

Original Article

The effect of the clinical nursing pathway on gastrectomy bariatric surgery patients

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Received September 30, 2020; Accepted November 6, 2020; Epub February 15, 2021; Published February 28, 2021

Abstract: Objective: To investigate the effect of the clinical nursing pathway on patients undergoing gastrectomy bariatric surgery. Methods: In total, 78 patients who underwent laparoscopic gastrectomy bariatric surgery were enrolled in this prospective study. Using the random number table method, these patients were placed in the control group or the experimental group (39 patients in each group). The patients in the control group underwent routine nursing, and those in the experimental group underwent clinical nursing pathway nursing. The length of the hospitalizations, the in-hospital costs, the incidences of postoperative complications, the pain (visual analogue scale) scores, the postoperative quality of life (MOS 36-item short form health survey) scores, and the satisfaction with the nursing were compared between the two groups. Results: The average length of hospitalization and hospital costs in the experimental group were lower than they were in the control group (both $P < 0.05$). Compared with the control group, the incidence of postoperative complications in the experimental group was significantly lower (20.51% vs 7.69%, $P < 0.05$). The visual analogue scale scores in the experimental group at 24 hours after surgery were lower when compared with the scores in the control group ($P < 0.001$). The MOS 36-item short-form health survey physiological functioning, general health, bodily pain, social functioning, and mental health scores in the experimental group were higher than the scores in the control group respectively (all $P < 0.01$). The satisfaction with the nursing in the experimental group was significantly higher when compared with the nursing satisfaction in the control group (94.87% vs 76.92%, $P < 0.05$). Conclusion: The clinical nursing pathway, a one-line model, can speed up the recovery, reduce complications and pain, improve the postoperative quality of life, and increase the satisfaction with the nursing, suggesting that it has a potential clinical value in the nursing of patients undergoing gastrectomy bariatric surgery.

Keywords: Clinical nursing pathway, gastrectomy, bariatric surgery, laparoscopy, clinical effect

Introduction

With the enrichment of people's material lives and changes in their eating habits, obesity has become a public health problem [1]. Data shows that the incidence of obesity among adults in China is above 7%. Diseases and complications induced by obesity have also been increasing yearly, seriously threatening people's health [2, 3]. For some obese patients, bariatric surgery is regarded as an effective treatment to prevent the aggravation of obesity [4]. Among these treatments, laparoscopic sleeve gastrectomy bariatric surgery is a relatively minimally-invasive, safe, and effective surgical method [5].

Traditional nursing involves mostly routine work. In this model, the nursing plan is not ori-

ented, and the nursing measures are prone to be missed. For surgery patients, the quality of the nursing is particularly critical. It was reported that scientific, reasonable, efficient, and meticulous nursing intervention has a positive clinical effect on the incidences of adverse reactions and the postoperative recovery rates in patients undergoing gastrectomy bariatric surgery [6]. The effect of the surgery is affected by the nursing quality, the length of the hospitalization, the postoperative quality of life, and the satisfaction with the nursing. The clinical nursing pathway is a new nursing model introduced in recent years. As an effective nursing management model, it is patient-centered and clinical pathway-based. The clinical nursing pathway can effectively reduce medical expenses and nursing errors or mistakes, ensure a clear and smooth nursing process, and improve

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overall nursing work efficiency [7]. What's more, scientific clinical nursing has significant advantages in reducing medical expenses and promoting recovery, demonstrating its significant clinical value [8].

Hong et al. applied the clinical nursing pathway in patients undergoing gastrectomy bariatric surgery and reported that the effectiveness of the clinical nursing pathway and the satisfaction with the nursing were significantly improved when compared with traditional nursing. However, they did not assess any hospitalization-related indicators or the postoperative quality of life [9]. In other words, theirs was not an in-depth study. In this study, we recruited patients undergoing gastrectomy bariatric surgery and further explored the effect of the implementation of the clinical nursing pathway on these patients. The clinical nursing pathway uses time as the horizontal axis and nursing items as the vertical axis. We hope to provide more supporting data and research materials for the application of the clinical nursing pathway in clinical practice.

Materials and methods

General information

This prospective study was conducted with a cohort of 78 patients who underwent laparoscopic gastrectomy bariatric surgery in The First Bethune Hospital of Jilin University between April 2019 and June 2020. Using the random number table method, these patients were randomly divided into the control group (n=39) and the experimental group (n=39). In the control group, the patients underwent routine nursing. Meanwhile, the patients in the experimental group underwent clinical nursing pathway nursing. Before the initiation of this research, adequate communication was performed between the researchers and the patients/family members. Informed consents were signed by the patients or their family members. This study was approved by the Ethics Committee of The First Bethune Hospital of Jilin University.

Inclusion and exclusion criteria

Inclusion criteria: Patients whose waist circumferences were above 90 cm (males) and 80 cm (females), respectively, patients whose

body mass indexes (BMI) were 32 kg/m² or higher, patients who were 18 to 60 years old, patients who were scheduled to undergo laparoscopic surgery, patients who had normal communication abilities and who could cooperate during the whole process of the clinical nursing pathway, and patients who didn't have any serious organ diseases.

Exclusion criteria: Patients were unsuitable for or intolerant to surgical treatment, patients who had severe complications or cardiopulmonary disease, patients who had a history of surgery, patients who had mental illnesses, patients who had participated in other research projects.

Nursing methods

In the control group, the patients underwent routine nursing, including preoperative health education, environmental and sanitation nursing, postoperative rehabilitation nursing, and diet and exercise guidance. During the whole nursing process, the nursing team was not established, and provisions for the shifts and transition of nursing were not made. The nursing staff only performed routine nursing. Moreover, the postoperative follow-up was terminated at one week after the surgery.

The patients in the experimental group underwent clinical nursing pathway nursing. Before the study, the nursing staff underwent training and systematic learning. To be specific, the clinical nursing pathway was composed of following 5 components: (1) A clinical nursing pathway team, in which qualified nurses and experienced experts took part, was developed before each operation. The patients' information was collected, and a comprehensive evaluation was conducted. The nursing staff were supposed to understand the patients' psychological states and to talk with them patiently. By doing so, a good nurse-patient relationship was established. The patients were fully aware of the treatment plan, and the preoperative preparations were completed. In addition, the patients received guidance on their medication, diets, work, and rest [10]. (2) The chief nurse was responsible for checking the patients' information, supervising of the stages of the clinical nursing pathway and nursing status, and the handover in the operating room. Before the operations, the operating room nurse con-

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firmed whether the apparatus and equipment were all in place or not. Also, he or she briefly introduced the operation process and precautions to the patients. During the operation, he or she cooperated with the anesthesiologist to intubate the patients, and was in charge of protecting the patient' from developing pressure ulcers. Specifically, he or she applied dressings or put soft cushions under the body. In order to prevent abnormalities, they were also supposed to pay close attention to the patients' physical signs. (3) The nursing staff guided the patients to maintain an appropriate postoperative lying posture and to inhale oxygen with a machine. The nursing of the drainage tube was performed, including observing the color and the amount of drainage fluid, and maintaining an unobstructed drainage tube. The patients' complications were closely observed, and the doctor was notified promptly once there was an abnormal wound condition. (4) On the second day after the surgery, the patients were encouraged to get out of bed as soon as possible to improve their gastrointestinal motility. On the third day after surgery, the digestive tract recovery was checked using angiography. Some drinking was provided for the patients, and they were gradually introduced to a light diet. One week after the surgery, patients could eat half-liquid food. Two weeks after the surgery, the patients could eat soft food. The patients gradually returned to a normal diet one month after their surgery. At the same time, they were given special instructions like chewing thoroughly and swallowing slowly, eating a suitable amount of food, and balancing their nutritional intake. Within three months after the surgery, the patients were not allowed to have spicy, irritating, cold or hard food [11]. (5) Within six months after the surgery, follow-up on the patients' health status and recovery was carried out monthly. Also, an effective contact system was established. In this way, the researchers could conveniently communicate with patients at any time and regularly update their health knowledge.

Outcome measures

Main outcome measures: The pain index was evaluated using the visual analogue scale (VAS) [12]. The scale ranges from 0-10. The higher the VAS score, the more severe the pain the patients suffered. In addition, the pain grading method was employed to evaluate the degree of the postoperative pain.

The quality of life before and after the surgeries was assessed using the MOS 36-item short form health survey (SF-36), which includes physical functioning, role-physical, general health, bodily pain, role-emotional, vitality, mental health, and social functioning [13]. The quality of life was better when the score was higher. The length of the hospitalizations and the hospital costs were compared between the two groups.

Secondary outcome measures: The postoperative complications and the satisfaction with the nursing were compared between the two groups. The complications included hemorrhage (exudation through the surgical wound), postoperative intestinal adhesions (abnormal adhesion in the intestines, and between the intestines and the peritoneum), and pressure sores (ulcers and bedsores, which were caused by skin tissue ischemia in the weight-bearing part of the operation). The incidence of complications = the number of complications/the total number of patients * 100%. The satisfaction with the nursing was divided into three levels, including satisfied, basically satisfied, and dissatisfied. Satisfaction in nursing = (satisfied + basically satisfied)/the total number of patients * 100%.

Statistical methods

All the data were analyzed using SPSS statistical software version 16.0. The enumeration data were calculated as number/percentage (n/%). The comparisons was conducted using chi-square tests. The rank data was analyzed using rank sum tests. Shapiro-Wilk tests were applied as the normality test method. The normally distributed measurement data were calculated as the mean \pm standard deviation ($\bar{x} \pm sd$). Independent sample t tests were used for the inter-group comparisons, and paired t-tests were used for the before-after comparisons within the same group. A difference was statistically significant when the *P* value was less than 0.05.

Results

Baseline data

There were no significant differences in the general patient information like gender, age range, average age, weight, BMI, or comorbidities between the two groups (all $P > 0.05$, **Table 1**).

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Table 1. Baseline data

Group	Control group (n=39)	Experimental group (n=39)	t/x ² /Z	P
Male/Female (n)	22/17	20/19	0.206	0.650
Age range (years)	20-46	19-44		
Average age (years)	30.5±7.8	31.1±9.7	0.301	0.764
Weight (kg)	90.9±9.7	91.5±10.4	0.264	0.793
BMI (kg/m ²)	28.4±2.3	29.1±3.1	1.132	0.261
Comorbidities				
Diabetes	24	22	-0.457	0.647
Hypertension	25	19	-1.361	0.173
Hyperlipidemia	19	24	-1.131	0.258

Note: BMI: body mass index.

Table 2. Hospitalization

Group	The length of the hospitalization (days)	Hospital costs (CNY)
Control group (n=39)	7.39±1.32	10982.81±1023.45
Experimental group (n=39)	6.75±1.01	10482.81±1145.71
t	2.405	2.033
P	0.019	0.046

Table 3. VAS scores

Group	VAS score
Control group (n=39)	5.57±0.44
Experimental group (n=39)	4.88±0.98
t	4.011
P	<0.001

Note: VAS: visual analog scale.

Table 4. Degrees of pain

Group	Level I (mild)	Level II (moderate)	Level III (severe)
Control group (n=39)	11	19	9
Experimental group (n=39)	13	24	2
t	0.241	1.296	5.186
P	0.624	0.255	0.023

Hospitalization

As shown in **Table 2**, the length of the hospitalization and the hospital costs in the experimental group were significantly lower than they were in the control group (both $P<0.05$), suggesting that the clinical nursing pathway can reduce the lengths of the hospitalizations and the hospital costs.

Pain index

The VAS scores in the experimental group were lower when compared with the VAS scores in the control group (4.88 ± 0.98 vs 5.57 ± 0.44 , $P<0.001$, **Table 3**). As displayed in **Table 4**, the number of patients with mild and moderate pain in the experimental group was higher than it was in the control group (both $P>0.05$), but the number of patients with severe pain was significantly lower ($P<0.05$). These results indicate that the clinical nursing pathway can relieve postoperative pain.

Complications

The incidence of complications in the experimental group, which included hemorrhage (1 case, 2.56%) and pressure ulcers (1 case, 2.56%) was significantly lower than it was in the control group (7.69% vs 20.51%, $P<0.05$, **Figure 1**), which included hemorrhage (2 cases, 5.13%), intestinal adhesions (3 cases, 7.69%), and pressure ulcers (3 cases, 7.69%). The results indicate that the clinical nursing pathway can effectively reduce the occurrence of intraoperative complications.

SF-36 scores

Compared with the SF-36 scores before the intervention, the SF-36 scores in all aspects after the intervention were significantly improved in both groups (all $P<0.01$). The SF-36 physiological functioning, general health, bodily pain, social functioning, and mental health scores in the experimental group

after the intervention were significantly higher than they were in the control group (all $P<0.01$, **Table 5**).

Satisfaction with the nursing

The satisfaction with the nursing in the experimental group was significantly improved when compared with the control group (94.87% vs 76.92%, $P<0.05$, **Table 6**).

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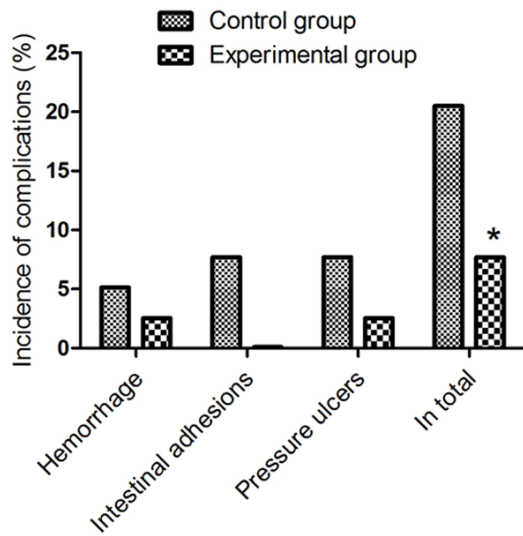


Figure 1. Comparison of the complications between the two groups. Compared with the control group, * $P < 0.05$.

Discussion

As we all know, surgery is the most effective measure currently available for the control and treatment of obesity in the long-term, especially laparoscopic sleeve gastrectomy bariatric surgery. Laparoscopic sleeve gastrectomy bariatric surgery is the primary surgical method used for the treatment of obesity in patients undergoing gastrectomy bariatric surgery. The surgery's wounds are small, so the physiological structure and continuity of the patients' gastrointestinal tracts are thus preserved to the greatest extent. Most patients can normally undergo gastroscopy, and the overall incidence of adverse reactions is low [14, 15].

During the process of laparoscopic sleeve gastrectomy bariatric surgery, high-quality nursing intervention such as comprehensive nursing and meticulous nursing have very positive clinical effects on the treatment of obesity. To be specific, the effects on the lengths of the hospitalization, the complications, the satisfaction with the nursing, and so on are extremely significant [16, 17]. The clinical nursing pathway is a novel nursing model introduced in recent years. In this model, a standardized and procedural nursing plan is made based on the characteristics of the patients' conditions. In one study, the clinical researchers found that proficient nursing skills and professional periopera-

tive nursing can reassure patients and maintain high patient compliance [18]. In the study, they focused on the transition between the chief nurse and the intraoperative nurse. In this way, the patients' negative emotions (like worry and anxiety), which were caused by changes in the preoperative staff and the environment, were minimized. At the same time, the patients' physical signs were closely monitored. The patients were instructed to undergo recovery training after their operations, so as to reduce unnecessarily long hospital stays. Long-term follow-up and guidance were carried out to improve the patients' quality of life. Grant et al. reported that the effective implementation of the clinical nursing pathway in gastrointestinal surgery can effectively reduce the negligence and omissions of the medical staff, the length of the hospitalization, and the treatment costs [19]. In our study, the patients in the experimental group had accelerated recoveries, earlier discharges, and increased satisfaction with the nursing. These factors might be closely related to the systematic preoperative nursing, health guidance, diet management, and the meticulous intraoperative nursing. The SF-36 scores can reflect the postoperative life status of patients and the differences in the clinical effect before and after treatment. It was reported that the clinical nursing pathway can help patients undergoing digestive surgery to improve their postoperative quality of life and effectively reduce their complications. At the same time, the SF-36 scale was used to evaluate the patients' quality of life after the treatment. The results showed that the effect was significant, reflecting the positive influence of clinical nursing pathway on the patients' physiology, psychology, and social conditions after the intervention [20, 21]. Gardikiotis et al. also used the SF-36 scale to assess the postoperative quality of life of the patients undergoing breast cancer resection, and the results were consistent with those reported previously [22]. In our study, the SF-36 scores in aspects like general health and mental health were measured. Our results showed that the SF-36 scores in all aspects in the experimental group after the intervention were higher than the corresponding scores in the control group, indicating that the clinical nursing pathway has a very positive clinical effect on patients undergoing gastrectomy bariatric surgery.

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Table 5. SF-36 scores

Scoring item	Control group (n=39)		Experimental group (n=39)	
	Before intervention	After intervention	Before intervention	After intervention
Physical functioning	62.87±4.23	78.32±4.31 ^{##}	64.17±5.26	83.49±4.77 ^{###**}
Role-physical	60.86±5.12	71.45±5.69 ^{##}	62.21±4.89	72.51±6.88 ^{##}
General health	47.76±3.66	74.34±4.42 ^{##}	46.89±4.01	80.51±5.47 ^{###**}
Bodily pain	59.17±4.22	77.22±4.44 ^{##}	57.99±3.87	81.62±5.02 ^{###**}
Role-emotional	55.78±5.25	73.52±4.67 ^{##}	56.91±5.52	75.12±6.71 ^{##}
Vitality	44.39±5.01	66.43±3.83 ^{##}	42.92±4.78	68.73±6.81 ^{##}
Social functioning	61.23±4.98	80.11±5.12 ^{##}	62.38±3.87	85.44±6.32 ^{###**}
Mental health	41.92±3.11	74.53±4.97 ^{##}	42.33±3.86	81.24±5.02 ^{###**}

Note: SF-36: MOS 36-item short form health survey. Compared with before the intervention, ^{##}P<0.01; Compared with the control group, ^{**}P<0.01.

Table 6. Satisfaction with the nursing

Group	Satisfied	Basically satisfied	Dissatisfied	Satisfaction with the nursing
Control group (n=39)	14	16	9	76.92%
Experimental group (n=39)	18	19	2	94.87%
Z		-2.263		
P		0.024		

However, there are some drawbacks to this study. For example, with an equal number of patients in both groups, no blind control was designed to reduce the risk of interference caused by human intervention.

In summary, the implementation of the clinical care pathway, a novel nursing model, can reduce the lengths of patient hospitalizations and the incidences of complications, quicken the recovery, and improve the postoperative quality of life, suggesting that it has a potential clinical value in the treatment of patients undergoing gastrectomy bariatric surgery.

Disclosure of conflict of interest

None.

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