Biofeedback with and without surgery for fecal incontinence improves maximum squeeze pressure, saline retention capacity and quality of life

B Nalinda L Munasinghe, M M Geethani Rathnayaka, Rajendran Parimalendran, Sumudu K Kumarage, Surenda de Zylva, M H Jayantha Ariyaratne, Kemal I Deen

Department of Surgery, Faculty of Medicine, University of Kelaniya, Sri Lanka

Introduction: Fecal incontinence (FI) impairs quality of life. We performed an audit of biofeedback (BFB) in management of patients with FI.

Methods: Fifty patients (median [range] age 30 [4-77] years; 28 men) who received BFB for median (range) of 15 weeks (4-28), either postoperatively (n=39), or as the sole treatment (n=11) were evaluated. Cleveland continence score (0-good, 20-poor), anorectal manometry parameters, and patient satisfaction (assessed by Fecal Incontinence Quality of Life Scale [FIQLS]) were evaluated at baseline and after the BFB therapy in all patients.

Results: Continence scores improved after intervention. In the surgery + BFB group, mean (SD) continence scores baseline vs. postsurgery + BFB (post-treatment) were 18.2 (3.9) vs. 6 (5.9; p<0.01). In the BFB alone group, scores were similar at baseline 11.7 (5.9) and 6.1 (5.2) post BFB (p=0.08). Maximum resting anal pressure (MRP) improved from preoperative 12.6 (9.8) mmHg to: vs. 21.1 (11.9) mmHg post-treatment (p<0.01). In patients who received BFB alone, MRP did not change significantly (pre vs post BFB 22.9 (11.7) mmHg vs. 29.6 (12.1) mmHg [p=0.08]). Maximal squeeze pressure improved significantly (preoperative vs. post-treatment: 46.3 (41.2) mmHg vs. 78.3 (33.9) mmHg [p<0.01]; pre vs. post BFB alone: 72.4 (34.8) mmHg vs. 114.5 (43.1) mmHg [p<0.01]). In 29 patients (19 surgery + BFB; 10 BFB alone), maximal tolerable volume in saline continence improved from baseline 47.9 (27.4) mL to 152.6 (87) mL after surgery + BFB (p<0.01); pre vs. post BFB: 98 mL (95.9) vs. 205 (134.3) p<0.02. There was significant improvement in all parameters of FIQLS in both groups: lifestyle (p<0.02), coping/behavior (p<0.02), depression/self perception (p<0.02) and embarrassment (p<0.02).

Conclusion: BFB therapy with or without surgical reconstruction of the damaged anal sphincter improves maximum squeeze pressure, saline retention capacity, quality of life and is a useful first line treatment for fecal incontinence.

Indian J Gastroenterol 2008 Jan-Feb; 27: 5-7

Fecal incontinence (FI) has significant social, medical and economic implications. FI may affect any age group, with significant impact on the quality of life of patients. Common causes of fecal incontinence are congenital anomalies of the anus, post partum tears or direct trauma to the anal sphincter.

Management of FI may be achieved either by nonsurgical interventions such as pelvic floor muscle training, sacral nerve stimulation and biofeedback or by surgical intervention aimed at reconstruction of a structurally defective anal sphincter or by creation of a neo-sphincter in the case of congenital absence of the native sphincter. Biofeedback (BFB) trains patients with FI to contract their anal sphincters voluntarily, and is performed in an orderly stepwise manner over a period of several weeks. BFB therapy may be performed either postoperatively to complement surgical reconstruction or as the sole mode of treatment especially, when damage to the anal sphincter is mild or if FI is predominantly due to pudendal neuropathy.

Most studies of BFB therapy have been in western patients. The aim of our study was to evaluate short term outcome of BFB on continence, anorectal physiological parameters and quality of life in a group of patients from Sri Lanka.

Methods
Between 1996 to 2007, fifty patients (median [range] age
30 (4-77) years; 28 men) received BFB either as adjuvant or the only treatment for FI. Incontinence was due to congenital deformity of the anal sphincter (n=13), perianal operations (12), traumatic injury (11), post obstetric tear (8), perianal sepsis (2), stress (1), and following coloanal (2) or pouch anal (1) anastomosis.

Thirty nine patients underwent surgical repair of the anal sphincter (gracilis neo-sphincter 32; and external sphincter repair 7). These patients received BFB post-operatively to complement surgery, whereas in 11 patients, BFB was the only treatment, as damage to the anal sphincter was mild.

All patients underwent assessment of continence score, anal manometry, and saline holding capacity test at baseline and after the BFB sessions were completed. Patient satisfaction after therapy was assessed by a fecal incontinence quality of life scale (FIQLS).

**Technique of biofeedback**

BFB commenced with a session of counseling about the procedure followed by therapy in a quiet environment by a trained therapist. We used a water-perfused manometry catheter attached to transducers and an amplifier to perform BFB. Changes in pressure within the anal canal were displayed on a computer screen situated in front of the patient. Increments in anal squeeze pressure were displayed by the rise in height of a bar chart. The patients were instructed to achieve a maximal squeeze of the voluntary anal sphincter initially, and later to hold a squeeze for as long as possible. The process was repeated several times for 45 minutes in one session every week for median (range) 15 (4-28) weeks. Patients were requested to perform up to 10 squeeze efforts three times each day at home.

**Anorectal physiology**

Anal manometry was performed using a station pull through technique of a water perfused manometry catheter as described previously. Maximum resting (MRP) and squeeze pressures (MSP) were assessed at between 1 and 5 cm from the anal verge.

Saline holding capacity was assessed with the patient seated on a chair designed for defecography. Normal saline at room temperature infused into the rectum at a constant rate of 1 mL/sec. The maximum tolerated volume (MTV) was reached at the point of observation of first leakage of saline into a pan positioned beneath the seat of the defecography chair.

**Continence score and quality of life**

Changes in lifestyle, coping/behaviour, depression/self perception and embarrassment were assessed by FIQLS previously validated for Sri Lankans. Continence was assessed using the Cleveland fecal incontinence score, where a score of 0 indicated normal continence and that of 20 signified severe FI. ^2

**Surgical repair**

Surgical repair consisted of either an overlapping anal sphincteroplasty ^10 in patients with a demonstrable anal sphincter defect on anal ultrasound ^11 or by gracilis muscle transposition in the case of a congenitally absent anal sphincter or where more than one half of the circumference of external anal sphincter was absent. ^12

**Statistical analysis**

Analysis of data was done using SPSS (version 13, Chicago, USA). Wilcoxon signed rank sum test was used to assess significance. p value <0.05 was considered significant.

**Results**

Following gracilis muscle transposition, 3 patients developed complications. One patient with congenital deformity of the anal sphincter required a transverse colostomy due to post operative bowel obstruction. Two patients (one each with congenital deformity of the anal sphincter and perianal operations) continued to be incontinent either due to failure of the surgery or poor compliance with post operative BFB. These patients were included in the study.

Continence score and MRP improved significantly after intervention in patients who underwent surgery and BFB (Table); the change was not significant in patients who underwent BFB alone. MSP and MTV improved significantly in both groups of patients.

Only 31 (62%) patients (24 surgery and BFB, 7 BFB alone) provided a completed questionnaire survey of quality of life with FIQLS which revealed an improvement in lifestyle, coping/behavior, depression/self perception and embarrassment.

**Discussion**

In our study, BFB was used either alone or in combination with surgery in patients with FI. There was significant improvement in MSP and MTV. Also, the quality of life improved significantly after treatment. It is worth noting that surgical intervention alone may have
resulted in improved outcomes. However, BFB therapy in a proportion of patients was employed as the only treatment because damage to their anal sphincter was mild. BFB alone was unable to achieve a significant outcome in MRP – a measure of internal anal sphincter function. Improvement in clinical and physiological parameters was recorded in all. We have previously shown that continence and MSP improved significantly after surgical reconstruction with the gracilis muscle when BFB therapy was given.13

The advantages of BFB therapy is that it is simple, cheap (although the initial cost of installing the equipment is high) and the ability to perform voluntary anal sphincter exercises at home. However, a major disadvantage of BFB therapy is the time duration required, and it demands patient compliance and family support, and the requirement of a trained therapist.

In BFB therapy, as patients voluntarily squeeze the anal sphincter, while watching the rise of squeeze pressure on a computer screen situated in front of them, we believe that inputs from higher center controls are also involved in the improvement in continence.

The shortcomings of our study could be attributed to the small number of patients included in the study and that all patients were unable to complete a quality of life questionnaire.

In conclusion, BFB therapy improves anal squeeze pressure, saline holding capacity of the rectum and quality of life in patients with FI. It could be recommended as first line therapy in patients awaiting surgery.

References

Data for constipation score and manometry parameters are as mean (SD), and for Fecal Incontinence Quality of Life Scale are as median (range)

*Data available for 24 patients in surgery and BFB and 7 patients in BFB alone group

References