

RESEARCH ARTICLE

Follow-Up Study of Survival of Patients with Advanced Cancer in a Hospice Setting

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Abstract

Objective: This study was to present the survival of advanced cancer patients and explore the influence of various factors on survival time as well as survival rate. The results provide guidelines for clinical practice of cancer treatment. **Methods:** Follow-up of 674 advanced cancer patients was performed in a hospice. The median survival time and survival rate were calculated, and survival analysis was carried out. **Results:** The median survival time of all patients dying from cancer was 12.0 months and the average survival time was 25.1 months. The 1-year cumulative survival rate was 0.518 ± 0.020 and the 5-year cumulative survival rate was 0.088 ± 0.012 . The following factors showed significant impacts on survival rate: gender, age, primary diagnosis, surgery and the time when pain appeared. **Conclusions:** The survival time of patients with advanced cancer was relatively short. Major approaches to extend the survival time include early detection, early diagnosis, effective surgical treatment, pain control, reasonable supply of nutrients and multiple interventions.

Keywords: Advanced cancer - survival time - survival analysis - pain

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Introduction

In recent years, cardiovascular diseases and malignant tumors have become the leading causes of death in China (Cook and Dummer, 2004). The total mortality rate decreases by 9.33% between 1970s and 1990s, but malignant cancer mortality increases by 29.42% and thus cancer has been the second leading cause of death in China (Guo et al., 2012). It is the first and second leading cause of death for urban and rural residents, respectively (Chen, 2009). Obviously, cancer poses a big threat to human health. Although the development of health care has reached an unprecedented level, it appears to be inadequate in the treatment of cancer (Wang et al., 2012). Routine anti-tumor therapy has been difficult to further extend the survival time of patients with late stage cancer and improve their life qualities. In 1967, the English hospice experts Dr. Sicily Saunders introduced for the first time the hospice concept and strategy in clinical practice and brought benefits to the majority of advanced cancer patients. Today, hospice care is booming and widely accepted as an effective approach in the world (Morin et al., 2007; Smith et al., 2007; Henry, 2011).

This study aimed to represent their living conditions by investigating the survival time, survival rate and influencing factors on advanced cancer patients who received hospice care.

Materials and Methods

Research Objects

Retrospective analysis and prospective follow-up investigation were performed on 674 cases of advanced cancer patients enrolled in a hospice from January 2007 to December 2009. The follow-up terminated on December 31, 2010. The malignant tumors of all cases were confirmed by pathology, clinical diagnosis or imaging diagnosis. Besides, all patients lived on basic living allowance as their economic source.

Follow-Up Survey and Scale

The medical records were checked to confirm their diagnosis of cancer and to understand their conditions since diagnosis. Follow-up of survival were then performed by telephone or visit and terminated when the patient died from the diagnosed cancer. Survival time was determined from the time of diagnosis to the point of death or follow-up termination. The data obtained from the case of non-cancer deaths, missing cases, and surviving cases when follow-up ended were treated as censored data in analysis. The degree of pain was assessed by numeric rating scale (NRS): 0 for painless, 1-3 for mild pain, 4-6 moderate pain, and 7-10 severe pain. The reliability and validity of this scale have been confirmed by a number of practices. The survey was performed by a special person

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Table 1. General Information and Composition of Advanced Cancer Patients

Item Category	Frequency number	Percentage (%)
Age		
11~	41	6.1
41~	478	70.9
71~	155	23
Income per capita		
< 300 Yuan/month	289	51.2
300 – 600 Yuan/month	125	22.1
> 600 Yuan/month	151	26.7
Awareness of the disease		
Full understanding	258	42
Partial understanding	234	38.1
Complete ignorance	101	16.4
Other	21	3.4
Primary cancer		
Urogenital system cancer	83	12.3
Digestive system cancer	267	39.6
Respiratory system cancer	228	33.8
Other	96	14.2
Metastasis		
No	47	7.1
Yes	614	92.9
Surgery		
No	388	58.4
Yes	276	41.6
Chemotherapy		
No	410	63.4
Yes	237	36.6
Radiotherapy		
No	461	73.5
Yes	166	26.5
Duration of pain before admission		
Less than a month	59	9.1
a month to half a year	418	64.7
Half a year to a year	137	21.2
More than a year	32	5
Effect of analgesic treatment		
Bad	110	17.4
Average	343	54.1
Basically satisfied	143	22.6
Very satisfied	38	6
Adverse reactions		
No	204	31
Yes	455	69
Nutritional status		
Good	41	6.3
Moderate	217	33.4
Bad	305	47
Severe	86	13.3

and evaluation form was filled out in sequence.

Statistical Tools and Methods

SPSS 13.0 software was used to analyze the data. The product limit method was used to calculate survival rate and survival time. Log rank test was used in univariate analysis of factors that may have impact on survival time, while Cox' proportional hazard regression model was used in the multivariate analysis. Inspection level α was set as 0.05.

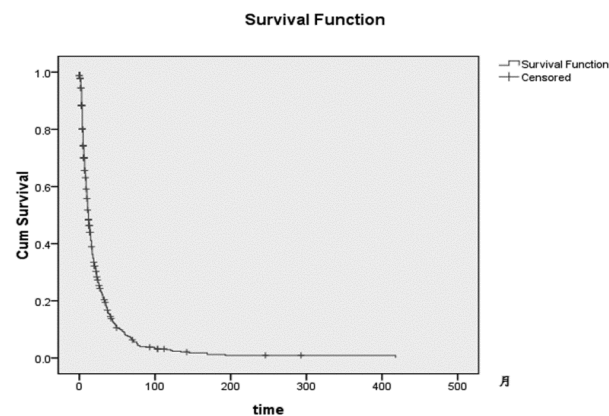
Results

Analysis of general information

A total of 674 patients with late stage cancer were involved in the follow-up survey, including 376 (55.8%) male and 298 (44.2%) female with the male to female

Table 2. Statistical Analysis Results for Each Factor on Survival Time

Factors Category	Median survival time	Average survival time	Log Rank	P value
Gender				
Male	10	18.039	30.123	<0.001
Female	16	32.891		
Age				
11~	24	59.861	18.845	<0.001
41~	13	23.301		
71~	9	16.433		
Nutritional status				
Good	20	29.043	11.35	0.01
Moderate	12	25.944		
Bad	13	27.851		
Severe	7	15.718		
Primary cancer				
Urogenital system cancer	18	26.019	41.247	<0.001
Digestive system cancer	11	21.048		
Respiratory system cancer	11	15.398		
Other	26	53.103		
Metastasis				
No	8	15.216	7.547	0.006
Yes	12	26		
Surgery				
No	9	15.356	79.521	<0.001
Yes	21	36.057		
Chemotherapy				
No	10	19.622	29.491	<0.001
Yes	17	30.982		
Radiotherapy				
No	10	23.146	18.833	<0.001
Yes	17	30.744		
Duration of pain				
Less than a month	9	15.74	25.421	<0.001
A month to half a year	10	23.735		
Half a year to a year	17	29.416		
More than a year	34	39.864		

**Figure 1. The Survival Curve for Advanced Cancer Patients**

ratio of approximately 1.3:1. They were diagnosed at the age of 13 to 95 with average 58.30 ± 13.531 . Male patient's average diagnosis age was 57.58 ± 12.914 , and female 59.21 ± 14.240 . There was no significant difference in the age between gender as the statistical result was: $Z = -1.554$, $P = 0.120$. The number of patient who have no pain before treatment was 0, mild pain 69 (10.2%), moderate pain 24 (3.6%) and severe pain 577 (86.1%). The corresponding numbers after one week treatment were 2 (0.3%), 175 (27.3%), 20 (3.1%) and 443 (69.2%). The difference was significant as the statistical result was: $Z = -6.705$, $P < 0.001$. Other general information and composition are shown in Table 1.

Table 3. Multivariate Analysis Results by Cox Regression Model on Survival Time

Variable	B	SE	Wald	Sig.	Exp(B)	95.0% CI for Exp(B)	
						Lower	Upper
Gender	-0.473	0.096	24.46	0	0.623	0.517	0.752
Primary tumor	-0.114	0.052	4.798	0.028	0.892	0.806	0.988
Metastasis	-0.146	0.184	0.632	0.427	0.864	0.602	1.239
Surgery	-0.649	0.1	41.873	0	0.522	0.429	0.636
Chemotherapy	-0.106	0.105	1.018	0.313	0.9	0.733	1.105
radiotherapy	-0.162	0.114	2.018	0.155	0.85	0.68	1.063
duration of pain	-0.363	0.073	24.824	0	0.696	0.603	0.803
Nutritional status	0.005	0.059	0.007	0.934	1.005	0.895	1.128
Age at Diagnosis	0.014	0.003	15.106	0	1.014	1.007	1.021

Survival analysis

Follow up survey resulted in 597 (88.6%) complete data and 77 (11.4%) censored data. Median survival time was calculated as 12.00 months and average 25.05 months for all patients died from diagnosed cancer. One year cumulative survival rate was determined as 0.518 ± 0.020 , 5-year cumulative survival rate 0.088 ± 0.012 , and 10-year cumulative survival rate 0.027 ± 0.007 . The survival function was shown in Figure 1 and the statistical results for all factors posing impact on survival time were listed in Table 2.

In addition to above factors, adverse reaction (especially nausea) and pain (especially visceral pain and bone pain) also had statistically significant impact on survival time. The Log Rank values were 4.747, 19.206, 16.108, 9.755 and 13.058, respectively. All of the p-values were smaller than 0.05. Multivariate analysis was then carried out using Cox model on the significant factors. The χ^2 was 134.404, $p < 0.001$, which meant that the model was statistically significant. The -2Log likelihood was 5232.370. The regression results for each variable were listed in Table 3.

As shown in Table 3, the partial regression coefficient of gender, primary tumor, surgery, duration of pain and diagnosis age were statistically significant, which further confirmed the impacts of these factors on survival time.

Discussion

General information: The results of this study showed that most advanced cancer patients were approximately 60 years old. There was no significant difference in onset age between genders. A large proportion of patients with digestive and respiratory system tumors were seen. Tumor metastases as well as poor nutritional status were common in the patients.

Survival rate: There was a rapid decline in the survival rate with time and the median survival time was only 1 year. It maybe results from the poor economic conditions and consequent delay in the diagnosis as well as treatment of cancer. Previous studies have shown that early stage lung cancer patients may benefit from surgery and adjuvant chemotherapy (Zheng et al, 2011). Early detection and treatment are the key to improve the survival rate of malignant tumor patients (Smith et al, 2006). In order to further improve the survival rate, public education is needed to promote the participation of patients and even the whole society in the diagnosis and treatment of cancer

(Rhodes, 1995).

Survival Time: Our study showed that women had a longer survival time than men. The reason may be that men have more physical exertion and also are more exposed to various pressures, suggesting that men should pay more attention to early detection. Age was also significantly related with survival time. That's possibly because immunity declines with age, suggesting that older people should pay attention to enhance their immunity and get treatment timely when pain occurs. Digestive and respiratory system cancers usually result in a shorter survival time. The sooner the pain occurs, the longer the survival time lasts, indicating that people sensitive to symptoms are stronger in cancer prevention. Surgery can prolong survival time and improve the survival rate for cancer patients, so people should consider have a surgery as soon as possible. In addition, radiotherapy and chemotherapy also may work in the therapy, which is consistent with previous results (DeAngelis et al, 2002).

In conclusion, the living conditions of patients with advanced tumors are generally poor. In order to strengthen prevention, prolong their survival time and even improve life quality, following aspects are needed to be done. First of all, early detection, early diagnosis, surgical treatment, radiotherapy and chemotherapy are important. Recent studies show that low-dose computer tomography scan can be used to screen lung cancer effectively and reduce its mortality (Aberle and Brown, 2008; Coche, 2008). Secondly, comprehensive interventions including psychological intervention, dietary guidance and exercise intervention are required (Peters et al, 1995; Cunningham et al, 1998; Glare et al, 2008). Thirdly, self-management educations should be promoted for patients to improve compliance and effectiveness of the treatment, to develop good habits and to alleviate the pressure. Lastly, palliative treatments are necessary for advanced cancer patients to prolong survival and improve life quality. For example, zoledronic acid in combination with chemotherapy can reduce skeleton related events in non-small cell lung cancer patients (Coleman et al., 2010). Percutaneous placement of metal stents to patients with malignant biliary obstruction were beneficial with regard to survival time (O'Brien et al., 1995). Analgesic can substantially reduce patient's suffering.

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