

ORIGINAL RESEARCH

Treatment of Adhesive Intestinal Obstruction by Nasogastric Tube Under Enhanced Recovery After Surgery: An Efficacy Analysis

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ABSTRACT

Objective • To explore the application value of enhanced recovery after surgery (ERAS) in the treatment of adhesive intestinal obstruction (AIO) by nasogastric tube (NGT).

Methods • Between December 2020 and December 2022, AIO patients who received NGT treatment at The Fourth Hospital of Changsha were selected, including 43 cases receiving ERAS nursing (observation group) and 35 cases receiving routine care (control group). The two groups were compared in terms of postoperative rehabilitation, as well as their psychology, pain, and quality of life which were evaluated using Self-Rating Anxiety/Depression Scale (SAS/SDS), Visual Analogue Scale (VAS), and Short-Form 36 Item Health Survey (SF-36), respectively. During treatment, the adverse reactions were recorded.

Results • In the observation group, the abdominal pain and distension relief time, time to first post-treatment flatus and

defecation, abdominal circumference reduction 48 hours after admission, bowel sound recovery, first oral food intake, and extubation time were shorter than those of the control group ($P < .05$), and the SAS and SDS scores were also lower than those of the control group after treatment ($P < .05$). At 6-24 hours after treatment, the VAS of the observation group was lower than that of the control group, while the SF-36 score was higher ($P < .05$). Finally, a lower adverse reaction rate was determined in the observation group compared to the control group ($P < .05$).

Conclusions • ERAS care promotes the recovery of AIO patients after NGT treatment, improves their pain and negative emotions, improves their quality of life, and is extremely valuable for clinical application. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

Intestinal obstruction (IO) is one of the common surgical acute abdomen, which refers to the failure of the intestine to function properly and to pass smoothly intestinal contents through the intestine due to various causes.¹ Its rapid development can not only cause anatomical and functional changes in the intestine itself but also lead to systemic physiological disorders, which can be life-threatening in severe cases, with complex and dynamic clinical manifestations.² Adhesive intentional obstruction (AIO),

mainly manifested as abdominal pain, abdominal distension, vomiting, and other symptoms, is the most common type of IO that accounts for 40-60% of all IO cases, and is mostly caused by intraperitoneal surgery, inflammation, trauma, bleeding, and foreign bodies,³ with the characteristics of recurrent attacks.⁴ Generally, patients with early-stage AIO are treated non-surgically, with gastrointestinal decompression being one of the core measures to treat AIO.⁵ A nasogastric tube (NGT) is currently the first choice for gastrointestinal decompression, which has a long length and can easily reach the distal end of the patient's small intestine, thus facilitating the gastrointestinal decompression effect.⁶

Recently, a growing body of research has shown that nursing interventions also exert a positive effect on promoting gastrointestinal functional recovery.^{7,8} Enhanced recovery after surgery (ERAS) is an important nursing intervention model found in clinical practice in recent years, which has been widely used in the surgical field and is of great significance for improving patient outcomes.^{9,10} However, after examining the previous data, we found few reports on the treatment of AIO with NGT and rare reference data on its efficacy and safety. Accordingly, this study was carried out to

clarify the efficacy and safety profile of NGT in the treatment of AIO under ERAS, to provide effective reference and guidance for future clinical treatment.

MATERIALS AND METHODS

Data collection

This is a retrospective study. After screening based on the inclusion and exclusion criteria, 78 AIO patients who received NGT therapy at The Fourth Hospital of Changsha between December 2020 and December 2022 were selected. This study met the requirements of the Medical Ethics Committee and was reviewed and approved by our hospital. Inclusion criteria: (i) diagnosis of AIO according to the clinical diagnostic criteria for early-stage AIO;¹¹ (ii) intact case data; (iii) no lost-to-follow-up in the three months after treatment and good compliance. Exclusion criteria: (i) strangulated IO or strangulation tendency of intestinal segments; (ii) those with recent treatment; (iii) serious systemic diseases such as those involving heart, liver, and kidney; (iv) mental or communication disorders; (v) drop-outs. Our hospital started promoting the use of ERAS care in June 2021. Among the research subjects, 35 patients were admitted before June 2021 and they received usual care and were considered as the control group. The other 43 patients were admitted after June 2021 and they received ERAS care, and considered as the observation group. All patients and their families were informed and signed informed consent forms.

NGT therapy

NGT, with a guide wire length of 300 cm and two pouches and three cavities, was placed in the esophagus of the patient. A gastroscope was then inserted to suck the residual fluid from the stomach and esophagus. After catheter placement into the upper jejunum, the water sac was filled and the vacuum suction device was connected, and then the catheter was slowly moved forward. The catheter was cleaned daily and pressurized to keep the drainage tube unobstructed.

Nursing methods

Routine care: First, routine health education was carried out, and precautions were explained to the patient's families. Patients were assisted to perform a series of routine examinations. After placing the NGT, the catheter and vacuum suction device were properly fixed, and the safety of the catheter was regularly checked to prevent tube detachment. Those with nasopharyngeal discomfort were given timely intervention during treatment, and doctors were informed in time in the case of other adverse reactions to prevent complications. After extubation, health education was performed to promote patient recovery. ERAS: First of all, an ERAS team was set up and its medical staff were trained. After collecting patients' data, the nursing plan suitable for each patient was formulated in combination with the clinic to promote the smooth development of treatment. Appropriate psychological care and measures were given to patients before catheter placement, to prevent patients from

feeling depressed and anxious due to clinical symptoms or the lack of understanding of IO catheterization. In addition, a good nurse-patient relationship was established, and encouragement and guidance were given to patients. Besides, the nursing staff patiently answered the relevant questions raised by patients and their families, and explained the specific process of IO catheterization, to enhance patients' confidence, improve their compliance, and reduce stress responses. As most patients developed adverse reactions after catheterization, psychological care, an important measure to improve patients' confidence in treatment, was also given in addition to rational drug treatment. Second, catheter care was carried out: after successful catheter placement, the catheter was labeled according to its characteristics, indicating its name, exposed length, indwelling date, and time; in addition, the catheter was fixed to prevent detachment, damage, rupture, obstruction, and catheter balloon rupture. Meanwhile, attention was paid to the prevention and nursing of catheter complications, and timely diagnosis and intervention were given when necessary. Furthermore, patients were guided to maintain oral hygiene and increase the humidification of the throat to prevent pharyngeal inflammation. Patients were also given parenteral nutrition to ensure water-electrolyte balance since they needed to fast and remain water-deprived for a long time after catheter placement; when IO was relieved, they were allowed to gradually transition from liquid to semi-liquid and general diet. After extubation, patients were informed of dietary, life, and other precautions in detail to accelerate their recovery and help improve their quality of life (QOL).

Primary observables

The following parameters were recorded and compared between the observation group and control group: recovery time of clinical symptoms (abdominal pain and distension relief time, time to first post-treatment flatus and defecation, and abdominal circumference reduction 48 h after admission), gastrointestinal function recovery (bowel sound recovery, first oral food intake, and extubation time), and hospitalization time.

Secondary observables

Pre- and post-treatment scores of Self-Rating Anxiety/Depression Scale (SAS/SDS; lower scores indicate less anxiety and depression);¹² pain assessed by the Visual Analogue Scale (VAS; a lower score means less pain) at 6, 12, 24, and 48 hours after treatment; incidence of adverse reactions; pre and post-treatment QOL evaluated by the Short-Form 36 Item Health Survey (SF-36; higher scores indicate better QOL).¹³

Statistical methods

Data analyses were completed by SPSS26.0 software, with statistical significance reported at the $P < .05$ level. Continuous variables (mean \pm standard deviation) were comparatively analyzed by independent sample *t* test, paired *t* test, variance analysis, and Bonferroni test. Count data were expressed as (%), and comparisons were made by chi-square tests.

Table 1. General Data

Group	n	Age	Gender Male / Female	BMI (kg/m ²)	Education level Middle school and below / High school and above	Ethnicity Han / Minority
Observation group	43	53.6 ± 3.3	25(58.1)/18(41.9)	27.4 ± 2.6	29(67.4)/14(32.6)	40(93.0)/3(7.0)
Control group	35	53.3 ± 4.3	21(60.0)/14(40.0)	27.2 ± 2.6	25(71.4)/10(28.6)	33(94.3)/2(5.7)
χ^2/t		0.349	0.028	0.338	0.144	0.051
P value		.728	.868	.736	.704	.821

Abbreviation: BMI, Body Mass Index.

RESULTS

Comparison of baseline characteristics

The comparison of general data of patients between the observation group and control group, shown in Table 1, revealed no statistical difference between them ($P > .05$).

Recovery time of clinical symptoms

The abdominal pain relief, distension relief time, time to first post-treatment flatus and defecation, and abdominal circumference reduction 48 hours after admission were observed and recorded. Compared to the control group, the observation group had a shorter recovery time in terms of these clinical symptoms, and the differences were statistically significant ($P < .05$, Figure 1).

Gastrointestinal function recovery time and hospitalization time

The data of bowel sound recovery time, first oral food intake, extubation time, and hospitalization time of the two groups were statistically analyzed. The gastrointestinal function of patients in the observation group was found to recover faster after nursing intervention ($P < .05$), with shorter hospitalization time compared to the control group ($P < .05$, Figure 2).

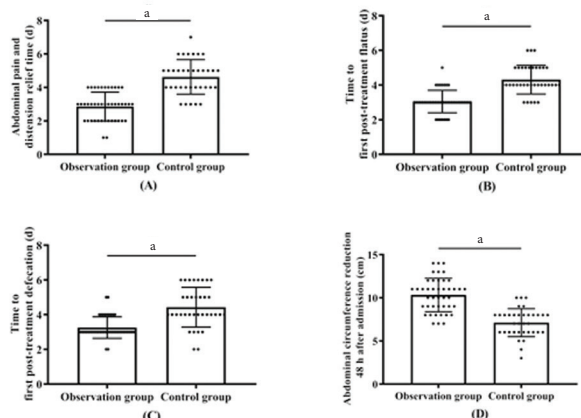
Psychological state before and after care

Patients were assessed for anxiety and depression degrees using the SAS and SDS scores before and after treatment. It was found that the observation group and the control group had similar SAS and SDS scores before the intervention ($P > .05$); the post-interventional SAS and SDS scores were markedly reduced in both groups, with lower scores in the observation group compared to the control group ($P < .05$, Figure 3).

Pain after treatment

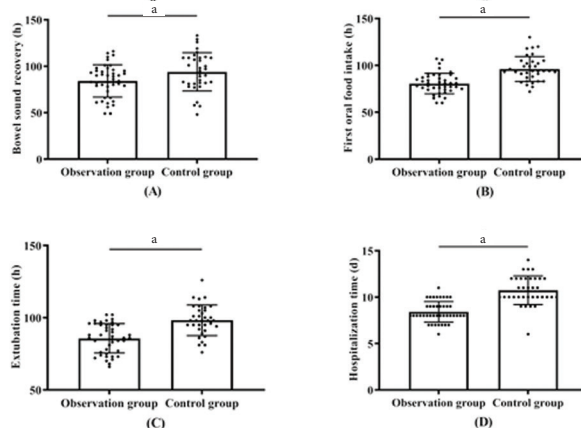
We employed the VAS to evaluate the pain of patients at 6, 12, 24, and 48 hours after treatment. It can be seen that the VAS in both groups showed a decreasing trend after treatment, and reached the lowest value at 48 hours after treatment ($P < .05$). VAS was found to be lower in the observation group than the control group at 6-24 h after treatment ($P < .05$), however, the score was similar in both groups at 48 h after the treatment ($P > .05$), as shown in Figure 4.

Figure 1. Recovery Time of Clinical Symptoms: A) Abdominal Pain and Distension Relief Time; B) Time to First Post-Treatment Flatus; C) Time to First Post-Treatment Defecation; D) Abdominal Circumference Reduction 48 h After Admission



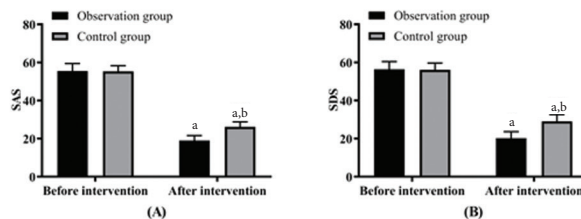
^a $P < .05$

Figure 2. Gastrointestinal Function Recovery Time and Hospitalization Time: A) Bowel Sound Recovery Time; B) First Oral Food Intake; C) Extubation Time; D) Hospitalization Time



^a $P < .05$

Figure 3. Psychological State before and After Care: A) SAS and B) SDS.

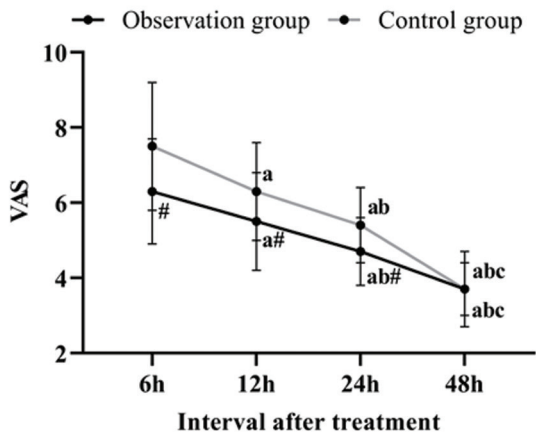


^aand ^b Indicate Comparison with the Before Care Intervention and Observation Group, Respectively ($P < .05$). Self-Rating Anxiety/Depression Scale (SAS/SDS).

Adverse reactions

The incidence of adverse reactions, including poor drainage, bleeding, perforation, and loss of appetite was

Figure 4. Pain After Treatment.

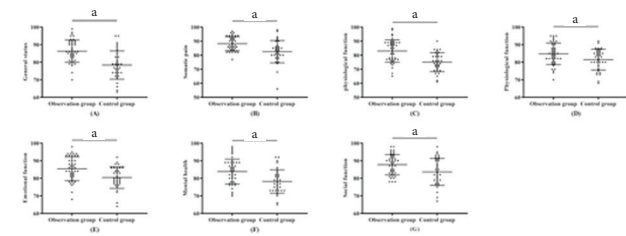


Note: a, b, c, and # Indicates Comparison with the 6h, 12h, and 24h After Care Intervention and Observation Group, Respectively ($P < .05$). Visual Analogue Scale (VAS).

Table 2. Adverse Reactions

Group	n	including poor drainage	bleeding	perforation	loss of appetite	Adverse reaction rate (%)
Observation group	43	1(2.3)	1(2.3)	0(0)	0(0)	2(4.7)
Control group	35	2(5.7)	2(5.7)	1(2.9)	2(5.7)	7(20.0)
χ^2						4.453
P value						.035

Figure 5. QOL Assessment After Treatment: A) General Health; B) Bodily Pain; C) Physical Functioning; D) Role-Physical; E) Role-Emotional; F) Mental Health; and G) Social Functioning



$aP < .05$

statistically analyzed. The statistical analysis revealed an overall adverse reaction rate of 4.7% in the observation group, versus 20.0% in the control group ($P < .05$, Table 2).

QOL assessment after treatment

After discharge, all patients received regular follow-up for 3 months. The QOL of patients in both cohorts after treatment was evaluated based on the SF-36 health questionnaire from 7 subscales. The results showed higher scores of general health, improvement of bodily pain, physical functioning, role-physical, role-emotional, mental health, and social functioning in the observation group compared to the control group ($P < .05$, Figure 5).

DISCUSSION

The use of NGT has become increasingly common in recent years as the incidence of AIO has increased.¹⁴ As an

emerging treatment scheme, NGT can effectively increase the depth of gastrointestinal decompression, relieve IO symptoms more quickly, and ease patients' pain.¹⁵ It is also well established that intervention combined with personalized nursing means can validly enhance the therapeutic effect of NGT.¹⁶ Currently, the patient-centered treatment system has been recognized by the medical community, and ERAS is an important part of this system. ERAS has been proven to be effective and has been successfully applied in many surgical diseases, especially in gastric and colorectal surgeries. However, ERAS is a multidisciplinary collaborative process. In addition to the efforts of the nursing staff, it requires a complete team of constantly updated concepts, including surgeons, anesthesiologists, operating rooms, ICUs, rehabilitation therapists, relatives, and social workers to work together to apply the ERAS concepts, to practice courageously, and to boldly explore, to make the patient's postoperative recovery early, which is the real purpose of ERAS. By exploring the effect of NGT in the treatment of AIO under ERAS nursing, this study has important reference opinions for future clinical management of AIO.

In this study, patients in the observation group cared for by ERAS had shorter recovery time for clinical symptoms, faster gastrointestinal functional recovery, and lesser hospitalization time than the control group, demonstrating that ERAS can significantly speed up patient rehabilitation after treatment. Similarly, previous studies on the application of ERAS have also revealed a shortened rehabilitation period by ERAS nursing in patients undergoing duodenectomy or bariatric surgery.^{17,18} As is known to all, ERAS employs a series of evidence-based optimized measures of perioperative management to reduce the physical and psychological traumatic stress of surgical patients and to achieve rapid recovery. ERAS mainly adopts multi-disciplinary and multi-form intervention techniques during the nursing intervention, where surgeons, anesthesiologists, and nurses fully communicate with patients and their families, take appropriate nursing intervention measures to reduce stress reactions and complications to accelerate post-treatment rehabilitation and optimize treatment and care pathways throughout disease treatment.¹⁹ Being patient-centered with a certain scientific theoretical basis, ERAS provides evidence-based comprehensive nursing interventions to patients considering the specific situation of each patient, to ease patients' unhealthy psychological states, prevent complications, and promote the recovery of their physiological functions.²⁰ During treatment with NGT, patients show obvious discomfort such as nausea and vomiting, and are prone to electrolyte disturbance, excessive gastrointestinal contraction, and other conditions due to changes in intestinal motility caused by external forces.^{21,22} This is also the main reason for the prolonged rehabilitation time and poor rehabilitation status of patients after NGT therapy. We believe that the use of ERAS can promote the recovery of patients' body function from physiological aspects and enable them to actively participate in the recovery and

reconstruction of gastrointestinal function, to avoid the occurrence of adverse reactions. On the other hand, the careful and close psychological attention and intervention given to patients under this care model can help to reduce patients' fear of diseases and improve their sense of trust and dependence on medical staff, so that patients can better and actively participate in the treatment. This can also be confirmed by the lower post-treatment SAS and SDS scores in the observation group than the control group when comparing the psychological state of patients. Similarly, a comparison of adverse reactions reveals a lower incidence of adverse reactions in the observation group compared to the control group, which can also preliminarily support the above viewpoint and confirm that ERAS can reduce adverse reactions after treatment with NGT. Subsequently, a comparison of pain revealed less pain in the observation group after treatment than in the control group. We believe that this may be due to the application of ERAS nursing, which accelerates the recovery of multiple organs of patients, reduces the risk of post-treatment complications, and improves the tolerance of the body, thus reducing the somatosensory pain. Finally, better QOL was determined in the observation group after treatment compared with the control group, which also indicates that the use of ERAS nursing can not only help patients recover faster after treatment but also improve the quality of medical services and the overall prognosis of patients. In this regard, similar findings were reported by Chao and other researchers in their study which involved ERAS nursing for patients undergoing minimally invasive gynecological surgery.²³

Despite the valuable findings of the study, there are a few limitations. First, although there may be room for optimization and improvement of nursing details outlined in this study, there are currently no uniform clinical guidelines for the application of ERAS in AIO. Second, the results of this study may be subject to bias due to the small number of cases and hence should be interpreted with caution. Third, due to our short trial period, we could not assess patients' long-term outcomes. In the future, we plan to perform a follow-up study in which we will conduct a more in-depth and comprehensive analysis of the application of ERAS nursing in the NGT treatment of AIO, to provide more reliable clinical reference and guidance.

CONCLUSION

ERAS can effectively shorten the rehabilitation period of patients with AIO treated by NGT, soothe pain and unhealthy psychological states after treatment, and prevent the occurrence of adverse reactions. Therefore, ERAS is recommended in the clinical treatment of AIO to comprehensively improve the quality of clinical and medical services and obtain a more reliable outcome in terms of patients' prognoses and QOL.

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AUTHOR DISCLOSURE STATEMENT

The authors declare no competing interests.

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