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Continuous Quality Improvement in Preoperative Preparation Management of Patients Undergoing Interventional Surgery

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Abstract: *Objective:* To explore the application effect of continuous quality improvement in preoperative preparation management of patients undergoing interventional surgery. *Methods:* Set up a continuous quality improvement (CQI) group consisting of the head nurse of the interventional operation room, the nurse, the interventional physician, and the head nurse of the interventional ward. A total of 3099 patients undergoing elective interventional surgery from January to December 2017 were selected as the control group, and 4,048 patients undergoing elective interventional surgery from January to December 2018 as improved group, which preoperative preparation was carried out after the implementation of continuous quality improvement measures. The current problems existing in the preoperative preparation were analyzed retrospectively, formulation and implementation of improvement measures. The qualified rate of preoperative preparation before and after CQI was statistically obtained. In addition, a third-party satisfaction survey was conducted and 200 valid questionnaires were collected to obtain the satisfaction of the two groups of patients. *Results:* The pass rate of preoperative preparation was increased from 58.02% to 87.18%, and patient satisfaction was also improved in improved group, with statistically significant difference between the two groups ($P < 0.05$). *Conclusion:* The application of CQI in preoperative preparation management can improve the pass rate of preoperative preparation, optimize the quality of preoperative nursing, and also improve patient satisfaction.

Keywords: Interventional Surgery, Preoperative Preparation, Continuous Quality Improvement

1. Introduction

Interventional medicine is a new subject which has developed rapidly in the past 30 years [1]. It is more and more popular because of minimally invasive precision. However, patients with interventional surgery are widely distributed in various clinical wards, so it is difficult to get unified management. Meanwhile, professional interventional clinical nursing has not been widely popularized in all wards. The imperfect and unprofessional preoperative preparation is one of the symptoms [2]. At present, preoperative preparation of patients undergoing interventional surgery, such as gastrointestinal preparation, clothing and skin preparation, preoperative education and practice, preoperative medication and other aspects of nursing work need to be improved urgently. Among the patients sent to the interventional operating room for interventional surgery, the preoperative preparation of the patients was uneven, or it was found that the patients made preoperative preparation strictly in accordance with the surgical standards, such as strict abstinence from drinking and fasting, or the patients made preoperative preparation only in accordance with the general imaging examination, such as clothing or skin preparation did not meet the surgical requirements, etc. The imperfection of preoperative preparation can directly affect the time of receiving the stage of interventional surgery, the process of surgery and the postoperative rehabilitation of patients. Since January 2018, continuous quality improvement (CQI) [3] has been implemented in the interventional operation room of our hospital for patients undergoing interventional surgery, with significant improvement effect, and now it is reported as

follows.

2. General Information

A total of 3099 patients undergoing elective interventional surgery from January to December 2017 were selected as the control group, including 1835 males and 1264 females, aged 14-87 years old, with an average age of (54.51±14.12) years. A total of 4,048 patients undergoing elective interventional surgery from January to December 2018 were selected as improved group, which preoperative preparation was carried out after the implementation of continuous quality improvement measures, including 2,413 males and 1,635 females, aged 7-97 years, with an average age of (56.37±17.64) years. There was no significant difference between the two groups in gender, age, type of disease, etc. ($P > 0.05$). This study has been approved by the ethics Committee of the hospital, and all patients have signed informed consent.

3. Methods

3.1. Set up a Study Group

Set up a continuous quality improvement group consisting of the head nurse of the interventional operation room, the nurse, the interventional physician, and the head nurse of the interventional ward (collectively, the interventional liaison nurse). Involved in the operating room nurses in a dominant position, joint cardiologists, preoperative preparation of a unified, standardized intervention in patients with care, perioperative nursing path, monthly organization involved in liaison nurse specialist training and information feedback, according to the feedback, analysis the problems and improvement measures are set into the PDCA (plan-do-check-action) cycle [4]. According to the operation needs, the knowledge of preoperative preparation and operational ability of ward nurses should be improved continuously.

3.2. Existing Problems and Analysis

3.2.1. Uneven Preparation of Gastrointestinal Tract

Interventional surgery is minimally invasive surgery. Most interventional surgeries can be performed under local anesthesia, so gastrointestinal preparation is not necessary for most patients. Due to the lack of patients' knowledge of interventional surgery and the lack of understanding of ward doctors and nurses, a considerable number of patients performed surgical preparation according to surgical standards, including strict fasting for 12h before surgery, prohibition of drinking for 6h and even enema for patients. In addition to affecting patients' experience of treatment, this will also increase the incidence of hypoglycemia in diabetics.

3.2.2. Untraceable the Preoperative Medication

Due to the lack of preoperative delivery order, surgeons and nurses cannot understand in detail the preoperative medication of patients undergoing interventional surgery. For patients with poor blood pressure or blood glucose control, it is impossible to directly know whether patients have routine application of antihypertensive drugs or hypoglycemic drugs, which may easily lead to the occurrence of repeated medication. In addition, when patients with acute coronary syndrome are undergoing interventional therapy, if they need to check the doctor's order or inquire the patient by telephone about the "double anti-thrombotic" medication due to the imperfect preoperative medication handover, it is easy to delay the best treatment opportunity for the patient.

3.2.3. Not Meeting the Requirements for Surgery with Clothing or Skin Preparation

Due to insufficient knowledge popularization of interventional surgery or insufficient preoperative education of patients, some patients only make surgical preparation according to the requirements of general imaging examination, some patients wear underwear, and some patients even wear casual clothes and are sent to the interventional operating room. Inadequate preparation in this area is associated with a low prevalence of interventional care. In addition, it is not recommended to use a scalpel for skin preparation in interventional surgery, but if the puncture site (mainly bilateral groin or right wrist joint) has a lot of body hair, it is recommended to use an electric shaving knife or hair removal cream for skin preparation, and not recommended to use a scalpel to avoid skin injury and postoperative wound infection [5]. However, the skin preparation work of some patients in wards is often unqualified because of imperfect preoperative medical advice.

3.2.4. Improper Location of Venous Access

Interventional surgery with improper location of venous access has certain risks, especially coronary intervention and nerve intervention [6]. Patients may suffer from sudden drop in blood pressure, heart rate or even cardiac arrest at any time. Therefore, preoperative venous access should be established for intraoperative medication. Most interventional surgeons operate on the right side of the patient, so venous access should be established on the left upper limb. Because there are many elective surgeries for interventional therapy, and the reception time is tight, it is suggested that the establishment of venous access should be completed by nurses in the ward. However, due to imperfect medical advice and insufficient knowledge of nurses, there are some patients with improper location of venous access.

3.2.5. Insufficient Preoperative Education and Training

During interventional surgery, patients should be kept still, closed eyes, breath-holding, deep breathing, cough and other intraoperative cooperation; Patients undergoing femoral artery puncture should rest in bed after surgery, and eat and relieve urine and urine in bed with the lower limb immobilization on the puncture side maintained. If the preoperative education and relevant exercises are carried out, it will be beneficial to the smooth operation and postoperative recovery [7]. However, due to the lack of popularization of interventional clinical nursing and the lack of knowledge of patients and

ward nurses, preoperative education and preoperative preparation for practice often cannot be completed properly.

3.3. Improvement Measures

3.3.1. Establish the Preoperative Preparation System for Patients

The interventional liaison nurses are familiar with the surgical procedures and details through learning and training, complete the integrated ward round with doctors one day before the operation, and conduct face-to-face communication with patients to enable them to have a further understanding of the interventional surgery, and jointly assist in the implementation of preoperative medical orders. According to the requirements of the operation, the nurse should prepare the gastrointestinal tract, prepare the skin, establish the venous access, and conduct preoperative education and practice.

3.3.2. Make Propaganda and Education Materials to Popularize the Specialized Knowledge of Intervention

Collected literature and referred to the actual clinical situation to standardize the preoperative preparation of nursing content. Through multimedia and other means, the contents of preoperative preparation and health education for interventional surgery are constantly expanded. Improve the attention of patients and their families to interventional surgery, and encourage patients to cooperate with the completion of preoperative preparation.

3.3.3. Develop and Use the Checklist for Preoperative Intervention

From the perspective of practical clinical problems, such as: preoperative evaluation, past medical history, gastrointestinal tract preparation, clothes and skin preparation, venous channel establishment, preoperative medication, surgery, take medicine, operation agreement signed, etc., check the content and the preoperative nursing measures, sort out to the document group discussion after menstruation nursing department audit the Checklist for Preoperative Intervention [8, 9]. The specific contents should be improved by the ward nurse before the operation. The operative day should be checked with the nursing leader item by item, and the execution time and signatures of both sides should be recorded on the form. Ensure preoperative preparation is completed in the ward. When the patient is delivered to the interventional operation room, the nurses in the interventional operation room will check each item of the Checklist for Preoperative Intervention Operation and sign their names after the check is correct. If any defect is found in the preoperative preparation, it shall be pointed out and registered in time, and put forward in the monthly communication meeting, analyze the reasons and propose improvement measures. The application of preoperative checklist makes preoperative preparation followed and easy to review and trace.

3.3.4. Develop Nursing Paths and Standardize Preoperative Preparation

According to the different preoperative preparation and nursing work of patients in the interventional operation room, the relevant standard operating procedure (SOP) [10] was improved, and the clinical nursing path of specialized interventional surgery was formed. To provide reference materials for ward nurses, so that preoperative preparation of nursing works to the standard, standardized development. The main contents are as follows: (1) Preparation of gastrointestinal tract: Generally, patients with interventional surgery do not need to drink or fast before surgery, but can eat a small amount of food, and it is appropriate to have no sense of hunger. Patients undergoing interventional surgery requiring intubation and general anesthesia should fast for more than 6h and abstain from drinking for more than 2h before surgery. (2) Dressing and skin preparation: The patient should take a bath before surgery, change the patient's clothes, do not wear contents, do not make up, do not paint nail polish, and remove any items unrelated to the operation (including movable dentures, glasses, necklaces, bracelets, earrings, etc.). Patients with long hair in both groins were prepared with electric shaving knife or depilation cream, and patients with coronary intervention and long hair in the right wrist were also prepared with the same skin. (3) Precautions for preoperative medication: Hypertension and diabetes patients are routinely treated with antihypertensive drugs and hypoglycemic drugs to control blood pressure and blood glucose. Patients with poor blood pressure or blood glucose control should report to the doctor and record. Patients undergoing coronary intervention should receive anticoagulant and antiplatelet drugs as prescribed by the doctor. Preoperative medication and intraoperative medication should be filled in the preoperative preparation checklist. (4) Establishment of venous access: Generally, the left upper arm or dorsal metacarpal vein access is routinely established before the operation of interventional patients. Special cases (such as patients with arteriovenous fistula, established central venous access, etc.) will be carried out according to the doctor's advice and recorded. (5) Preoperative training and health education: Preoperative simple intervention-related education should be conducted. The interventional surgery only requires percutaneous puncture of the artery, with small wound and no obvious pain. The patient has no special discomfort and is awake during the operation, without excessive tension and anxiety. During the intervening operation, if the patient does not cooperate or moves autonomously, it will cause image artifacts or affect the operation, and delay the diagnosis and treatment. Therefore, the patient should cooperate in the key steps of the examination, and follow the doctor's command to close eyes, do not move, do not swallow, do not hold breath, cough, etc., so as not to delay the operation process. It is beneficial for the smooth operation of preoperative patients to do relevant exercises to form psychological preparation. In addition, due to the inability to get out of bed for a period of time after surgery, preoperative in-bed defecation practice can reduce postoperative complications such as urinary retention, constipation, bleeding or hematoma at the puncture point [3].

3.4. Effect Evaluation

The team took the error-free items in the preoperative

preparation of the above nursing paths as the qualified criteria for preoperative preparation. The surgeon and the surgical nurse decide whether the patient was qualified during the preoperative evaluation of the patient. The qualified rate of preoperative preparation before and after CQI was statistically obtained. In addition, a third-party satisfaction survey was conducted and 200 valid questionnaires were collected to obtain the satisfaction of the two groups of patients before and after CQI.

3.5. Statistical Processing

SPSS 21.0 statistical software was used to analyze the data, and chi-squared test was used to compare the statistical data. $P< 0.05$ was considered statistically significant, while $P< 0.01$ was considered statistically significant.

4. Results

4.1. Comparison of Qualified Rate of Preoperative Preparation Between the Two Groups (Table 1)

Table 1. *Comparison of qualified rate of preoperative preparation between the two groups Cases (%).*

Groups	Cases	Qualified	Unqualified
Control group	3099	1798 (58.02)	1301 (41.98)
Improved group	4048	3529 (87.18)	519 (12.82)
χ^2		786.34	
P		< 0.01	

4.2. Comparison of Preoperative Satisfaction Between the Two Groups (Table 2)

Table 2. *Comparison of preoperative satisfaction between the two groups (Cases).*

Groups	Number	Satisfaction	Basically Satisfied	Dissatisfaction
Control group	200	66	113	21
Improved group	200	101	93	6
χ2		17.61		
P		<0.01		

5. Discussions

With the rapid development of interventional medicine, higher requirements are put forward for the nursing work of interventional surgery [11]. However, at present, there are imperfect and unprofessional conditions in patients' preoperative preparation, such as uneven preoperative preparation, or finding that patients are strictly in accordance with surgical standards, such as strict prohibition of drinking and fasting, or finding that patients only make preoperative preparation according to ordinary imaging examination. We have established a continuous quality improvement team composed of the head nurse, the nurse, the interventional doctor and the nurse team leader of the intervention related ward (collectively referred to as the interventional liaison nurse) to improve the preoperative preparation of patients with interventional surgery since January 2018. The causes of preoperative preparation problems in patients with interventional surgery were collected and retrospectively analyzed. The existing problems were mainly as follows: uneven preparation of gastrointestinal tract, untraceable the preoperative medication, not meeting the requirements for surgery with clothing or skin preparation [12], improper location of venous access, insufficient preoperative education and training etc. These improvements were implemented, such as establishing the preoperative preparation system for patients, making propaganda and education materials to popularize the specialized knowledge of intervention, developing and use the checklist for preoperative intervention, developing nursing paths and standardize preoperative preparation. Those measures had a significant improvement effect. The pass rate of preoperative preparation was increased from 58.02% to 87.18%, and patient satisfaction was also improved in improved group, with statistically significant difference between the two groups ($P < 0.05$).

After continuous quality improvement of preoperative preparation management for patients undergoing interventional surgery, the qualified rate of preoperative preparation was significantly improved [13]. However, the CQI team found from the feedback results that there were still some problems, such as missing items in preoperative preparation for intervention, failing to meet the requirements for preoperative preparation for intervention, inconsistency between the checklist for preoperative intervention and reality (wrong filling or missing filling), and failure to fill in the checklist for preoperative intervention. The CQI team will continue to discuss and summarize the problems, confirm the achievements and find out the problems for further improvement, strengthen the communication with the head nurse at all levels and the interventional liaison nurses, and optimize the improvement measures to achieve further improvement.

The results of this continuous quality improvement in improving the qualified rate of preoperative preparation and satisfaction of patients with interventional surgery are preliminary. However the current intervention of nursing development is relatively lagging. Such as Mei-shu Qin studies: at present our country is common interventional nursing intervention in different stages of the nursing disjointed [14], involved in the operating room nurses focus on interventional treatment of intraoperative coordination, and ward nurses focus on postoperative nursing, this model ignores the perioperative nursing, ignoring patients and nursing problems. Continuous quality improvement is a on the basis of quality control and quality assurance, pay more attention to the whole process of quality supervision, continuous positioning higher standards of management theory [15, 16], We will be in the continuous quality improvement of preoperative preparation will be the basis of improving experience to intervention operation on the whole perioperative nursing care of patients, to encourage involvement in clinical nursing more high quality and professional.

6. Conclusion

The application of CQI in preoperative preparation management can improve the pass rate of preoperative preparation, optimize the quality of preoperative nursing, and also improve patient satisfaction.

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Biography

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