

# Application value of nursing intervention combined with early nutritional support in preventive stoma reversion of low rectal cancer

XINMEI YE, DANDAN HE, JIE ZHAO, YUQING LEI, QIUQIONG YAO and HUI WANG

Department of Colorectal Anal Surgery, The Sixth Affiliated Hospital of Sun Yat-Sen University,  
Guangzhou, Guangdong 510655, P.R. China

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**Abstract.** Application value of nursing intervention combined with early nutritional support treatment in preventive stoma reversion of low rectal cancer was explored. Ninety-two cases of low rectal cancer patients undergoing preventive stoma reversion from January 2014 to December 2016 were retrospectively analyzed. All the patients had closed fistula 3 months after neostomy. Forty-four cases with routine nursing care were the control group; 48 cases with early nutritional support and nursing intervention were the experimental group. Nutritional status, psychological status, incidence of adverse reactions, wound infection rate, number of shaped and regular defecation were compared in the two groups. The levels of albumin, prealbumin and serum total protein in the experimental group were significantly higher than those in the control group after operation ( $P<0.05$ ); the levels of albumin in the two groups after operation were significantly lower than those before operation ( $P<0.001$ ). The SAS and SDS scores in the experimental group were significantly lower than those in the control group after operation ( $P<0.001$ ); the SAS and SDS scores in the two groups after operation were significantly lower than those before operation ( $P<0.001$ ). The number of abdominal pain, abdominal distention, diarrhea, incision infection and abdominal infection in the experimental group were less than those in the control group ( $P<0.05$ ). The number of shaped and regular defecation cases in the experimental group was more than that in the control group ( $P<0.05$ ). Nursing intervention combined with early nutritional support can improve the nutritional status, psychological anxiety-depression of the patients undergoing preventive stoma reversion, decrease the

incidence of adverse reactions, and wound infection rate. It can also increase the shaped and regular defecation cases and is helpful for the recovery of intestinal function.

## Introduction

The proportion of rectal cancer in colorectal cancer is 56-70% (1). The death toll from rectal cancer has been increasing in recent years (2). In developing countries, the incidence ratio of middle and low rectal cancer, which is more difficult to treat in rectal cancer, accounts for 70-75% (3). Tumors with 3-8 cm distance from the lower margin to the anal margin are called low rectal cancer (4). At present, the patients with low rectal cancer are mostly treated with fistulation in clinic, which improves significantly the survival of patients. However, the changes of physical function can easily cause physiological and psychological effects on patients after operation (5).

Early enteral nutrition, that is, enteral nutrition given to patients 6-24 h after operation, can not only promote the recovery of postoperative intestinal function, but also reduce the incidence of related complications, accelerate the postoperative recovery, shorten the length of hospital stay and reduce economic losses for patients (6,7). Nursing intervention can effectively relieve the anxiety after preventive stoma reversion, help the patients and their families to improve their self-care ability, and can effectively improve the postoperative recovery of patients (8,9). However, early enteral nutritional support combined with nursing intervention is rarely used in preventive stoma reversion.

In this study, medical records of 92 patients with low rectal cancer undergoing preventive stoma reversion were retrospectively analyzed to explore the application value of nursing intervention combined with early nutritional support treatment in preventive stoma reversion of low rectal cancer.

## Materials and methods

**General information.** Ninety-two cases of low rectal cancer patients undergoing preventive stoma reversion from January 2014 to December 2016 in the Sixth Affiliated Hospital of Sun Yat-Sen University (Guangzhou, China) were

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*Correspondence to:* Dr Hui Wang, Department of Colorectal Anal Surgery, The Sixth Affiliated Hospital of Sun Yat-Sen University, 26 Er'heng Road, Guangzhou, Guangdong 510655, P.R. China  
E-mail: hau2ry@163.com

**Key words:** low rectal cancer, early nutritional support, nursing intervention, preventive stoma reversion, anxiety-depression, wound infection

Table I. General information [n (%)].

| Factors                                 | Groups              |                | t/ $\chi^2$ value | P-value |
|---|---------------------|----------------|-------------------|---------|
|   | Experimental (n=48) | Control (n=44) |                   |         |
| Age (years)                             | 60.24±9.46          | 59.12±10.73    | 0.532             | 0.596   |
| Sex                                     |                     |                | 0.565             | 0.519   |
| Male                                    | 32 (66.67)          | 26 (59.09)     |                   |         |
| Female                                  | 16 (33.33)          | 18 (40.91)     |                   |         |
| Distance from tumor to anal margin (cm) | 5.46±1.43           | 5.52±1.69      | 0.184             | 0.854   |
| BMI (kg/m <sup>2</sup> )                | 24.14±1.53          | 23.61±1.65     | 1.599             | 0.113   |
| Blood sugar value (mmol/l)              | 4.78±0.56           | 4.89±0.64      | 0.879             | 0.382   |
| Hemoglobin (g/l)                        | 143.59±4.15         | 142.86±4.37    | 0.822             | 0.413   |
| Long-term smoking                       |                     |                | 0.341             | 0.675   |
| Yes                                     | 28 (58.33)          | 23 (52.27)     |                   |         |
| No                                      | 20 (41.67)          | 21 (47.73)     |                   |         |
| Long-term drinking                      |                     |                | 0.207             | 0.680   |
| Yes                                     | 23                  | 19             |                   |         |
| No                                      | 25                  | 25             |                   |         |

Table II. Comparison of nutritional status.

| Index                     | Time             | Groups              |                | t value | P-value |
|---------------------------|------------------|---------------------|----------------|---------|---------|
|                           |                  | Experimental (n=48) | Control (n=44) |         |         |
| Albumin (g/l)             | Before operation | 36.46±3.11          | 37.52±2.84     | 1.702   | 0.092   |
|                           | After operation  | 34.12±3.08          | 32.31±2.47     | 3.092   | 0.003   |
|                           | t value          | 3.704               | 9.182          |         |         |
|                           | P-value          | <0.001              | <0.001         |         |         |
| Prealbumin (g/l)          | Before operation | 285.24±16.44        | 287.91±18.32   | 0.737   | 0.463   |
|                           | After operation  | 282.62±19.57        | 271.13±20.13   | 2.775   | 0.007   |
|                           | t value          | 0.710               | 4.089          |         |         |
|                           | P-value          | 0.479               | <0.001         |         |         |
| Serum total protein (g/l) | Before operation | 60.23±3.86          | 60.63±3.34     | 0.529   | 0.598   |
|                           | After operation  | 59.62±4.43          | 56.84±4.24     | 3.069   | 0.003   |
|                           | t value          | 0.719               | 4.658          |         |         |
|                           | P-value          | 0.474               | <0.001         |         |         |

retrospectively analyzed. All the patients underwent successful resection of tumor tissue for the first time, and preoperative evaluation showed that they could be performed preventive stoma reversion. Forty-four patients, including 26 males and 18 females, were treated with routine nursing as control group; 48 patients, including 32 males and 16 females, were treated with early nutritional support and nursing intervention (including stomal nursing and perioral dermatitis nursing) as experimental group. There was no significant difference in general information between the two groups ( $P>0.05$ ). All patients were diagnosed with rectal cancer by imaging and fiberoptic colonoscopy and pathological tissue test before operation, and low rectal cancer was diagnosed by rectal

examination. All patients were excluded from Hartmanton, TEM, McB, temporary or permanent colostomy, local anal resection, cardio-cerebrovascular disease, diabetes, anemia, hypoproteinemia and other diseases.

This study was approved by the Medical Ethics Committee of the The Sixth Affiliated Hospital of Sun Yat-Sen University and informed consent was signed by the patients and their families (Table I).

**Nursing methods.** The patients in the control group received nursing intervention, including routine nursing, diet nursing, symptom nursing and other preoperative nursing care before operation, as well as routine nursing, psychological nursing,

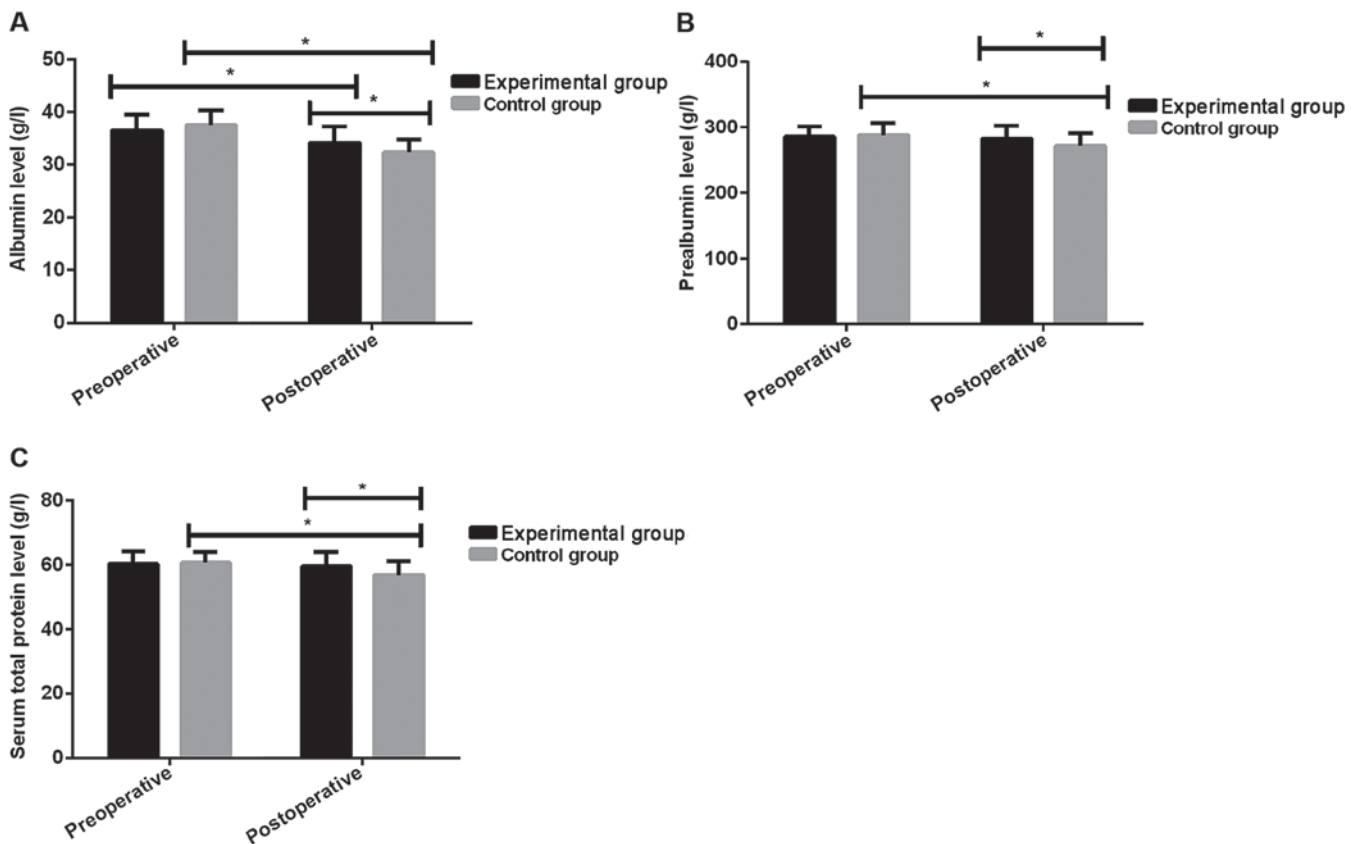


Figure 1. Comparison of nutritional status. The results showed that (A) the level of albumin in the experimental group after operation was significantly higher than that in the control group, and the difference was statistically significant ( $P < 0.05$ ); the levels of albumin in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P < 0.001$ ); the level of albumin in the control group after operation was significantly lower than that before operation, and the difference was statistically significant ( $P < 0.001$ ). (B) The level of prealbumin in the experimental group after operation was significantly higher than that in the control group, and the difference was statistically significant ( $P < 0.05$ ); the level of prealbumin in the control group after operation was significantly lower than that before operation, and the difference was statistically significant ( $P < 0.001$ ). (C) The level of serum total protein in the experimental group after operation was significantly higher than that in the control group, and the difference was statistically significant ( $P < 0.05$ ); the level of serum total protein in the control group after operation was significantly lower than that before operation, and the difference was statistically significant ( $P < 0.001$ ). \* $P < 0.05$ .

diet nursing, symptom nursing, posture nursing, pipeline nursing and other postoperative nursing care after operation and health education (10).

The patients in the experimental group received early nutritional support combined with nursing intervention. The specific methods are as follows: The patients in experimental group were treated with enteral nutritional emulsion (Sino-Swed Pharmaceutical Corp. Ltd., Beijing, China; SFDA approval no. H20040188) for nutritional intervention within 6-24 h after operation, 1,000 ml daily, for 7 consecutive days (11).

**Observation index.** The morning fasting nutritional status (albumin, prealbumin, serum total protein), self-rating anxiety scale (SAS) and self rating depression scale (SDS) were compared between the two groups 1 day before operation and 7 days after operation. The higher the score of both scales, the more serious the depression. The incidence of postoperative adverse reactions, wound infection rate, shaped and regular defecation were analyzed in both groups.

**Statistical analysis.** The statistical analysis was conducted by SPSS19.0 (IBM Corp., Armonk, NY, USA) statistical software.

Enumeration data were represented by  $[n (\%)]$ ;  $\chi^2$  test was used to compare the rate. Measurement data are represented by mean  $\pm$  SD. t-test was used for the comparison between the two groups. Paired t-test was used to compare the preoperative and postoperative results in the group. ANOVA was used for comparison between multiple groups with Dunnett's post hoc test.  $P < 0.05$  had statistical significance.

## Results

**Comparison of nutritional status.** There was no significant difference in the levels of albumin, prealbumin and serum total protein between the experimental group and the control group before operation ( $P > 0.05$ ). The levels of albumin, prealbumin and serum total protein in the experimental group were significantly higher than those in the control group after operation, and the difference was statistically significant ( $P < 0.05$ ); the levels of albumin in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P < 0.001$ ); there was no significant difference in prealbumin or serum total protein levels before and after operation in the experimental group ( $P > 0.05$ ). The levels of prealbumin and serum total protein

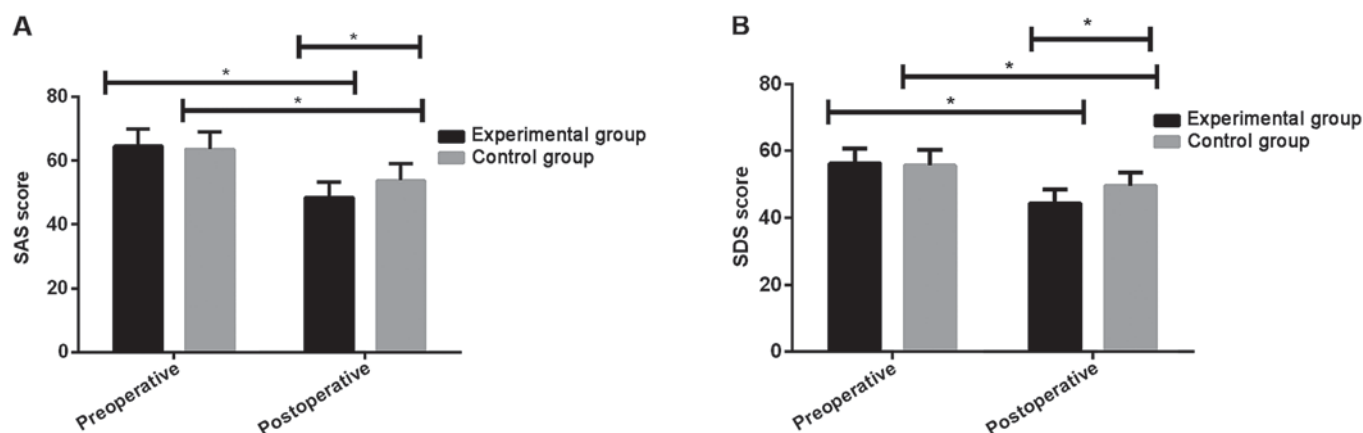


Figure 2. Comparison of psychological status. The results showed that (A) the SAS score in the experimental group after operation was significantly lower than that in the control group, and the difference was statistically significant ( $P<0.001$ ); the SAS scores in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ). (B) The SDS score in the experimental group after operation was significantly lower than that in the control group, and the difference was statistically significant ( $P<0.001$ ); the SDS scores in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ). \* $P<0.001$ .

Table III. Comparison of psychological status.

| Index | Time             | Experimental group (n=48) | Control group (n=44) | t value | P-value |
|-------|------------------|---------------------------|----------------------|---------|---------|
| SAS   | Before operation | 64.52±5.34                | 63.58±5.53           | 0.829   | 0.409   |
|       | After operation  | 48.53±4.79                | 53.74±5.24           | 4.983   | <0.001  |
|       | t value          | 15.070                    | 8.568                |         |         |
|       | P-value          | <0.001                    | <0.001               |         |         |
| SDS   | Before operation | 56.31±4.38                | 55.68±4.62           | 0.671   | 0.504   |
|       | After operation  | 44.28±4.31                | 49.58±4.06           | 6.057   | <0.001  |
|       | t value          | 13.560                    | 6.579                |         |         |
|       | P-value          | <0.001                    | <0.001               |         |         |

after operation in control group were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ) (Fig. 1 and Table II).

**Comparison of psychological status.** There was no significant difference in SAS and SDS scores between the experimental group and the control group before operation ( $P>0.05$ ). The scores of SAS and SDS in the experimental group after operation were significantly lower than those in the control group, and the difference was statistically significant ( $P<0.001$ ). The scores of SAS and SDS in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ) (Fig. 2 and Table III).

**Comparison of postoperative adverse reactions, incidence of complications and the number of regular defecation.** There was no significant difference between the two groups in the number of nausea, vomiting and pulmonary infection ( $P>0.05$ ). The number of abdominal pain, abdominal distention, diarrhea, incision infection and abdominal infection in the experimental group were less than those in the control group, and the difference was statistically significant ( $P<0.05$ ). There was no anastomotic fistula in the experimental group or

the control group. The number of shaped and regular defecation cases in the experimental group was more than that in the control group, and the difference was statistically significant ( $P<0.05$ ) (Table IV).

## Discussion

At present, the performing of preventive stoma for low rectal cancer is to avoid the occurrence of anastomotic fistula in clinic (12,13). Preventive stoma needs reversion operation, at the same time, the recovery of the patient is closely related to whether the operation can be carried out smoothly or not. While reversion operation is also prone to incision, abdominal cavity, pulmonary infection and other complications, all of which would bring great psychological pressure and inconvenient for the patient (14). According to literature reports, the advantages of nursing intervention are mainly reflected in the nursing of patients' wounds and psychological guidance, which can make the patients' physical function recover quickly, and reduce or even totally alleviate of the psychological burden (15). Early nutritional support can effectively improve hormone imbalance, reduce the incidence of postoperative infection, activate the intestinal endocrine system, and promote the recovery of anorectal function (16).

Table IV. Comparison of postoperative adverse reactions, incidence of complications and the number of regular defecation between the two groups.

| Index                     | Nausea and vomiting | Abdominal pain and distention | Diarrhea  | Incision infection | Pulmonary infection | Abdominal infection | Shaped and regular defecation |
|---------------------------|---------------------|-------------------------------|-----------|--------------------|---------------------|---------------------|-------------------------------|
| Experimental group (n=48) | 1 (2.08)            | 4 (8.33)                      | 2 (4.17)  | 3 (6.25)           | 0                   | 2 (4.17)            | 46 (95.83)                    |
| Control group (n=44)      | 3 (6.82)            | 12 (27.27)                    | 8 (18.18) | 10 (22.73)         | 1 (2.27)            | 9 (20.45)           | 35 (79.55)                    |
| $\chi^2$ value            | 1.238               | 5.732                         | 4.654     | 5.137              | 1.103               | 5.785               | 5.785                         |
| P-value                   | 0.346               | 0.026                         | 0.044     | 0.035              | 0.478               | 0.023               | 0.023                         |

A retrospective analysis of 92 cases of patients with low rectal cancer undergoing preventive stoma reversion was conducted, the levels of albumin, prealbumin, serum total protein, SAS and SDS scores in both groups 1 day before and 7 days after operation were compared, and the incidence of postoperative adverse reactions, wound infection rate, shaped and regular defecation were analyzed. The results showed that the levels of albumin, prealbumin and serum total protein in the experimental group were significantly higher than those in the control group after operation, and the difference was statistically significant ( $P<0.05$ ). The levels of albumin in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ). The levels of prealbumin and serum total protein in the control group after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ). This result showed that the nutritional level of the experimental group was superior to that of the control group at 7 days after operation. However, surgery could promote catabolism, reduce the nutritional status of patients, thereby reducing immunity and increasing the possibility of postoperative complications (17). This study found that the SAS and SDS scores in the experimental group were significantly lower than those in the control group after operation, and the difference was statistically significant ( $P<0.001$ ); the SAS and SDS scores in the two groups after operation were significantly lower than those before operation, and the difference was statistically significant ( $P<0.001$ ). The tension and anxiety of patients due to adverse reactions that might occur after operation can be relieved by nursing intervention combined with early nutritional support, which could help patients' psychology, reduce negative emotions, and effectively alleviate their anxiety (18,19). According to literature reports, adverse reactions of early nutritional support were mainly characterized by nausea and vomiting, abdominal pain and abdominal distention, diarrhea and other symptoms (20). In this study, there was no significant difference between the two groups in the number of nausea, vomiting and pulmonary infection ( $P>0.05$ ); the number of abdominal pain, abdominal distention, diarrhea, incision infection and abdominal infection in the experimental group were less than those in the control group, and the difference was statistically significant ( $P<0.05$ ). There was no anastomotic fistula in the experimental group or the control group. The number of shaped and regular defecation cases in the experimental group was more than that in the control group, and the difference was statistically significant

( $P<0.05$ ). It might be that early nutritional support could cause the hepatic portal venous system to absorb nutrients, thus facilitating the absorption of the nutrient substrate in the small intestinal mucosa and maintaining the barrier function of the intestinal mucosa. The incidence of intestinal infection and adverse reactions could also be reduced effectively to avoid intestinal stress reaction (21).

In conclusion, early nutritional support combined with nursing intervention can improve the nutritional status, psychological anxiety-depression of the patients undergoing preventive stoma reversion, and effectively decrease the incidence of adverse reactions, and wound infection rate. It can also increase the shaped and regular defecation cases and is helpful for the recovery of intestinal function.

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#### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

#### Authors' contributions

XY and DH conceived the study and drafted the manuscript. JZ and YL acquired the data. QY and HW analyzed the data and revised the manuscript. All authors read and approved the final manuscript.

#### Ethics approval and consent to participate

This study was approved by the Ethics Committee of The Sixth Affiliated Hospital of Sun Yat-Sen University (Guangzhou, China) and informed consent was signed by the patients and their families.

#### Patient consent for publication

Not applicable.



## Competing interests

The authors declare that they have no competing interests.

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