

Original Article

A study on the efficacy of high-quality nursing on alleviating adverse reactions and cancer pain, and its effect on QOL of patients with liver cancer after interventional surgery

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Abstract: Objective: This study was designed to evaluate the efficacy of high-quality nursing on alleviating adverse reactions and cancer pain, and its effect on quality of life (QOL) of patients with liver cancer after interventional surgery. Methods: 84 patients admitted to our hospital due to liver cancer were included as the study objects and randomized into the observation group (n=42) and control group (n=42). Patients in the control group were routinely nursed after surgery, while patients from the observation group received high-quality nursing on the basis of routine nursing. The two groups were observed for length of stay (LOS), appetite and sleep quality, evaluated for anxiety and depression with Self-Rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS), degree of pain with Visual Analogue Scale (VAS), nursing satisfaction with the Questionnaire on Nursing Satisfaction (QNS) formulated by the hospital, QOL referring to QLQ-C30, and compared for incidence of complications. Results: Significant improvement in LOS, appetite, sleep quality, and QOL, reduced SAS, SDS and VAS scores, and total incidence of adverse reactions, and significantly increased nursing satisfaction were observed in the observation group compared with the control group ($P < 0.05$) after nursing intervention. Conclusion: The effects of high-quality nursing for patients with liver cancer in interventional surgery have been established that it can shorten the LOS, improve appetite, sleep quality, and unhealthy mood, reduce pain and incidence of adverse reactions after surgery, and consolidate QOL and nursing satisfaction.

Keywords: High-quality nursing, interventional surgery, liver cancer, adverse reactions, cancer pain, QOL

Introduction

Liver cancer is the 2nd killer among global cancers [1, 2]. It develops in patients with chronic liver diseases in most of the cases, and may sustain a decade driven by the circle of liver injury, inflammation and regeneration [3]. Liver cancer is also one of the most common malignant tumors with unfavorable prognosis worldwide that each year an increase of over 500,000 patients with this disease is expected. While patients in early stage of liver cancer may be healed by liver transplantation or curative surgery [4], options are extremely limited when the disease develops to the terminal stage [5], against which interventional treatment has been developed as the first choice to kill tumor cells collectively, reduce the quantity of malignant tumors as far as possible, and

postpone tumor metastasis and spread [6] in the forms of embolization of tumor vessel and local targeted drug perfusion. For patients with liver cancer, not only timely symptomatic treatment is necessary, the quality of nursing intervention may also affect treatment effect, prognosis and rehabilitation [7, 8].

In routine nursing, nurses may take care of patients based on their clinical experience with little stress on individual difference, which results in repeated and blind operations [9], undesired clinical efficacy and failure to satisfy the demands of most patients [10]. In contrast, high-quality nursing is personalized and patient-centered [11], and extensively applied on patients with various diseases, yielding comparatively ideal effects [12] based on its demonstrated values through the facts that para-

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medics not only develop their professional accomplishments and overall nursing level [13], but also work more efficiently, and improve patients' clinical results. Examples include the important role of high-quality nursing in survival nursing programs that it can improve the quality and coordination of patient nursing after cancer treatment [14], and its function of reinforcing the safety of patients in emergency nursing environment [15].

So far, fewer studies have been conducted to understand the application of high-quality nursing in interventional surgery for patients with liver cancer, a problem which was solved in this study by introducing the intervention mode into such surgical cases, in order to find a feasible nursing intervention measure for patients with liver cancer.

Material and methods

General materials

84 patients admitted to our hospital due to liver cancer were included as the study objects and randomized into the observation group (n=42) and the control group (n=42). Patients in the control group were routinely nursed after surgery, while patients from the observation group, on the basis of routine nursing, received high-quality nursing. The observation group included 23 males and 19 females aged between 25 and 77 with average age of 56.8 ± 1.2 , while the control group had 26 males and 16 females aged between 26 and 72 with average age of 56.3 ± 1.4 .

Inclusion and exclusion criteria

Patients diagnosed with liver cancer via CT or MRI [16] and satisfying indicators for surgery with stable vital signs, complete clinical general materials, ability of independent thinking, and expected survival time greater than or equal to 1 year were included. The study has been approved by the ethics committee of the hospital, and informed to the study objects and their family members who signed on the complete informed consent form. Patients who were suffering from severe liver and renal failure, metastasis of other malignant tumor to liver, coagulation disorders, aphasia and dysaudia, combined severe medical diseases, or mental diseases, or patients in pregnancy or lactation, or having a family history of mental illness were excluded.

Nursing methods

For patients in the control group, the surgical time was established according to their specific conditions, and requirements on preoperative clinical examinations and routine procedures, including no food and water, and callout of allergic history to the drugs used, were put forward. Before and after surgery, patients were organized for basic health education, reminded of caution on infection and bleeding, and instructed in terms of diet and exercises.

On the basis of routine nursing for the control group, patients from the observation group received high-quality nursing, which included: (1) Health education before surgery, which requires paramedics understanding and evaluating patients' psychology as they may be involved in seriously unhealthy mood after learning the disease, consolidating health education, and explaining the purpose of surgery and advantages, etc., and assisting patients in regulating their moods to maintain the best status, in order to avoid adverse effect of negative mood on treatment. (2) Sufficient nutritional intervention before surgery, which requires paramedics strengthening the intervention with patients' diet by giving them food which are richer in nutrients and easier to be digested since cancer liver may result in metabolic and digestive absorption disorders in patients, weakening their tolerance during surgery and recovery after surgery. Also measures shall be adopted for better regulation of water and electrolytes to improve patients' nutritional status. (3) Postoperative OR preparation, which requires an OR at 25°C and infusions at 37°C 20 min before the surgery, in order to avoid the effect of body temperature drop on physiologic functions due to anesthesia and hemorrhage in surgery since the patients' physiologic functions such as immunity and blood may be impaired by surgical wound and anesthesia to the disadvantage of postsurgical recovery. (4) Postoperative mood control, which demands cooperation between the paramedics who shall timely inform the patient that the surgery is a success, and the family members who shall encourage and comfort the patients, and take responsibility for postoperative nursing (key points to be cared in postsurgical nursing) as the patient may feel somehow painful and worry about the surgical effect. (5) Postoperative diet intervention, which is performed by supplementing nutrition via nasal feeding or I.V.T. in early stage after surgery, and preparing nutri-

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ent solution according to the patient's nutritional status, which may be replaced by liquid diet later, and reasonably adjusted and supplemented to ensure the patient's daily diet and calories between 2500 and 2850 kcal, otherwise, the postoperative recovery will be slowed down since the patient is required jejunitas before and after surgery, and may be severely affected in appetite and ability to take and digest food due to the interventional surgery. (6) Postoperative prevention of complications, which requires pressure dressing of the surgical wound and regular observation of the puncture point, administration of coagulant and hemostatics to patients, enhanced monitoring on liver function indicators, and 3d hypobaric oxygen therapy to alleviate the burden on the patient's liver since the patients with liver cancer are characterized by unsatisfactory coagulation functions possibly resulting in coagulation disorders to various degree and affecting postsurgical recovery. (7) Family nursing and healthcare, comprising a systematic physical examination before discharge, formulation of detailed home nursing and healthcare schedule, notes to the patient for follow-up, regular online nursing tracking and door-to-door instructions.

Observation indicators

The two groups were observed and recorded for LOS, appetite, sleep quality and adverse reaction after surgery.

The two groups were assessed for anxiety with SAS [17] before nursing and 1 d before discharge, with full mark of 100, and a score between 50 and 70 indicates mild anxiety, 71 to 90 moderate anxiety, and over 90 severe anxiety. Higher score represents more serious anxiety.

The two groups were assessed for depression with SDS [18] before nursing and 1 d before discharge, with full mark of 100, and a score between 50 and 70 indicates mild depression, 71 to 90 moderate depression, and over 90 severe depression. Higher score represents more serious depression.

The two groups were assessed with QLQ-C30 for QOL, which consists of 5 items to each a full mark of 100 is assigned, including physical function, cognitive function, emotional function, role function and social function. Higher score represents better QOL.

The two groups were assessed for nursing satisfaction with the Questionnaire on Nursing Satisfaction (QNS) formulated by the hospital, which includes 20 questions about attitude, personality, dressing, and operation sophistication, etc. Each question values 5 points. A score below 70 represents dissatisfactory, between 70 and 89 basically satisfactory, and at or above 90 satisfactory. Degree of satisfaction = (Satisfaction + Basic Satisfaction)/Total case number $\times 100\%$.

The two groups were assessed for the degree of pain by VAS [19], in which 0 represents no pain and 10 worst possible pain. A higher VAS score indicates more serious pain.

Statistical analysis

SPSS20.0 (IBM Corp, Armonk, NY, USA) was adopted for statistical analysis and GraphPad Prism 7 for data mapping. Nominal data were expressed in [n (%)] and subject to chi-squared test between groups. Measurement data were expressed in $\bar{x} \pm sd$, and subject to independent-samples t test between groups or paired t-test in the same group for pre-and-post comparison. $P < 0.05$ indicates a statistically significant difference.

Results

General information

No significant difference was observed between the two groups in gender, age, BMI, educational background, diet habits, domicile, history of smoking and drinking alcohol, exercise habits, marriage and nutritional status ($P > 0.05$, **Table 1**).

Comparison in postoperative LOS, appetite and speed quality

The observation group was better than the control group in terms of postoperative LOS, appetite and speed quality after nursing intervention ($P < 0.05$, **Table 2**).

Comparison in SAS scores before and after nursing

The SAS scores of the observation group and the control group showed a decrease ($P < 0.05$) which was more significant in the observation group ($P < 0.05$, **Figure 1**) although the two groups demonstrated no significant difference before nursing ($P > 0.05$).

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Table 1. Comparison of general materials [n (%)] (x ± sd)

Group	Observation group (n=42)	Control group (n=42)	t/X ² value	P value
Gender			0.441	0.507
Male	23 (54.76)	26 (61.90)		
Female	19 (45.24)	16 (38.10)		
Age in Year	56.8±1.2	56.3±1.4	1.757	0.083
BMI (kg/m ²)	23.8±3.6	22.9±3.5	1.162	0.249
Educational Background			0.431	0.512
< High school	21 (50.00)	24 (57.14)		
≥ High school	21 (50.00)	18 (42.86)		
Diet habit			0.435	0.509
Mild	17 (40.48)	20 (47.62)		
Spicy	25 (59.52)	22 (52.38)		
Domicile			0.460	0.498
Urban	28 (66.67)	25 (59.52)		
Rural	14 (33.33)	17 (40.48)		
History of smoking			0.791	0.374
Y	23 (54.76)	27 (64.29)		
N	19 (45.24)	15 (35.71)		
History of drinking alcohol			0.808	0.369
Y	24 (57.14)	28 (66.67)		
N	18 (42.86)	14 (33.33)		
Exercise habit			0.429	0.513
Y	22 (52.38)	19 (45.24)		
N	20 (47.62)	23 (54.76)		
Marriage			1.921	0.383
Married	25 (59.52)	26 (61.90)		
Unmarried	15 (35.71)	11 (26.19)		
Widowed	2 (4.76)	5 (11.90)		
Nutritional status			0.449	0.799
Good	27 (64.29)	24 (57.14)		
General	10 (23.81)	12 (28.57)		
Poor	5 (11.90)	6 (14.29)		

Table 2. Comparison in LOS, appetite and sleep quality after surgery (x ± sd)

Group	n	LOS (d)	Appetite	Sleep quality
Observation group	42	24.17±4.56	2.92±0.61	3.34±0.51
Control group	42	36.24±6.21	2.37±0.41	2.78±0.29
t		10.150	4.850	6.186
P		<0.001	<0.001	<0.001

ficant difference before nursing (P>0.05).

Incidence of adverse reactions after nursing

The observation group showed significantly less incidence of adverse reaction than control group (P<0.05, **Table 3**).

Comparison in SDS scores before and after nursing

The SDS scores of the observation group and the control group exhibited a decrease (P<0.05) which was more significant in the observation group (P<0.05, **Figure 2**) although the two groups demonstrated no signi-

Comparison of VAS scores before and after nursing

The two groups demonstrated a reduced VAS score after nursing (P<0.05), which was more significant in the observation group (P<0.05, **Table 4**) though no difference was observed before nursing (P>0.05).

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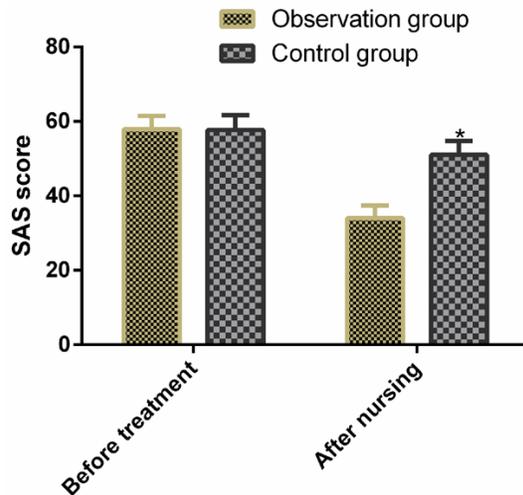


Figure 1. SAS scores of the two groups before and after treatment. The two groups demonstrated a decrease in SAS score after nursing, which was more significant in the observation group ($P < 0.05$) although the two groups demonstrated no significant difference before nursing ($P > 0.05$). Note: $P < 0.05$ as compared with the control group after nursing.

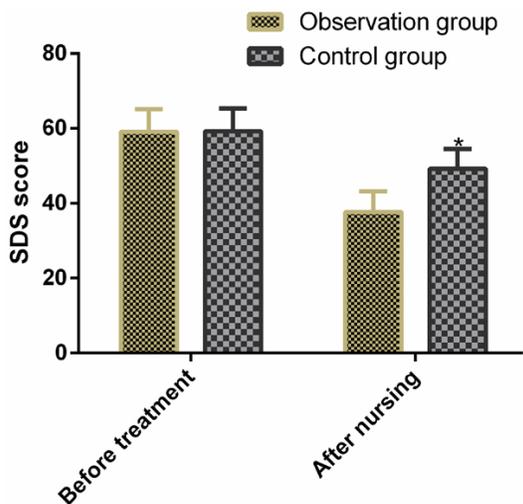


Figure 2. SDS scores of the two groups before and after treatment. The two groups demonstrated a decrease in SDS score after nursing, which was more significant in the observation group ($P < 0.05$) although the two groups demonstrated no significant difference before nursing ($P > 0.05$). Note: $P < 0.05$ as compared with the control group after nursing.

Comparison of QOL scores after nursing

The observation group was better than the control group in terms of physical function, emotional function, role function and social function ($P < 0.05$, Table 5).

Comparison of nursing satisfaction

The observation group was significantly higher than the control group in terms of degree of nursing satisfaction ($P < 0.05$, Table 6).

Discussion

Liver cancer has been known as one of the most lethal and common cancers in the world [20]. It is invasive [21] and inclusive of various pathogenies [22] as well as cancer stem cells which participate in the invasion, reoccurrence, and resistance to treatment of tumors, resulting in unfavorable prognosis and limited options for treatment [23]. Though interventional treatment is characterized by small wound and better efficacy in treating liver cancer [24, 25], it also leads to various problems and adverse reactions. For this reason, high-quality nursing plays a vital role in helping patients during interventional treatment [26].

As medical level increases, routine nursing fails to satisfy the demand and expectation of most patients on nursing quality [27, 28]. High-quality nursing is a new, comprehensive, scientific and overall intervention model focusing on patients, considering more for patients and tailored for patients [29]. In the study of Yuli et al [8], nursing intervention was performed on patients who were receiving interventional treatment against liver cancer and cirrhosis, and achieved the effects of improving the patients' QOL and survival rate while reducing complications after surgery. The same effects were also observed in the study by Klafke et al [30] who found that nursing intervention can effectively improve the QOL of patients with tumor in chemotherapy period and stabilize their emotional functions. In this study, the observation group showed improvements in LOS, appetite and sleep quality as compared with the control group after surgery, indicating that high-quality nursing can markedly shorten the LOS, improve appetite and sleep quality of patients. The decrease in SAS of both groups and more significant in the observation group after nursing revealed the function of high-quality nursing in alleviating the anxiety state of patients during surgical treatment. In addition, the scores of SDS after nursing decreased significantly, which was more obvious in observation group. It shows that the emotional regulation intervention can not only improve the anxiety state of patients,

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Table 3. Incidence of adverse reactions after nursing ($x \pm sd$)

Type	Observation group (n=42)	Control group (n=42)	X ² value	P value
Hepatalgia	1 (2.38)	2 (4.76)	0.346	0.557
Nausea and vomiting	2 (4.76)	3 (7.14)	0.213	0.645
Fever	1 (2.38)	5 (11.90)	2.872	0.090
Uroschesis	1 (2.38)	3 (7.14)	1.050	0.306
Total incidence of adverse reactions	5 (11.90)	13 (30.95)	4.525	0.033

Table 4. Comparison of VAS scores before and after nursing ($x \pm sd$)

Group	n	Before nursing	After nursing	t	P
Observation group	42	46.35±6.67	34.16±5.16	9.368	<0.001
Control group	42	45.37±6.61	40.21±5.83	3.794	0.003
t		0.676	5.036	-	-
P		0.501	<0.001	-	-

Table 5. Comparison of QOL scores after nursing ($x \pm sd$)

QOL Score	Observation group (n=42)	Control group (n=42)	t value	P value
QOL	77.13±5.12	62.93±3.56	14.760	<0.001
Physical function	72.87±3.94	59.21±4.40	14.990	<0.001
Emotional function	73.81±6.71	60.89±4.56	10.320	<0.001
Role function	77.33±7.68	58.97±8.75	10.220	<0.001
Social function	77.63±8.33	63.43±9.40	7.327	<0.001

Table 6. Comparison of nursing satisfaction [n (%)]

Item	Observation group (n=42)	Control group (n=42)	X ² value	P value
Very satisfied	24 (57.14)	15 (35.71)	-	-
Satisfied	15 (35.71)	13 (30.95)	-	-
Dissatisfied	3 (7.14)	14 (33.33)	-	-
Nursing satisfaction	39 (92.86)	28 (66.67)	8.924	0.003

but also reduce the depressive mood of patients, thus improving the unhealthy mental mood of patients. QOL reflected the recovery of patients after treatment or surgery [31]. The study also reported improved physical function, cognitive function, emotional function, role function and social function in the observation group after nursing, supporting the fact that high-quality nursing can improve the patients' QOL. In the observation group, high-quality nursing also yielded an incidence of adverse reactions and VAS score significantly lower than the control group, providing evidence for its functions of reducing the incidence of adverse reactions and pain after surgery. A survey of nursing satisfaction among patients

demonstrated that the observation group was more satisfied because of the new nursing model, providing a more solid reference for its future clinical application.

However, the study failed to assess the treatment compliance of patients with liver cancer though the advantages of high-quality nursing over routine nursing in patients with liver cancer were established. Future studies shall be developed around those shortcomings to further support the conclusions obtained through the study.

In general, the effects of high-quality nursing for patients with liver cancer in interventional surgery have been established that it can shorten the LOS, improve appetite, sleep quality, and unhealthy mood, reduce pain and incidence of adverse reactions after surgery, and consolidate QOL and nursing satisfaction.

Disclosure of conflict of interest

None.

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