JBUON 2016; 21(6): 1546-1551
ISSN: 1107-0625, online ISSN: 2241-6293 • www.jbuon.com
E-mail: editorial_office@jbuon.com

NURSING ARTICLE

Efficacy of whole-course pain intervention on health-related quality of life for patients after esophagectomy

Miao Zhang, Heng Wang, Xuefeng Pan, Wenbin Wu, Qi Zhang, Yun Liu, Hui Zhang

Department of Thoracic Surgery, Xuzhou Central Hospital Affiliated to Southeast University, Jiangsu, Xuzou 221009, People's Republic of China

Summary

Purpose: *The purpose of this study was to evaluate the efficacy of whole-course pain intervention on health-related quality of life (QoL) for patients after esophagectomy.*

Methods: *A retrospecitve analysis was performed on 81 patients who were enrolled as conventional care group (control group with 40 cases) and whole-course pain intervention group (observation group with 41 cases) respectively after Sweet, Ivor-Lewis and McKeown esophagectomy between January 2011 and December 2013. Then, the postoperative recovery parameters of the patients were compared, accompanied with evaluation of QoL using the 36-Item Short Form Health Survey 6 months after the operation.*

Results: *The patients in the observation group demonstrated significantly better pain control and overall satisfaction rate than those of the control group, along with significantly lower morbidity of chronic postsurgical pain (CPSP) ($p<0.05$). However, the health-related QoL 6 months after the operation indicated no significant difference between the two groups ($p>0.05$).*

Conclusion: *In summary, the whole-course pain intervention is conducive to relieve pain and to reduce the occurrence of CPSP in patients after esophagectomy.*

Key words: *chronic post-surgical pain, esophagectomy, quality of life, whole-course pain intervention*

Introduction

Holistic medicine and nursing aim at the improvement of healing of the individual as a bio-psycho-social unity, from birth until death, and a disease should be treated as a disturbance of the balance of an organism as a whole and its environment, therefore, modern medicine takes into account the biological, social and spiritual needs of the patient to promote health to increasingly higher levels of mental and physical well-being and functionality [1]. It has been reported that nearly 1 out of 4 patients undergoing thoracic surgery, including thoracotomy and thoracoscopy, might develop CPSP, and in one third of them this is accompanied with a neuropathic component followed by poor QoL [2]. Our hospital adopted holistic and comprehensive nursing care principles since 2011 and offered whole-course pain intervention including communication and instruction before the operation and analgesia after the operation for patients who underwent esophagectomy. Besides, the patients or their home caregivers were followed up continuously by smartphone or Internet, and the initial results indicated that the whole-course pain intervention encouragingly improved the patients' QoL apart from pain relief. The results of this retrospective analysis are reported below.

Methods

This study was approved by the Institutional Review Board of Xuzhou Central Hospital. Informed consent was provided by all patients before entering the

Correspondence to: Yun Liu, RN. Department of Thoracic Surgery, Xuzhou Central Hospital Affiliated to Southeast University, No.199 Jiefang South Road, Xuzhou, Jiangsu 221009, People's Republic of China. Tel: +86 516 83969578, E-mail: wuwb2012@163.com
Received: 27/06/2016; Accepted: 06/07/2016

study, and the procedure of normal nursing or whole-course nursing was chosen by their own.

Selection of cases and general information

The clinical data of patients who underwent radical esophagectomy for esophageal cancer from January 2011 to December 2013 in our hospital was retrospectively analyzed. Inclusion criteria were: pathologically diagnosed esophageal cancer without obvious postoperative complications such as chylothorax, anastomotic leaks or thrombosis. Exclusion criteria were: other operations or history of trauma before esophagectomy, comorbidities of varicella-herpes zoster or other diseases resulting in chest and back pain, metastasis and/or recurrence after operation, and lost to follow-up.

A total of 81 patients who underwent radical operations for esophageal cancer were enrolled in this study, and the surgical procedures included Sweet, Ivor-Lewis and McKeown esophagectomy. Fentanyl, diprivan and atracurium were all used during the operations. After the operations, thoracic paravertebral block (TPVB) using 0.25 % ropivacaine or patient-controlled intravenous analgesia (PCIA) using 1μg/mL fentanyl were adopted respectively for postoperative pain relief for 48 hrs, and then patients' pain was evaluated by visual analogue scale (VAS). When the score was >5, intramuscular injection of pethidine (25mg each time for each patient) was administered for pain control. According to the difference of preoperative and postoperative nursing procedures, the patients were divided into conventional care group (control group) with 40 cases and whole-course pain intervention group (observation group) with 41 cases. The general information of these patients is displayed in Table 1.

Nursing intervention

The conventional care group included preoperative informing about the care and instructing methods of respiratory function training, expectoration, and prevention of bedsores and thrombosis. Preoperatively, patients were instructed to carry out every advice from the doctor, and were guided for proper daily diet and physical activity.

The procedures of whole-course pain intervention group included issues as follows:

(1): Before operation: Exploration of the culture, religious beliefs, occupations and society relationships of the patients, and communication with doctors about surgical risks, and familiarization of patients' mental characteristics and their response to pain or stress to eliminate their fear or anxiety in with regard to operation, illustration of how to cooperate with surgeons and anesthetists during the surgery, and establishment of a harmonious doctor-patient relationship as well as detailed individualized nursing plans.

(2): Comfortable nursing during the operation: making the patients psychologically stable, adjustment of room temperature and body position to avoid nerve compression and assistance with the surgeons and anesthetists to resolve detailed problems during the operation.

Table 1. General patient characteristics

	Control group (N=40)	*Observation group (N=41)*	*p value*
Age, years	65.9±7.5	67.0±9.1	0.156
Gender, N			0.740
Male	31	34	
Female	9	7	
Body mass index, mean±SD	25.9±1.6	26.1±1.5	0.085
Surgical procedures, N			0.545
Sweet esophagectomy	4	6	
Ivor-Lewis esophagectomy	29	25	
McKeown esophagectomy	7	10	
Operation time (min), mean±SD	219.6±46.1	227.3±45.5	0.167
Postoperative analgesia method, N			0.526
Thoracic paravertebral block	11	15	
Patient-controlled intravenous analgesia	29	26	
Time of chest drainage (days, mean±SD)	6.7±2.1	6.5±2.1	0.091
Patients needing pethidine, N	11	9	0.614
Times of using pethidine, N	27	15	—
Hospitalization time (days, mean±SD)	10.7±2.6	11.0±2.5	0.561
CPSP case number, N (%)	16 (40.0)	6 (14.6)*	0.021
Satisfaction of patients, N (%)	26 (65.0)	36 (87.8)*	0.032

Continuous variables are presented by means± standard deviation. *Compared with the control group, the difference was significant

(3): Postoperative psychological and pain intervention: it included assisting with the anesthetist to ease pain of the patients after operation, instructions such as postoperative body position, meal time, postoperative physical activities, deep breathing, expectoration and detailed methods to prevent bedsores and thrombosis. Besides, the psychological status of depression or anxiety, VAS on pain and sleep quality etc. The patients were evaluated by simplified questionnaires continuously, which was helpful to deliver symptom-triggered or targeted psychological support from special doctors. Furthermore, a good doctor-patient relationship was maintained to avoid negative psychological reactions and to help patients to adjust and adapt their social roles gradually with the help from their families.

(4): Instruction of self-management for patients: It included keeping in close contact with patients via telephone, E-mail, by Internet, monitoring various indicators of pain, fatigue and other symptoms and QoL of the patients, and targeted instruction as well as education. As for patients with poor self-management who could not cooperate with remote intervention via internet, their homecare givers were instructed to carry out detailed nursing care and proper therapy, so as to keep the cooperation efficiency of hospital-family-community unit to deliver adequate intervention in the whole process.

Investigation of quality of life

The documented VAS of pain from 1 to 6 months after esophagectomy was collected, and the variation tendency during the 6 months after operation was analyzed. The 36-item Short Form Health Survey (SF-36) was utilized to assess QoL of the patients. The SF-36 questionnaire included items of physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH), and every item was compared between the two groups.

Statistics

SPSS 19.0 software (IBM, Armonk, NY, USA) was used for data analysis. Continuous variables are presented as mean± standard deviation (SD). The Student's t-test or Mann-Whitney U test were used while comparing continuous variables between groups. Chi-square or Fisher exact test were used to compare categorical variables and enumeration data. P value <0.05 was considered as statistically significant.

Results

Changes of postoperative pain of patients

The differences of general information of patients, such as gender, age, body mass index, surgical procedures of esophagectomy, operative incision lengths, operation time, postoperative analgesic method, chest drainage indwelling time, hospitalization time etc. in the control and observation group were not significant (p>0.05) (Table 1). Both the number of patients who needed pethidine and the times of pethidine used by patients for postoperative pain relief were less in the observation group compared with the control group but without significant difference (p>0.05). Besides, VAS of pain from 1 to 6 months after operation in the observation group were significantly lower than that in the control group (p<0.05), as shown in Figure 1. Furthermore, the overall satisfaction of patients in the observation group was dramatically better compared with the control group (p<0.05).

The changes of pain scores of patients from 1 to 6 months after the operation can be seen in Figure 1. Compared with the control group, the postoperative pain was relieved effectively in the observation group. Additionally, most of patients in the observation group could tolerate the pain after surgery with lower pain scores, and postoperative pethidine requirements (15 times) were encouragingly less than that of the control group (27 times) (Table 1 and Figure 1). During the postoperative follow-up, the patients with continuous pain and needing therapy for pain relief for more than 3 months were diagnosed as CPSP; 6 patients were diagnosed as CPSP (6/41,14.6%) in the follow-up period in the observation group, which was considerably less than 16 patients in the control group (16/40,40.0%) (p=0.021).

Comparisons of postoperative patient QoL

Scores of each item in SF-36 of esophageal

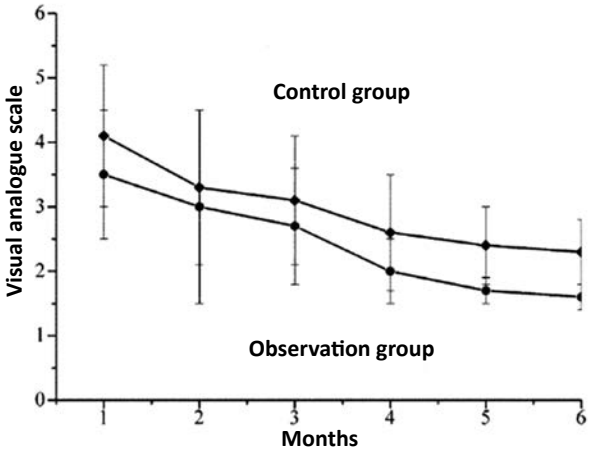

Figure 1. Pain visual analogue scales of the patients 1-6 months after esophagectomy.Compared with normal control group, the difference was significant (p<0.05).

cancer patients 6 months after the operation in the observation group, including physical functioning (PF), role-physical (RP), bodily pain (BP), general health status (GH) etc. were all better compared with the control group, but the difference was not significant (p>0.05) as shown in Table 2. Meanwhile, the overall satisfaction rate of the patients in the observation group was notably higher than that of the control group as evaluated by the questionnaire via Internet 6 months after the operation (p=0.032). It is noteworthy that the QoL of some patients after esophagectomy was poor and they really needed long-term and even lifetime standard pain or psychological intervention.

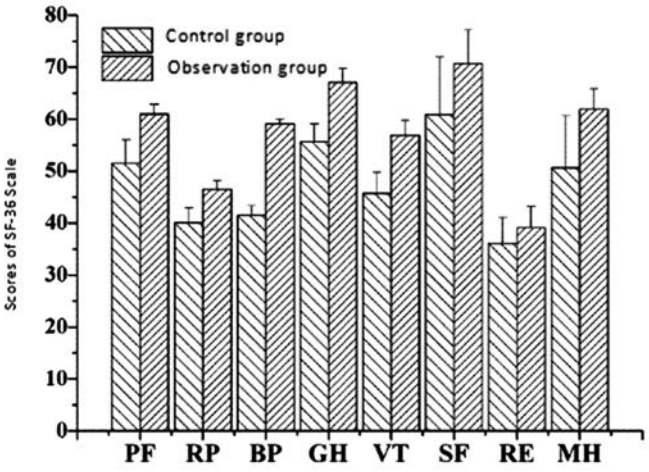

Figure 2. Quality of life scores of the patients 6 months after esophagectomy, evaluated by SF-36 questionnaire. PF: physical functioning, RP: role-physical, BP: bodily pain, GH: general health, VT: vitality, SF: social functioning, RE: role-emotional, MH: mental health. Comparisons among groups showed no statistically significant difference (p>0.05).

Discussion

Postoperative QoL of patients is an important issue for doctor-patient relationship and patient satisfaction. Surgical procedures could lead to CPSP in a general surgical patient population, and the most frequent cited pain sites were joint, incisional/scar and nerve [3]. A research for standardization of CPSP diagnosis and therapy initiated by VanDenKerkhof et al. indicated that CPSP was common, and included demographic, surgery-related and psychological risk factors [4]. Hinrichs-Rocker et al. demonstrated that the etiology of chronic pain is grounded in the bio-psychosocial model whilst physical, psychological, and social factors are implicated in CPSP development, among them, biomedical factors included preoperative pain, severe acute postoperative pain, modes of anesthesia and surgical approaches, while psychosocial predictors for and correlates to CPSP included depression, psychological vulnerability, stress, and late return to work [5]. In addition, somatic and psychiatric symptoms including fatigue, numbness/tingling, depression, nervousness, headaches etc. are highly intercorrelated [6], which frequently result in damaged postoperative QoL of patients with CPSP. Furthermore, chest drain insertion was associated with late nerve injury and severe movement-related acute pain as well as development and maintenance of persistent postoperative pain, which was proved to be a noxious stimuli result in postthoracotomy pain syndrome [7].

Nevertheless, patients' self-management skills for pain relief are affected by their knowledge, activities and attitudes, and a trial by Jahn et al. revealed that the nursing intervention had a positive impact on patients' self-management of cancer pain [8]. Additionally, interactive sections as part of Internet-based interventions can positively alter the empowerment feelings of chronic back pain patients, which was helpful to prevent medication misuse without detrimental effects [9]. However, a web-based survey by Atasoy et al. demonstrated that most physicians sometimes can not offer sufficient pain management due to lack of time [10]. Despite the recognized association between cancer and pain [11], insufficient attention was paid in CPSP after esophagectomy, and to date, further efforts are necessary in order to identify the risk factors of CPSP after thoracotomy for targeted analgesic interventions and enhanced health-related QoL during the follow up. Therefore, Internet-based intervention may be a choice to solve this problem.

Telehealth technologies can bridge geographic distance where pain specialists were unavailable in non-academic medical centers, to provide timely help for pain suffering patients including internal medicine, addiction medicine, rehabilitation medicine, anesthesiology, psychiatry and nursing, so as to effectively solve the problems in terms of pain intensity, pain's interference on function and sleep, and anxiety, depression, and cost-effectiveness [12]. Besides, a web-based, smartphone-delivered intervention using cognitive behavioral approaches with personalized feedback for women with chronic widespread pain following inpatient rehabilitation can promote their self-management of pain conditions and prevent increases in functional impairment as well as symptom levels [13]. Moreover, psycho-

logical therapies via the Internet could effectively reduce the intensity or severity of pain, and the satisfaction with these treatments was generally positive, which were traditionally performed face-to-face in medical centers [14]. And a large trial of Internet-delivered cognitive-behavioral therapy for pediatric chronic pain by Palermo et al. demonstrated that internet-delivered intervention produced a number of beneficial effects [15]. A pilot study by Chavooshi et al. indicated that 16 weeks of Intensive Short-Term Dynamic Psychotherapy delivered by Skype can significantly reduce pain intensity and clinical symptoms of idiopathic pain [16]. However, Baumeister et al. reported that patients with chronic pain display a relatively low acceptance of Internet-based psychological pain interventions, which can be substantially increased by a short informational video about the procedure [17].

It is noteworthy that cancer patients and their relatives showed a higher tendency to use health-related Internet information after cancer diagnosis with or without their physicians [18], therefore, health professionals should offer Internet-based intervention to avoid misleading information.

The preliminary experience suggests that whole-course pain intervention and psychological support for a lifetime can decrease the incidence of CPSP effectively, and remote pain intervention via Internet or smartphone was helpful to improve the long-term QoL for patients with CPSP. Not only did this share the same efficacy as regular clinical visits to hospitals, but it cut down on time and expenses. Therefore, it is worth its widespread application, however, more multicenter prospective high quality trials with long-term follow up are truly needed for the validation and promotion of benefits from whole-course pain intervention.

Acknowledgements

Many thanks to the Editors of J BUON for their kind help in correcting this paper. This study was supported by speciality fund for Jiangsu Key Laboratory of Molecular and Translational Cancer Research (No. BM2013007).

Conflict of interests

The authors declare no confict of interests.

References

1. Papathanasiou I, Sklavou M, Kourkouta L. Holistic nursing care: theories and perspectives. Am J Nurs Sci 2013;2:1-5.
2. Peng Z, Li H, Zhang C, Qian X, Feng Z, Zhu S. A retrospective study of chronic post-surgical pain following thoracic surgery: prevalence, risk factors, incidence of neuropathic component, and impact on qualify of life. PLoS One 9:e90014, 2014.
3. Simanski CJ, Althaus A, Hoederath S et al. Incidence of chronic postsurgical pain (CPSP) after general surgery. Pain Med 2014;15:1222-1229.
4. VanDenKerkhof EG, Peters ML, Bruce J. Chronic pain after surgery: time for standardization? A framework to establish core risk factor and outcome domains for epidemiological studies. Clin J Pain 2013;29:2-8.
5. Hinrichs-Rocker A, Schulz K, Järvinen I et al.Psychosocial predictors and correlates for chronic post-surgical pain (CPSP) - a systematic review. Eur J Pain 2009;13:719-730.
6. Fishbain DA, Gao J, Lewis JE et al. Prevalence comparisons of somatic and psychiatric symptoms between community nonpatients without pain, acute pain patients, and chronic pain patients. Pain Med 2015;16:37-50.
7. Wildgaard K, Ringsted TK, Ravn J et al. Late sensory changes following chest drain insertion during thoracotomy. Acta Anaesthesiol Scand 2013;57:776-783.
8. Jahn P, Kuss O, Schmidt H et al. Improvement of pain-related self-management for cancer patients through a modular transitional nursing intervention: a cluster-randomized multicenter trial. Pain 2014;155:746-754.
9. Riva S1, Camerini AL, Allam A et al. Interactive sections of an Internet-based intervention increase empowerment of randomized controlled trials. J Med Internet Res 2014;13;16:e180.
10. Atasoy A, Bogdanovic G, Aladashvili A et al. An international survey of practice patterns and difficulties in cancer pain management in Southeastern Europe: a Turkish & Balkan Oncology Group common initiative. J BUON 2013;18:1082-1087.
11. Bianchini C, Maldotti F, Crema L et al. Pain in head and neck cancer: prevalence and possible predictive factors. J BUON 2014;19:592-597.
12. Eaton LH, Gordon DB, Wyant S et al. Development and implementation of a telehealth-enhanced intervention for pain and symptom management. Contemp Clin Trials 2014;38:213-220.
13. Kristjánsdóttir OB, Fors EA, Eide E et al. A smartphone-based intervention with diaries and thera-

pist-feedback to reduce catastrophizing and increase functioning in women with chronic widespread pain: randomized controlled trial. J Med Internet Res 2013;15(1):e5.

14. Fisher E, Law E, Palermo TM et al. Psychological therapies (remotely delivered) for the management of chronic and recurrent pain in children and adolescents. Cochrane Database Syst Rev 2015,3:CD011118.
15. Palermo TM, Law EF, Fales J et al. Internet-delivered cognitive-behavioral treatment for adolescents with chronic pain and their parents: a randomized controlled multicenter trial. Pain 2016;157:174-185.
16. Chavooshi B, Mohammadkhani P, Dolatshahi B. A Randomized Double-Blind Controlled Trial Comparing Davanloo Intensive Short-Term Dynamic Psychotherapy as Internet-Delivered vs Treatment as Usual for Medically Unexplained Pain: A 6-Month Pilot Study. Psychosomatics 2016;57:292-300.
17. Baumeister H, Seifferth H, Lin J et al. Impact of an Acceptance Facilitating Intervention on Patients' Acceptance of Internet-based Pain Interventions: A Randomized Controlled Trial. Clin J Pain 2015;31:528-535.
18. Nayir E, Tanriverdi O, Karakas Y et al. Tendency of cancer patients and their relatives to use internet for health-related searches: Turkish Oncology Group (TOG) Study. J BUON 2016;21:714-719.