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Retrospective Study

Effect of biofeedback combined with high-quality nursing in treatment of functional constipation

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statement: This study was approved by the Ethics Committee of the Shenyang Coloproctology Hospital, Liaoning Province, China and carried out in accordance with the Helsinki Declaration.

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There is no conflict interest issue.

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Abstract**BACKGROUND**

Functional constipation (FC) is a common functional gastrointestinal disease with various clinical manifestations. It is a physical and mental disease, which seriously affects patient physical and mental health and quality of life. Biofeedback therapy is the treatment of choice for FC, especially outlet obstructive constipation caused by pelvic floor dysfunction. High-quality nursing is a new nursing model in modern clinical work and a new concept of modern nursing service.

AIM

To explore the effect of biofeedback combined with high-quality nursing in the treatment of FC.

METHODS

A total of 100 patients with FC admitted to our hospital from March 2015 to July 2019 were selected for clinical observation. These patients were randomly divided into two groups of 50: Experimental group (biofeedback combined with high-quality nursing treatment group) and control group (biofeedback group).

RESULTS

The constipation symptom score of the experimental group was significantly lower than that of the control group, and the difference was statistically significant ($P < 0.05$). The anal canal resting pressure and initial defecation threshold of the experimental group were significantly lower than those of the

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control group, and the maximum squeeze systolic pressure of the anal canal of the experimental group was significantly higher than that of the control group ($P < 0.05$). The Self-Rating Anxiety Scale and Zung's Self-Rating Depression Scale scores of the two groups were significantly lower than before treatment. The Self-Rating Anxiety Scale and Self-Rating Depression Scale scores of the experimental group were significantly lower than those of the control group ($P < 0.05$). The patient satisfaction score of the experimental group was significantly higher than that of the control group ($P < 0.05$).

CONCLUSION

The application of biofeedback combined with high-quality nursing in the treatment of FC has significant advantages over pure biofeedback treatment, and it is worthy of promotion in clinical work.

Key Words: High quality care; Functional constipation; Biofeedback; Pelvic floor dysfunction; Self-rating anxiety scale; Self-rating depression scale

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Core Tip: One-hundred patients with functional constipation were selected for clinical observation. The constipation symptom score, anorectal pressure measurement, Anxiety Scale and Zung's Self-Rating Depression Scale scores, and the patient satisfaction score of the experimental group (biofeedback combined with high-quality nursing) were significantly higher than those of the control group (pure biofeedback treatment).

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INTRODUCTION

Functional constipation (FC) is a common functional gastrointestinal disease with various clinical manifestations. The main manifestations include: Fewer than three bowel movements *per week*, prolonged defecation time, stools hard to discharge, stools discharged dry and hard, and feeling not completely excreted after defecation, which may be accompanied by abdominal pain, hyperintestinal sounds, anal swelling, and irritability^[1-4]. The incidence of FC is about 14% worldwide^[5-9]. In the United States, the incidence is 2.4%-4%^[10,11]; in Europe it is about 17.1%^[12]; in France, it is about 22.44% among the community population^[13]; and in Hong Kong, it is 14%^[14]. FC is more common among women, with a male to female ratio of 1:2. This is related to increasing age, lower socioeconomic status, less exercise, low fiber intake, low water intake, and low magnesium intake^[15,16]. FC seriously affects quality of life^[17-19]. According to the characteristics of evacuation motility, FC is divided into three categories internationally: Outlet obstructive constipation (OOC), slow transit constipation, and mixed constipation. The cause of FC is complex, so traditional surgery and medication are not effective.

Biofeedback therapy uses the intuitive audiovisual assistance provided by anal canal pressure measurement or electromyography equipment, allowing patients to watch directly the screen images and visually perceive the pressure changes in their own pelvic floor muscles and rectum during defecation. After repeated training, the patient learns to relax the pelvic floor and external anal sphincter, while increasing the intra-abdominal pressure, adjusting the coordination between the abdomen and the anorectal muscles, so the constipation is cured^[20-22]. Biofeedback therapy is the treatment of choice for FC, especially OOC caused by pelvic floor dysfunction.

Our study used biofeedback combined with high-quality nursing to treat FC and evaluated its effectiveness.

MATERIALS AND METHODS

General information

A total of 100 patients with FC who were admitted to our hospital from March 2015 to July 2019 and met the Rome III diagnostic criteria were selected for clinical observation. The patients were randomly divided into two groups of 50 cases in the experimental group (biofeedback combined with high-quality nursing treatment) and 50 cases in the control group (Biofeedback Group). Among them, 57 were male and 43 were female, aged 33-71 years, with a disease course of 2-11 years. There was no significant difference between the patients in terms of age and course of disease, and the groups were comparable (Table 1).

Inclusion criteria

Patients who met the Rome III criteria^[23] and had two or more of the following symptoms were included: (1) More than one in four bowel movements were laborious; (2) More than one in four of the defecations produced dry ball-shaped or hard stools; (3) More than one in four of the bowel movements felt incomplete; (4) More than one in four of the bowel movements had anorectal obstruction/blockage; (5) More than one in four defecations required an auxiliary maneuver; and (6) Defecation was less than three times *per week*. Loose stools without the use of laxatives were rare. The diagnostic criteria for irritable bowel syndrome were not met. The patients had symptoms for at least 6 mo and met the criteria in the last 3 mo.

Instrument and methods

Biofeedback treatment instrument: Rectal and anal pressure measurement and biofeedback treatment instrument (Canadian Labore Company). Psychological measuring instrument: Pulepu psychological measuring system.

Control group (biofeedback group): Biofeedback was based on operational conditioned reflex technology, using anal electrodes and the rectal pressure catheter method to allow the patients to watch directly the screen image. Under the guidance of audiovisual signals, the patients learned to relax the pelvic floor and external anal sphincter, correct wrong bowel movements, re-coordinate the movements of abdominal and pelvic floor muscles during defecation, and restore control of the muscles, thereby improving defecation difficulty.

Experimental group (biofeedback combined with high-quality nursing): On the basis of the above-mentioned conventional biofeedback treatment and conventional nursing, the following high-quality nursing interventions were implemented: (1) The formation of a high-quality nursing team. Team members must undergo strict education and training in high-quality nursing models, master the theoretical knowledge and practical skills related to biofeedback therapy, and obtain corresponding qualifications^[24,25]; (2) Evaluation of the patients' condition and introduction of precautions during treatment. During the treatment period, changes in the patients' condition should be closely observed to enable them to understand fully the changes in the pelvic floor electromyography pattern and anorectal pressure during defecation. The patients' constipation symptoms and changes in stool shape (Bristol classification) were recorded to provide a reliable basis for recovery; (3) Health education and nutrition care. Nursing staff should give patients and their families more knowledge about diseases, diet, living habits, prevention, and care, give patients reasonable dietary guidance, urge them to increase their intake of water and dietary fiber, increase exercise, and develop good bowel habits; and (4) Psychological care. The patients' psychology will change to varying degrees after being repeatedly affected by symptoms and illness. Nursing staff should actively communicate with patients according to their different characteristics and psychological characteristics, carry out psychological nursing interventions in time, mobilize their subjective initiative, relieve their bad emotions, and encourage them to actively participate in treatment^[26,27].

Efficacy evaluation

The main symptoms of FC were scored (Table 2).

Bristol stool standard classification is shown in Table 3.

Before and after the treatment, the patient's psychological status was evaluated by Zung's Self-Rating Anxiety Scale (SAS) and Zung's Self-Rating Depression Scale (SDS).

Table 1 General patient information

Items	Control group, n = 50	Experimental group, n = 50	t value	P value
Age in yr	55.3 ± 7.3	54.7 ± 3.6	0.521	> 0.05
Gender, F/M	28/22	29/21		
Disease course in yr	6.34 ± 4.31	6.23 ± 4.35	0.127	> 0.05

Table 2 Scoring criteria for constipation symptoms

Score, points	Defecation frequency, times/d	Defecation time in min	Defecation exertion	Incomplete defecation	Stool shape
0	1-2	< 5	Easy	No	B4-7
1	2-3	5-15	Force required	Mild (occasionally)	B3
2	3-5	15-30	Excessive force required	Moderate (often)	B2
3	≥ 5	≥ 30	Kaiserol or hand required to help defecate	Severe (frequently)	B1

Stool shape based on Bristol standard classification.

Table 3 Bristol standard classification

B1	B2	B3	B4	B5	B6	B7
Scattered and hard	Sausage-like clumps	Dry and cracked sausage-like	Smooth and soft sausage-like	Soft and lumpy	Mushy stool	Watery stool

Statistical analysis

SPSS 22.0 software (Armonk, NY, United States) was used for data analysis and processing, and *t* and χ^2 tests were used. *P* < 0.05 indicated statistically significant differences.

RESULTS

Improvement of constipation symptoms

After follow-up treatment, the patients' constipation symptoms were evaluated. The frequency of defecation, time of defecation, degree of defecation effort, feeling of incomplete defecation, and hand-assisted defecation in the two groups of patients were significantly reduced compared with before treatment, and the symptoms of constipation improved significantly. The constipation symptom score of the experimental group was significantly lower than that of the control group (*P* < 0.05) (Table 4).

Anorectal pressure measurement

The anal canal resting pressure and initial defecation threshold of the two groups of patients were significantly lower than before treatment. The anal canal resting pressure and initial defecation threshold of the experimental group were significantly lower than those of the control group (*P* < 0.05). The maximum systolic pressure of the two groups of patients was significantly higher than that before treatment, and the maximum systolic pressure of the experimental group was significantly higher than that of the control group (*P* < 0.05) (Table 5).

Anxiety and depression scores

The SAS and SDS scores of the two groups of patients were significantly lower than before treatment. The SAS and SDS scores of the experimental group were significantly lower than those of the control group (*P* < 0.05) (Table 6).

Table 4 Scores of constipation symptoms before and after treatment

Defecation	Control, n = 50		Experiment, n = 50		t value	P value
	Before treatment	After treatment	Before treatment	After treatment		
Frequency	2.25 ± 0.71	0.92 ± 0.43	2.27 ± 0.52	0.67 ± 0.58	2.448	< 0.05
Time	2.33 ± 0.26	0.83 ± 0.27	2.31 ± 0.41	0.58 ± 0.63	2.579	< 0.05
Exertion	2.30 ± 0.39	1.07 ± 0.15	2.28 ± 0.43	1.01 ± 0.12	2.209	< 0.05
Incomplete	2.01 ± 0.55	1.13 ± 0.21	2.02 ± 0.46	1.05 ± 0.17	2.094	< 0.05
Hand-assisted	2.35 ± 0.31	0.46 ± 0.52	2.37 ± 0.12	0.31 ± 0.10	2.003	< 0.05

Table 5 Anorectal pressure measurement before and after treatment

Items, mmHg	Control, n = 50		Experiment, n = 50		t value	P value
	Before treatment	After treatment	Before treatment	After treatment		
Anal canal resting pressure	63.25 ± 13.86	46.92 ± 13.43	63.27 ± 12.52	41.37 ± 11.58	2.213	< 0.05
Maximum systolic pressure	104.93 ± 32.18	122.71 ± 33.15	105.1 ± 31.93	127.62 ± 32.87	-0.737	< 0.05
Initial defecation threshold	75.31 ± 24.42	58.89 ± 15.15	76.33 ± 25.06	53.28 ± 12.23	2.037	< 0.05

Table 6 Self-Rating Anxiety Scale and Self-Rating Depression Scale scores before and after treatment

Items	Control, n = 50		Experiment, n = 50		t value	P value
	Before treatment	After treatment	Before treatment	After treatment		
SAS	47.61 ± 10.37	37.22 ± 11.32	46.31 ± 11.72	32.61 ± 10.18	2.141	< 0.05
SDS	53.54 ± 9.76	46.18 ± 10.7	51.51 ± 10.57	40.82 ± 11.12	2.456	< 0.05

SAS: Self-Rating Anxiety Scale; SDS: Self-Rating Depression Scale.

Patient satisfaction scores

The patient satisfaction score of the experimental group was significantly better than that of the control group ($P < 0.05$) (Table 7).

DISCUSSION

FC is a physical and mental disease that seriously affects patient physical and mental health and quality of life. Most patients have different levels of psychological disorders, often manifested as anxiety, depression, and compulsion^[28]. In order for patients to eliminate symptoms and recover quickly, care should be taken to implement nursing interventions for patients to improve further the effectiveness of treatment.

In order to meet the requirements of the development of the biological-psychological-social medical model, a new type of nursing model is urgently needed. The essence of nursing service must be changed from disease-centered to patient-centered^[29]. High-quality nursing is a new nursing model in modern clinical work and a new concept of modern nursing service. It advocates patients first, strengthens basic and mental health nursing, and fully implements responsible nursing^[30]. It extends the connotation of nursing profession and improves the overall level of nursing service^[31]. In terms of ideology and medical behavior^[32], we always consider the patients, and all nursing activities must put the patients first; we closely focus on patients' needs, improve service quality, control service costs, formulate convenient measures, and simplify work processes to facilitate providing the patients with high-quality, high-efficiency, low-consumption, satisfactory, and assured nursing services^[33].

Biofeedback combined with high-quality nursing is used in the treatment of FC patients. By comparing and analyzing data such as constipation symptom score,

Table 7 Patient satisfaction score

Group (n)	Satisfaction score	t value	P value
Experiment (50)	98.21 ± 2.56	13.897	< 0.05
Control (50)	89.83 ± 3.41		

anorectal pressure measurement, SAS score, SDS score, and patient satisfaction score of the experimental group and control group, we revealed that high-quality care can significantly improve the effect of biofeedback treatment.

CONCLUSION

Therefore, we believe that biofeedback combined with high-quality nursing has significant advantages in the treatment of FC, and it is worthy of popularization and continuous improvement in clinical work.

ARTICLE HIGHLIGHTS

Research background

Functional constipation (FC) is a common functional gastrointestinal disease. FC seriously affects quality of life. Biofeedback therapy is the treatment of choice for FC, especially outlet obstructive constipation caused by pelvic floor dysfunction. High-quality nursing is a new nursing model in modern clinical work and a new concept of modern nursing service.

Research motivation

Biofeedback therapy was reported in some case reports; however, the therapeutic outcome of the biofeedback combined with high-quality nursing has not been well studied.

Research objectives

This study aimed to explore the effect of biofeedback combined with high-quality nursing in the treatment of FC.

Research methods

One-hundred patients with FC were selected for clinical observation. Research data of these patients were summarized and analyzed.

Research results

The constipation symptom score, anorectal pressure measurement, Self-Rating Anxiety Scale and Self-Rating Depression Scale scores, and the patient satisfaction score of the experimental group (biofeedback combined with high-quality nursing) was significantly higher than those of the control group (pure biofeedback treatment).

Research conclusions

The application of biofeedback combined with high-quality nursing in the treatment of FC has significant advantages over pure biofeedback treatment, and it is worthy of promotion in clinical work.

Research perspectives

Biofeedback combined with high-quality nursing has significant advantages in the treatment of FC, and it is worthy of popularization and continuous improvement in clinical work.

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