

RESEARCH ARTICLE

Perioperative Comprehensive Supportive Care Interventions for Chinese Patients with Esophageal Carcinoma: a Prospective Study

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Abstract

Objective: To assess the effects of perioperative comprehensive supportive care interventions on outcome of Chinese esophageal cancer patients in a prospective study. **Methods:** 60 patients with primary esophageal carcinoma were randomized into an intervention group (IG, n=31) and a control group (CG, n=29). The Chinese version of symptom checklist-90 (SCL-90) was adopted to assess their psychological status. The interventions, including health education, psychological support, stress management, coping strategies and behavior training, were carried out in 3 phases (preoperative, postoperative I and postoperative II), and psychological effects were thereafter evaluated accordingly before surgery, and 1 week, 4 weeks and 24 weeks post-surgery. Medical costs were estimated at discharge. Survival of patients was estimated each year post-surgery. General health status and satisfaction-with-hospital were surveyed by a follow-up questionnaire 4 years post-surgery. **Results:** All the subjects demonstrated higher scores in the preoperative phase than the normal range of Chinese population concerning 7 psychological domains including somatization, obsessive-compulsive, depression, anxiety, hostility, phobic anxiety and paranoid ideation. Although no significant difference was observed between the two groups at admission, the scores of IG, which tended to decrease at a faster rate, were generally lower than those of CG at weeks 1, 4 and 24 post-surgery. The length of hospital stay and medical costs of IG were significantly less than those of CG and satisfaction-with-hospital was better. However, there was no significant difference in 4-year survival or health status between two groups. **Conclusions:** Appropriate perioperative comprehensive supportive care interventions help to improve the psychological state of Chinese patients with esophageal carcinoma, to reduce health care costs and to promote satisfaction of patients and their families with hospital.

Keywords: Supportive care - esophageal carcinoma - health care cost - patient satisfaction

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Introduction

Esophageal carcinoma, of which more than 50% occurred in China, is one of the most common malignant tumors and the 6th leading cause of cancer-related death worldwide (Jemal et al., 2005). Although surgery is the main therapy for these patients, the operative trauma and damage of local anatomical structure usually affects these subjects so massively that they have to change their daily lifestyle including diet and sleeping habit for quite a long time or even lifelong, with physiological malfunction as well as a high probability of accompanying psychological problems. It was estimated that approximately 35% of patients with cancer experienced significant distress (Zabora et al., 2001). Prospective study showed that anxiety and depression were prevalent at diagnosis of cancer (Gil et al., 2012; Iwatani et al., 2013). Over 1/3 of patients newly diagnosed with esophageal cancer suffered

from significant psychological symptoms, particularly anxiety (Bergquist et al., 2007; Dempster et al., 2012). Pain, fatigue, insomnia and mood disturbance are highly prevalent in patients, especially the elderly undergoing cancer therapy (Cheng et al., 2011; Stauder et al., 2013). Of postoperative patients with esophageal carcinoma, ingestion disorders, appetite and weight loss are common complaints, particularly in the first year. Esophagectomy and the remaining symptoms after surgery were reported to have long-term negative impacts on quality of life in some studies (Blazeby et al., 2000; Brooks et al., 2002; Malmström et al., 2013). In addition, huge economic burden, isolation from working environment and society, insufficient support from families or friends, might be factors attributable to worsen physical and mental status. Observational studies demonstrated that the most frequently reported unmet needs of cancer patients included medical information, psychological or emotional

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support, physical practice guidance, financial support, social and family-related support (Maguire et al., 2013; Yun et al., 2013). Participants with unmet needs in physical, psychological and patient care domains were reported to have poorer health-related quality of life (So et al., 2013). Regarding the quality of life and psychological problems of cancer patients, an increasing number of psychological and psychosocial interventions have been in practice in recent years. Despite of debates whether psychological or psychosocial interventions could improve survival of cancer patients (Stefanek et al., 2009), randomized controlled studies proved benefits of psychological disorders relief and life quality improvement generally (Cameron et al., 2007; Pitceathly et al., 2009; Capozzo et al., 2010; Goerling et al., 2011; Lurati et al., 2012).

However, psychological or psychosocial intervention, as a kind of support, can only meet partial needs of patients. Supportive care, as a more complete form of care, is advocated by medical associations and researchers. The European Society for Medical Oncology and the American Society of Surgical Oncology have endorsed supportive and palliative care as essential service that must be part of comprehensive cancer care (Edwards, 1998; Cherny et al., 2003), and thereafter some recommendations and guidelines have been listed in some studies (Ford et al., 2013). Supportive care is defined as providing essential services that satisfy cancer patients' physical, psychological, social, informational, sexuality-based, and spiritual needs across their cancer journey (Steele and Fitch, 2008). Psychological intervention has been integrated inside as an essential component. Various kinds of supportive care programmes have been developed and applied in cancer patients, some of which demonstrated positive effects (Macvean et al., 2007; Sussman et al., 2011; Yavuzsen et al., 2012).

Among all the studies, reports about psychological intervention or supportive care for esophageal cancer patients are relatively rare. Considering the unique clinical features, large population, various unmet needs of patients with esophageal carcinoma and the special cultural context and health service status of China, we designed this randomized controlled trial, to observe the psychological change of Chinese perioperative patients with esophageal carcinoma and to evaluate the short-term and long-term effects of perioperative comprehensive supportive care interventions on their physiological and psychological rehabilitation.

Materials and Methods

Patients

Inclusion criteria were: (1) age between 18 and 75 years old; (2) newly diagnosed with primary esophageal carcinoma; (3) available for surgery with cancer stage below IV. To reduce the possible bias in evaluation of psychological status caused by existing psychological disorders or severe physical suffering, patients with organic brain dysfunction, psychiatric disorders or severe surgical complications were excluded in our study. Patients were randomized into two groups according to

a random number table. All participants in both groups received detailed information about the study from medical staff previously and joined in voluntarily with signed informed consents. The study was approved by the Ethics Committee of Sun Yat-sen University Cancer Center.

Methods

Therapists training: 6 medical graduate students from Zhongshan School of medicine in Sun Yat-sen University who had completed their medical study, were chosen as major therapists to perform the supportive care interventions. All were well-trained for 4 weeks by a psychologist, an esophageal cancer specialist and an experienced nurse from our Cancer Center. Essential medical knowledge about esophageal carcinoma including etiology, epidemiology, clinical manifestation, treatment, postoperative complications and prognosis were provided by the oncological specialist. Basic nursing skills, common perioperative psychological reactions and basic coping strategies were taught by the nurse and psychologist.

Comprehensive supportive care interventions: Comprehensive supportive care interventions were delivered face-to-face and one-to-one by therapists under guidance of oncological medical staff in hospital, mostly in wards. IG received usual medical care and perioperative comprehensive supportive care interventions while CG received usual medical care only. Usual medical care included individually planned anticancer therapies and frequent interviews with esophageal cancer specialist and nurses who are responsible to give information and provide advices of the disease and treatment. The interventions, conducted every other day in a 1-hour session, consisted of 3 phases, each lasted 1 week.

(1) Preoperative phase (1st week): During the first phase, patients usually did not recover from the shock brought by previous diagnosis. Therefore, therapists performed as listeners at first, helped patients release their feelings and emotions, tried to provide a stress-free atmosphere and to build a friendly and trustful relationship with patients. Then they progressively informed the patients of medical information, and helped them accept the fact of cancer. Health education, emotional comfort and psychological support were emphasized in this phase. Medical information of available treatment was provided orally and in written brochure to help the patients relieve the anxiety and be better prepared for the upcoming surgery. Common and simple methods coping with distress, such as music, humor videos, appropriate physical activities, conversations with other patients, were introduced to patients and their families. Physical guidance, such as way of expectoration and movements on bed, was also provided to patients preoperatively to help them be physically well-prepared.

(2) Postoperative phase I (2nd week): Shortly after surgery, patients had just gone through huge trauma and change of physiologic status. Complications might start to appear in this phase. Interventions mainly included psychological support, teaching of coping strategies for stress and complications. Survivors of esophageal

carcinoma were invited back to hospital to share their experiences fighting with cancer, including how they gradually accepted the fact of cancer and how they treated with postoperative complications. Music, books and videos which could help people to relax and cheer up were recommended to patients. Instructional videos of esophageal cancer treatments were displayed. Therapists communicated with the patients, to understand their annoying problems, such as pain and sleeping difficulties, and provided medications when necessary. Meanwhile, therapists introduced to patients and their carers the function and related cautions of medical supporting instruments, such as indwelling catheter. Detailed diet guidance was given to help patients through the postoperative transition of diet. Physical guidance, such as special positions of eating and sleeping to prevent regurgitation, was provided as well.

(3) Postoperative phase II(3rd week): In this phase, both physiologic and psychological state of patients became relatively stable and they were about to leave hospital. The interventions mainly included psychological support, coping strategies for long-term complications and physiological changes, and behavior training. Diet guidance was also emphasized in this phase. Diet instructions were published in brochures and distributed to patients and their families, to help them build new long-term diet habits. Therapists taught patients to recognize and treat common postoperative side-effects, and introduced positions and movements which could avoid or reduce these unpleasant experiences. Patients were trained in daily activities especially in their behaviors of diet and sleeping under the guidance of therapists. Patients

were encouraged back into normal social activities in a family-community-workplace progressive way.

During the whole study, patients and their families were encouraged to present their problems and needs, and counseling was provided by oncological medical staff and intervention performers. Therapists were informed of the psychological measuring results of patients during the study and tried to perform patient-specific interventions. For patients with apparent depression, intermittent meetings with other optimistic or well-recovered patients were arranged. Carers and family members of patients were informed of the importance of family support and asked to take part in most of the educational sessions. Basic nursing skills such as oral care were also taught to them.

Measurement: The outcome was measured by interview and questionnaire. The Chinese version of symptom checklist-90 (SCL-90) (Wang, 1984), a 90-item multidimensional self-report inventory aiming to evaluate a broad range of psychological problems and symptoms of psychopathology, was adopted as the major measurement for psychological status. The reliability, validity and utility of SCL-90 have been proved not only by psychiatric and psychological studies (Peveler et al., 1990; Schimitz et al., 1999; Prins et al., 2001), but also been demonstrated by studies in cancer patients (Derogatis et al., 1983; Tross et al., 1996; Lerman et al., 2011). The data from SCL-90 were calculated and compared with the normal range in Chinese reported by Jin et al. (1986) (n=1388). Patients filled in the written inventory consisting of 90 items which were scored on a five-point scale, reflecting 9 psychological domains including somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. Measurements of both groups were done on 1st day of admission, at week 1, 4 and 24 post-surgery, respectively. Length of hospital stay and medical costs during hospitalization were estimated at discharge. A follow-up questionnaire was designed to collect information including postoperative symptoms, general health status and satisfaction-with-hospital of the patients or their families 4 years post-surgery (Figure 2). Therapist contacted patients or their families by telephone and the questionnaire was presented orally to them. Answers were noted down by therapists after the phone conversations. Patients still alive at year 4 since surgery were asked to fully fill in this questionnaire individually. For patients who had died, only the third part of the questionnaire (satisfaction-with-hospital) was completed by their families.

Statistical analysis: χ^2 test was used for the enumeration data such as demographic information of patients. Student t test or Wilcoxon rank-sum test was used for the measurement data, expressed as Mean \pm Standard Deviation (SD) and Median (Interquartile range, IQR). Kaplan-Meier method with log-rank test was performed for survival analyses. *P* value <0.05 was considered statistically significant. All data were analyzed using the statistical software SPSS 17.0 for windows.

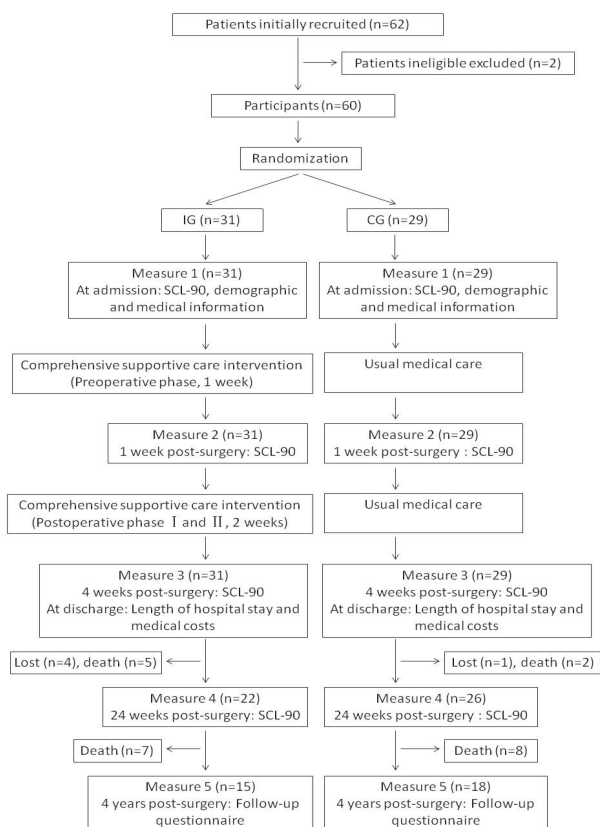


Figure 1. Flow Chart of the Study

Table 1. Demographic and Medical Characteristics of Patients

Characteristics	Frequency (rate)			χ^2 (t)	P
	I G (n=31)	C G (n=29)	Total		
Gender				0.21	0.65
Male	26 (83.9%)	23 (79.3%)	49 (81.7%)		
Female	5 (16.1%)	6 (20.7%)	11 (18.3%)		
Age (year)	59 ± 6	59 ± 9	59 ± 7	0.22	0.8
Cancer stage (TNM ^a staging)				1.63	0.44
I	3 (9.7%)	1 (3.4%)	4 (6.6%)		
II	14 (45.2%)	17 (54.8%)	31 (51.7%)		
III	14 (45.2%)	11 (37.9%)	25 (41.7%)		
Tumor anatomical sub-site (thoracic segment)				0.02	0.99
Upper	2 (6.5%)	2 (6.9%)	4 (6.7%)		
Middle	20 (64.5%)	19 (65.5%)	39 (65.0%)		
Lower	9 (29.0%)	8 (27.6%)	17 (28.3%)		
Education level				0.21	0.9
Primary school	5 (16.1%)	6 (20.7%)	11 (18.3%)		
Middle school	17 (54.8%)	15 (51.7%)	32 (53.3%)		
High school and above	9 (29.0%)	8 (27.6%)	17 (28.3%)		
Payment manner of medical expenses				0.72	0.7
Self-paid ^b	21 (67.8%)	22 (75.9%)	43 (71.7%)		
Medical insurance-paid	6 (19.4%)	5 (17.2%)	11 (18.3%)		
Government employee insurance-paid	4 (12.9%)	2 (6.9%)	6 (10.0%)		

^aTNM, The TNM Classification of Malignant Tumors; ^bPatients without medical insurance or government employee insurance pay all the medical expenses by their own

Table 2. SCL-90 Scores of Patients at Different Time Before and after Intervention (Mean ± SD)

Domains	Somatization	Obsessive-compulsive	Interpersonal sensitivity	Depression	Anxiety	Hostility	Phobic anxiety	Paranoid ideation	Psychoticism	°GSI
	Norm 1.37±0.48	1.62±0.58	1.65±0.51	1.50±0.59	1.39±0.43	1.48±0.56	1.23±0.41	1.43±0.57	1.29±0.42	-
Admission [°]	IG 1.45±0.36 ^a	1.86±0.34 ^a	1.66±0.36	2.08±0.42 ^a	1.86±0.34 ^a	1.74±0.35 ^a	1.73±0.41 ^a	1.79±0.43 ^a	1.36±0.27	1.73±0.17
	CG 1.44±0.26 ^a	1.89±0.38 ^a	1.62±0.39	2.06±0.48 ^a	1.92±0.37 ^a	1.79±0.34 ^a	1.80±0.36 ^a	1.84±0.33 ^a	1.36±0.21	1.74±0.21
1 week [§]	IG 1.93±0.35 ^{ab}	1.65±0.44 ^b	1.61±0.44	1.83±0.49 ^{ab}	1.62±0.35 ^{ab}	1.50±0.33 ^b	1.44±0.44 ^{ab}	1.47±0.39 ^b	1.33±0.28	1.56±0.13 ^b
	CG 2.14±0.42 ^a	2.09±0.60 ^a	1.65±0.36	2.15±0.52 ^a	1.96±0.38 ^a	1.91±0.26 ^a	1.72±0.45 ^a	1.79±0.44 ^a	1.39±0.25 ^a	1.76±0.21
4 weeks [‡]	IG 1.65±0.30 ^{ab}	1.60±0.30 ^b	1.60±0.32 ^b	1.80±0.35 ^{ab}	1.63±0.25 ^{ab}	1.48±0.32 ^b	1.27±0.26 ^{ab}	1.45±0.35 ^b	1.32±0.32 ^b	1.53±0.17 ^b
	CG 1.84±0.42 ^a	2.12±0.37 ^a	1.63±0.39	2.12±0.44 ^a	1.90±0.34 ^a	1.82±0.35 ^a	1.79±0.27 ^a	1.71±0.34 ^a	1.41±0.49 ^a	1.83±0.24
24 weeks [‡]	IG 1.40±0.33 ^b	1.61±0.37 ^b	1.64±0.41	1.53±0.28 ^b	1.41±0.27 ^b	1.46±0.27 ^b	1.26±0.27 ^b	1.43±0.36 ^b	1.32±0.32	1.45±1.25 ^b
	CG 1.57±0.42 ^a	1.78±0.46	1.65±0.34	1.66±0.46 ^a	1.77±0.34 ^a	1.53±0.43	1.55±0.33 ^a	1.58±0.44	1.31±0.24	1.62±1.66

^aP<0.05 compared with norm; ^bP<0.05 compared with CG; ^cGlobal Severity Index (GSI) measures overall psychological distress; [°]On first day of admission before intervention; [§]1 week post-surgery; [‡]4 weeks post-surgery; [‡]24 weeks post-surgery. –Data unavailable

Results

Baseline information of patients

During the period from January to October 2008, 62 patients who were newly diagnosed with primary esophageal carcinoma at the thoracic segment as squamous cell carcinoma by gastroscopic pathological biopsy and were supposed to undergo the same surgery procedure in our Cancer Center, were initially recruited in the study. One patient with postoperative anastomotic leakage and one patient with altered surgery procedure were excluded later. 60 patients (male 49, female 11) participated in the study eventually. Of them, 31 were randomized into intervention group (IG, male 26, female 5) and 29 to the control group (CG, male 23, female 6). No significant difference was shown between two groups with respect to gender, age, cancer stage, tumor site, education level and payment manner of medical expenses (Table 1).

Psychological status of IG and CG

Before interventions: Apart from interpersonal sensitivity and psychoticism, scores of all the other

psychological factors were higher than Chinese National Norm (Jin et al., 1986) in both groups, which indicated that patients generally demonstrated both emotional and behavioral symptoms or problems when diagnosed with esophageal carcinoma. No significant difference was observed between two groups (Table 2).

After interventions: (1) 1 week post-surgery: Both groups exhibited obvious somatization after surgery. The psychological symptoms of CG did not get effective remission compared with preoperative phase. Nevertheless, while depression and anxiety still existed, IG patients got some psychological symptoms alleviated, such as obsessive-compulsive, hostility and paranoid ideation. Significant differences were shown between two groups in GSI (Global Severity Index) and most of the domains (Table 2). (2) 4 weeks post-surgery: While symptoms of somatization, depression, anxiety and phobic anxiety were still obvious in IG, decreasing tendencies were shown in scores of most psychological domains, some of which already returned to normal level. But as to CG patients, significant psychological problems still

Table 3. Length of Hospital Stay and Medical Costs in IG and CG

	IG (n=31)	CG (n=29)	P
Period before surgery (day)	6.00 (5.00-9.00) 6.39 ± 2.56	6.00 (4.00-7.00) 6.31 ± 3.36	0.576
Period after surgery (day)	14.00 (12.00-15.00) 13.68 ± 2.61	15.00 (14.00-19.00) 16.86 ± 6.03	0.013
Duration of hospital stay (day)	20.00 (17.00-23.00) 20.06 ± 3.73	23.00 (18.50-25.50) 23.24 ± 7.37	0.041
Medical costs ^a (RMB)	71264.61 (53031.02-79515.15) 66390.56 ± 20450.35	77862.28 (68098.04-81570.20) 78960.90 ± 19443.87	0.045

^aTotal medical costs during hospitalization. Data were expressed as Median (IQR) and Mean ± SD. Wilcoxon rank-sum test was used for statistical analysis

Follow-up questionnaire of postoperative patients with esophageal carcinoma

Name _____ Date _____

Instructions:
If you are the patient, please fully fill in this questionnaire individually. If you are family of the patient, please complete the third part of the questionnaire (satisfaction-with-hospital).

Part I: General health status
Please circle the number that best corresponds to your health state:
1 2 3 4 5
Extremely poor → Very good

Part II: Physical symptoms
Listed below are a number of symptoms that you may or may not have experienced since the surgery. Please indicate by circling Yes or No, whether you have ever experienced any of them.

Pain	Yes	No
Nausea	Yes	No
Weight loss	Yes	No
Fatigue	Yes	No
Upset stomach	Yes	No
Sleeping difficulty	Yes	No
Swallowing difficulty	Yes	No
Swallowing pain	Yes	No
Sore throat	Yes	No
Chronic cough	Yes	No
Hiccup	Yes	No

Please note down other symptoms bothering you which are not listed above: _____

Part III: Satisfaction with hospital
Please circle the number that best corresponds to your satisfaction:

(1) How was the attitude of doctors you got in touch with?
1 2 3 4 5
Extremely poor → Very good

(2) How was the attitude of nurses you got in touch with?
1 2 3 4 5
Extremely poor → Very good

(3) How do you evaluate the level and quality of our medical care?
1 2 3 4 5
Extremely poor → Very good

(4) Are you well-informed of the diagnosis, examination and treatment about the disease by doctors?
1 2 3 4 5
Extremely poor-informed → Very well-informed

(5) Are you well-informed of the instructions and related cautions about stay-in-hospital by nurses?
1 2 3 4 5
Extremely poor-informed → Very well-informed

(6) Are you satisfied with the organization and efficiency of our hospital (including hospital environment, instructions, facilities, waiting time for examination, etc.)?
1 2 3 4 5
Very dissatisfied → Very satisfied

(7) How is your overall satisfaction with our hospital?
1 2 3 4 5
Very dissatisfied → Very satisfied

Figure 2. Follow-up Questionnaire at 4 years Post-surgery

existed, with higher scores than norm in most domains (Table 2). (3) 24 weeks post-surgery: Psychological status of IG had improved markedly by this time. Although scores of some domains were still higher than norm, no significant difference could be observed. For CG, despite of the general decrease of psychological scores, there were still significant problems of somatization, depression, anxiety and phobic anxiety (Table 2).

Generally, scores of psychological domains in IG were significantly lower than CG at week 1, 4 and 24 post-surgery.

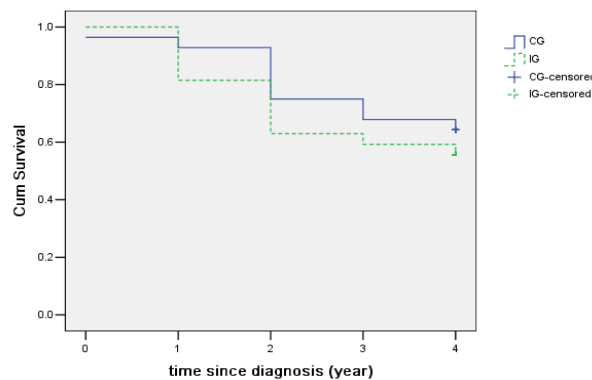
Comparison of length of hospital stay and medical costs between two groups: The duration in hospital and the medical costs of IG were significantly less than those of CG (Table 3).

Comparison of survival: There was no significant difference in survival between two groups (Table 4, Figure 3).

Table 4. Survival and General Health Status of Survivors and Satisfaction-with-hospital of Patients or Families (all patients/survivors)

	IG (n=27/15)	CG (n=28/18)	P
Survival			0.446
1 year ^a	92.90%	81.50%	
2 years ^b	75.00%	63.00%	
3 years ^c	67.90%	59.30%	
4 years ^d	64.30%	55.60%	
General health status ^d	3.93	4.06	0.68
Satisfaction-with-hospital ^d			
Attitude of doctors	4.70/4.87	4.36/4.50	0.009/0.022
Attitude of nurses	4.70/4.87	4.43/4.50	0.040/0.022
Quality of medical care	4.07/4.80	4.21/4.83	0.650/0.812
Informed by doctors	4.85/4.87	4.61/4.72	0.042/0.048
Informed by nurses	4.96/5.00	4.71/4.72	0.012/0.004
Organization & efficiency	4.78/4.93	4.71/4.94	0.653/0.898
Overall satisfaction	4.30/4.73	4.14/4.44	0.412/0.035

^a1 year post-surgery; ^b2 years post-surgery; ^c3 years post-surgery; ^d4 years post-surgery

**Figure 3. Survival Plots of Two Groups**

Comparison of health status and satisfaction-with-hospital 4 years post-surgery: 55 questionnaires was collected, 27 from IG and 28 from CG. 33 of these 55 patients were survivors. Pain (60%), upset stomach (53%), weight loss (47%), fatigue (47%), sleep (47%) and swallow difficulty (47%) were postoperative symptoms commonly stated by patients. No significant difference was observed in general health status between two groups. As for satisfaction-with-hospital, scores of most of the items in IG were significantly higher than CG, except for quality of medical care and hospital organization and efficiency. Satisfaction of survivors, particularly in the item of medical care quality and overall satisfaction, were higher than the one estimated with all patients and families involved (Table 4).

Discussion

In our study, patients with esophageal carcinoma generally demonstrated psychological symptoms and different psychological patterns could be observed at different time of disease. When initially diagnosed, patients showed emotional and behavioral problems, among which depression and anxiety were most prominent. As time moved on, an exacerbation period appeared from week 1 to week 4 post-surgery. In this phase, scores of most psychological domains, particularly somatization, were apparently higher than norm, most probably due to the huge surgical trauma, physical complications and discomfort. Physical symptoms such as short of breath, diarrhea and regurgitation could last till 1.5 months after surgery. Health status did not get effective improvement until 6 to 12 months later (Blazeby et al., 2006). Our results showed that psychological scores decreased generally 24 weeks after surgery, which was consistent with the physical rehabilitation process.

By measurement of SCL-90, obvious psychological improvement was found in intervention group at 6 months post-surgery, with faster rate of psychological recovery and lower scores than control group. This confirms that even short and relatively simple supportive care interventions enable promotion of postoperative psychological rehabilitation. Similar outcome was shown in Goerling U's research in cancer patients of a surgical-oncology department (Goerling et al., 2011).

Despite of some available recommendations (Ford et al., 2013), there is no standard procedure for supportive care for cancer patients yet. Components most commonly consisted are educational and psychological or psychosocial interventions (Pitceathly et al., 2009; Capozzo et al., 2010; Goerling et al., 2011; Lerman et al., 2011; Lurati et al., 2012). Due to complexity and individuality of psychological and physiological changes, researchers usually design their programs based on their own experiences and understandings. To design more specific interventions and to reach better outcomes, understanding patients' individual needs and background is essential. As reported by Whelan et al. (1997), around 80% of the patients took medical information of their disease as their primary need. In our study, most patients asked questions actively about their health conditions at diagnosis, and they were strongly inquisitive to information related to surgical procedures and prognosis. It was claimed that, after surgery, patients paid more attention to symptom control and physical comfort (Given et al., 2001). Our study also indicated that postoperative patients presented evident somatic symptoms, especially sleeping difficulty. Considering the different psychological manifestations in each phase, we designed interventions with 3 sessions in order to satisfy their changing needs.

Psychological status of patients and effects of our interventions might be affected by many factors, including physical health, social environment, family support, economic burden, education level, etc. Economic or financial situation was an important impact factor of psychological stress which could not be ignored. 70% of our patients were under certain economic pressure owing

to the fact that they were paying all the medical expenses privately with their own wealth, and those with no health insurance or government employee insurance and their families demonstrated more concerns on the medical costs rather than our interventions.

Apart from psychological outcome, socioeconomic effects were also different with respect to the patients group. Length of hospital stay and medical costs of intervention group were significantly less than control, which indicates that the interventions can help to accelerate patients' physical and mental rehabilitation, to shorten their hospital stay and thus to reduce their economic burden. In China, there was a phenomenon that the community hospitals were considered as undeveloped and generally patients at every medical stage rely on the medical staff of "large" hospitals like ours. Therefore sometimes they have to be "forced" to be discharged from hospitals when their doctors considered them as "safe". Nowadays, medical practitioners in China begin trying to promote patient's rehabilitation by systemic treatment and health education. Cao et al. (2012) previously reported that a fast-track rehabilitation program could lead to a reduction in the length of hospital stay and faster return to work and normal activities after esophagectomy in Chinese patients. Since the length of hospital stay is in connection with the medical expenses, prolonged time intra-hospital stay certainly increases economic burden of patients and the stress of hospital bed requirements. As a developing country, the healthcare in China is still far from perfect. The Government Employee Insurance is only available to those whose jobs are related to government management. The Government Citizen Healthcare Insurance, although under reform at present, covers only some citizens and a small proportion of rural population. Even with the insurance, most patients still have to pay a relatively high proportion (30-80%) of the costs. Take our investigation as an example, the average medical costs were 73243 ± 24889 yuan (RMB) (over 10,000 USD), which is about 5 times the annual per-capita income (1,500 USD) of China in 2009, indicating the huge financial burdens of the patients. In this sense, our interventions played an important role in relieving patients' economic stress.

As to yearly survival and health status in 4th year post-surgery, there was no significant difference between the two groups, which indicated that perioperative psychological interventions resulted in positive effect in the first year after surgery, but no longer survival or health benefit. Our investigation showed that physical symptoms are still prominent in patients even after long-term rehabilitation. Due to the physiological change and trauma brought by surgery, digestive function and eating experiences were significantly affected. Patients had to rebuild their lifestyle, particularly their eating habit, and tried new physical ways to reduce discomforts. Pain, upset stomach, weight loss, fatigue, sleep and swallow difficulty were symptoms commonly complained by our patients, which was in accordance with studies of Malmström et al. (2013) and Stauder et al. (2013).

Estimated by a 7-item questionnaire, satisfaction-with-hospital of patients in intervention group was significantly

higher than control 4 years post-surgery, suggesting that positive psychological approval existed long time post-surgery not only from patients but also from their families. But the long duration since diagnosis might cause recall bias in evaluation and thus impair reliability of the result. We noticed that the bereaved families in both groups usually gave lower scores in satisfaction questionnaire, particularly in the item of medical care quality and overall satisfaction. Some of them even strongly expressed their dissatisfaction. This phenomenon indicated that medical outcome or disease progression was the last or latest impact factor of satisfaction-with-hospital. The result could partly be explained by traditional views towards death and the shortage of palliative care in China. Until now, most Chinese people still take death as a kind of miserable event or disaster, especially for a family with cancer patients who have spent much time and money since diagnosis and treatment. When lacking palliative care, most cancer patients died at home without any medical support or pain control. These factors might attribute to the impaired satisfaction. Hopefully, some Chinese researchers have noticed this issue and have already done surveys and explored new programs of palliative and supportive care for cancer patients in China (Chan et al., 2012; Chan et al., 2012; Mok et al., 2012).

Concerning with the selection of therapists of supportive care, researchers expressed various opinions and practices. At present, the responsible staff most commonly reported are nurses, psychologists and doctors, although the previous call is still resonating that oncological doctors need not only thorough medical training, but also additional training in psychosomatic medicine (Siegel, 1998). In this way, we claim that oncological medical staff with enough psychological training and medical background are the most suitable therapists, especially in China where psychologists are insufficient and people are not so willing to receive professional psychological therapies.

It must be mentioned that different cultural or health service settings are among the factors accounted for cancer patients' needs of supportive care. Chinese patients prioritized or emphasized needs for information about their disease, treatment and care, whereas German and Japanese patients preferred psychological support more often (Lam et al., 2011; Fielding, 2013). These evidences match with our clinical experiences and this is why we emphasized the part of health information and education in our study. In addition, we consider that a comprehensive supportive care programme consisting psychological component instead of simple psychological intervention is more appropriate for Chinese patients. In this way, oncological medical staff are the best candidates for this work, as patient can then easily accept help from their doctors or nurses based on their relationships in the medical course. With complete systemic psychological and sociological training, medical staff can better communicate with the patient, design specific supportive care programme to alleviate stress, which would be a good way to promote rehabilitation of cancer patients and to save medical and economic resources.

Above all, although our study demonstrates that

perioperative comprehensive supportive care interventions can help to improve the psychological status of patients with esophageal carcinoma, to reduce health care costs and to promote satisfaction of patients and families with hospital, the positive effect of the interventions might be affected at certain levels due to the lack of professional psychological intervention skills of therapists. The small sample size, single inventory of psychological measurement and the absence of measurement in other aspects, such as quality of life, might also cause bias in evaluation of living condition and limit the value of our study, indicating that further trials with larger samples and variable measurements are in need to confirm the present findings. Moreover, based on the report that Chinese women with advanced breast cancer expressed desire for continuity of care and improved information provision (Au et al., 2013), for postoperative patients with esophageal carcinoma who have to undergo physical rehabilitation of long duration, a long-term supportive care programme should be developed in the near future.

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