease progression and pathology features

Indicator	Armpit lymph nodes status	Lesion diameter	TNM staging	Molecular typing	Histology grading	Disease progression
Armpit lymph node status	1	0.166[a]	0.634[b]	-0.114	-0.085	0.278[b]
Lesion diameter	-	1	0.474[b]	0.074	-0.015	0.148[a]
Pathological stage	-	-	1	0.124	0.095	0.363[b]
Molecular typing	-	-	-	1	0.258[b]	0.084
Histology grading	-	-	-	-	1	0.131
Disease progression	-	-	-	-	-	1
Note: a indicates significant correlation at the 0.05 level; b indicates significant correlation at the 0.01 level.						

3.5. Factors Affecting the Progression of Breast Cancer Patients

Table 7. Multifaceted logistic regression analysis of risk factors affecting progression

Indicator	*B*	Wals	*P*	OR	95% CI	
					Lower bound	Upper limit
Molecular typing [a]		7.868	0.049			
Luminal B	1.152	4.749	0.029	3.165	1.123	8.919
HER2 over-expression	-0.245	0.114	0.736	0.783	0.188	3.254
Triple negative	0.801	1.257	0.262	2.228	0.549	9.037
Pathological stage [b]		26.759	< 0.001			
Phase II	1.167	3.059	0.080	3.212	0.869	11.879
Phase III	2.947	19.169	< 0.001	19.053	5.093	71.277
Constants	-3.746	28.335	< 0.001	0.024		
Note: a indicates that molecular typing is based on Luminal A type as a reference, and b indicates that pathological staging is based on pathological stage 0-I as a reference.						

Binary logistic regression analysis was used to explore the risk factors affecting the progression of the patients' disease after treatment, and after single variable regression analysis, it could be understood that the general demographic characteristics and lipid indexes of the patients had no influence on the progression of their disease, and the difference was not statistically significant ($P > 0.05$). After single factor analysis of pathological characteristics, it can be understood that they can have an impact on the progression of the patient's disease, and in the above correlation results to remove the problem of covariance, the following indicators are mainly taken for multifaceted analysis, it can be understood that pathological staging and molecular typing are the risk of the patient's disease progression after treatment, and the difference is statistically significant ($P < 0.05$). (Table 7).

4. Discussion

Currently, breast cancer has become the first malignant tumor in the world, and the mortality rate of breast cancer is increasing day by day, seriously threatening women's health. Epidemiological surveys show that breast cancer mortality accounted for 6.9% of all cancer mortality in 2020, becoming the most common malignant tumor endangering women's health [9]. However, there are still many deficiencies in the diagnosis, treatment and prognosis of breast cancer, so it is extremely important to identify the risk factors affecting the prognosis of breast cancer patients as early as possible, to strengthen monitoring and intervention, to reduce recurrence and metastasis after treatment, and to improve the quality of life of patients after surgery.

From the data collected in this study, it can be understood that the preferred age of the 226 breast cancer patients in this study generally showed middle-aged and elderly female patients, with a high incidence age of 44-58 years (50%), and 124 patients (54.9%) were menopausal, which was more delayed compared with the survey of Yang Yuzi [10] (40-50 years), and more compared with the national high incidence age of breast cancer (60-64 years) earlier [11]. This may be more related to differences in female hormone secretion and regional distribution. Secondly, with the aging process in China, the peak age of breast cancer incidence may also be delayed, which also suggests that we should pay attention to the screening of breast-related diseases in women of higher age groups. Through the collection of patients' medical records, it can be understood that the BMI, blood glucose and blood pressure of patients in this study are at the normal level in a large proportion, which are 55.31%, 90.71% and 71.24%, respectively. In the current study, no relevant studies have reported the distribution characteristics of BMI, blood glucose and blood pressure in breast cancer patients. However, it has been pointed out that BMI can affect the occurrence, development and prognosis of breast cancer to a certain extent, or it is an independent risk factor for postoperative hyperlipidemia in patients with invasive breast cancer, and it is also closely related to the clinical characteristics of patients [12-14]. The reason for the failure to obtain consistent results in this study may be that only 26 patients (11.5%) with BMI ≥28 kg/m2 did not reach 15% of the total sample size, which resulted in insufficient confidence in the conclusions obtained and failed to find associations with patients' pathological characteristics and disease progression, so if we want to further substantiate this point of view, this study still needs a larger sample population to Therefore, in order to further confirm this idea, this study still needs a larger sample population for further clarification.

In the current clinical management of breast cancer, the pathological characteristics of patients often provide a basis for the selection of treatment modalities and the judgment of prognosis. In this study, we found that the pathology characteristics of the breast cancer patients in this institution were highest in the proportion of pathological stage II (46.0%), histology II (75.6%), tumor T2 stage (55.3%), armpit lymph node-negative status (62.8%), molecular type Luminal B (37.6%), and no progression (83.1%), and the composition of the proportions was similar to that reported by some scholars' studies on the breast cancer distribution characteristics [15]; while another scholar's [16] study had the highest percentage of molecular type Luminal A. The reason for this may be due to the different standards of detection methods used in the two studies, the standard used in this study was Ki-67 with a cut-off of 15%, so when the number of patients with Luminal B increased, the number of patients with Luminal A decreased accordingly, and secondly, this study found that Luminal B and HER-2 over-expression were more prone to armpit lymph node metastasis than Luminal A. This is in line with the previously mentioned scholars' study [9]. This is close to the conclusion that Ki-67 is not involved in lipid metabolism in breast cancer and HER-2 affects postoperative metastasis or recurrence in breast cancer patients, which is not consistent with the findings of other scholars [17], probably due to the differences in race, region and sample size. The multifaceted logistic regression analysis in this study showed that molecular typing and pathological staging were the risk factors affecting the occurrence and progression of breast cancer patients, which was consistent with the reports in the domestic literature [18-21], which concluded that with the progression of tumor staging, the survival rate of breast cancer patients showed a significant decreasing trend, and the tumor diameter and staging were the prognostic risk factors for breast cancer patients, which was consistent with scholars' proposal [22,23] that the tumor pathology staging and molecular typing were the independent risk factors for the metastatic recurrence of breast cancer.

In the current research on breast cancer, in addition to its own pathological characteristics, the serum lipid levels of patients are also one of the hot spots of current research. This study showed that patients' dyslipidemia was manifested in TC, TG, and LDL-C levels higher than the normal range, with the proportions of 52.21%, 23.89%, and 37.61%, respectively, and HDL-C lower than the normal range (9.29%). However, a case-control study [24] showed that patients' serum TC and LDL-C levels were higher compared to those in the healthy cohort, while HDL-C levels and TG levels were relatively lower compared to those in the healthy cohort, which differed from the results obtained in the present study, and the failure to confirm the credibility of this observation due to the absence of case-control analysis in the present study is one of the limitations of the present study. In the exploration of the mechanism of action of lipids on the development of breast cancer, some studies have shown that this may be related to the fact that TG in vivo competitively binds to sex hormone-binding globulin (SHBG) to increase the level of estrogen in vivo [25]. Some studies have also shown that the proliferation and migration of tumors increase the demand for lipids and cholesterol by tumor cells, which increases their intake of

lipids and cholesterol and strengthens the body's biosynthesis ability to synthesize fatty acids and cholesterol, which leads to an increase in the level of serum lipid indexes in breast cancer patients [26]. In this study, 118 out of 226 patients (52.21%) were diagnosed with hyperlipidemia, of which 23 patients experienced progression after treatment, failing to confirm conclusively the existence of a correlation between dyslipidemia and the progression of breast cancer. However, some studies have pointed out that serum lipid levels are negatively correlated with the development of breast cancer, which may be related to the fact that a decrease in total cholesterol levels leads to a decrease in the stability of immune cell membranes, which leads to a decrease in the body's immune ability [6,27]. In this study, only 10 of 226 patients (4.42%) had TC below the normal range, and one of them had progressed after treatment. In addition, some studies have reported that dyslipidemia can lead to recurrence and distant metastasis in breast cancer patients [28], but an association between lipids and disease progression could not be found in this study. Some studies have suggested that lipid levels in young breast cancer patients are associated with lymph node metastasis, histology grading and HER2 expression, and that TG has clinical significance [29], but in the present study, only patients with Luminal B type and tumors in stages T1 and T2 were found to have higher TC levels than patients with Luminal A type and tumors in stage T3, and the differences of the other lipid indices among the different subgroups were not The correlation analysis also failed to find any correlation between TC and molecular staging and tumor stage, which is consistent with the results of the correlation between TC and molecular staging in the study of Li Chengwei [30]. Therefore, in the analysis of whether the lipid index can be used as the progression of patients after treatment, this study concluded that the lipid index has no exact correlation with the progression of breast cancer patients, and cannot be used as an independent risk factor for the prognosis of breast cancer patients, which is in line with the scholars' [9,22] opinion that the lipid index could not be used as an independent risk factor for the occurrence and development of breast cancer and its prognosis, which may be due to the fact that most of the patients in this study had a short course of disease and had not been able to observe their progression or death. The reason for this may be that most of the patients in this study had a short course of disease, and their progression or death had not been observed, and the total sample size and the number of patients with progression of disease were small, which may have caused the results of this study to be insignificant.

In conclusion, the results of this study suggest that the overall performance of breast cancer patients in this department of the hospital is middle-aged and elderly women, different tumor stages and molecular typing are relevant risk factors for breast cancer patients, which have an impact on the progression of the patients' disease, and the abnormalities of lipid indexes have no impact on the recurrence and metastasis of breast cancer, and cannot be used as an independent risk factor. Although lipid cannot be an independent risk factor, it can play a role in the prognosis of patients as an indirect influence factor, so strengthening the monitoring of lipid metabolism level before and after treatment can be beneficial to improve the quality of life of patients. Based on the findings of this study, the authors concluded that a healthy lifestyle and good control of blood glucose and lipids are of great benefit in the prevention of breast cancer.

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