

Original Article

The effects of perioperative nursing intervention on the postoperative complications in patients undergoing laparoscopic vertical banded gastroplasty

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Abstract: Objective: This study aimed to explore the effects of nursing intervention on the postoperative complications in patients undergoing laparoscopic vertical banded gastroplasty (LVBG), so as to provide references for nursing in controlling and reducing postoperative complications in such patients. Methods: Patients undergoing LVBG were adopted as clinical observation objects and divided into a control group (n=69) and an observation group (n=70) according to the order of parity. The control group was nursed routinely, while the observation group was nursed through intervention nursing measures against intraoperative bleeding, intestinal mucosa, especially lower limb venous thrombosis and pressure sores, based on the nursing measures for the control group. The postoperative complications in the two groups were compared, and their nursing satisfaction was also compared. Results: The number of patients with intraoperative bleeding and the number of patients with intestinal adhesion in the control group were 7 and 8, respectively, while the two numbers in the observation group were 1 and 2, respectively. The femoral vein parameters of the two groups after pneumoperitoneum were evaluated, and it was found that the control group showed a significantly wider femoral vein diameter and a significantly lower femoral vein blood flow rate than the observation group (both $P<0.05$). The monitoring results at 1 day after surgery revealed that the control group showed a significantly different rate of lower limb vein thrombus from the observation group (13.0% vs. 2.9%, $P<0.05$) and also showed a significantly different rate of pressure sores from the observation group (11.6% vs. 2.9%, $P<0.05$). In addition, the patients' nursing satisfaction in the observation group was significantly higher than it was in the control group (97.1% vs. 85.5%, $P<0.05$). Conclusion: Targeted nursing intervention can reduce the postoperative complications in patients undergoing LVBG, especially lowering the incidences of pressure sores and lower limb vein thrombus.

Keywords: Laparoscopy, operative nursing, vertical banded gastroplasty, complication, clinical observation

Introduction

In recent years, with the rapid development of the social economy and the acceleration of the pace of life, people enjoy an increasingly higher quality of life, and live under greatly changed eating habits and changed living and rest patterns, making obesity become an important social concern [1].

Obese patients show corpulence, which compromises their life and work. In addition, many of them suffer from unhealthy emotions such as psychological obstacles and depression, and they face higher than normal risks of unexpected illnesses such as hypertension, diabe-

tes mellitus, coronary heart disease, and cerebrovascular diseases, living under a serious threat from obesity on their lives and health [2, 3]. According to data, in terms of the deaths caused by preventable factors, the number of deaths due to obesity ranks second to that due to smoking in the United States every year [4]. At present, the number of obese people in China is as high as 6 million [5]. Therefore, the control and treatment of obesity has become a public issue requiring serious attention and a solution from social and medical institutions.

At present, treatments such as conventional drugs, diet, and exercise cannot bring an ideal efficacy in treating obesity, while operative

methods such as laparoscopic gastric bypass surgery, vertical banded gastroplasty (VBG), and adjustable gastric banding contribute to good clinical efficacy, but they also have some deficiencies. For example, they may cause patients to be tense and panic, resulting in poor compliance. In addition, many patients treated with one of those operative methods usually suffer from various complications, including anastomotic leakage, intestinal adhesion, and anastomotic stenosis, which affects treatment efficacy [6, 7]. One study found that effective nursing intervention could have a positive influence on patients after weight loss through surgery, lower the complication rate in the patients, and improve their nursing satisfaction [8]. However, at present, researchers pay less attention to the comprehensive nursing intervention measures for obese patients undergoing LVBG during the perioperative period, and no comprehensive studies on this topic have been found in the scholarly databases.

Therefore, this study mainly discusses the influences of perioperative nursing intervention on the postoperative complications in patients undergoing LVBG, especially the prevention and control of lower limb vein thrombus and pressure sores after surgery, so as to provide a nursing reference for controlling and reducing patients' postoperative complications.

Materials and methods

General data

Patients undergoing LVBG in The first hospital of Ninghai County from September 2014 to August 2019 were enrolled as clinical observation objects, divided into a control group (n=69) and an observation group (n=70) according to the parity order, and analyzed prospectively. During surgery, the control group was nursed routinely and professionally, while the observation group was nursed through effective intervention nursing measures based on the nursing measures for the control group. Each enrolled patient signed an informed consent form, and they were filed by the Ethics Committee of The first hospital of Ninghai County.

Inclusion criteria

Patients between 18 and 50 years old, patients with a body mass index (BMI) higher than 35,

patients whose weight loss treatment efficacy through internal medicine was ineffective or insignificant (The weight loss within 1 month did not exceed 2.5 kg) [9], and patients without other major organ diseases.

Exclusion criteria

Patients with a mental disease or communication obstacle, patients with secondary obesity, and patients with a severe systemic disease or unsuitable for bariatric surgery.

Nursing methods

The control group was nursed conventionally. In order to ensure the nursing quality, measures were taken actively to help the patients be well prepared for the surgery, and the following information was presented to the patients and their families in detail: Relevant health knowledge, matters needing attention, operation mode selection, treatment efficacy, postoperative expectations, and so on. All the patients' vital signs were closely monitored during surgery, and intraoperative cooperation and nursing supporting measures were taken in strict accordance with the corresponding standards to maintain the stability of their vital signs.

The observation group was nursed with targeted nursing measures additionally based on the nursing measures for the control group, including preoperative evaluation, intraoperative nursing intervention against complications, and postoperative guidance. The specific measures were as follows: 1. Preoperative evaluation and nursing: The patients were assessed comprehensively at admission, and the attending doctors selected appropriate surgical methods for them and pre-judged the possible complications of obese patients' systemic diseases with the cooperation of the cardiovascular and internal medicine departments. In addition, the nursing staff performed psychological guidance for most patients experiencing anxiety or depression, and they actively communicated with the patients to establish a good relationship with them and to help them gain confidence in successfully alleviating their obesity. Group discussions were conducted to fully prepare for the operation methods in the obese patients and to avoid the risk of intraoperative complications. 2: Intraoperative nursing intervention: During surgery, elastic bandages were

Table 1. Comparison of the general clinical data in two groups

Group	Control group	Observation group	t/ χ^2 /Z	P
Number of cases	69	70		
Average age (years)	27.6 \pm 7.7	28.1 \pm 8.9	0.354	0.724
Gender				
Male	44	47	1.175	0.676
Female	25	23		
BMI	37.5 \pm 2.4	37.8 \pm 2.1	0.785	0.434
Complications before treatment				
Hyperglycemia	54	52	-0.604	0.546
Hyperlipidemia	43	39		
Diabetes mellitus	17	23		

Table 2. Comparisons of the intraoperative complications in the two groups

Group	Control group	Observation group	χ^2	P
Number of cases	69	70		
Intraoperative bleeding	7 (10.1%)	1 (1.4%)	4.867	0.027
Intestinal adhesion	8 (11.6%)	2 (2.9%)	3.973	0.046

employed to put pressure on the patients' lower limbs, and an intermittent pressure pneumatic pump was used for the limbs' inflation cycles. Meanwhile, Vaseline was applied to the patients' vulnerable sites, and a foam application was employed for the decompression intervention nursing of the patients [10]. 3. Postoperative intervention: After surgery, the patients were given systematic health guidance and instructed to exercise with the necessary intensity and on schedule to prevent thrombosis. They were also followed up by telephone at one week and at four weeks after the surgery, respectively, to understand their treatment status. They were urged to perform activities according to the doctor's advice and keep their follow up appointments.

Observation indexes

Patients with bleeding and intestinal adhesions during surgery or with pressure sores and lower extremity varicose veins were followed up and recorded. The patients' femoral vein diameters and femoral vein blood flow rates after pneumoperitoneum were monitored using a color Doppler ultrasonic diagnostic apparatus (Beckman, USA), and the patients' nursing satisfaction was surveyed using a self-made Nursing Satisfaction Questionnaire from our hospital, which consisted of the following items: Attitude

and professionalism of the nurses, nursing quality, environment, means of communication, and overall evaluation. The satisfaction = (the number of patients satisfied with the nursing + the number of patients basically satisfied with it)/the total number of patients \times 100%.

Data statistics and analysis

All the data in this paper were analyzed using SPSS 15.0. The enumeration data (n, %) were analyzed using chi-square χ^2 tests, and the measurement data were expressed as the means \pm standard deviations (Mean \pm SD). The comparisons between groups were performed using independent sample t tests.

$P < 0.05$ indicated a significant difference in a comparison.

Results

Clinical data

Table 1 shows that there was no significant difference between the control group and the observation group in terms of the general clinical data, including sex, average age, BMI, and the complications before treatment (hyperglycemia, hyperlipidemia, and diabetes mellitus) (all $P > 0.05$), which were comparable.

Intraoperative complication rates of the two groups

The observation of the surgeries revealed that the number of patients suffering from complications in the control group was significantly different from that in the observation group ($P < 0.05$), and the former included 7 patients with intraoperative bleeding and 8 patients with intestinal adhesions, but the latter only included 1 patient with intraoperative bleeding and 2 patients with intestinal adhesions. See **Table 2**.

Figure 1 shows that the incidence of intraoperative complications in the control group was 21.7% (15/69), significantly higher than the

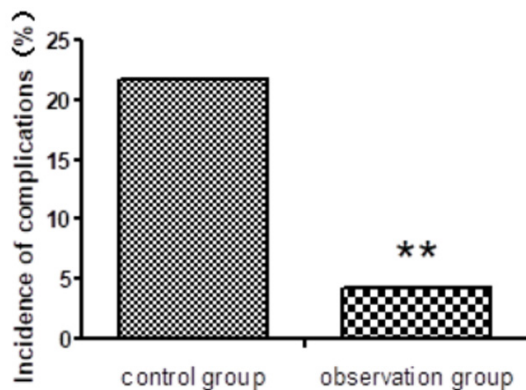


Figure 1. Comparison of the intraoperative complications between the two groups. **indicates compared with the control group, $P<0.01$.

rate in the observation group (4.3%, 3/70, $P<0.01$), which suggests that intraoperative nursing intervention can effectively lower the incidence of complications and improve the quality of surgery.

The femoral vein diameter and the femoral vein blood flow rate after pneumoperitoneum

Table 3 reveals that after pneumoperitoneum, the two groups showed certain differences in their femoral vein diameters and femoral vein blood flow rates, and the control group had a wider diameter and a slower rate than the observation group (both $P<0.01$).

Postoperative complications

Monitoring and observing at 1 hour after each surgery revealed that there were 9 patients who suffered from lower limb vein thrombus and 8 patients who suffered from pressure sores in the control group, and 2 patients who suffered from lower limb vein thrombus and 2 patients who suffered from pressure sores, so in this aspect, the control group was much different from the observation group ($P<0.05$). See **Table 4**.

As shown in **Figure 2**, the incidence of postoperative complications in the control group was significantly different from the incidence in the observation group (24.6% (17/69) vs. 5.7% (4/70)), indicating that targeted intraoperative nursing intervention can effectively reduce complications such as lower limb venous thrombosis and pressure sores, and improve the recovery rate of patients.

Nursing satisfaction of the two groups

The two groups were treated under different nursing intervention modes, and their nursing intervention was analyzed at 1 week after surgery. It turned out that the control group showed a nursing satisfaction score of 85.5%, with 28 patients satisfied with it, and 31 patients basically satisfied with it, but the observation group showed a nursing satisfaction of 97.1%, so the nursing intervention was significantly different between the two groups in terms of the patients' satisfaction scores ($P<0.05$). See **Table 5**.

Discussion

With the rapid development of China's economy, people's living standards have improved remarkably, and obese patients are more and more common, and showing an annually increasing trend. Clinical data reveal that obesity has evolved as one of the major diseases affecting people's health, bringing with it various metabolic or cardio-cerebrovascular diseases, affecting the patients' quality of life and mental health [3].

Obesity is usually treated with surgery in clinical practice, especially the minimally invasive surgeries such as laparoscopy, which can lower the surgical risk and help patients recover quickly. One study concluded that obesity causes a high incidence of intraoperative complications due to the special weight of the obese patients [11]. Another study found that effective nursing intervention measures can have a positive clinical role in weight reduction treatment for obese patients. However, for the purpose of fully guaranteeing nursing and performing effective nursing interventions, medical institutions are required to carry out systematic training and establish standards to ensure smooth operations and reduce complications in patients [12, 13].

This study adopted an intraoperative nursing intervention mode for the patients as follows: The nursing staff actively communicated with the patients about their operation process and intervention mode before surgery, and they used elastic bandages to pressurize their lower limbs and an intermittent pressure pneumatic pump to intervene in their lower limbs during surgery. The results revealed that compared with the control group under routine nursing,

Table 3. Comparison of the diameter of the femoral veins and the flow velocities of the femoral veins after pneumoperitoneum between the two groups

Group	Control group	Observation group	χ^2	P
Number of cases	69	70		
Diameter of femoral vein (cm)	1.37±0.42	1.20±0.39	2.807	0.006
Flow velocity of femoral vein (cm/s)	14.52±5.81	19.81±9.43	3.994	0.000

Table 4. Comparisons of the postoperative complications in the two groups

Group	Control group	Observation group	χ^2	P
Number of cases	69	70		
Lower limb vein thrombus	9 (13.0%)	2 (2.9%)	4.948	0.026
Postoperative pressure sores	8 (11.6%)	2 (2.9%)	3.973	0.046

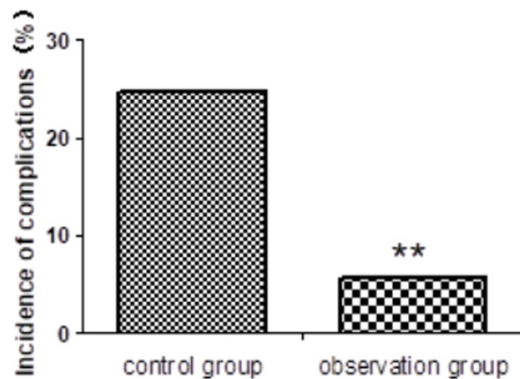


Figure 2. Comparisons of the postoperative complications between the two groups. ** indicates compared with control group, $P < 0.01$.

the observation group showed a tightened femoral vein diameter and an accelerated femoral vein blood rate. This study found that after pneumoperitoneum, the surgery patients showed increased atrial filling pressures, and their CO_2 pressure often needed to be higher than the normal venous pressure during laparoscopy, which could easily cause thicker venous lumen diameters and slower venous blood flow rates. Elastic bandages can be used to maintain external pressure and prevent the blood vessels from expanding, and intermittent pressure pneumatic pumps can be used to accelerate the blood supply rate of the arteries and perform periodic pressure inflation intervention to promote pulsatile blood flow in the lower limbs and accelerate the speed of blood

return, thus effectively relieving the slowing down of lower limb blood flow under CO_2 pneumoperitoneum [14, 15]. A study by Lee et al. also reported that intermittent inflation could effectively accelerate the venous blood flow rate of the lower limbs and prevent venous thrombosis of the lower limbs [16], and a study by Osman et al. concluded that slower blood flow was one of the main causes of deep venous thrombosis, and controlling the femoral

venous blood flow rate could effectively prevent venous thrombosis [17]. This study found a significantly lower incidence of lower limb vein thrombus in patients after surgery based on effective nursing intervention. A study by Liyanage et al. also found that elastic bandages and other lower limb pressure interventions can prevent postoperative lower limb venous thrombosis [18] and is consistent with our research results.

During bariatric surgery, obese patients are prone to pressure-induced injuries due to their heavy weight, long posture time during surgery, hypoxia of the local pressure tissues, etc. Moore et al. found that lubricating the protective agents and dressings can reduce the local shear and friction forces and lower the incidence of pressure sores [19]. Carrigan et al. reported that adjusting the local pressure distribution can relieve the pressure intensity, keep the skin dry, and reduce the risk of pressure sores [20]. This experiment applied a Vaseline and foam application on the sacrococcygeal side of the patients to lower pressure. It turned out that the number of patients suffering from pressure sores under such intervention was significantly less than those under no intervention, and the incidence of pressure sores was reduced by more than 70%. Parker et al. reported that targeted skin decompression nursing during surgery could lower the incidence of pressure sores by more than half, improve the treatment quality, and enjoy a high level of patient satisfaction [21].

Table 5. Comparison of the nursing satisfaction between the two groups

Group	Number of cases	Satisfaction	Basic satisfaction	Unsatisfied	Nursing satisfaction rate	P
Control group	69	28	31	10	85.5%	0.015
Observation group	70	31	37	2	97.1%	

This study has observed and monitored the complications in obese patients undergoing VBG under perioperative nursing intervention but does not deeply explore the correlation between obese patients with complications such as systemic diseases including hypertension and hyperlipemia and their postoperative complications. Meanwhile, it only performed a single-center study with a small sample size, so further discussion on this topic is warranted.

To sum up, targeted nursing intervention can reduce the postoperative complications in patients undergoing LVBG, especially lowering the incidences of pressure sores and lower limb vein thrombus, so it can be used as a model nursing method for patients undergoing the surgery.

Disclosure of conflict of interest

None.

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