

Clinical Study on the Impact of long-term Survival Quality in Postoperative Patients with Breast Cancer by Logistic Regression Analysis Model

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Abstract Objective To study the integrated impact factors to long-term survival quality in postoperative patients with breast cancer. **Methods** A single and general multivariate retrospect analysis was performed by the Logistic regression model to 188 cases of patients with breast Cancer. **Results** Single factor analysis displayed such as age, drinking, society function and economic situation correlated with health, lymphatic metastasis instance and hormone dependence make no effect on long-term survival in postoperative patients with breast cancer. Both single factor and multiple factor analysis displayed, besides operation pattern, growth pattern and morbidity time, the change of emotional function and social function were independent factors which influence long-term survival in postoperative patients with breast cancer. **Conclusions** The change of emotional function and social function were the most important independent factors. They may play an important role in prognosis and making the postoperative treatment and follow-up program for patients with breast cancer. We should think along with all the others factors in order to evaluate the prognosis of patients with breast cancer more accurately.

Key Words Breast cancer; Survival quality; Prognosis; Regression analysis

With modern medical model transforming from biomedical model to biology-psychology-community medical model, the therapy no longer simply emphasized the minification of tumor as well as prolongation of life span, meanwhile, emphasizes the improving the quality of life^[1]. As a result, study for patients' quality of life (QOL) was emphasized increasingly. For this reason, we pulled 188 cases of clinical pathologic documents of postoperative patients with breast cancer into Logistic regression analysis model, to make clinical synthetic evaluation and analysis in order to further improve their quality of life and get effect of long-term survival.

MATERIALS AND METHODS

General material According to selected standard we chose 188 cases out of 256 patients who have

been treated by Oncosurgery Department in the First Hospital of Xi'an Jiaotong University from Jan. 1996 to Jan. 2000, which were all diagnosed definitely by pathohistology after operation and have received radiotherapy and chemotherapy. The selected standard is: ①making a definite diagnosis of breast cancer according to clinical pathology; ② status of postoperative recurrence and metastasis was conclusive, furthermore, the cases of recurrence and metastasis were confirmed by clinic, CT, type-B ultrasonic and X-rays photographs; ③ character of operation was reforming radical correction; ④ having no preoperative radiotherapy and chemotherapy; ⑤ depleting postoperative recurrence and metastasis or cases of death among 3 months. Mean age of the patients is (49.39±6.29) years old, (ranged form 35 to 75 years old).

Methods of operation: breast-keeping operation-15 cases, typical radical correction-24 cases, reforming radical correction-144 cases, exaggerative radical correction-4 cases, 1 case received typical radical correction on left breast and reforming radical correction on right breast.

Classification of pathology: infiltrating ductal carcinoma-166 cases, infiltrating lobular carcinoma-9 cases, myxo-adenocarcinoma-3 cases, carcinoma-2

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cases, intraductal carcinoma-8 cases.

Lymphatic metastasis status: 0 pieces-158 cases, <3 pieces-23 cases, 3~7 pieces-5 cases, >7 pieces-2 cases; ER(+), PR(+)-127 cases; ER(+), PR(-)-14 cases; ER(-), PR(+)-15 cases; ER(-), PR(-)-32 cases.

Postoperative patients received CMF project-29 cases, CEF project-124 cases, others-11 cases. Postoperative patients received radiotherapy-31 cases. Patients used TAM-165 cases.

Status of follow-up visit Postoperative patients got clinic rechecking 1 time per 3 months in the first year, then got follow-up visit 1 time per 6 months. The deadline of follow-up visit is Dec 30th, 2004. Full set of documents included complete data bobtail cases 168 (among which had visit loss-4 cases, died of breast cancer-2 cases, died of other diseases-2 cases, survival-182 cases).

Statistical methods 16 items of lifestyles and clinical pathologic factors have been used as the indexes of analysis, which came from clinical records and may influence prognosis of patients with breast cancer. Patients' live time were calculated by month, which means the time span from operation day to death or termination of follow-up

visit, and we put corresponding data of every patients into computer on the basis of clinical records and results of follow-up visit, and dealt data via SPSS10.0 for WINDOWS software and calculate survival rate with life table method, then the comparison of survival rate was done with Log-rank analysis. All indexes were done analysis of survival rate difference by single factor logistic regression analysis model, and then put significant indexes into multivariate logistic regression analysis model. (using gradually forward progressive method, two-tailed $\alpha=0.05$)

RESULTS

Survival rate status 5-year follow-up visit rate of whole group of documents was 89.4%; among 188 patients, death of breast cancer-2 cases, average live time-58.5 months; 1 year survival rate-100%; 3 year survival rate-99. 5%; 5 year survival rate-96.8%.

Single factor Logistic regression analysis

On the level of $\alpha=0.05$, it was indicated by analytic results that the life-style and clinical patho-

Table 1 16 items of survival analysis index and quantification

Variable	Index	quantification
X1	age	Years of age
X2	Operation method	Whole breast resection=0, breast-keeping operation=1
X3	Axillary nodes metastasis	no=0 yes=1
X4	Drinking	no=0 yes=1
X5	Tstaging	T1=0 T2=1 T3=2 T4=3
X6	Nstaging	N0=0 N1=1 N2=2 N3=3
X7	Pathology differentiation	Well-differentiated=1, moderately differentiated =2, poorly differentiated =3
X8	Growth pattern **	Infiltrating type=1*, lump type=2
X9	Body weight loss	no=0 yes=1
X10	Morbidity time***	<3 months=1, 3~6 months=2, >6 months=3
X11	Emotional function (tension ,worry ,emotional control)	light=1, midst=2, heavy =3
X12	Cognitional function(retention difficulty or not, concentration or not)	light=1, midst=2, heavy =3
X13	Social function(family life , social intercourse limited or not)	Light limited=1, midst limited=2, heavy limited =3
X14	Economical status correlated with health (diseases and treatment influence patients' economy)	Light influence=1, midst influence=2, heavy influence=3
X15	Lymphoid node metastasis	0 piece=1, <3 pieces=2, >3 pieces=3
X16	Hormonal dependent (ER , PR detection result)	Entirely masculine=1, partly masculine =2, entirely negative=3

*because cases are not enough, we do not put the data into statistical analysis model ** referring to we can touch the lump preoperatively ***referring to the time span from the first symptom appearance to the operation day.

logic factors which influence survival time significantly include operation method of breast cancer, axillary lymph nodes metastasis status, T staging, N staging, pathologic differentiation, growth pattern, weight loss, morbidity time, emotional function and social function. But patients' age, drinking, social function and economic status correlated with health had no influence on the long-term survival time of postoperative patients with breast cancer. (See table 2)

Multivariate Logistic regression model analysis

On the level of $\alpha=0.01$, it was indicated by analytic results that the life-style and clinical pathologic factors which influence survival time significantly include operation method of breast cancer, growth pattern, morbidity time, emotional function and social function (See Table 3).

DISCUSSION

Prognosis estimation of patients with malignant tumor is one of the important contents in tumor clinical works. Effective prognosis estimation can

help doctor more reasonably to choose disposal strategy at early stage for patients; and can be of benefit to giving individually prognosis suggestion and concern for patients, thereby, finally improve survival quality and effect of patients.

Breast cancer is the most frequent malignancy in women, and its incidence is increasingly as well. Over the last 20 years, the operation for breast cancer, chemotherapy, radiotherapy, internal hormone, traditional Chinese medicine, and biotherapy have been made a full-grown progress. Nevertheless, with the transformation of modern medical model, the therapy of breast cancer has no longer purely paid attention to tumor minification and extension of life span, meanwhile emphasized the improvement of patients' survival quality^[1].

From socially functional point of view, such as family and work role, disease and therapy have few influences on the family life, as it's concerned with apprehension got from family. To the aspect of patients' social activities, most of them can attend social activities with powerful energies and favorable minds. Nevertheless, part of young patients postoperatively may get some self-abasement owing to

Table 2 Indexes of single factor logistic regression analysis model

variables	Indexes	Coefficient of regression (β)	Standard error (SE)	Standard coefficient of regression (HR)	value
X2	Operation methods	-1.678	0.291	0.187	<0.01
X3	Axillary lymph nodes	0.999	0.122	2.716	<0.01
X5	Tstaging	1.169	0.115	3.218	<0.01
X6	Nstaging	0.809	0.136	2.246	<0.01
X7	Pathology differentiation	-1.348	0.220	0.260	<0.01
X8	Growth pattern	2.122	0.229	8.350	<0.01
X9	Weight loss	0.294	0.126	1.341	<0.05
X10	Invasion time	0.999	0.122	2.716	<0.01
X11	Emotional function	-0.6735	0.2050	1.031	<0.01
X13	Social function	0.7133	0.3754	2.096	<0.01

Table 3 outstanding index of multivariate logistic regression model analysis

variables	Indexes	Coefficient of regression (β)	Standard error (SE)	value (step 0)	value (step 1)	value (step 2)
X2	Operation methods	-1.678	0.291	0.001	0.001	0.002
X8	Growth pattern	2.122	0.229	0.034	0.041	0.022
X10	morbidity time	0.999	0.122	0.004	0.006	0.011
X11	Emotional function	-0.6735	0.2050	0.007	0.001	0.001
X13	Social function	0.7113	0.3754	0.033	0.027	0.009

worrying about discrimination coming from colleagues, which is apparently limit to acting role such as family life and social work's aspect. It demonstrates that operation for breast cancer, radiotherapy and chemotherapy bring about some serious harm and let patients hardly recover to touch normal condition, which may arise from both operation and spirit aspects. Yet, most of patients with shortly morbidity time and hormonal dependence can break away from weak condition after operation more quickly to recover and get elemental self-care ability, such as having a meal, putting on clothes, rinsing and washing, entering toilet and social activities on a small scale, due to operation in time and application of endocrine therapy of early stage.

At the feeling aspect, most of patients with breast cancer may undergo emotional transformation, such as feel anxious, tense, depression and angry, etc, owing to all kinds of by-effect of radiotherapy and chemotherapy and fear of cancer. Especially, in the patients with advanced poorly differentiated tumor or with advanced clinical stage, the affection is more obviously. Furthermore, different economical ability of family also restricts seriously therapy moods of patients. It is worth mentioning that seemingly part of patients' anxious feeling and depression, with the development of breast-keeping operation, obviously take a turn for the better, because of seeing the hope of recovery. But they still feel anxious about cancer recurrence as well as metastasis. Thus, we must, in the process of therapy, think highly of chief complaints of patients, and help them to eliminate indisposition; and diminish fear of diseases and enhance confidence of defeating disease.

The prognosis of breast cancer is differences tremendous, most commonly used indexes of clinic to evaluate its prognosis refer to TMN staging system and degree of tumor pathology, which reflect pathological anatomic scope and histological transformation affecting prognosis. Yet above-mentioned 2 groups of indexes in clinic also have many insufficiencies, we usually found that the postoperative prognosis of the patients with same pathologic staging and same pathologic differentiation were not same, and even more different. It is possibly primary reason is that these two indexes are merely based on descriptions of tumor histomorphology, and yet they ignore biologic factors intimately correlation with patients' prognosis. It was reported o-

verseas that biologic malignancy could affect survival and prognosis of patients with breast cancer through other pathways, Bertucci^[2] et al considered that recurrence of tumor in progression more depended on biologic character other than anatomic factors. At present, there are so lots of biologic indexes about concerning affecting prognosis of breast cancer, but most of these are concentrated in laboratory indexes about molecular biology, such as P53, CD34, CD44, CyclinD, etc, which keep certainly distance away from clinical application. But clinical symptoms reflect biological proceeding about patients' malignancy process, which properly contain lots of biological prognosis messages as the independently and additionally biological prognosis factors to both TNM staging system and degree of tumor pathology differentiation. Furthermore, it is more easily to be applied in clinic and has been reported by literature about renal carcinoma, nasopharyngeal carcinoma, oropharynx carcinoma and carcinoma of prostate. The outcomes of this group of patients with breast cancer indicate that clinical symptoms, besides life-style and clinical pathology factors, have importantly influence on prognosis of breast cancer as well. Of the symptoms, growth pattern of breast cancer is a protective factor, possibly because appearances of tumor make for early discovery, early diagnosis and early treatment. But metastasis of axillary lymph nodes maybe means higher biological malignancy of tumor and bad prognosis. Thus, follow-up of these patients after operation must be reinforced so as to improve their survival qualities and rates as far as possible.

In brief, there are still many risk factors influencing long-term survival effect of the patients with postoperative breast cancer, which include independent effects and comprehensive effects that refer to entire independent effects' product of multiplication. So these risk factors can bring out tremendous chance and we ought to make corresponding precaution for introduced risk factors. At present, Breast Self-Examination (BSE) is the preferred way of supervising breast cancer, especially for those with family history of cancer, can effectively discover breast cancer in early period and save many people through surgical therapy. It should be the best utilization and explanations for the discovering time of breast cancer which is independent clinical factor.

With Logistic regression analysis model^[3] to do multiplicity can regulate efficiently confounding fac-

tors, deal with deletion and loss data, quantitatively analyze effective strength and direction of indexes, so it is superior to single factor analysis and other multiplicity in foreseeing the prognosis of breast cancer. This test was from the point of view of convenience and feasibility of clinical application and it utilized logistic regression analysis model in order to investigate clinical pathologic factors about long-term survival quality of breast cancer after operation, and used synthesis evaluation to analyze objective indexes of influencing patients' prognosis with breast cancer. Yet more accurately, more practically new indexes and new methods are still waiting for further study and apply.

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