



The impact of anorectal biofeedback therapy on the quality of life of patients with dyssynergic defecation

BOWEL

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ABSTRACT

Background/Aims: Dyssynergic defecation is a common health problem affecting the quality of life of patients adversely. We aimed to evaluate the impact of biofeedback therapy on the quality of life of constipated patients due to dyssynergic defecation.

Materials and Methods: Constipated patients due to dyssynergic defecation were enrolled to the study. Patients having secondary causes of constipation and who didn't fulfill the eligible criteria were excluded. All the patients underwent three to ten sessions each of which was thirty minutes biofeedback therapy under the supervision of a trained nurse. After one month the patients were assessed for the control. The impact of biofeedback therapy on the quality of life of patients having dyssynergic defecation was assessed using the validated Medical Outcomes Study Short Form-36 (SF-36) questionnaire before and one month after therapy.

Results: Thirty-two patients (20 female 62.5%, 12 male 37.5% and mean age 48 (18-72) underwent three to ten sessions biofeedback therapy. Post-therapy improvements of subscores of SF-36 consists of eight domains were all statistically significant when we compared with the pre-therapy values.

Conclusion: This study showed not only the effectiveness of biofeedback as a therapy modality for constipation but also its impact on the improvement of QOL of constipated patients due to dyssynergic defecation. Patients with chronic constipation not improved by dietary fiber and laxatives should be referred to specialized centers that have facilities for further anorectal physiological assessments.

Keywords: Constipation, anorectal, biofeedback, quality of life

INTRODUCTION

Constipation is a common health problem. It has a profound impact on a patient's quality of life (QOL), and is a major social and psychological disability (1). Constipation affects nearly 30% of Americans in four patterns: slow transit constipation, dyssynergic defecation, combination of both and normal colon transit with normal pelvic floor function (2). In two large population-based studies, chronic constipation showed significant impairment of health related quality of life (QOL), patients having constipation had lower scores for QOL when compared with control subjects. Also psychological distress and lower quality of life were strongly correlated suggesting that these dysfunctions have synergistic effects on bowel (3,4). In another study, patients with normal transit constipation had lower scores when compared with patients with

slow transit constipation (STC) (5), but patients with dyssynergia were not assessed.

Dyssynergic defecation is a type of obstructed defecation, characterized by a failure to relax the puborectalis muscle and external anal sphincter, which are required for successful defecation. Among non-responders to primary care treatment, dyssynergic defecation seems particularly common and accounts for up to 50% of referrals to the tertiary referral centers (6). Because of being eliminated by behavioral training it may be considered as a form of maladaptive behavior. Also there is no anatomical or neurological defect in these patients. Treatment choices like laxatives and high dietary fibers are not effective in this group of patients (7). The uncoordinated and dyssynergic action of defecation can cause paradoxical anal contractions; additionally an in-

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adequate pushing effort or incomplete anal relaxation occurs. A decrease in rectal sensation can accompany with this disorder (8). Biofeedback therapy is effective in treating functional pelvic floor disorders such as constipation and fecal incontinence (9). In patients with dyssynergic defecation, biofeedback therapy is directed at teaching patients to relax their pelvic floor muscles while simultaneously applying a downward intra-abdominal pressure to generate a propulsive force toward the anus. It can be provided with the aid of visual or auditory feedback to the patients, with information from either electromyography (EMG) sensors or anal manometry sensors.

The purpose of this prospective study was to evaluate the impact of biofeedback therapy on QOL of constipated patients due to dyssynergic defecation

MATERIALS AND METHODS

Patients

Patients with chronic constipation who had failed routine management of constipation (longer than 1 year) and fulfilled Rome III criteria for functional constipation were evaluated for the study. In this study, balloon expulsion test and anorectal manometry were used for the diagnosis of dyssynergic defecation. All patients also underwent radio opaque marker study for measurement of colonic transit time. Retention of more than 20% of radio opaque markers considered as prolonged colonic transit time on abdominal x-ray taken 120 hours after ingestion of capsule containing radio opaque markers. The participants who fulfilled diagnostic criteria of dyssynergic defecation (10) were enrolled the study. All subjects completed the following criteria for dyssynergic defecation; they showed a dyssynergic pattern of defecation during attempted defecation on anorectal manometric examination, and also had prolonged difficulty with expelling a 50-mL water-filled balloon (>1 min) or prolonged delay (>20% marker retention) in colonic transit time (10,11). Defecography was not used for the diagnosis in order to avoid extra radiation exposure. We performed colonoscopy/barium enema when it is indicated clinically to exclude any structural disease. Routine hematological, biochemical, and also thyroid function tests were performed in all patients to exclude any metabolic or structural diseases which could cause chronic constipation. Patients who needed to take drugs which could cause constipation and who couldn't stop these drugs before two weeks of enrollment were also excluded. Other exclusion criteria were as follows; previous gastrointestinal, spinal, or pelvic surgery except cholecystectomy, hysterectomy or appendectomy, alternating constipation and diarrhea, rectal prolapse, anal fissure, neurologic diseases such as multiple sclerosis, stroke or spinal injury, severe cardiac or renal disease, pregnancy, blindness and any other disease causing cognitive impairment. From the total of 152 patients with chronic constipation which were referred to our gastroenterology unit, thirty two patients fulfilled the inclusion criteria for the study. Patients who agreed and gave written consent were enrolled

in to the study. The study was approved by the Institutional Review Board.

Biofeedback therapy

All patients were informed about normal and abnormal defecation types. We explained the patients how the habit of defecation should be regulated. Manometry tracings were trained on samples. Biofeedback therapy was performed using a manometry catheter with balloon placed anorectally. Patients lied at left lateral decubitus position so they could see manometric tracing from computer monitor. They underwent generally three to four session biofeedback therapy (maximum 10 sessions, when it's needed) each of which was thirty minutes, under the supervision of a trained nurse until they achieved success during the therapy. They received training by using visual and verbal feedback techniques (8). The subjects' posture and breathing techniques were continuously monitored. Also appropriate advices and feedback were provided to improve defecatory effort. There were three components of biofeedback therapy. The goal of rectoanal coordination was to decrease anal sphincter pressure by increasing the push effort as reflected by a rise in intra-abdominal/ intrarectal pressures and synchronizing with anal relaxation. Patients with impaired rectal sensation received sensory conditioning by repeated inflations/deflations of a rectal balloon (9,11). Several objective and subjective outcome measurements were assessed at baseline and after therapy because the diagnosis of dyssynergic defecation requires to be fulfilled for both symptomatic and physiological parameters (7,8,11). These included anorectal manometric study, balloon expulsion test and colonic transit study. All subjects were advised to maintain a prospective stool diary, starting one week before enrollment in which they recorded the time, straining effort (1=normal, 2=moderately excessive, 3=severe) of each bowel movement and whether a bowel movement was complete or digital evacuation was needed (12).

Quality of life assessment

The Medical Outcomes Study Short Form-36 (SF-36) (13) was used to measure multi-dimensional QOL and has been widely used in research settings especially in medically ill populations. The SF-36 data were assessed in eight domains, with each domain including three to four questions. These domains included physical functioning, role-physical (limitation of daily activities resulting from physical health problems), bodily pain, general health, vitality, social functioning, role-emotional (limitation of daily activities resulting from emotional problems) and mental health. A higher score on the SF-36 represented better functioning. Turkish version of SF-36 had been studied and validated by Kocuyigit et al. (14).

Subjects were also asked to note information regarding the presence and severity of commonly reported symptoms (excessive straining, digital evacuation) on a questionnaire using a Likert-type scale (1=never, 2=occasionally, 3=often). We asked the subjects weekly defecation numbers and the numbers of normal deliveries of obstetric history. This scale and QOL as-

assessment were performed before and one month after biofeedback therapy.

We measured all of the patients' anal resting and maximal anal contraction pressures before and after therapy and also analyzed the correlation between SF-36 and these measurements.

Data and statistical analyses

The Statistical Package for the Social Sciences Version 17 for Windows (SPSS 17 Inc. Chicago, IL) was used to perform all statistical analyses. The variables were investigated using visual (histogram, probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk's test) to determine whether or not they are normally distributed. Descriptive analyses were presented using medians for non-normally variables. Since SF-36 subscores and the other measurements were not normally distributed; non-parametric tests were conducted to compare these parameters. The effect of biofeedback therapy on symptoms was assessed by determining the measurements of patients with each symptom before and after therapy. The Wilcoxon test was used to compare the improvement changes in SF-36 subscores and the other measurements between baseline and one month after biofeedback therapy. While investigating the associations between non-normally distributed variables, the correlation coefficients and their significance were calculated using Spearman test. A 5% type-I error level was used to infer statistical significance.

RESULTS

Total of thirty-two patients who had eligible inclusion criteria were enrolled in to the study. There were more female patients (n=20, 62.5%), and the mean age of our patients was 48 (18-72). The mean number of vaginal deliveries of female patients was 1 and history of operation was also 11(34.4%). Also there were total 4 traumatic deliveries of female patients (Table 1). The number of patients with straining and digital evacuation was significantly reduced after biofeedback therapy (p<0.001). We also observed a significant improvement of weekly defecation numbers with biofeedback treatment (pre-therapy 3 (1-14); post-therapy 7 (2-21), p<0.001). Before the biofeedback therapy 11 patients (n=29) needed digital evacuation in order to facilitate defecation (5 patients needed digital evacuation and 6 patients needed vaginal pressure), after the therapy only two patients continued to use digital evacuation. When we analyzed the straining characteristics (1=no straining, 2=moderate straining, 3=severe straining) we observed a significant improvement with biofeedback therapy (Table 2). Symptoms data were obtained before and after biofeedback therapy. All patients completed the SF-36 questionnaires before therapy. Twenty nine of the patients returned for questionnaire after the therapy.

This study shows that biofeedback therapy improves quality of life of patients with constipation due to dyssynergic defecation. All of the subscores of the SF-36 test were improved significantly after therapy (Table 3). There was a negative cor-

Table 1. Demographic data of patients

Demographic data	Mean±Range
Age; range (yrs)	43 (18-72)
Gender*	
Female	20 (62.5%)
Male	12 (37.5%)
Number of operation	11 (34.4%)
Traumatic deliveries	4
Number of deliveries	1 (0-5)

*Data is presented as No (%)

Table 2. Defecation characteristics

Variables	Symptom severity	Before therapy	After therapy	p value
Digital maneuvers	1. No digital maneuvers	18	27	
	2. Digital anal evacuation	5	1	0.004*
	3. Vaginal pressure	6	1	
Straining effort	1. No straining	9	26	
	2. Moderate straining	12	4	<0.001*
	3. Severe straining	9	0	
Weekly defecation numbers	3 (1-14)	7 (2-21)	<0.001*	

*p value was statistically significant (p<0.05)

Table 3. SF-36 Subscores before and after biofeedback therapy

SF-36 Subscores	Before therapy ±(Standart error)	After therapy ±(Standart error)	Difference (Δ) ±(Standart error)	p-value
Physical functioning	70.6±4.0	82.5±2.6	11.9±2.7	<0.001*
Role-physical	51.6±4.0	64.5±3.4	12.9±3.2	<0.001*
Bodily pain	53.0±4.1	63.3±4.2	10.4±3.8	<0.010*
General health	49.6±3.8	60.3±3.6	10.7±3.9	<0.010*
Vitality	43.9±3.4	54.5±3.7	10.5±4.3	0.020*
Social function	57.0±4.6	67.9±4.7	10.9±5.3	0.046*
Role-emotional	51.6±4.2	66.1±4.4	14.6±3.7	<0.001*
Mental health	50.9±3.0	61.6±4.1	10.6±3.2	0.002*

*p value is statistically significant (p<0,005)

relation between physical role and age (p<0.01, r= - 0.429) and a less increase in the older age patients' physical role subscore values after treatment was seen but there was no correlation between vaginal deliveries subscore improvements (Table 4). The relationship between symptomatic improvement and QOL subscores improvement was analyzed and a negative correlation had been found between vitality and digital evacuation after biofeedback therapy (p<0.01 and r:-0.620). Those patients who improved digital evacuation had significantly higher vitality subscores of the SF-36 after therapy (Table 5). But there

was no correlation between genders and SF-36 subscores. We measured all of the patients' anal resting and maximal anal contraction pressures. The analysis of the pretreatment anal resting and maximal contraction pressures were not correlated with the SF-36 subscore improvement. We also showed that biofeedback therapy even for a short time may improve the quality of life by decreasing the symptoms affecting daily life. Patients with dyssynergic defecation tend to respond better to biofeedback therapy than laxatives, as the primary problem is an inability to relax the puborectalis muscle and the pelvic floor, which can be addressed by biofeedback therapy.

DISCUSSION

The objective of this study was to assess whether there is an improvement in the health related QOL, which is reduced by constipation due to dyssynergic defecation (12), after biofeedback therapy. In this study we found that the symptoms of dyssynergic defecation and the health related QOL improved significantly after biofeedback therapy. In the recent years several randomised controlled trials of patients with dyssynergic defecation had been reported. All these studies showed that

biofeedback therapy was superior to treatments like sham feedback therapy, fibers, laxatives (15), the use of polyethylene glycol (16), diazepam or placebo treatment (17). Some of these studies reported long-term follow-up of nearly one year or more and showed that improvements with biofeedback therapy were sustainable and also there was no or very little adverse effects of therapy (18). These successful treatment studies gave rise to the problem of whether biofeedback therapy improves the quality of life of patients and our study constituted an affirmative answer to this question. In this study we analyzed the relationship between symptomatic improvements and QOL subscores improvements and we found negative correlation between vitality and digital evacuation after biofeedback therapy. And also digital evacuation adversely affects the quality of life. Those patients who decreased usage of digital evacuation had significantly higher vitality subscores of the SF-36 after therapy. With our study we showed a decrease in the number of straining and also there was fewer requirement of digital evacuation after biofeedback therapy.

In the study of Koh et al. (19) patients with dyssynergic defecation were enrolled and after the biofeedback therapy there was improvement across most areas in the QOL scores. They have preferred to use the GIQLI instead of SF-36. In studies showing that constipation due to dyssynergic defecation impairs the quality of life, SF-36 is used to measure the quality of life (12). Also SF-36 questionnaire had been validated for Turkish population (14). For these reasons we used SF-36 to evaluate the impact of biofeedback therapy on the quality of life. In our study, we also compared anorectal physiological scores pre- and post-biofeedback therapy and the numbers of straining and digital evacuation of patients were significantly reduced after biofeedback therapy. We observed a significant improvement of weekly defecation numbers with biofeedback therapy (pre- therapy; post- therapy). The straining characteristics were observed and a significant improvement with biofeedback therapy had been found. There were statistically significant improvements between pre- and post- therapy SF-36 subscores.

Table 4. The correlation between age/deliveries and SF-36 subscores changes after therapy

SF-36 subscores	Age		Number of vaginal deliveries	
	Correlation Efficient	p-value	Correlation Efficient	p-value
Physical function	0.174	0.342	-0.180	0.447
Physica role	-0.429	0.014*	-0.404	0.077
Bodily pain	-0.233	0.198	-0.098	0.682
General health	-0.178	0.330	0.018	0.939
Vitality	-0.123	0.503	-0.021	0.931
Social function	0.138	0.450	-0.185	0.435
Emotional role	-0.222	0.223	0.040	0.868
Mental health	0.017	0.926	-0.349	0.131

*p value was significant (p<0.05)

Table 5. The correlation between symptoms and SF-36 subscores changes after therapy

SF-36 subscores	Δ Digital manœuvre		Δ Straining		Δ Weekly defecation number	
	Correlation Efficient	p-value	Correlation Efficient	p-value	Correlation Efficient	p-value
Physical function	-0.270	0.156	-0.254	0.175	-0.106	0.592
Physica role	-0.099	0.610	0.181	0.338	0.224	0.252
Bodily pain	-0.294	0.121	-0.293	0.116	-0.311	0.107
General health	-0.329	0.082	-0.148	0.436	-0.214	0.274
Vitality	-0.620	<0.001*	0.194	0.305	0.157	0.426
Social function	-0.106	0.583	-0.160	0.397	-0.081	0.681
Emotional role	-0.202	0.294	0.057	0.763	0.155	0.431
Mental health	-0.222	0.246	0.159	0.400	-0.064	0.747

*p value was statistically significant (p<0,05) Δ: Difference before and after therapy

Patcharatrakul et al. (20) studied the impact of biofeedback therapy on dyssynergic defecation with and without irritable bowel syndrome (IBS). They found the presence of IBS in dyssynergic defecation did not affect the outcome of biofeedback therapy. Biofeedback therapy improved both constipation and IBS symptoms of patients with dyssynergic defecation. In the dyssynergic defecation, biofeedback therapy corrects abnormalities causing obstructed defecation like failure to relax the puborectalis muscle and external anal sphincter and asynchrony. The effect of the biofeedback therapy and its mechanism on IBS symptoms is not fully understood and needs to be further evaluated.

Despite the differences in pelvic anatomic structures between male and female, biofeedback therapy appears to have similar potential in treating dyssynergic defecation in both genders, as both our male and female patients showed comparable improvements. There was no significant difference between male and female genders.

There was a negative correlation between age and physical role. It may be a result of a decrease in adherence to therapy of older patients. The older patients' cooperation to the therapy was less than younger ones and also not enough accordance had been provided during therapy. Also other confounding factors like chronic diseases might have influenced this conclusion.

Biofeedback is an effective therapy for patients with constipation due to dyssynergic defecation. It is evident from the examples of chronic constipation and dyssynergic defecation, that behavioral medical techniques, such as biofeedback, are not thought of just as alternative medical therapies, but also a valuable routine management possibility at low costs and with little or even no side effects.

This study showed not only the effectiveness of biofeedback as a therapy modality for constipation but also its impact on the improvement of QOL of constipated patients due to dyssynergic defecation. Patients with chronic constipation not improved by dietary fiber and laxatives should be referred to specialized centers that have facilities for further anorectal physiological assessments.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Gazi University Faculty of Medicine.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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