

Original Article

Effects of full-course optimized nursing intervention on prognosis of patients with foreign body impaction in esophagus under gastroscop

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Abstract: Objective: To explore the effect of full-course optimized nursing intervention on the clinical prognosis of patients with foreign body impaction (FBI) in the esophagus under gastroscop. Methods: Patients (n=180) with esophageal FBI who underwent gastroscopy were selected and divided into two groups, randomly. The control group (n=85) received traditional nursing intervention, and the research group (n=95) received full-course optimized nursing intervention. The total treatment efficiency, as well as pulse, blood pressure and mental state scores of the two groups before and after nursing were compared. The incidence of postoperative adverse reactions and nursing satisfaction were also compared between the two groups. Results: The total effective rate of treatment in the research group was significantly higher than that in the control group (96.84% vs 88.24%, P<0.05). After nursing, pulse, blood pressure and mental state scores of the two groups of patients were significantly lower than those before nursing, and the improvement of these indicators in the research group was significantly better than the control group (P<0.05). The research group had significantly lower incidence of complications (3.16% vs 15.29%, P<0.01), but higher nursing satisfaction rate (95.79% vs 78.82%, P<0.01) than the control group. Conclusion: Optimized nursing intervention for patients with FBI in the esophagus who received gastroscopy treatment had significantly improved treatment efficiency and reduced incidence of complications, and better nursing experience in both physical and mental aspects, which is worthy of clinical promotion.

Keywords: Foreign body impaction in the esophagus, full-course optimized nursing, gastroscopy treatment, psychological state, complications

Introduction

Esophageal foreign body (EFB) is a common clinical emergency. Common causes include accidentally swallowing an animal bone spurs, chips, and other objects such as a lost denture. It is common among children and the elderly, and the occurrence is related to individual factors of the patients, such as age, personality, diet and working habits, as well as consciousness, disease, and iatrogenic factors, as well as suicide attempts [1]. In 68.8% of cases, the foreign body is embedded in the cervical esophagus, and in 50%-58% of cases, the foreign body stays in the cricopharyngeal muscle [2]. Obvious esophageal foreign body sensations, including difficulty swallowing, and pain behind the sternum are the main clinical manifestations of EFB, which was

directly affected by the properties of the foreign body, the site of impaction, and the degree of damage to the esophageal mucosa. In severe cases, EFB can cause posterior pharyngeal wall abscess, rupture of large blood vessels, esophageal perforation, and esophageal fistula. Hence, improper treatment can even be life-threatening, and timely treatment after diagnosis is the key to improving prognosis [3]. Nowadays, the increasingly developed endoscopic technology benefits the smooth removal of EFB. At the same time, due to the acute onset of EFB, patients often have fear and anxiety reactions. Therefore, it is extremely important to apply scientific and effective nursing interventions during surgical treatment.

Previous studies have found that the application of full-course nursing and optimized nurs-

ing in the clinic, especially in surgical nursing, can significantly reduce the patients' complication rate and improve their mental state [4, 5]. Full-course nursing and optimized nursing have the advantages of being a complete nursing process and with classification, which makes it easy to implement specific interventions according to the individual problems found in the process. Previous research has confirmed that full-course optimized nursing can improve the rescue effects of critically ill patients in the emergency department, such as with acute cerebral infarction, and the complication rate of these patients was reduced [6]. At the same time, studies have pointed out that 95% of the patients with EFB who received personalized perioperative care can be cured and discharged after the foreign bodies are removed [7]. The above report provides scientific evidence for the feasibility of giving reasonable nursing intervention to patients during the perioperative period based on the concept of rapid rehabilitation in modern clinics, and also confirms that modern nursing models can improve the efficiency of clinical treatment of esophageal foreign body impaction (FBI). Therefore, this study applied full-course optimized nursing intervention to patients with esophageal FBI to explore its clinical effect.

Materials and methods

General information

A total of 180 participants were selected, from patients with esophageal FBI who underwent gastroscopy from April 2018 to April 2020 in the endoscopy department of The First Affiliated Hospital of Anhui Medical University. They were randomly divided into two groups: the control group (85 cases) that received traditional nursing intervention; and the research group (95 cases) that received full-course optimized nursing intervention. The patients and their family provided informed consent. This study was approved by the Ethics Committee of The First Affiliated Hospital of Anhui Medical University.

Inclusion criteria: All patients were diagnosed with esophageal FBI by imaging or endoscopy, and there were no contraindications to the surgery [8]; patients were in accordance with indications for gastroscopy; patients had foreign

body sensation, dysphagia/pain, retrosternal pain, or gastrointestinal adverse reactions (nausea, vomiting, acid reflux, decreased appetite, etc.); and patients were aged 15 to 80 years.

Exclusion criteria: Patients had important organ dysfunction or malignant tumors; patient had congenital diseases; or patients were pregnant or lactating.

Methods

Control group: Traditional nursing intervention was adopted, including routine consultation and registration. Patients were assisted by specialized nurses to assess their vital signs and clinical symptoms, then patients were transferred to the corresponding departments for specific examination and treatment, followed by analysis of onset causes, drug administration and dietary guidance. Patients were instructed to pay attention to both their daily activities and the prevention and treatment of common complications after discharge. Meanwhile, they were given correct analysis and answers to their questions.

Research group: The full-course optimized nursing interventions were implemented as follows.

Preoperative preparation: Most esophageal FBI patients were admitted to the emergency department, and the patient's vital signs were evaluated quickly. The registration was performed by the family later. Patients were transferred to the corresponding department for further treatment by a specialized nurse. During this period, the endoscopy room was made ready for operation, and the patient room was kept quiet, tidy, clean and comfortable. After the patient entered the department, a professional physician treated the patient in a timely manner. The medical history, sedation and anesthesia history, allergy history and the type and time of FBI were carefully learned before surgery. CT scan was performed to confirm the location and depth of the esophageal FBI, and the patient's pulse and blood pressure were monitored. Surgery was only performed when every indicator was within normal levels. For patients with abnormal dynamic electrocardiogram or high blood pressure, careful medical treatment was per-

Effects of full-course optimized nursing intervention in patients with FBI in esophagus

formed to avoid accidents such as cardiac arrest or sudden blood pressure rise during surgery.

Intraoperative nursing: During the treatment, the patient was guided to maintain a left lateral decubitus as a preoperative preparation. The nurse cooperated with the doctor to carry out the relevant work. The nurse confirmed that the patient's respiratory tract was unobstructed and placated the patient's nervousness. The patient was told to breathe slowly and deeply, keep the body muscles relaxed, and not to swallow during the operation.

Psychological nursing: For patients with postoperative pain or difficulty in swallowing and other discomforts, psychological counseling was given. The nurse guided the patient to relax his mind and ensure rest to eliminate fatigue, and then appeased any obvious anxiety. The nurse also listened to the patient's negative emotions carefully, communicated with them, and satisfied their reasonable needs. For patients with severe pain, medical treatment was given if necessary to relieve body discomfort [9]. Especially, for patients who deliberately swallowed foreign bodies, mental counseling was conducted. The patients were guided to talk about the true reason of swallowing. At the same time, the family of the patient was told to pay more attention to the patient's emotions. If patients had other serious behaviors such as self-mutilation, the nurse and doctor actively confirmed whether the patient had a tendency for depression. If necessary, the nurse and doctor suggested to the patients and their family to transfer to the relevant department in the hospital for further examination.

Postoperative care: After the operation, the amount and state of the secretion of the esophagus and respiratory tract of the patient were regularly checked, and sputum excretion was instructed. At the same time, the patient was told to drink more water to dilute the sputum, and sputum suction was used to help if necessary. The postoperative diet was designed according to the degree of the patient's condition. The patients in a severe condition fasted for one day, and the patients in a mild condition could take warm and cool liquid food two hours after surgery. After the operation, the signs of hematemesis, blood in the stool, abdominal distension, diarrhea, chest pain,

shortness of breath, and other uncomfortable feelings were closely observed, and the patient's vital signs such as pulse, breathing, and body temperature were regularly monitored.

Complication nursing: Postoperative patients who had symptoms such as reduced blood pressure, pale skin, and cold sweats were notified to the doctor immediately to prevent patients from postoperative bleeding due to their own coagulation dysfunction. Meanwhile, blood oxygen saturation monitoring, and gastric and thoracic drainage tube care were given. Patients with pleural effusion and chest pain were given treatment in real time to avoid further deterioration. Food swallowing after surgery was avoided to prevent postoperative wound infection and secondary infection [10].

Health education: The various causes and avoidance measures of esophageal FBI were patiently explained to patients and their families. Patients were instructed to maintain good living habits. If foreign objects were embedded in the esophagus, patients were told to go to the hospital immediately to avoid delaying the treatment time. Patients were told not to listen to private remedies such as forced swallowing other foods, because it would only make esophageal injury worse and surgery more difficult. At the same time, patients were guided to prevent esophageal FBI in everyday life.

Outcome measures and evaluation standards

Evaluation of the total treatment efficiency: The location, size and clinical symptoms of FBI was confirmed by imaging again [11]. The treatment efficiency was defined as followings: significant, esophageal FBI was successfully removed from the impacted site in the body and the clinical symptoms disappeared; effective, the esophageal FBI was successfully removed from the impacted site in the body and the clinical condition was relieved; invalid, esophageal FBI failed to be removed and patients was transferred to surgical treatment, and the related clinical condition was not reduced or continued to deteriorate. The total effective rate of treatment (%) = (significant + effective) number/Total patient number × 100.

Pulse and blood pressure comparison: The value of pulse, systolic blood pressure (SBP) and diastolic blood pressure (DBP) before and

Table 1. Comparison of general data of two groups of patients

Item	Control group (n=85)	Research group (n=95)	χ^2/t	P
Gender (Male/Female)	47/38	53/42	0.004	0.947
Age (year)	52.8±3.2	52.4±2.5	0.927	0.355
Mean disease course (min)	35.52±3.57	35.38±3.35	0.271	0.786
Location of foreign body (n)			0.018	0.991
Upper Esophagus	48	52		
Middle Esophagus	26	29		
Lower Esophagus	11	14		

Table 2. Comparison of the total treatment efficiency of the two groups of patients (n, (%))

Group	Significant	Effective	Invalid	Total effective rate
Control group (n=85)	54 (63.53)	21 (24.71)	10 (11.76)	75 (88.24)
Research group (n=95)	70 (73.68)	22 (23.16)	3 (3.16)	92 (96.84)
χ^2				4.960
P				0.026

after the nursing were recorded and compared.

Mental state: The Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) were used for evaluation [12, 13]. The full score of each scale is 100 points, with a total of 20 items each. Each item is scored 1-4 points. If the total scores of SAS and SDS were more than 50 points and 53 points, respectively, the patient was judged in anxious or in a depressed mental state.

Nursing satisfaction: The nursing satisfaction rate was evaluated according to previous study [14]. It was implemented by a questionnaire survey. The satisfaction degree was defined as: very satisfied, patient was highly recognized and satisfied with the nursing work; satisfied, the patient was generally recognized and satisfied with the nursing work; dissatisfied, the patient was not recognized the nursing work. Nursing satisfaction rate (%) = (Very satisfied + Satisfied) number/Total patient number × 100.

Complication rate: Post-pharyngeal wall abscess, esophageal perforation, bleeding and other complications were recorded. The incidence of complications (%) = (post-pharyngeal wall abscess + esophageal perforation + bleeding) number/total patient number × 100.

Statistical methods

All statistical data were analyzed using SPSS 21.0 statistical software. Measurement data that conformed to a normal distribution were expressed as mean ± standard deviation ($\bar{x} \pm SD$), and the independent sample t test was used for comparison between groups. All enumeration data were expressed as cases/percentage (n/%), and χ^2 test was used for comparison between groups. P<0.05 was considered statistically significant.

Results

Comparison of general data of the two groups of patients

There was no statistical difference in the general data between the two groups of patients (all P>0.05). See **Table 1** for details.

Comparison of the total treatment efficiency of the two groups of patients

The total effective rate of treatment in the research group was significantly higher than that in the control group (96.84% vs 88.24%, P<0.05). See **Table 2** for details.

Comparison of pulse and blood pressure values between the two groups of patients before and after nursing

Before nursing, there was no significant difference in pulse (81.54±5.07 times/min, 81.56±5.13 times/min), SBP (125.38±10.73 mmHg, 125.32±10.22 mmHg), DBP (82.34±7.16 mmHg, 82.63±7.40 mmHg) between the two groups (P>0.05). After nursing, the pulse of the two groups ((76.74±3.45 times/min), (71.35±3.76 times/min)), SBP ((120.56±9.23 mmHg), (114.34±8.56 mmHg)) and DBP ((77.38±6.39 mmHg), (72.20±5.72 mmHg)) were significantly lower than those before nursing (P<0.05), and the decrease in the research group was more significant than that

Effects of full-course optimized nursing intervention in patients with FBI in esophagus

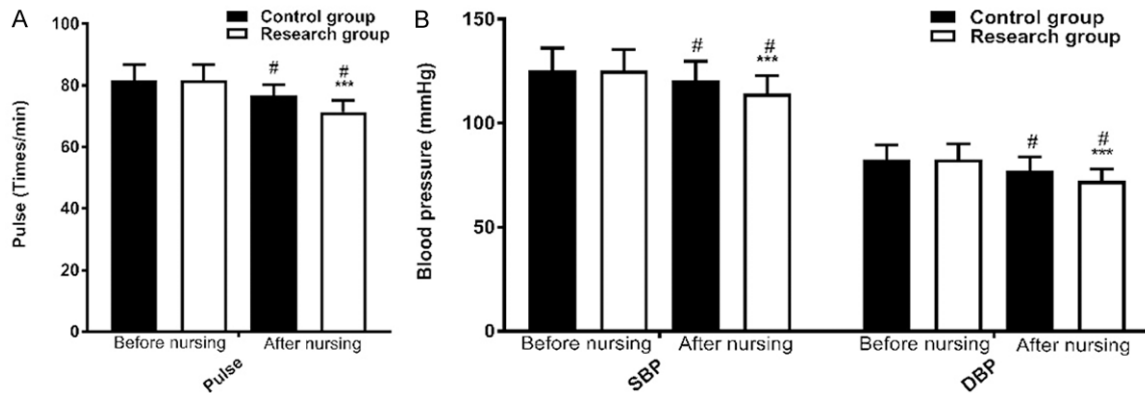


Figure 1. Comparison of pulse and blood pressure between two groups of patients before and after nursing. A: Comparison of pulse between two groups of patients before and after nursing; B: Comparison of blood pressure between two groups of patients before and after nursing. Compared with the optimized nursing group before nursing, # $P<0.05$; Compared with the control group after nursing, *** $P<0.001$. SBP: systolic blood pressure; DBP: diastolic blood pressure.

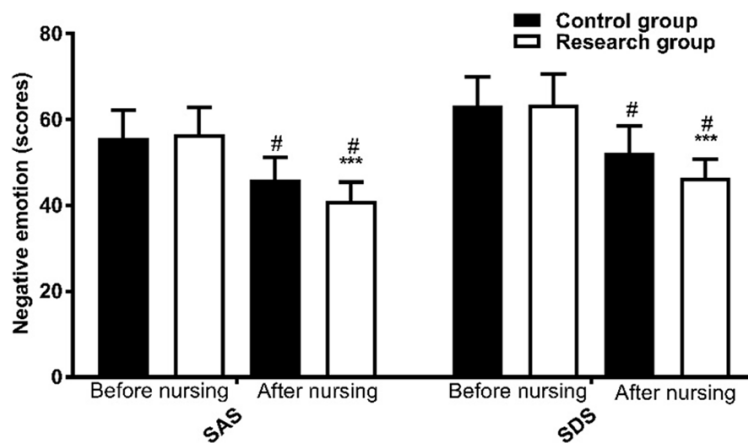


Figure 2. Comparison of negative emotions between two groups of patients before and after nursing. Compared with the optimized nursing group before nursing, # $P<0.05$; Compared with the control group after nursing, *** $P<0.001$. SAS: self-rating anxiety scale; SDS: self-rating depression scale.

in the control group ($t=9.981, 4.690, 5.739, P<0.001$). See **Figure 1** for details.

Comparison of SAS and SDS scores of the two groups of patients before and after nursing

Before nursing, there was no significant difference in the SAS and SDS scores between the two groups ((55.71 ± 6.53) vs (56.58 ± 6.27) ($t=0.911, P=0.363$), (63.28 ± 6.77) vs (63.52 ± 7.09) ($t=0.232, P=0.817$)) ($P>0.05$). After nursing, the SAS and SDS scores of the two groups were lower than those before nursing ($P<0.05$), but the SAS and SDS scores of the research group were both significantly lower than those of the control group

$((41.07\pm 4.42)$ vs (46.09 ± 5.22) ($t=6.984, P<0.001$), (46.51 ± 4.28) vs (52.27 ± 6.35) ($t=7.052, P<0.001$)). See **Figure 2** for details.

Comparison of the incidence of complications between the two groups

The total incidence of complications such as abscess, esophageal perforation, and bleeding in the research group was significantly lower than that in the control group (3.16% vs 15.29%, $P<0.01$). See **Table 3** for details.

Comparison of nursing satisfaction between two groups of patients

The nursing satisfaction rate of the research group was significantly higher than that of the control group (95.79% vs 78.82%, $P<0.01$). See **Table 4** for details.

Discussion

With the diversified development of dietary structure, the incidence of esophageal FBI has increased significantly. The study of Yuan et al. pointed out that sharp objects are currently the most common foreign bodies found in the esophagus of Chinese patients [15]. The retention time of FBI in the esophagus is closely

Table 3. Comparison of the incidence of complications between the two groups of patients (n, (%))

Group	Abscess of the posterior pharyngeal wall	Perforation of the esophagus	Bleeding	Total complication rate
Control group (n=85)	3 (3.53)	2 (2.35)	8 (9.41)	13 (15.29)
Research group (n=95)	1 (1.05)	0 (0.00)	2 (2.10)	3 (3.16)
χ^2				8.159
P				0.004

Table 4. Comparison of nursing satisfaction of two groups of patients (n, (%))

Group	Very satisfied	Satisfied	Dissatisfied	Total satisfaction rate
Control group (n=85)	22 (25.88)	45 (52.94)	18 (21.18)	67 (78.82)
Research group (n=95)	55 (57.89)	36 (37.89)	4 (4.21)	91 (95.79)
χ^2				12.036
P				0.001

related to the complication rates of patients, so timely treatment after the onset is extremely important.

At present, esophageal foreign body removal under gastroscopy is the preferred treatment method for esophageal FBI. Due to the different properties of each impacted foreign body, the surrounding tissues are vulnerable to be hurt during the procedure. Whether the foreign body is successfully taken through the upper gastrointestinal endoscopy depends on the professional level of the surgical team and the cooperation of the nurses and patients [16]. Currently, clinical care for esophageal FBI is focused on assisting doctors to remove foreign bodies during surgery, routine vital sign monitoring and routine discharge guidance after surgery [17]. This far from meets the physical and mental needs of patients with the sudden onset of an illness. In order to alleviate the patient's surgical stress response, the perioperative care of esophageal FBI should be performed from the beginning of the operation until the patient recovers after surgery. Scientific nursing is also a key and necessary component to improve the effectiveness of esophageal FBI treatment [18]. The full-course optimized nursing model is an extension of modern new nursing based on service awareness, which pays more attention to the perioperative nursing and the enhancement of nursing details [19]. It has been proven that

full-course optimized nursing can improve the efficacy of comprehensive patient care in the clinic and promote the patients' postoperative recovery [20].

Studies have shown that adequate preparation before surgery is the key factor to ensure the successful removal of esophageal foreign bodies under gastroscopy [21]. In this study, the whole process of nursing intervention was optimized. Preoperative preparation included detailed medical history learning to avoid potential surgical

risks, and patient psychological counseling, so that patients would fully believe in the safety of surgery and maintain a good physical and mental state during the surgery, thus their surgical tolerance was improved. At the same time, nursing is strictly executed during the operation and nurses skillfully cooperated with the doctors to monitor the patient's physical status in real time.

Endoscopic treatment has the advantages of high safety, less trauma, economy, and high success rate. However, esophageal FBI is operated under a gastroscope. Surface anesthesia is unavoidable during the operation. Postoperative pain after anesthesia ends is the main reason for the abnormal increase in sputum secretion [22]. In response to this phenomenon, the nurses in this study gave patients professional sputum guidance. Moreover, patients were also prone to postoperative hyperthermia and difficulty in swallowing, which was associated with secondary infection and surgical trauma, so nurses need to regularly monitor patients' vital signs such as pulse, breathing and body temperature to avoid potential risks [23]. The results of our study showed that the total effective rate of treatment in the research group was significantly higher than that in the control group, and after nursing, the improvement in pulse, systolic and diastolic blood pressure of the research group was better than that of the control group, indi-

cating that full-course optimized nursing promotes the success of the operation.

Studies have pointed out that incomplete understanding of the disease was the main cause of frequent recurrence and postoperative complications [24]. For esophageal FBI, which is a controllable issue, the purpose of clinical care is not only for the nursing effect of this perioperative period, but also for the longer-term goal to improve the patient's awareness and reduce the incidence of FBI [25]. Hence, perioperative nursing is important. In addition, the full-course optimized nursing in this study also covers the psychological level and health knowledge, in order to ensure the patients' good psychological state and improve their nursing satisfaction. Meanwhile, besides informing about esophageal FBI postoperative basic precautions, patients were guided to change their living habits to avoid the recurrence of esophageal damage caused by their improper living habits and the importance of scientific nursing was stressed by nurses to improve the self-care ability of patients [26]. Strict prevention of complications, such as sternal pain, is also needed to avoid secondary injury such as esophageal perforation. We found that patients who received the full-course optimized nursing had better psychological state, lower incidence of complications and higher nursing satisfaction rate than those received traditional nursing, indicating that the full-course optimized nursing is more comprehensive and effective, because it pays more attention to the refinement and extension of nursing strategy.

Our study is the first one to report the effect of full-course optimized nursing on the comprehensive therapeutic effect of esophageal FBI, which may provide some new insights for esophageal FBI nursing in clinic. However, there are some limitations in this study. For example, different impacted sites and differences in surgical tolerance of patients may interfere with the subjective sensitivity of patients. Thus, further study design needs to be more detailed and individualized.

In summary, full-course optimized nursing intervention for esophageal FBI patients undergoing gastroscopy can significantly improve the treatment efficiency, reduce the incidence of complications, and improve the patient's

physical and mental comfort degree, which is worthy of clinical promotion.

Disclosure of conflict of interest

None.

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Effects of full-course optimized nursing intervention in patients with FBI in esophagus

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