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Original Research Article

Role of recto-anal biofeedback in management of fecal incontinence: early experience for prospective non-surgical management

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ABSTRACT

Background: Fecal incontinence is a difficult and debilitating problem with various nonsurgical and surgical modes of treatment. Biofeedback is among the most considerable nonoperative strategies. This study is to review of the short-term effectiveness of the use of biofeedback therapy in management of fecal incontinence.
Methods: A retrospective review of 14 patients with fecal incontinence were included and completed the planned biofeedback sessions regarding clinical response and change in anorectal manometric parameters.
Results: 14 incontinent patients (9 males and 5 females), mean age 38.0 ± 21.4 years, 6 patients (42.8%) showed excellent response (cured), 5 patients (35.7%) showed good response (improved) and 3 patients (21.5%) showed poor response. There were a highly significant decrease in the grade with mean 3.8±1.4 to 2.4±1.7 (P value =0.003) and a score mean 11.8±5.9 to 6.1±7.1 (P value = 0.002). increase in anal resting pressure by mean 33.6±18.1 mmHg (P value = 0.004) and anal squeeze pressure by mean 75.4±35.2 mmHg (P value = 0.002). Also increase in anal resting pressure from 36.2±13.4 mmHg to 46.0±19.7 mmHg (P value = 0.046) and the anal squeeze pressure 89.3±21.8 mmHg to 106.7±21.0 mmHg (P value = 0.026). the volume required for 1st sensation mean 34.6±10.8 cc. decreased to 29.3±9.4 cc. (P value = 0.048) and the maximum tolerable volume increases from 221.4±55.9 cc to 235.7±54.9 cc (P-value = 0.022).
Conclusions: Biofeedback therapy has an effective role in short term efficacy in management of fecal incontinence.

Keywords: Biofeedback, Fecal incontinence, Manometry

INTRODUCTION

Fecal incontinence is a distressing condition defined as recurrent incapacity to control voluntarily bowel contents exit through the anal canal in unsuitable place and time, causing a social and psychological embarrassment which in turn pushes those patients to be isolated with social fear and by time patients turn to be house-bound.[1,2] Moreover, it represents an important economic burden on the society as it represents the second com-mon cause of elderly admissions in care units.[3] Fecal incontinence represents a frequent problem, with vague incidence which is suggested to be 2-3% of general population with variable prevalence.[4] It is mostly common in older individuals and is more frequent in women than in men with a female to male ratio of 8:1.[5] Fecal incontinence may arise from either structural cause (sphincters and puborectalis muscle injury, rectal diseases, and central or peripheral nerves injuries), or functional abnormalities (anorectal sensation disorders, fecal impaction, stool characteristics changes), and is classified to passive (during rest), stress (during cough) and urgency (during

voluntary squeeze), with many scoring systems.[6-8] Biofeedback is a psychological learning strategy through conditioning of the autonomic functions by training mental functions to control them. The basic principle of bio-feedback is that organ function is translated into a feedback signal which may be presented to the patient visually, acoustically, or combination of both. In anorectal biofeedback, the feedback signal is mediated via a manometric or an electromyographic anal probe.[9]

Biofeedback therapy is considered the gold standard treatment of fecal incontinence, and is believed to be an effective treatment of incontinence, particularly in patients without major sphincteric damage amenable for surgical repair.[10] Reported improvement rates range between 50% and 92%.[11] This study is to review of the effectiveness of the use of biofeedback therapy in management of anorectal fecal incontinence.

METHODS

A retrospective review of 14 patients with fecal incontinence were included and completed the planned biofeedback sessions for the management of fecal incontinence enrolled from General surgery department, Kasr El Aini hospital, Faculty of medicine, Cairo University and from referrals from private clinics from (July 2013) till (July 2014). Exclusion criteria were those patients who were unable to understand the principles of biofeedback therapy and patients who are younger than 5 years or older than 80 years and those patients who had complete absence of contraction of anorectal sphincter or rectal sensitivity. An informed consent form was signed by each patient or guardian enrolled in this study including the possible advantages and disadvantages of this study including the possibility of non-improvement prior to start the treatment plan.

All patients went proper history taking and full general and local examination to assess the tone and to identify any disorder. Incontinence were scored using Farag's scoring which categorizes patients into 6 grades (Table. 1) and Wexner fecal incontinence score which considers five parameters that are scored on a scale from zero (absent) to four (daily) frequency of incontinence to gas, liquid, solid, of need to wear pad, and of lifestyle changes (Table.2).[7,8] Prior to starting the biofeedback sessions anorectal manometry was done using a water perfused multi-lumen radial or spiral catheter was placed in the rectum with 8 side holes with varying distances from the anal verge. A 5-cm latex balloon was attached to the catheter and linked to an air-filled transducer. With computer based software for analysis and recording.

Biofeedback therapy

Biofeedback therapy is composed of sixteen sessions each of which was lasting for about (30-40 minutes) with average two to three sessions per week. During each session, patients were evaluated for sensory threshold, which was defined by the smallest volume of rectal distention sensed by the patient. Then, the patients were encouraged to contract the external anal sphincter in response to sensory threshold to record the highest pressure repetitively according to a visual stimulus on a screen on which the anal pressure monitored during rest and during squeeze through a manometry radial catheter or a spiral catheter inserted in the anal canal. Adopting a challenge pressure by asking the patients to look at the biofeedback device monitor and try to pass the virtual obstacle over a bar (representing the challenge pressure) by maximum squeeze.

The muscle response measured by pressure transducers is translated into a visual display so that the patient receives immediate feedback regarding the strength and duration of pelvic floor muscle contraction. Challenge pressure, challenge time and resting time could be adjusted individually through the program before starting the session. After the last session, a follow up for the patient after 4 months is done including examination, rescoring and grading and anorectal manometry.

Statistical methods

All collected data revised for completeness and accuracy with statistical analysis using version 15(SPSS). Data was summarized using Mean and SD for quantitative variables and number and percent for qualitative variable. Comparison between quantitative variable done using paired-samples T test for variables which where normally distributed and nonparametric Wilcoxon for quantitative variables, which were not normally distributed. Comparison between qualitative variables done using chi square. P value less than 0.05 was considered of statistically significant.

RESULTS

14 patients were included in this study 5 females (35.7%) and 9 males (64.3%), the age ranges (12 - 71 years, mean 38 ±21.4) years.

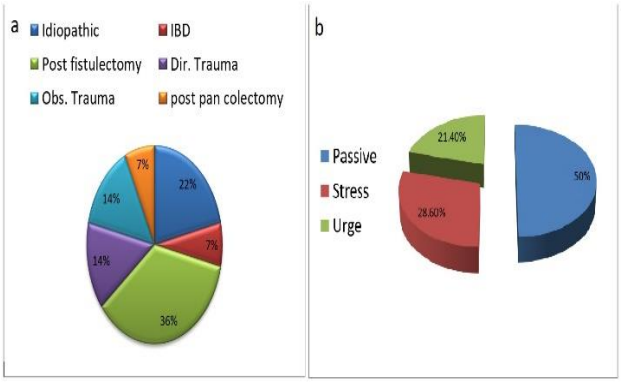

Figure 1: (A) Distribution of incontinent patients according to the etiology of the disease. (B) Distribution of incontinent patients according to their clinical subtypes.

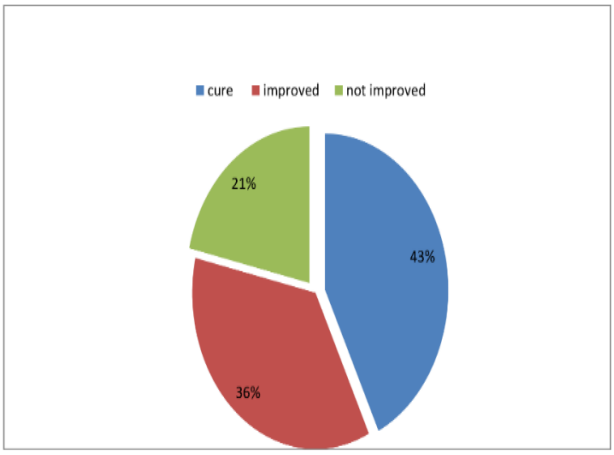

Figure 2: Distribution of incontinent patients according clinical response after biofeedback therapy.

The patients had variable causes including three patients of idiopathic etiology (21.4%), IBD in one patient (7.1%), five patients post fistulectomy (35.7%), two patients with direct trauma (14.3%), two patients with obstetric trauma (14.3%) and one patient post pan-proctocolectomy (7.1%). Regarding clinical subtypes: There were seven patients with passive incontinence (50%), four patients with stress incontinence (28.6%) and three patients with urge incontinence (21.4%) (Figure 1).

According to clinical response on a short term follow up, 6 patients (42.8%) showed excellent response (cured), 5 patients (35.7%) showed good response (improved) and 3 patients (21.5%) showed poor response (Figure 2). So, in the study biofeedback has been effective (either with excellent response or good response) in management of 11 patients (78.5%) from the total 14 patients.

Table 1: Change of Fi grade and score pre-and post-biofeedback treatment (BFT).

	Before BFT Mean ±SD	After BFT Mean ±SD	P value
Grade	3.8±1.4	2.4±1.7	.003*
Score	11.8±5.9	6.1±7.1	.002*

SD: Standard deviation. *Significant: P-value<0.05 (S), Highly significant: P-value<0.01 (HS). Non-significant: P-value>0.05 (NS).

A statistical significant decrease of the incontinence severity grade from (Mean 3.8 / SD 1.4) to (Mean 2.4 / SD 1.7) and by Wexner score from (Mean 11.8/ SD 5.9) to (Mean 6.1/ SD 7.1) (P value < 0.05) (Table 1).

Table 2: Manometric changes in incontinent patients pre-and post-biofeedback therapy (BFT).

	Before BFT Mean ±SD	After BFT Mean ±SD	P value
Resting P.	27.1±12.9	33.6±18.1	0.004*
Squeeze P.	65.9±29.0	75.4±35.2	0.002*
1st Sens.	34.6±10.8	29.3±9.4	0.048*
Max. tolerable volume	221.4±55.9	235.7±54.9	0.022*

SD: Standard deviation. *Significant: P-value < 0.05 (S), Highly significant: P-value<0.01 (HS). Non-significant: P-value>0.05 (NS).

Table 3: Relation between manometric changes and clinical response in biofeedback therapy in fecal incontinence.

Clinical improvement		Mean± SD Pre BFT	Mean ±SD post BFT	P value
Not improved(n=3)	Resting p.	16.3±1.5	17.3±3.1	0.414
	Squeeze P.	34.3±15.5	36.3±18.8	0.414
	1st Sens.	36.67±15.3	36.67±15.3	1.000
	Max. Tol. Vol.	176.7±25.2	186.7±20.8	0.414
Improved(n=5)	Resting p.	22.8±9.1	28.4±10.5	0.066
	Squeeze P.	56.8±18.8	61.2±21.0	0.077
	1st Sens.	36.0±8.9	32.0±5.7	0.461
	Max. Tol. Vol.	210.0±49.5	222.0±48.2	0.109
Cured(n=6)	Resting p.	36.2±13.4	46.0±19.7	0.046*
	Squeeze P.	89.3±21.8	106.7±21.0	0.026*
	1st Sens.	32.5±11.7	23.3±5.2	0.066
	Max. Tol. Vol.	253.3±57.9	271.7±51.2	0.104

SD: Standard deviation; *Significant: P-value<0.05(S); Highly significant: P-value<0.01 (HS); Non-significant: P-value>0.05 (NS).

There is a highly significant positive correlation between changes in anal pressures (resting and squeeze) and biofeedback therapy. Also, there is significant positive correlation between changes in rectal sensitivity parameters (1st sensation and maximum tolerable volume) and biofeedback therapy (Table 2 and 3).

DISCUSSION

Being an embarrassing and debilitating disease, Faecal incontinence (FI) is a recognized problem in U.S. to the extent that it affects about 2.2% of the general population with more prevalence in the elderly population, moreover and is one of the most common cause for home care burden. The etiology of FI is multifactorial and can be due to several factors including neuropathic, traumatic, congenital, and obstetric trauma, as well as iatrogenic injuries due to injudicious fistula surgery, haemorrhoidectomy, and lateral internal Sphinctrotomy among several others.[12]

Management of FI includes a variety of options ranging from conservative to surgical management, Conservative non-surgical measures include life style patient education, dietary management, Pharmacological agents, pelvic floor exercises, and biofeedback.[13] Biofeedback is cheap, generally safe, and effortlessly endured by most patients, and achievement rates can be as high as 100%.[14-15] Dietary adjustments, conformity of medications, and a trial of biofeedback ought to be the first line of treatment in many patients.[13] In this study, Application of biofeedback as a non-surgical management of the FI has shown a significant effect on the improvement of FI symptoms together with improvement of anorectal manometric parameters over the follow up period. Among the 14 studied patients, 6 (42.8%) showed excellent response (cured), 5 (35.7%) showed good response (improved) and 3 patients (21.5%) showed poor response, With a satisfactory result (either with excellent or good response) in management of 11 patients (78.5%).

Moreover, the subjective parameters for assessment the severity of the incontinence (Grade and score) show significant changes before and after the bio-feedback therapy. As we found that there is a highly significant decrease in Farag's grade with mean 3.8±1.4 before therapy to 2.4±1.7 after therapy (P value =0.003). and decrease in Wexner score with mean 11.8±5.9 before the therapy and mean 6.1±7.1 after the biofeedback (P value=0.002). By review of related literature many studies have mentioned positive effect of biofeedback with excellent improvement of (FI) in (23-50%), good response in (17-41%) and failed to achieve response in (8-36%) of the studied patients.[16-19] However, most of these studies are small or lack control groups.[20] The manometric parameters showed variant significance in different studies. Squeeze anal canal pressures have not been found to be predictive of the outcome of biofeedback therapy for fecal incontinence. The physiologic parameters that have been shown to be improved by biofeedback training are the sensation of rectal filling.[21]

In this study, there were a highly significant positive correlation between changes in anal pressures (resting and squeeze) and biofeedback therapy in incontinent patients with highly significant increase in anal resting pressure after completing the treatment by (mean 33.6±18.1 mmHg) (P value = 0.004) and a highly significant increase anal squeeze pressure after completing the treatment program by (mean 75.4±35.2 mmHg) (P value = 0.002). Also, we found that in patients who showed excellent response in biofeedback, there was a significant increase in anal resting pressure from pre-management with mean 36.2±13.4 mmHg to mean 46.0±19.7 mmHg after the therapy with (P value = 0.046) and the anal squeeze pressure showed a significant increase from (mean 89.3±21.8 mmHg) to (mean 106.7±21.0 mmHg) (P value = 0.026). Moreover, in our study the volume required for 1st sensation before biofeedback (mean 34.6±10.8 cc.) has significantly decreased after biofeedback to (mean 29.3±9.4 cc.) (P value = .048) and the maximum tolerable volume showed significant increase from before the therapy with (mean 221.4±55.9 cc) to (mean 235.7±54.9 cc) (P-value = 0.022). However, the manometric changes showed no significant relations with the clinical response.

The above significant anorectal manometric improvements are congruous with many studies had shown the improvement of maximal anal sphincter pressure together with resting and squeeze pressures.[22-25]. In contrary in some studies it was found that there was a good clinical response to biofeedback, but with no significant difference in their mean amplitude squeeze pressure before and after biofeedback.[19,26-27] The weak point of our study is the small number of recruited patients which was explained by the non-commitment of the patients to follow the planned biofeedback sessions as well as finding the suitable patients to be included in the study. However, the reported outcomes push towards the implementation of long term follow up with larger number of included cases to clarify the role of biofeedback therapy in management of fecal incontinence.

CONCLUSION

The anorectal biofeedback therapy has an effective role in short term efficacy in management of fecal incontinence with a significant effect on anorectal manometric parameters, but of non-predictive value in the clinical response.

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