

# Quality of life in rectal cancer patients with permanent colostomy in Xi'an

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## Abstract

**Objectives:** To observe the quality of life (QOL) in rectal cancer patients with permanent colostomy in different periods after operation.

**Methods:** A 1-,3-,6-month prospective study of QOL in 51 rectal cancer patients with permanent colostomy and 50 without permanent colostomy was assessed using European Organization for Research and Treatment of Cancer (EORTC) QOL-30 and CR38 questionnaires.

**Results:** The variation of QOL in different periods was "v" type. In the 1st postoperative month, these patients had the lowest quality of life scores, accompanied significantly varied functions and severe symptoms. Almost of all indexes of these patients had improved consistently in the postoperative period. The scores of global QOL even better than pre-operative level at 6th months post-operation, but the social function, body image, chemotherapy side effects and financial difficulties had not restored to the baseline level. Patients without permanent colostomy had a better score in most of categories of QOL-30 and CR38.

**Conclusions:** The 1st postoperative month was crucial for patients' recovery, in which we should pay great attention to these problems which relate to the recovery of rectal cancer patients with permanent colostomy.

**Keywords** Quality of life, Rectal cancer, Permanent colostomy, EORTC QOL-30, CR38 questionnaires

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## Introduction

Rectal cancer surgery often results in a permanent colostomy, and therefore seriously limited the quality of life of patients for bowel and sexual function[1, 2]. Therefore, it is important to assess rectal cancer patients' quality of life to determine whether such impairments disrupt everyday life.

Both the cross-sectional and prospective studies of the QOL in rectal cancer patients with permanent colostomy had been shown in some countries with the comprehensive methods which had made reliability, validity and comparable results[3-5]. In China,

however, there were only some preliminary studies in this field, the majority of which were the cross-sectional[6]. Besides, the trends of the QOL of the patients differed significantly among different areas. The aim of this study was to establish the pattern of dynamic changes of the QOL in rectal cancer patients with permanent colostomy by using the EORTC QLQ-C30 and QLQ-CR38 questionnaires, so as to provide the basis for developing the health education program.

## Materials and methods

### *Patients*

From April to October 2011, 51 patients with cancer of the rectum were considered to be eligible for our study since they had been scheduled for Miles operation, agreed to participate, had no other complications and difficulty with communicating with each other; and 50 people who had undergone low anterior resection (LAR), as control group. All the patients received postoperative chemotherapy FOLFOX Regimen (5- fluorouracil with leucovorin and oxaliplatin).

### *Research tools*

The questionnaires were divided into two main sections: the European Organization for Research and Treatment of Cancer QLQ-C30 and QLQ-CR38, which incorporating a global health and quality-of-life scale,

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nine functional scales, ten symptom scales and seven single-item measures[7-9]. The responses were linearly transformed to provide ranges from 0 to 100. A high overall and function score indicated a good function, whereas a high symptom and single-item score indicated a high degree of symptom. The study was authorized by EORTC and it also provided us the normal reference data from the “questionnaire reference data manual”. Scoring was according to EORTC QLQ-C30 Scoring Manual.

#### *Data collection*

From April 2011 to February 2012, after we had explained our study to the patients in a standard way and they had agreed to participate it, we collected the data at the time of pre-operation and 1st, 3rd, 6th months post-operation through calling the patients randomly, respectively.

#### *Statistical analysis*

The original data was entered into database using Epidata-3.0 and was analyzed using SPSS version 17.0 with descriptive analysis, repeatable deviation analysis, LSD-t test and single-sample t-test. A  $P$ -value  $\leq 0.05$  was considered statistically significant.

## **Results**

#### *General demographic characteristics*

There were 51 permanent colostomy patients and 50 ones without permanent colostomy participated in our study in all. 49 permanent colostomy patients (96.08%) and all 50 ones (100.0%) without permanent colostomy completed all the questionnaires. One had lost to follow up at the time of 3rd months post-operation. One had died within 6 months after the operation. The general demographic characteristics of patients with or without permanent colostomy were as follows (Table 1):

#### *The QOL of rectal cancer patients with or without permanent colostomy*

Table 1 The general demographic characteristics of permanent colostomy patients of rectal cancer (n=49)

variables	n	%
Gender		
Male	31	63.3
Female	18	36.7
Age		
≤44	6	12.2
45□ 59	22	44.9
≥60	21	42.9
Marriage		
Not married	0	0.0
Married	49	100.0
Education		
≤6 years schooling	14	28.6
6-9 years schooling	17	34.7
9-12 years schooling	8	16.3
≥12 years schooling	10	20.4
Family income per month		
≤699	11	22.4
700□ 1499	12	30.6
1500□ 2999	15	24.5
≥3000	11	22.4
Employment		
Employed	28	57.1
Not working	21	42.9
Fee source		
Medical insurance	24	49.0
Farmers' insurance	24	49.0
At patients' own expense	1	2.0

Table 2 reported the mean scores and statistical analysis of the functional and symptom scales of the QLQ30 and CR38 in all patients with or without permanent colostomy. Through using the repeated measures

ANOVA, the result showed that except for constipation and diarrhea, there was a significant difference among all the dimensions in patients with permanent colostomy (including the global QOL score).

Table 2 Comparisons of QOL of permanent colostomy patients in preoperative and different postoperative periods□ n=49□ X ±s□

EORTC						
QLQ-C30 CR38	preoperative	1st postoperative month	3rd postoperative month	6th postoperative month	F value	P value
Function scale					135.3	
Physical function	87.35±13.14	46.67±14.91	70.48±11.39	84.76±8.39	1	0.00
Role function	77.89±23.42	26.19±15.59	52.38±16.67	73.97±14.50	95.92	0.00
Emotional function	68.20±16.64	35.72±19.91	61.90±18.56	73.98±14.50	51.01	0.00
Cognitive function	88.42±15.03	71.42±16.67	81.29±15.07	91.54±10.66	21.46	0.00
Social function	81.29±18.83	30.95±15.96	52.72±17.13	64.28±11.28	82.38	0.00
Body image	97.96±8.69 <sup>bcd</sup>	53.29±19.51 <sup>acd</sup>	66.21±15.04 <sup>ab</sup>	66.67±14.70 <sup>ab</sup>	88.78	0.00
Future perspective	61.90±23.57	31.29±18.52	51.70±18.08	58.50±16.00	28.17	0.00
Global health and quality-of-life score	71.77±13.16 <sup>bcd</sup>	28.70±11.92 <sup>acd</sup>	54.42±10.31 <sup>abd</sup>	74.21±10.17 <sup>abc</sup>	198.95	0.00
Symptom scale						
fatigue	24.04±17.70 <sup>b</sup>	52.38±18.90 <sup>acd</sup>	30.16±12.83 <sup>bd</sup>	21.09±13.22 <sup>bc</sup>	46.92	0.00
Nausea and vomiting	5.44±13.70	15.30±20.90	21.70±18.70	10.90±16.90	3.26	0.03
Pain	18.40±17.20 <sup>bcd</sup>	61.70±19.70 <sup>acd</sup>	29.93±18.94 <sup>abd</sup>	11.11±16.17 <sup>abc</sup>	8.61	0.00
Problems with urination	4.54±11.77 <sup>bc</sup>	39.91±24.94 <sup>acd</sup>	18.14±17.23 <sup>abd</sup>	8.90±14.79 <sup>bc</sup>	48.79	0.00
Chemotherapy side effects	5.44±11.81 <sup>bcd</sup>	14.74±15.77 <sup>ac</sup>	22.22±16.35 <sup>abd</sup>	14.06±15.35 <sup>ac</sup>	13.25	0.00
Gastrointestinal symptoms	11.29±10.38 <sup>bd</sup>	31.97±14.33 <sup>acd</sup>	14.69±10.45 <sup>bd</sup>	4.76±6.94 <sup>abc</sup>	69.48	0.00
Stoma symptoms	-	51.70±10.40	37.80±10.50	31.90±7.53	68.86	0.00
Single-item scale						
EORTC						
QLQ-C30 CR38	preoperative	1st postoperative month	3rd postoperative month	6th postoperative month	F value	P value
Shortness of breath	16.40±18.00	29.90±19.50	19.73±16.55	12.24±16.24	10.18	0.00
Agrypnia	21.09±21.19 <sup>b</sup>	60.54±25.16 <sup>acd</sup>	40.14±26.33 <sup>abd</sup>	20.41±17.76 <sup>bc</sup>	38.94	0.00
Appetite loss	19.05±20.41	34.01±24.99	27.21±17.57	15.65±21.63	9.09	0.00
Constipation	23.13±31.13	16.32±20.55	10.26±16.75	17.61±20.23	0.76	0.59
Diarrhea	29.90±28.90	23.10±18.30	27.23±21.75	30.19±20.30	1.16	0.33
	22.40±19.40 <sup>bcd</sup>	59.20±22.80 <sup>a</sup>	59.86±22.54 <sup>a</sup>	53.74±22.37 <sup>a</sup>	50.90	0.00
Weight loss	38.77±22.90 <sup>bcd</sup>	19.72±25.38 <sup>acd</sup>	2.72±9.22 <sup>ab</sup>	0.68±4.72 <sup>ab</sup>	50.92	0.00

\* Note: aP<0.05 vs the dimensions of the pre-operation; bP<0.05 vs dimensions of the 1st postoperative month; cP<0.05 vs dimensions of the 3rd postoperative month; dP<0.05 vs dimensions of the 6th postoperative month.

The result of LSD-T test is as follows:

Our studies illustrated that the trend of QOL of 49 patients with permanent colostomy was a “v” type over time. In the domain of function scale and global QOL in patients with permanent colostomy, the scores of all items in the 1st postoperative month were particularly lower than any other periods of pre

and post operation ( $P<0.05$ ). The scores of function scales appeared to up-regulated and stable during the 6 months following surgery, even approached those of pre-operation. Likewise, the scores of symptom scales were similar to function ones. Except for nausea, vomiting and chemotherapy side effects, the scores of other items in the 1st postoperative month were

significantly higher than any other periods of pre and post operation ( $P<0.05$ ). The symptom scores of nausea and vomiting and chemotherapy side effects were significantly higher at the time of 3rd months post-operation ( $P<0.05$ ). The score of single-item scale, however, seem to appear different to function scale and symptom scale. For the items of shortness of breath, agrypnia and appetite loss, their scores were highest in all periods and got down-regulated at the 3rd and 6th postoperative month, even better than pre-operation ( $P<0.05$ ). For the domain of financial difficulties, there were meaningful differences between pre-operation and post-operation, whereas there were no meaningful differences in different periods after operation ( $P>0.05$ ). Before operation, the score of weight loss was bad and this appeared to get better during the 6 months following surgery ( $P<0.05$ ). Except for the categories of nausea and vomiting, gastrointestinal symptoms, appetite loss, financial difficulties and weight loss, there were significantly better scores in most of categories of QOL-30 and CR38 in patients without permanent colostomy than that in patients with permanent colostomy ( $P<0.05$ ) (Table 2).

Before the operation, the scores of patients' physical function, role function, social function, global QOL, constipation, diarrhea and financial difficulties in patients with permanent colostomy were obviously higher than the norm, whereas the scores of fatigue, pain and agrypnia were lower than the norm ( $P<0.05$ ). At the one-month time point post operation, the scores of all the function scale (including the global QOL), symptom scales and single-item scale were obviously worse than the norm ( $P<0.05$ ). There was a trend toward better scores for global health and QOL scale in rectal cancer patients with permanent colostomy. Although the scores of all the functional dimensions, which except the cognitive function and include the global QOL and fatigue, were lower than the norm; and the scores of nausea and vomiting, pain, agrypnia, appetite loss, diarrhea and financial difficulties were higher than the norm ( $P<0.05$ ). But this status had got better at post-operative 3 months. Except for social function, diarrhea and financial difficulties, all items of EORTC QLQ-C30 had recovered. Especially, the scores of fatigue, pain, shortness of breath, agrypnia, physical function, emotional function, cognitive function and global QOL were better than the norm ( $P<0.05$ ) (Table 3).

Table 3 Comparison of quality of life of permanent colostomy patients with rectal cancer with normal reference data of EORTC QLQ-C30  $n=49$   $\bar{X} \pm s$

EORTC QLQ-C30	Normal reference data (n=1773)	Pre-operation	1st postoperative month	3rd postoperative month	6th postoperative month
Functional dimension					
Physical function	79.2±21.1	87.35±13.14**	46.67±14.91**	70.48±11.39**	84.76±8.39**
Role function	70.4±32.8	77.89±23.42**	26.19±15.59**	52.38±16.67**	73.97±14.50
Emotional function	68.9±24.4	68.20±16.64	35.72±19.91**	61.90±18.56**	73.98±14.50*
Cognitive function	85.2±20.4	88.42±15.03	71.42±16.67**	81.29±15.07	91.54±10.66**
Social function	76.0±28.6	81.29±18.83*	30.95±15.96**	52.72±17.13**	64.28±11.28**
Global QOL	60.7±23.4	71.77±13.16**	28.70±11.92**	54.42±10.31**	74.21±10.17**
Symptom dimension					
Fatigue	34.7±28.4	24.04±17.70**	52.38±18.90**	30.16±12.83*	21.09±13.22**
Nausea and vomiting	7.3±17.2	5.44±13.70	15.30±20.90**	21.70±18.70**	10.90±16.90
Pain	24.0±29.6	18.40±17.20*	61.70±19.70**	29.93±18.94*	11.11±16.17**
Single-item scale					
Shortness of breath	17.4±26.3	16.40±18.00	29.90±19.50**	19.73±16.55	12.24±16.24*
Agrypnia	30.5±32.6	21.09±21.19**	60.54±25.16**	40.14±26.33*	20.41±17.76**
Appetite loss	19.1±30.2	19.05±20.41	34.01±24.99**	27.21±17.57**	15.65±21.63
Constipation	15.8±27.9	23.13±31.13*	16.32±20.55	10.26±16.75	17.61±20.23
Diarrhea	16.6±27.6	29.90±28.90**	23.10±18.30	27.23±21.75**	30.19±20.30**
Financial difficulties	13.6±26.3	22.40±19.40**	59.20±22.80**	59.86±22.54**	53.74±22.37**

Note: \* $P<0.05$  vs normal reference data; \*\* $P<0.01$  vs normal reference data.

*The anxieties of rectal cancer patients with permanent colostomy*  
Whether the operation can be successful is the most anxious thing for the patients to worry about before operation. When these patients had got surgery, the patients' anxiety had changed to the recurrence after the

operation and accompanied by sacrococcygeal region wound, stoma complication in the 1st postoperative month and defecation problem, stoma complication in the 3rd and 6th month. (Table 4)

Table 4 The anxieties of permanent colostomy patients with rectal cancer in different operative periods □ n=49 □

Anxiety of patients	Pre-operation		1st postoperative month		3rd postoperative month		6th postoperative month	
n	%	n	%	n	%	n	%	
Possibility of successful operation	25	51.0	0	0.0	0	0.0	0	0.0
Financial ability	13	26.5	2	4.1	3	6.1	5	10.2
protopathy	8	16.3	14	28.6	15	30.6	17	34.7
Defecation problem	3	6.1	2	4.1	14	28.6	15	30.6
Sacrococcygeal region wound	0	0.0	12	24.5	4	8.2	2	4.1
Micturition	0	0.0	7	14.3	2	4.1	1	2.0
Stoma complication	-	-	11	22.4	11	22.4	9	18.4
Abdomen wound	0	0.0	1	2.0	0	0.0	0	0

The incidence rate and types of stoma complications 23 in the 3rd postoperative month (46.94%) and 20 twenty four patients suffered from the stoma in the 6th postoperative month (40.82%). Table 5 complications in the 1st postoperative month (48.98%), illustrated the types.

Table 5 The incidence rate and types of stoma complications of permanent colostomy patients with rectal cancer in different operative periods (n=49)

Types of stoma complications	1st postoperative month		3rd postoperative month		6th postoperative month	
	n	%	n	%	n	%
Peristomal dermatitis	14	28.57	14	28.57	8	16.33
Peristomal mucous membrane separation	5	10.20	1	2.04	0	0.00
Peristomal dermatitis and mucous membrane separation	2	4.08	2	4.08	0	0.00
Parastomal prolapse	1	2.04	0	0.00	0	0.00
Parastomal retraction						
Parastomal herniation	2	4.08	5	10.20	11	22.5



## Discussion

The purpose of this study was to provide a comprehensive overview of the functional outcome and quality of life in rectal cancer patients with permanent colostomy. The Camilleri-Bernnan's study demonstrated that the gastrointestinal symptoms of the stoma patients became improving since the 3rd postoperative month, which was consistent with our results[10]. Schmidt C E[11] also proved that the scores of QOL were much lower than the baseline's level in the early postoperative periods. He also illustrated that the global health and QOL, emotional function and physical function had improved since the 3rd month, and it needed two years for nausea and vomiting, agrypnia, constipation and diarrhea to restore to the baseline's level. However, in our study, the agrypnia had already restored to the baseline's level in the 6th postoperative month in with permanent colostomy, while the constipation and diarrhea continued to exist with no significant improvement. This may result from the different physical qualities and people's understanding of social culture. It is clearly seen from Lian L's study[12] that the global QOL, physiological function, role function, cognitive function, emotional function and social function improved significantly in the 3rd postoperative month but which didn't continue afterwards. Some dimensions, such as micturition symptoms, gastrointestinal symptoms, stoma-related problems, weight loss and chemotherapy side effects and so on had relieved gradually during the 6 months following surgery. However, in contrast, fatigue, pain, dyspnea, sleep disturbance and appetite loss became worse. In our study, unlike the body image and future perspective, the dimensions of fatigue, pain, dyspnea, sleep disturbance and appetite loss became better in the postoperative periods, which is different to those of Lian L's study. But the results of the dimensions of micturition symptoms, gastrointestinal symptoms, stoma-related problems, weight loss and chemotherapy side effects in our study were in consistent with Zhang's study. Besides, his study didn't ascertain the time for the dimensions to restore to the preoperative level as a result of lack of the baseline's level. Patients without permanent colostomy had relatively higher quality of life than that of patients with permanent colostomy, might be explained by the fact that the impact of the permanent colostomy on their life.

Except for constipation, diarrhea, weight loss and financial difficulties, all the scores of pre-operative symptoms in patients with permanent colostomy were close to the normal reference values of EORTC QLQ-C30.

Early colorectal cancer produces no obvious

symptoms until the tumors breaks into the ulceration[13]. There were mainly three aspects of symptoms[14]: the first aspect is the irritative symptom of rectum, which was manifested as frequent awareness of defecation, the change in bowel habit, tenesmus and incomplete evacuation. The second aspect is the stenosis of bowel symptom, which was manifested as narrow stools, and the malignant obstruction could lead to the constipation and difficult defecation. The last aspect was the tumor-breaking infection symptom, which was manifested as mucus per rectum, bloody stool and even the bloody purulent stool with obvious weight loss resulting from the tumor consumption. Diarrhea, constipation or difficult defecation, bloody purulent stool and weight loss were the main reasons for patients' hospitalization. In our study, the higher scores of the dimensions of constipation and diarrhea of patients with permanent colostomy in the preoperative periods were caused by the cancer itself. As for the high scores of financial difficulties, it might be associated with the local economy and the medical insurance system.

At the 1st postoperative month, the QOL of patients with permanent colostomy decreased significantly with the worse functions and severe symptoms. The diagnosis of rectal cancer and the existence of permanent colostomy had caused great pressure that the patients can't stand, as well as the discomfort which as a result of the postoperative wound pain and chemotherapy. The QOL of patients with permanent colostomy was the lowest in this period and had lots of problems, such as pain, micturition, gastrointestinal symptoms, stoma-related symptoms, agypnia, appetite loss and so forth. The pain, especially, the score of which was three times more than the norm and affected the patients' daily life significantly. The micturition problems mainly include urinary incontinence, urinary retention, incomplete evacuation and urodynia postoperatively, and the dysuria will disappear when the patients restore to health. To prevent the stoma complications caused by the inexperienced stoma nursing and improve the patients' confidence, the medical staff should increase their interview times, focus on the psychology and stoma nursing skills, and teach them the pain management knowledge and how to rest and strengthen nutrition properly. They should also been informed that the frequent micturition and urinary retention are induced by the urinary catheter and it will disappear gradually, so as to relieve their pressure.

After the 3rd postoperative month, all the function dimensions improved evidently: emotional function, cognitive function, fatigue, gastrointestinal symptoms

and shortness of breath restored to the baseline's level. However, the chemotherapy side effects, nausea and vomiting, pain, micturition problems, agrypnia, appetite loss, diarrhea and financial difficulties were still worse, among which the chemotherapy, nausea and vomiting were the worst because of the therapy. In our study, there were 29 patients (59.2%) that accepted the radiotherapy or chemotherapy in the 1st postoperative month, with 36 (73.5%) in the 3rd and 36 (73.5%) in the 6th postoperative month respectively. The entire course of treatment can be divided into 6 times for half a year and the symptoms were also relieved over time. The pain and micturition became better in the 1st postoperative month because of the patients' recovery, the excision of tumor and the nutritional support for patients. Meanwhile, the patients themselves also became confident and plucky, accepted the reality and returned to society. It is the best time for the medical staff to teach them the stoma-related knowledge and encourage them to nurse the stoma independently in order that they can master the knowledge regarding the complication and conscious defecation methods.

After the 6th postoperative month, the QOL of rectal cancer patients with permanent colostomy improved consistently. Most dimensions restored to the preoperative level and even some were beyond it. Social function and body image still kept worse and chemotherapy didn't restore to the preoperative level though it had already become better. At this time, constipation and diarrhea were still the problems that frustrated the patients the most for the stimulation of tumor, obstruction in pre-operation and excision of anal sphincter in post-operation. Lots of study showed that colonic irrigation was helpful to conscious defecation. But in our study, most patients still defecated physiologically. This was the main reason why the scores of the two dimensions were higher than the norm. This fact suggested us that the medical staff should introduce the colonic irrigation to the patients as soon as possible which in order to decrease constipation and diarrhea for improving the QOL.

Whether the operation could be successful and the financial ability was the main anxieties preoperatively. As a result of the confidential medical insurance system, most relatives concealed the reality to the patients preoperatively. The patients in our study, for example, most of them only knew it was just a stoma operation and had no idea with the diagnosis of rectal cancer and permanent colostomy. As a result, there were few patients worrying about the primary disease. Nevertheless in the 1st postoperative month, the

primary disease became the most important anxiety of patients, followed by the sacrococcygeal region wound and stoma complications. As the patients realized their diseases gradually, as well as the radio-chemotherapy, they were anxious about the cancer metastasis. Meanwhile, they paid great attention to the problem of sacrococcygeal region wound since the larger wound could cause the severe pain or got infected because of the discharge and hospital transfer in advance. So this time was also the peak period of stoma complications. The primary disease and conscious defecation were still the anxieties in the 3rd and 6th postoperative month, for the reason that unconscious defecation and exhaust had caused much inconvenience to the patients. Besides, the problem of stoma complications still existed. The results above indicated us that the medical staff should make intervention pertinently according to the anxieties in different periods. For instance, the medical staff should introduce the operation methods or effectiveness in pre-operation, and then the knowledge regarding primary disease, the higher survival rates of cancer, the guiding of stoma complications and pain management knowledge should be informed to the patients in the 1st postoperative month to relieve their stress. Afterwards, knowledge on the reasonable diet and colonic irrigation should be introduced to the patients.

The incidence rates of stoma complications in the 1st and 3rd postoperative month were 48.98% and 46.94% respectively, and peristomal dermatitis was the main complication in both periods. When in the 6th postoperative month, the incidence rates of stoma complications in decreased to 40.82%, and with parastomal herniation as the main complication. Some studies[15, 16] showed that the incidence rates of peristomal dermatitis consistently decreased stenosis of stoma tended to be stable over time whereas the rates of peristomal mucous membrane separation and parastomal herniation increased continuously, which was in corresponded with ours. Peristomal dermatitis includes fecal dermatitis and allergic dermatitis. The fecal dermatitis was stimulated by the dejection and change of PH value if the harmful substances penetrate the defense mechanism. The reason why the allergic dermatitis occurs was the allergen which can induce the allergic reaction, mainly including the stoma bags fitting such as belt, underpan and so on[17]. As a result, the medical staff should focus on the peristomal dermatitis in the 3rd and 6th postoperative month. First of all, distinguishing the type of dermatitis plays an important role. For the fecal dermatitis, we should keep the surrounding of the stoma dry and clean, wash

the stoma carefully using warm water other than the irritant substance like alcohol. We also should attach the underpan with the stoma closely to prevent the dejection and intestinal fluid from irritating the skin, combined with the use of the skin protective film and stoma skincare powder if the size of stoma bags is too larger. For allergic dermatitis, it was necessary to change the articles for stoma nursing use.

After the 6th postoperative month, the patients with permanent colostomy should be informed to avoid any action that can induce the increase of abdominal pressure, such as chronic coughing, lifting a heavy weight, giving stress on abdomen when changing the clinostatism and so forth. At the same time, the stoma bags with slight convex underpan should be introduced to reduce the increasing of herniation. Then we should consider operating method if all the measures above are ineffective.

## Conclusions

The trend of QOL of rectal cancer patients with permanent colostomy in Xi'an in different operative periods showed as "v" type: in the postoperative 1st month, the score of QOL was the lowest with the worst functions and the worst symptoms; when in the 3rd postoperative month, all the dimensions improved significantly. As for the 6th postoperative month, physical function, role function, emotional function, cognitive function, future perspective, global QOL, fatigue, nausea and vomiting, pain, micturition problem, gastrointestinal symptoms, shortness of breath, agrypnia and appetite loss all restored to the preoperative level with obviously improving weight loss and stoma-related symptoms. Nevertheless, social function, body image, chemotherapy side effects and financial difficulties were still below the baseline's level with the consistent constipation and diarrhea. In conclusion, the 1st postoperative month is a crucial period for patients' recovery, in which we should pay great attention to the problems which regard to the patients' psychological conditions, the prevention and control of stoma complications and the conscious defecation methods. It is recommended that the stoma nursing staff should be brought into the medical insurance system that in order to reduce the patients' financial stress.

## Conflict of interest

None of the authors have any conflict of interest.

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