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Original Article

Effect of evidence-based nursing intervention on diet and pain after subtotal gastrectomy

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Abstract: Objective: To understand the effect of evidence-based nursing on diet and pain after subtotal gastrectomy. Methods: From June 2014 to May 2016, 68 patients with gastric cancer undergoing subtotal gastrectomy were selected as the research group (RG) and 57 patients with routine nursing as the control group (CG). The incidence of complications and recovery time were compared between the two groups. The pain and sleep were evaluated by visual analogue scale (VAS) and Pittsburgh Sleep Quality Index (PSQI). The survival condition of the two groups after 3 years of prognosis was observed. Results: The incidence of complications and recovery time in RG were less than those in CG ($P < 0.05$), and the VAS and PSQI scores in RG were lower than those in CG on the 3rd and 7th day after operation ($P < 0.01$). However, the nursing satisfaction and 3-year survival rate of RG were higher than those of CG ($P < 0.05$). Conclusion: Evidence-based nursing can effectively reduce postoperative complications and pain in patients with gastric cancer undergoing subtotal gastrectomy.

Keywords: Evidence-based nursing, gastric cancer, after subtotal gastrectomy, diet, pain

Introduction

Gastric cancer is the fifth most common tumor at home and abroad [1], and more than 70% of new cases occur in developing countries, which shows obvious regional differences [2]. Gastric cancer has a high incidence rate and ranks second in cancer-related death causes [3], and is one of the most deadly malignant tumors. Although the level of comprehensive treatment for gastric cancer has been continuously improved in recent years, due to the absence of obvious symptoms in the early stage of gastric cancer, most patients have reached advanced stage at diagnosis. Therefore, the clinical curative effect is still unsatisfactory, with only 30% of patients surviving for more than 5 years [4]. At present, surgery is the only treatment method for gastric cancer patients [5]. Most of them are subtotal gastrectomy, which can eradicate lesions. However, postoperative complications are obvious, such as postoperative intestinal obstruction, and intestinal perforation. These complications have a great impact on the prognosis of patients, making the postoperative mortality rate of gastric cancer patients much higher than that of liver cancer and pancreatic cancer patients [6]. At present, facing the increasingly severe challenges of gastric cancer in clinical practice, researchers at home and abroad are constantly striving to find new methods that can effectively reduce the complications and adverse reactions after subtotal gastrectomy [7, 8]. With the deepening of research, more and more scholars pointed out that nursing intervention may be one of the key factors that affect the physical condition of patients with gastric cancer after surgery. For example, Ray et al. [9] proposed that receiving relevant nursing intervention can effectively improve the mood of dementia patients. Jiang et al. [10] believed that combined family nursing in the operating room can improve the psychological state of gastric cancer patients and has a posi-

tive effect on postoperative rehabilitation and prognosis. Evidence-based nursing is one of the nursing methods. Its main function is to apply evidence-based nursing measures to nursing decisions, thus solving the problems encountered in clinical nursing work and effectively improving the quality of nursing [11]. Eaton et al. [12] achieved good results in studying the value of evidence-based nursing practice for pain management of cancer patients. We speculated that evidence-based nursing has high application value for the treatment of adverse reactions and complications after gastric cancer resection, but there is still little research on this point at home and abroad. Therefore, in this study, evidence-based nursing intervention was implemented for gastric cancer patients to prove the application value of evidence-based nursing in subtotal gastrectomy and to provide effective reference and guidance for the clinical practice when nursing patients with gastric cancer.

Materials and methods

General information

Altogether 125 patients with gastric cancer undergoing subtotal gastrectomy admitted to our hospital from June 2014 to May 2016 were selected as the research subjects, including 73 males and 52 females, aged 34-72 years. Among them, 68 patients received evidence-based nursing during hospitalization, which was regarded as the research group. The other 57 patients received only routine care during hospitalization and were regarded as the control group. This experiment has been approved by the ethics committee of our hospital. All the above research subjects understood the nursing contents and signed the informed consent form.

Inclusion and exclusion criteria

According to the diagnostic guidelines for gastric cancer [13], patients who were diagnosed as gastric cancer after biopsy in our pathology department and underwent subtotal gastrectomy in our hospital were taken as the study objects. Exclusion criteria: patients who could not tolerate surgery; patients with mental diseases who could not cooperate with treatment and nursing; patients with other malignant tumors; patients at end-stage of the disease; patients with drug allergy; patients with poor treatment compliance; patients transferred from other hospitals.

Methods

Most gastric resection operations were performed after the patients were admitted to hospital, and were completed by senior surgical clinicians in our hospital. The patients in the control group only received routine nursing, including: guiding the patients and their families with routine precautions and nursing points during the perioperative period, regularly checking the vital signs of the patients every day, and cooperating with the attending doctors to carry out corresponding rehabilitation treatment and rehabilitation guidance for the patients. The research group carried out evidence-based nursing intervention on the basis of routine nursing, including: 1. An evidence-based nursing team was set up to train the team members so that they can quickly and effectively use evidence-based nursing knowledge to complete the nursing of patients during hospitalization. 2. The changes of vital signs after the operation were closely observed and a careful monitoring was carried out. Complications after subtotal gastrectomy included gastric hemorrhage, duodenal stump fistula, anastomotic obstruction, infection, etc. Nursing staff were required to attach great importance to the patients and notify doctors to deal with them in time when abnormalities were found. 3. Gastrorrhagia: A small amount of brown blood was drained within 1 day after operation. If the drainage fluid turned bright red after 1 day, and the patient was pale and apathetic, the possibility of gastrorrhagia should be alerted and the doctor should be notified immediately for treatment. 4. Duodenal stump fistula: 4~7 days after operation, the patient suddenly developed abdominal muscle tension and severe abdominal pain. Duodenal stump fistula should be considered and should be treated with doctors immediately. 5. Anastomosis obstruction: It was manifested as belching or hiccups after eating, and the patient complains of foreign matter retention. Therefore, the nursing staff should give dietary guidance to encourage the patient to get out of bed as soon as possible to promote defecation and exhaust. After the anus recovers exhaust, a small amount of drinking water should be given first, and fluid diet should be given after no discomfort such as abdominal pain and the like. With the recov-

ery of gastrointestinal function and clinical examination without abnormality, the patient should slowly transition to normal diet. The principle of small amount and multiple meals should be followed in all stages. For patients with fasting and gastrointestinal decompression, the drainage volume should be observed and recorded daily, and rehydration therapy should be done well. 6. Infection: In case of suppuration, inflammatory exudation or persistent high fever in the postoperative wound of the patient, consideration should be given to whether the patient was complicated with infection, prevention of infection should be done in accordance with the doctor's advice, attention should be paid to the wound dressing, and timely replacement should be made in case of bleeding and exudation.

Observation index

1. Incidence of postoperative complications of patients: the occurrence of postoperative complications of patients was recorded, and the incidence of complications = number of complications/total number × 100%; 2. Rehabilitation time: exhaust time, drainage duration and total hospitalization time after operation; 3. Pain situation: visual analogue scale (VAS) was used to score the patients before operation (T0), 3 days after operation (T1) and 7 days after operation (T2). The low score indicates improved pain situation. 4. Sleep quality: using the Pittsburgh Sleep Quality Index Questionnaire (PSQI) [14]. The low score indicates improved sleep quality of patients. 5. Nursing satisfaction: when patients were discharged from the hospital, anonymous investigation was conducted to fill in the nursing satisfaction questionnaire. The content of the form included the satisfaction degree of nursing staff, the evaluation of nursing ability and the evaluation of self-benefits. A percentile system was adopted. Over 90 points were very satisfied, 80-90 points were satisfied, 60-79 points were needed for improvement, and less than 60 points were not satisfied. Satisfaction = (very satisfied+satisfied)/total number of cases × 100%. 6. Prognostic survey: The patients were followed up for 3 years, and the survival of the two groups for 3 years was recorded.

Statistical method

SPSS20.0 software package was used to carry out statistical analysis on the collected data. GraphPad 5 software package was used to visualize the required pictures. Counting data were expressed in the form of rate. Chi-square test was used for comparison between groups. Measurement data, such as recovery time, were expressed in the form of mean ± standard deviation. T test was used for comparison between groups. Multiple time points comparision was conducted by repeated measurement variance analysis and Bonferroni post hoc testing. The survival rate was calculated by Kaplan-Meier method, and the survival rate was compared by Log-rank test. The *P* value less than 0.05 was regarded as statistical significance.

Result

There was no difference in clinical data between the two groups

There was no significant difference in age, sex, TNM stage, differentiation degree, marital status, education level, eating habits, smoking and drinking between the two groups ($P > 0.05$). See **Table 1**.

Incidence of complications in RG was lower than that in CG

The postoperative complications of the two groups were compared. Analysis showed that the incidence of complications in the control group (31.58%) was greatly higher than that in the study group (14.70%), $P < 0.05$. See **Table 2**.

Recovery time of RG was shorter than that of CG

The postoperative exhaust time of the study group was 2.35 ± 0.73 d, greatly shorter than that of the control group (3.08 ± 0.79 d), $P < 0.01$. The duration of drainage in the study group was 6.29 ± 1.41 d, greatly shorter than that in the control group (7.18 ± 1.52 d), $P < 0.01$. The total hospitalization time of the study group was 14.77 ± 2.58 d, greatly shorter than that of the control group (16.97 ± 2.94 d), $P < 0.01$. See **Figure 1**.

VAS score of RG was lower than that of CG

There was no significant difference in the VAS score among all patients at T0 ($P > 0.05$). The VAS scores of control group at T1 and T2 were

Table 1. Comparison of clinical data [n (%)]

	Research group (n=68)	Control group (n=57)	t or χ^2	P
Age	54.87±6.35	56.12±6.47	1.087	0.279
Gender			0.220	0.639
Male	41 (60.29)	32 (56.14)		
Female	27 (39.71)	25 (43.86)		
TNM staging			0.051	0.821
I~II	38 (55.88)	33 (57.89)		
III~IV	30 (44.12)	24 (42.11)		
Degree of differentiation			0.435	0.509
High differentiation	39 (57.35)	36 (63.16)		
Medium and low differentiation	29 (42.65)	21 (36.84)		
Marital status			0.567	0.328
Married	52 (76.47)	46 (80.70)		
Unmarried	16 (23.53)	11 (19.30)		
Degree of education			0.323	0.570
Below high school	42 (61.74)	38 (66.67)		
High school or above	26 (38.24)	19 (33.33)		
Eating habits			0.009	0.926
Light	28 (41.18)	23 (40.35)		
Pungent	40 (58.82)	34 (59.65)		
Smoking			0.001	0.973
Yes	36 (52.94)	30 (52.63)		
No	32 (47.06)	27 (47.37)		
Drinking			0.307	0.580
Yes	45 (66.18)	35 (61.40)		
No	23 (33.82)	22 (38.60)		

Table 2. Comparison of complication rates between two groups of patients

Group	Gastric hemorrhage	Duodenal stump fistula	Anastomotic obstruction	Infection	Incidence of complications
Research group (n=68)	2 (2.94)	2 (2.94)	1 (1.47)	5 (7.35)	10 (14.70)
Control group (n=57)	3 (5.26)	3 (5.26)	4 (7.02)	8 (14.04)	18 (31.58)
χ^2					5.079
P					0.024

greatly higher than those of the study group (P < 0.01). The VAS scores of the two groups were the highest at T0, T1 was lower than T0, and T2 was the lowest (P < 0.01). See **Figure 2**.

PSQI score of RG was lower than that of CG

There was no significant difference in PSQI score of preoperative sleep quality among all patients (P > 0.05). The PSQI score of postoperative study group was significantly lower than that of control group (P < 0.01). The PSQI score after operation in both groups was greatly lower than that before operation (P < 0.01). See **Table 3**.

Nursing satisfaction of RG was higher than that of CG

The total nursing satisfaction score of the study group (80.88%) was higher than that of the control group (64.91%), P < 0.05. Among them, the majority of patients in the study group were very satisfied, while the majority of patients in the control group were satisfied. See **Table 4**.

Survival rate of RG was higher than that of CG

By May 2019, 119 patients have been successfully followed up through telephone, hospi-

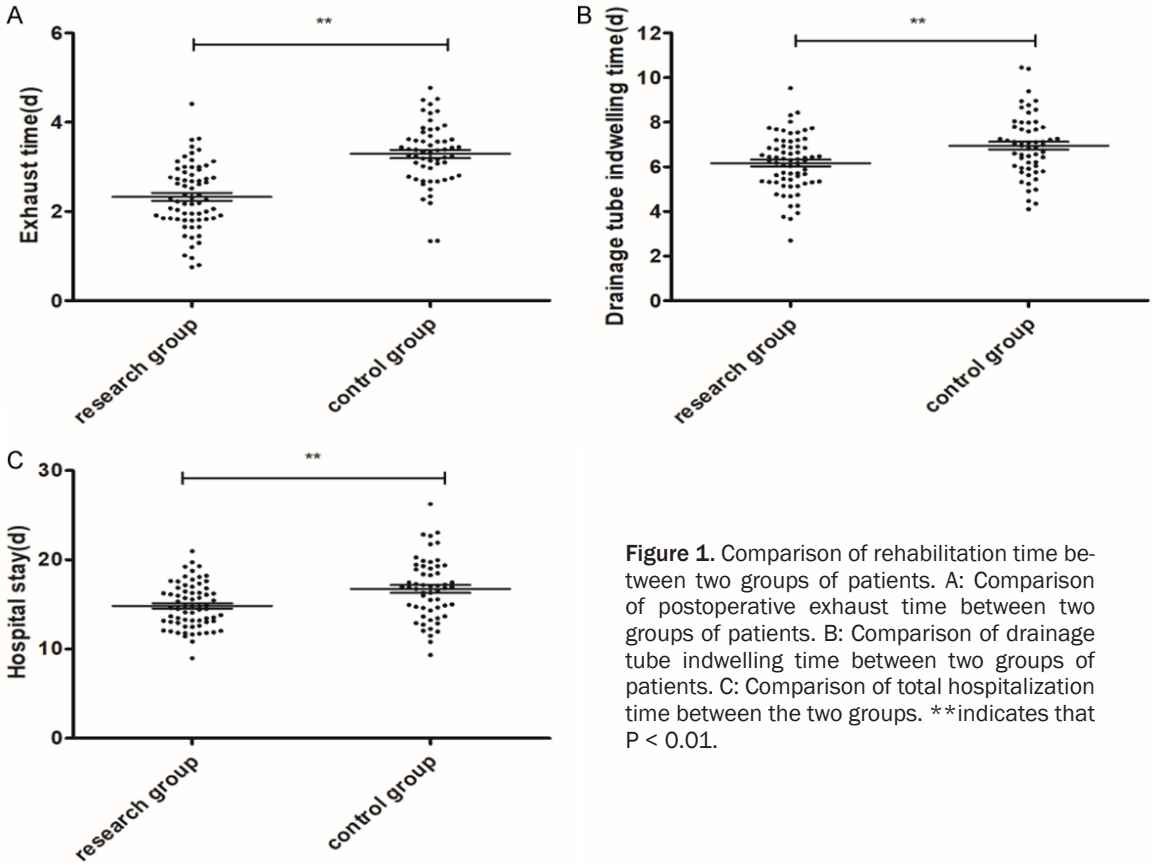

Figure 1. Comparison of rehabilitation time between two groups of patients. A: Comparison of postoperative exhaust time between two groups of patients. B: Comparison of drainage tube indwelling time between two groups of patients. C: Comparison of total hospitalization time between the two groups. **indicates that P < 0.01.

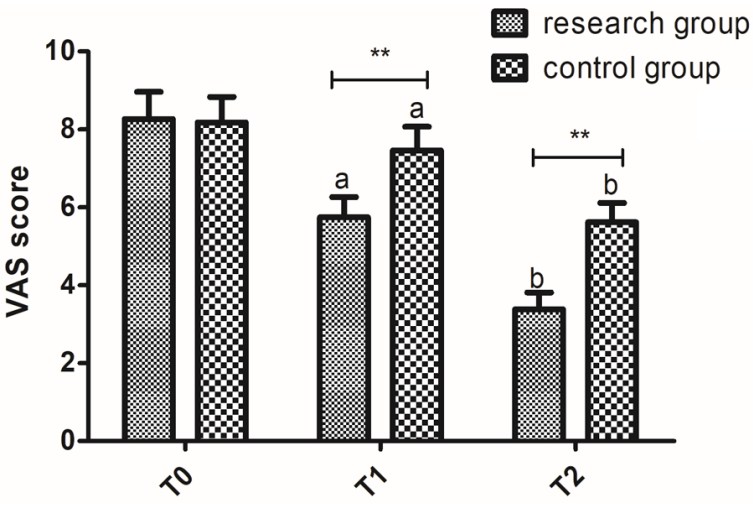

Figure 2. Comparison of pain scores. a represents that the two groups were respectively compared with the VAS score at T0, P < 0.01; b represents that the two groups were respectively compared with VAS score at T1, P < 0.01; **indicates that P < 0.01.

tal reexamination and on-site follow-up among 125 patients, with a follow-up success rate of 95.20%. Among them, the study group lost 2 cases and the control group lost 4 cases. The survival rates of the study group in the first, second and third years were 93.94%, 84.85% and 71.21%, respectively. The survival rates in the first, second and third years of the control group were 90.57%, 75.47% and 52.83%, respectively, with statistical significance (P=0.039). See **Figure 3**.

Discussion

Gastric cancer accounts for 10% of all cancer-related deaths, and about 720,000 people worldwide die every year [15]. Venerito et al. showed that although the incidence and mortality of gastric cancer have decreased in recent years, it is still the main cause of cancer death for men and women [16, 17]. At present, more and more researchers at home and abroad have devoted themselves to exploring all factors that

Table 3. Comparison of PSQI score of sleep quality

		Research group (n=68)	Control group (n=57)	t	P
Preoperative	Sleep quality	2.13±0.53	2.08±0.48	0.548	0.585
	Sleep time	2.27±0.59	2.21±0.56	0.580	0.563
	Sleep time	1.41±0.63	1.39±0.62	0.178	0.859
	Sleep efficiency	1.22±0.38	1.17±0.35	0.759	0.449
postoperative	Sleep quality	1.25±0.44**	1.52±0.47**	3.312	0.001
	Sleep latency	1.38±0.52**	1.65±0.59**	2.719	0.008
	Sleep time	0.82±0.21**	0.94±0.28**	2.734	0.007
	Sleep efficiency	0.67±0.26**	0.83±0.35**	2.928	0.004

**Shows that the two groups were respectively compared with preoperative, P < 0.01.

Table 4. Comparison of nursing satisfaction between two groups of patients [n (%)]

	Research group (n=68)	Control group (n=57)	χ^2	P
Very satisfied	34 (50.00)	14 (24.56)		
Satisfied	21 (30.88)	23 (40.35)		
Need improvement	10 (14.71)	14 (24.56)		
Dissatisfied	3 (4.41)	6 (10.53)		
Overall satisfaction	55 (80.88)	37 (64.91)	4.070	0.044

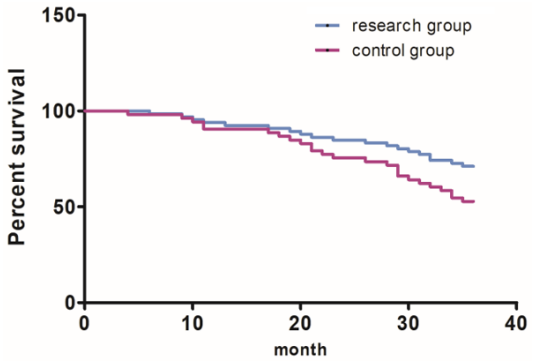

Figure 3. Prognosis and survival of patients after subtotal gastrectomy.

may affect the prognosis of gastric cancer in clinic in order to effectively improve the survival rate of gastric cancer [18-20]. With the deepening of the research, many studies have pointed out that the intervention of nursing methods has a certain improvement effect on the rehabilitation and adverse reactions after tumor surgery [21, 22]. However, there is still little research on the application value of evidence-based nursing in gastric cancer patients undergoing subtotal gastrectomy, and this experiment is of great clinical significance by comparing the application value of evidence-based nursing and routine nursing in the perioperative period of gastric cancer patients undergoing subtotal gastrectomy.

The results show that the incidence rate of complications in the study group receiving evidence-based nursing was greatly lower than that in the control group receiving routine nursing, suggesting that evidence-based nursing can effectively reduce the incidence rate of postoperative complications in patients undergoing subtotal gastrectomy. It was speculated that the causes for the incidence rate of complications in the study group to be greatly lower than that in the control group included the following points: 1. Guiding patients to eat high protein diet before operation and guiding patients to get out of bed early after operation can effectively promote wound healing. By comparing the postoperative exhaust time and drainage duration of the two groups of patients, it can be seen that the time taken by the patients in the study group was much shorter than that of the patients in the control group, which can support this view. 2. Real-time monitoring of patients' vital signs and close observation of wound conditions can discover the occurrence of complications in an early stage and carry out intervention treatment. The occurrence of infection in the study group was obviously less than that in the control group. 3. The diet of patients was guided by evidence-based nursing. First of all, relevant information and data were obtained through literature retrieval, and a diet plan was formulated so that patients were given priority to a light diet rich in high protein, and in a gradual and orderly fashion with a small amount of multiple meals. In this way, the dietary nutrition of patients could be affluent, and the postopera-

tive physical recovery could be promoted. This could be proved by the fact that the total hospitalization time of patients in the study group was obviously shorter than that of patients in the control group. For the management of patients' pain, we further adopted evidence-based nursing measures, including accepting pain-related knowledge, guiding patients' family members to talk with patients to divert their attention, keep good body position, and follow doctor's advice for drug analgesia. The results showed that, compared with the control group, the pain scores of the study group on the 3rd and 7th days after operation were lower than those of the control group, and the sleep quality of the patients in the study group was also better than that of the patients in the control group, proving that evidence-based nursing can effectively improve the pain after subtotal gastrectomy and improve the comfort of the patients. Postoperative pain of gastric cancer is very common and can change with the mood. Attention shift is helpful to relieve pain. Previous studies by Song et al. have shown that evidence-based nursing intervention can reduce postoperative pain, shorten the duration of pain and make patients more comfortable [23]. It is consistent with the experimental data and can support our research results. According to the survey of nursing satisfaction, the overall satisfaction of the patients in the study group was significantly higher than that of the patients in the control group, and the patients who were dissatisfied and needed improvement were also greatly lower than those in the control group, which further proved that the implementation of evidence-based nursing measures could significantly improve the satisfaction of patients in hospital, thus effectively improving the overall impression of patients on medical staff and promoting doctor-patient harmony. The survival rate of patients in the study group was significantly higher than that in the control group by comparing the survival rate of patients in the prognosis of the two groups for 3 years, suggesting that different nursing measures may have certain influence on the prognosis of patients, which may be related to the less occurrence of postoperative complications of patients in the study group. Takeuchi et al. believed that postoperative complications of gastric cancer will affect the prognosis of patients, and can verify the experimental results [24, 25].

At present, there are many clinical nursing interventions, such as individualized nursing and comprehensive nursing. In this study, only routine nursing was compared as the control group. It was not excluded that there may be differences between evidence-based nursing and other nursing interventions, or there may be other nursing interventions more suitable for subtotal gastrectomy. In the future, we will conduct more in-depth research on this point to improve our results.

To sum up, evidence-based nursing can effectively reduce the incidence of postoperative complications in patients with gastric cancer undergoing subtotal gastrectomy, accelerate the recovery of gastrointestinal function, relieve pain, and promote patient comfort.

Disclosure of conflict of interest

None.

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