

Evaluation of Improvement Project in Shortening the Time of Patients' First Eating After Orthopedic Surgery

Hong Zhang, Jiajie Yan, Sujuan Lin, Songwei Huan, Junyuan Chen, Cuiqing Liu^{*}

Department of Orthopedics, the First Affiliated Hospital, Jinan University, Guangzhou, China

Email address:

cuiqing.liu@yahoo.com (Cuiqing Liu)

^{*}Corresponding author

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Abstract: To shorten the time of first eating of the patients after orthopedic surgery by carrying out improvement project, a project team was set up to identify improvement themes and set improvement goals. Before starting the project activities, 102 patients with orthopedic surgery in our department were selected as the control group and the anesthesia of these patients was spinal anesthesia. Another 161 with orthopedic surgery patients were selected as the intervention group. We compared the time between returning to the ward after surgery and the time of first eating after the surgery. After the implementation of the improvement project, the average time of first eating was 92 minutes. The time of intervention group was shorter than that of the control group ($P < 0.05$), and the rate of intervention group patients who started to drink within 2 hours after surgery was higher than that of the control group patients ($P < 0.05$); There was no significant difference in postoperative gastrointestinal side effects between the two groups. Patients who returned to the ward at the end of the N class (22:00-08:00) had their first drink after a long time. The data indicate that by carrying out the improvement of nursing projects, the traditional concept of medical staff can be changed, the diet management and nursing process of patients during the operation period can be regulated. Moreover, the time of first-time eating after surgery for patients with orthopedic spinal anesthesia can be shorten, and the safety of early postoperative diet can be improved, which is good for patients to recover quickly after surgery.

Keywords: Project Improvement, First Eating, Spinal Anesthesia, Orthopedic Surgery, Nursing

1. Introduction

Traditional anesthesia theory believes that the patients after surgery can have intestinal dysfunction due to the influence of anesthesia [1]. And early eating can easily lead to adverse reactions such as nausea, vomiting or abdominal distension. In addition, vomit is easy to cause serious complications such as aspiration and endangers the patient's life, since postoperative patients' consciousness and limb function have not fully recovered. So, it is considered that the patient should be fasted for 6 hours after surgery. And this traditional fasting time is written into textbooks and is used in clinical practice until now. For example, in "Surgical Nursing" [2, 3], it is mentioned that patients with spinal anesthesia are fasted for 12 hours before surgery and then fasted for 6 hours after surgery. In the "Surgery", the

description of postoperative diet is: the patients with non-abdominal surgery who have accepted subarachnoid and epidural anesthesia can start the diet in 3-6h after surgery. Orthopedic surgery belongs to non-gastrointestinal surgery [4] and most patients with orthopedic spinal anesthesia have accepted lower extremity surgery. At present, low-level spinal anesthesia is often used in clinical practice, and most of the anesthesia plane is controlled below the L1 plane, which has little effect on the gastrointestinal tract. During epidural anesthesia [5], sympathetic would be inhibited and parasympathetic would be excited, which has no inhibition of intestinal peristalsis. Therefore, gastrointestinal function is almost unaffected, providing a theoretical basis and possibilities for early initiation of diet in patients with orthopedic spinal anesthesia. Some scholars have suggested that the patients with orthopedic surgery can eat without nausea and vomiting if they are awake. Domestic nursing

staff also discussed the postoperative dietary time of orthopedic patients. The results showed that it is feasible and safe for patients with orthopedic spinal anesthesia to drink water within 1 hour after orthopedic surgery. Some literatures have also reported that it is safe for patients with orthopedic surgery to eat 2-4 hours after surgery. In addition, it is also mentioned in the perioperative nutrition management of FTS [6, 7] that patients are encouraged to take oral food early after surgery.

Nursing project improvement activities refer to the concept that the clinical nursing staff and nursing management personnel mobilize nursing staff and related personnel to improve the people, things and materials which are existed in clinical nursing work, so quality of nursing activities can be effectively improved. And these improvement projects are based on management theory and use the problem-solving process as a method. Nursing improvement project activity is a groundbreaking, systematic, problem-solving solution that can effectively use limited resources and expect maximum problem-solving results. The nursing improvement project activity is a scientific method to improve the quality of nursing. In recent years, it has been widely valued and applied in Taiwan. The nursing improvement project have also begun to be used in the continuous improvement of nursing quality in China and have achieved good results. In this study, the nursing project improvement method was used to shorten the time of first eating after surgery for patients with orthopedic spinal anesthesia.

2. Methods

2.1. General Information

Patients included criteria: those who underwent orthopedic surgery and the anesthesia of them is spinal anesthesia; conscious and cognitive function of the patients are normal. These patients can cooperate with nursing treatment. Exclusion criteria: the patients who have cognitive dysfunction and are unable to communicate daily; those with a history of esophagus, gastrointestinal surgery; the patients who have swallowing dysfunction. Before starting the nursing project improvement activity, 102 cases of orthopedic surgery patients who underwent spinal anesthesia in our department from March to May 2017 were assigned as a control group. There are 43 males and 59 females in the group and they are aged 23-89 years old, 51.0 ± 17.3 year old. 161 patients with orthopedic surgery in our department were included in the intervention group. The anesthesia method of these patients was intraspinal anesthesia and they have accepted the implementation of the project improvement from July to November in 2017. There were 69 males and 92 females in the intervention group who were aged 17-90 years, with an average age of 54.1 ± 19.2 years old. There was no significant difference in demographic data between the two groups ($P > 0.05$), which was comparable. Comparing if there was any statistical significance between the two time points (after returning to the ward and the time of first eating after the

operation).

2.2. Project Design

Firstly, we need to establish a nursing project improvement theme and set up a project team. After establishing the theme, the special task force was established, which was led by the head nurse. The team consists of 2 senior responsible nurses, 3 primary responsible nurses and 2 doctors in the ward. To shorten the time of first eating after the operation of the spinal canal anesthesia, the task force for the improvement of the nursing project was established. The team consisted of two senior nurses in the ward, three primary responsible nurse and two doctors. The theme of this nursing project improvement was shorting the time of first eating after surgery for the patients undergoing spinal anesthesia.

2.3. Investigation and Analysis of the Current Situation of the Department

The average time of the first eating after the surgery was investigated. From March to May 2017, 102 patients with orthopedic surgery who underwent spinal anesthesia in our department were investigated. The time points after returning to the ward were recorded on the general nursing record sheet. The results of the survey showed that the average time for patients to drink after surgery was 5 hours and 12 minutes (312 minutes). The patient's time of first eating after the surgery was calculated by reviewing the time points which were recorded on the general care record sheet. The sheet had recorded time point of returning to the ward after surgery, and the time point of first eating after the surgery. The results of the survey showed that the average time for patients to firstly drink after surgery was 5 hours and 12 minutes (312 minutes).

2.4. Set the Target

Many literatures has reported that orthopedic patients are safe to eat in 2-4 hours after surgery, so the goal of nursing improvement project is: until December 1, 2018, for the patients who have underwent the orthopedic spinal anesthesia surgery, the time of first eating after the surgery would be shortened to 3 hours (180 minutes).

2.5. Analyze the Reason and Determine the Main Reason

Through the brainstorming method, the nursing project team analyzed the reasons from four aspects: person, material, method and environment. (1) Person: The medical staff was affected by the traditional anesthesia concept, which leads to prolong the time of first eating for patients after surgery; the knowledge of spinal canal anesthesia on gastrointestinal function was insufficient. (2) Material: There was no publicity material related to dietary guidance for patients in the department. (3) Method: The department lacked the first dietary guidance and operation procedures of postoperative patients. (4) Environment: The atmosphere of rapid rehabilitation of departments was insufficient.

2.6. Develop Countermeasures and Implement Them

The project team developed project improvement measures, which were based on literature reviewing, clinical research and analysis.

(1) The relevant information which is about the effects of rapid rehabilitation surgery [8, 9] and anesthesia on gastrointestinal function should be reviewed. Then we analyzed and organized the training courseware and gave lectures to all staff in the department. The purpose was to let everyone learn the knowledge of rapid rehabilitation and change the traditional postoperative diet.

(2) In order to provide a reference for nurses and let them know how to guide patients to have the diet for the first time, "the guidelines of the first-time diet care for patients with spinal anesthesia surgery" [10, 11] and "the first diet care operation procedure after spinal anesthesia" should be formulated. 1) Preoperative assessment and preparation. The patient's status was assessed by the tube bed responsible nurse. These assessment indicators included the patient's mental state, degree of cooperation, and swallowing function which was tested by the mean of Kubota eating water test. It was necessary to prepare cups, straws and other items and explain to patients and their families the necessity and safety of early postoperative diet and diet education. The above preoperative assessment and preparation work were recorded on the general care record by the nurse. 2) At the end of the operation, the patient would return to the ward for the first evaluation. The nurse reported these patients who satisfied the following conditions to the doctor. Then, the doctor modified the postoperative diet and the nurse would give 5-10ml warm water to these patients for their first eating according to the doctor's advice. The conditions include: The patient's consciousness was clear, and the vital signs were normal; the patient's swallowing function was normal, which was tested by the Kubota eating water test; the patient had the willingness to drink water. We observed the patient for 5-10 minutes after their first eating. If the patient had no discomfort, the nurse could let them drink more than 20ml at intervals of 10 minutes. 3) If the patient did not have nausea, vomiting and other discomfort after eating water, the nurse could guide and assist the patient to eat semi-liquid or soft food that was easy to digest, and eat no more than 100g for the first time. It was important to emphasize that when eating water for the first time, the nurse should guide the patient at the bedside to avoid them sucking and coughing. 4) If the patient developed nausea or vomiting after eating water, he or she should be suspended from the diet. Then the nurse should report the situation to the doctor for treatment. 5) Responsible nurses recorded the care assessment and observations on the general care record.

(3) Health education materials would be formulated, such

as "Dietary Guidance for Orthopaedic Patients", then the responsible nurses issued them to patients or their families when they gave dietary guidance to patients.

(4) Quality control during the implementation of countermeasures. The head nurse and the senior responsible nurse were responsible for supervising the nurses to follow the process to guide the patient's postoperative diet and the writing of the general care record.

2.7. Effect Evaluation

The orthopedic surgery patients who underwent spinal anesthesia in our department from July to November 2017 were collected. The data of the first eating time after the operation and the patients with gastrointestinal side effects after surgery were statistically analyzed and compared with data before the improvement project was implemented.

2.8. Statistical Analysis

The data obtained in this study were statistically processed by SPSS17.0 software.

3. Results

After the implementation of the improvement project, from July to November 2017, 161 patients with orthopedic surgery accepted the spinal anesthesia in our department, including 69 males and 92 females, aged 17-90 years, with an average age of 54.1 ± 19.2 years. The patients in intervention group were compared with the patients in the control group before the implementation of the improvement project, we found that there was no statistically significant difference in demographic data ($P > 0.05$), and the two groups were comparable. The results of comparison of patients 'time of first eating before and after the implementation of the improvement project' were shown in Table 1. Results of the time of first eating after the surgery were shown in Table 2. The results of comparison of gastrointestinal side effects after surgery in both groups were shown in Table 3. The patients had undergone different nursing shifts and had returned to the ward, then the the time of first eating after surgery was analyzed, please find Table 4.

Table 1. The average time of first eating after surgery for patients before and after the implementation of the improvement project.

project	Number of cases (n)	Average time (min)
before	102	312
after	161	92

According to two-sample t-test and $\alpha=0.05$ level, the difference of the average time of first-time intake between the two groups was statistically significant, $t = 2.40$, $P = 0.0023$.

Table 2. The time of first eating after surgery for patients before and after the implementation of the improvement project [example (percentage)].

project	Postoperative time (min)				
	0-30	30-60	60-90	90-120	> 120
before	0	3 (2.9%)	6 (5.9%)	3 (2.9%)	90 (88.3%)
after	27 (16.8%)	60 (37.3%)	11 (6.8%)	23 (14.3%)	40 (24.9%)

Table 3. The condition of gastrointestinal side effects after surgery in both group.

group	case	nausea		Vomiting		Bloating	
		no	yes	no	yes	no	yes
before	102	98	4	101	1	102	0
after	161	147	14	157	4	161	0
X ²							
P		>0.05		>0.05		>0.05	

Table 4. The average time of first eating after the patients undergoing different nursing shifts and returning to the ward.

shift	Cases (n)	Proportion (%)	average age (year old)	Average time (min)
A (08:00-15:00)	58	36.0	57.1±18.1	102
P (15:00-22:00)	89	55.3	52.8±20.3	72
N (22:00-08:00)	14	8.7	47.8±6.9	218

4. Discussion

The safety analysis of early postoperative diet in patients with orthopedic spinal anesthesia [12]. Firstly, the development of modern anesthesiology has made it possible for patients to have the diet early. With the advancement of modern medical technology, the control and methods of anesthetic drug dosage have been improved, which not only improves the quality of anesthesia, but also ensures the safety of patients, and the dose control of anesthesia drugs is more accurate. Many anesthesiologists are even able to accurately control the duration of anesthesia at the end of the procedure, greatly reducing the recovery period of postoperative anesthesia, which makes the recovery period of postoperative anesthesia [13] greatly shortened. Balanced anesthesia and combined anesthesia can take advantage of each anesthetic or anesthetic technique and improve the safety and controllability of anesthesia. Traditional anesthesia medicine has been replaced by modern anesthesia medicine, and the traditional postoperative fasting theory has not adapted to the progress of modern medicine. Secondly, early postoperative eating can promote the recovery of gastrointestinal function [14]. The latest view is that if the gut is functional, then we should use it. Clinical nutrition studies have shown that enteral nutrition is the best way to maintain and promote intestinal function, if gastrointestinal function persists, it should be stimulated by food as much as possible to help the gastrointestinal self-healing.

As a living organism, there is a physiological phenomenon which is clear. When fasting, the stomach and small intestines are slow to move, the contraction wave is irregular, and the peristalsis of the stomach and small intestine increases after eating. Since during the eating process, the stimulation of the mouth through food and chewing exercise causes a series of neurohumoral reflex adjustments. Firstly, the food stimulates the chemical and mechanical receptors of the oropharynx, stimulating the vagus nerve, causing an increase in the secretion of digestive juice, thereby increasing gastrointestinal activity, which is conducive to the recovery of gastrointestinal motility. The mechanical stimulation of the duodenum and the passive expansion of the intestine can also cause the receptors of the intestinal mucosa to excite and the reflex can cause the small intestine to move. Moreover, the movement of the small

intestine is characterized by weakened movement during fasting. The exercise is strengthened in the intestine when the chyme enters the twelve fingers. Therefore, and the group peristalsis caused by the duodenum-colon reflex can shorten the exhaust defecation time after the chyme entering the duodenum. Secondly, Chewing exercise itself can reflexively cause increased activity in the stomach, intestine, pancreas, liver, gallbladder and so on, stimulating the secretion of gastrointestinal hormones [15], thereby promoting the recovery of gastrointestinal motility. The long-term fixed contact between the intestine, the intestine and the parietal peritoneum can also be avoid by chewing exercise which can promote gastrointestinal motility and chewing exercise is also helpful to prevent intestinal adhesions [16, 17] and adhesive intestinal obstruction.

Orthopedic surgery belongs to a kind of non-gastrointestinal surgery. Most patients with orthopedic spinal anesthesia have accepted lower extremity surgery. At present, low-level spinal anesthesia is usually used in clinical practice and the anesthesia plane is mostly controlled below the L1 plane, which has little effect on the gastrointestinal tract. During epidural anesthesia, sympathetic will be inhibited, parasympathetic will be excited, and there is no inhibition in intestinal peristalsis. Therefore, gastrointestinal function is almost unaffected, providing a theoretical basis and possibility for early initiation of diet in patients with orthopedic spinal anesthesia. Some scholars have suggested that the patients with orthopedic surgery can eat after they are awake if they do not have the sense of nausea and vomiting. Because the surgery does not involve the abdomen, which will not cause or cause less systemic reactions [18]. Therefore, if the patients with orthopedic spinal anesthesia surgery have normal swallowing function and their mind is conscious, then it is safe to have the diet early.

The improvement of nursing project can shorten the time of first-time eating after surgery for patients with orthopedic spinal anesthesia [19]. As a scientific means to improve the quality of care, the nursing improvement project is an activity that controls and analyzes specific topics in the nursing business to achieve specific goals. The process of improvement project is the process in which the nursing staff fully exerts the team spirit, solves the problem with scientific methods and rational attitudes, and improves the quality of the nursing service. In this improvement project activity, the team

members developed targeted care measures by the means of surveys, literature review, brainstorming, causal analysis. The project have changed the traditional concept of medical staff to have the diet after surgery [20, 21], and formulated the first dietary guidelines and operation procedures for patients after surgery, which further ensured the safety of patients after eating.

The time of first-time eating was shortened to 92 minutes in patients undergoing orthopedic anesthesia, which was shorter than the time which was reported by other literatures. In addition, the proportion of patients who start to drink within 2 hours increased a lot if the patients accepted improvement nursing project. Moreover, through the improvement of this project, the degree of medical cooperation has been improved, and the cohesiveness of the department has been enhanced.

It can be seen from Table 4 that patients in the N class who returned to the ward after 22:00, after surgery, had significantly longer postoperative eating time than those in the A and P classes. According to the analysis of the panelists, 13 of the 14 patients who returned to the ward at the end of the N-class operation had accepted emergency surgery. Due to emergency surgery, the preoperative preparation time was relatively short, and the night shift nursing work was busy, resulting in the patient's dietary guidance was not fully implemented; In addition, since it was night surgery, the accompanying staff were mostly sleeping and resting when the patients returned to the ward after the end of the operation, moreover the patients' objects had not been sufficiently prepared. As a result, these patients had a longer time to drink after surgery. In the next work, we will take some measures to solve this problem. For example, we will prepare disposable cups and straws in the ward and focus on improving the management of the time of first eating for patients who have accepted the N class surgery and will return to the ward.

5. Conclusion

Through carrying out the improvement of nursing projects, the traditional concept of medical staff can be changed, the diet management and nursing process of patients during the operation period can be regulated. Moreover, the time of first-time eating after surgery for patients with orthopedic spinal anesthesia can be shorten, and the safety of early postoperative diet can be improved, which is good for patients to recover quickly after surgery.

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