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Evaluation of conventional anorectal manometry and biofeedback therapy in adolescents with functional constipation

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ABSTRACT

OBJECTIVE: The aim was to evaluate the outcomes of conventional anorectal manometry (ARMM) testing and biofeedback therapy in adolescents with functional constipation.

METHODS: A retrospective analysis of ARMM findings in patients aged 10–18 years with intractable constipation over a 4-year period was conducted.

RESULTS: Of the 41 patients (mean age, 13.5±2.44 years) included, 20 (48.7%) were male. Rectoanal inhibitory reflex (RAIR) was positive in all patients. Group 1 had 31 patients with dyssynergic defecation (DD) and Group 2 had 10 patients without DD. Anal canal resting pressure, squeeze test pressure, rectal defecation pressure, and first and urge sensation volumes were similar between the groups. Maximum tolerated volume and the relaxation percentage of RAIR were higher in Group 1 than in Group 2 ($p<0.05$). Among 31 patients referred for biofeedback therapy, 8 (25.6%) completed the program with complete resolution of their symptoms. The mean follow-up period for these patients was 21±14.7 months.

CONCLUSION: DD is relatively common in patients with psychosocial adjustment disorders, and it can be diagnosed via ARMM. Despite the low rate of adherence to the therapy in the presented series, biofeedback therapy was highly effective in resolving the symptoms including soiling.

Keywords: Adolescents; anorectal manometry; biofeedback therapy; functional constipation; soiling.

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Constipation accounts for 3%–10% of visits to pediatric clinics and 25% of referrals to pediatric gastroenterologists worldwide [1]. Typically, constipations occur around the age of toilet training and persist into adulthood in 25% of patients [2]. Although many factors have been implicated in its etiology, chronic functional constipation is predominantly caused by dyssynergic defecation (DD), which arises from disruptions in the defecation process [3]. DD diagnosis, in patients who do not respond to conventional therapy in particular, is greatly facilitated by anorectal manometry (ARMM) used to determine the pattern and type of defecation as well as for the assessment of anorectal anatomy and physiology [3]. In this patient group, biofeedback therapy–used in

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addition to conventional therapy–was effective to manage constipation [4]. The purpose of the present study was to investigate the role of conventional ARMM in DD diagnosis and treatment with a focus on the causes of constipation–a psychosocially challenging condition–for adolescent patients in particular.

MATERIAL AND METHODS

Data of patients aged 10–18 years who underwent conventional ARMM over a 4-year period (2019–2023) were retrospectively analyzed. Patients were excluded when they presented with chronic organic diseases and Hirschsprung's disease (HD) or had undergone anorectal surgery. Patients who met the Rome IV criteria for functional constipation and were unresponsive to standard treatment were included in the study population. Demographic data of the patients along with their ARMM findings were evaluated. Manometry was performed in all patients in the left lateral position using an 8-channel water perfusion catheter (Menfis [Medica], Italy, Dynosmart). Resting pressure, pressure increase in the squeeze test and anal relaxation pressure in the push and strain test, compliance testing, and rectoanal inhibitory reflex (RAIR) data from ARMM reports were evaluated. Manometric findings related to impaired relaxation of the puborectal and external anal sphincter muscles, or the presence of paradoxical contractions during straining for defecation were classified as indicative of dyssynergic defecation (DD). The patients in the study were divided into the following two groups: patients with and without DD. All patients diagnosed with DD were referred to a biofeedback program. The biofeedback program was delivered to each patient in a standard manner consisting of two separate sessions per week for 5 weeks. Patients were advised to continue exercises at home during the treatment period. If patients received biofeedback therapy, their results were obtained from the outpatient clinic records. Approval for this study was obtained from the Istanbul Medeniyet University, Goztepe Training and Research Hospital Clinical Research Ethics Committee (date: 24.05.2023, number: 2023/0289) and was performed in accordance with the principles outlined in the 1964 Helsinki Declaration.

Statistical Methods

Statistical analysis was performed using SPSS for Windows (SPSS Inc., Chicago, IL, USA). The Shapiro–Wilk test was used to evaluate whether or not the variables showed normal distribution. Categorical variables were compared using the Chi-square test or Fisher's exact test. Continuous variables were compared using the Independent samples t-test or Mann–Whitney U test. The values were expressed as mean±standard deviation. A p-value of less than 0.05 was considered statistically significant.

Highlight key points

- Functional constipation is a prevalent condition among adolescents, and the evaluation of diagnostic tools and treatment modalities is crucial for effective management.
- Anorectal manometry is an important diagnostic tool in the diagnosis of dyssynergic defecation disorder.
- It is possible to achieve successful outcomes with regular biofeedback therapy in adolescents with dyssynergic defecation.

TABLE 1. Baseline patient characteristics

	Group 1 (n=31)	Group 2 (n=10)	p
Male/Female	15/16	5/5	0.92
Age, years (Mean±SD)	13.29±2.65	14±1.26	0.27
Fecal incontinence, (%)	54.8	40	0.32
Nocturnal enuresis, (%)	6.4	10	

SD: Standard deviation

RESULTS

A total of 41 patients participated in the study. Of these patients, 20 (48.7%) were male. The mean age was 13.5±2.44 (range, 10–18) years. Furthermore, 3 patients showed concomitant anal fissures and 1 patient had an anal fistula. Fecal incontinence was present in 21 patients (51.2%).

The patients were categorized into Groups 1 and 2 based on the presence (n=31 [75.6%]) and absence (n=10 [24.3%]) of DD, respectively. Intergroup distribution of sex and age was similar (Table 1).

No significant intergroup difference was observed in terms of resting pressure, pressure increase in the squeeze test, and anal relaxation pressure in the push and strain test. Compliance testing was performed on 19 patients (12 and 7 in Groups 1 and 2). The first sensation and urge sensation volumes were similar between the groups, whereas the maximum tolerated volumes were higher in Group 2 than in Group 1 ($p<0.05$) (Table 2).

Table 2. Manometric values of patients

Parameter	Group 1 (n=31) Mean±SD	Group 2 (n=10) Mean±SD	p
Anal canal resting pressure (mmHg)	51.4±18.5	70.27±28.7	0.06
Anal canal squeezing pressure (mmHg)	94.21±45.6	101.30±40.3	0.86
Push and strain (mmHg)	56.60±19.1	51.85±13.4	0.47
RAIR relaxation (%)	56.09±19.6	41.60±11.7	**0.03***
First sensation volume (mL)	61.66±23.3	80±25.8	0.13
Urge sensation volume (mL)	113.33±40.3	125.71±32.1	0.49
Maximum tolerated volume (mL)	149.09±41.34	208.57±45.9	**0.01***

A p-value of less than 0.05 was considered statistically significant. Categorical variables were compared using the Chi-square test or Fisher's exact test. SD: Standard deviation.

Rectoanal inhibitory reflex (RAIR) was considered positive if the pressure in the anal sphincter decreased by <25%. RAIR was positive in all patients. Rectal biopsies were performed in 4 (10%) patients who were extremely refractory to medical therapy. All were ganglion-positive. RAIR relaxation percentage values were higher in Group 1 than in Group 2 ($p<0.05$).

The biofeedback program was discontinued by 23 (74.2%) patients. Symptoms regressed completely in 8 (25.8%) patients who followed and completed the program. These patients were followed up for a mean duration of 21±14.7 months.

Of the 41 patients assessed in the study, 13 (32%) were already under the follow-up care of a pediatric psychiatrist. Of these patients, three had attention deficit disorders, two had eating disorders, five had learning difficulties, and three had behavioral disorders. All other patients were referred to the pediatric psychiatry clinic as part of the treatment for DD.

DISCUSSION

Functional constipation affects approximately 0.7%–29.6% of children [1]. This may be associated with psychological, behavioral, and neurological causes. In 90% of patients, no detectable organic problems were reportedly noted [5]. The Rome IV criteria define functional constipation based on the presence of at least two of the following complaints: straining, lumpy, or hard stools, sensation of incomplete evacuation, sensation of anorectal obstruction, fewer than three spontaneous bowel movements per week, and need for manual maneuvers to facilitate more than a quarter of defecations during the last 3 months with symptom onset at least 6 months prior to diagnosis [6]. Diagnosis of functional constipation is based on history and physical examination [7]. Additional tests may be required to identify underlying causes in the presence of red flag symptoms or in patients with refractory disease. In the presented series, only 4 patients had a pathological finding in anal region examination. According to the information obtained from the outpatient clinic follow-ups, it was determined that although the lesions in the anal region of these patients improved with drug treatments, the complaints of constipation persisted. Indeed, the specificity of the physical examination for functional constipation is low as it relies on the experience of the practitioner [6].Therefore, despite its high prevalence, constipation is often treated without addressing the underlying pathology, leading to treatment failure [8].

As part of the normal physiology of defecation, an increase in rectal distension mediates the initiation of rectal evacuation, and defecation occurs at a socially appropriate time. However, school-aged children and adolescents may develop fecal retention for several reasons, including reluctance to interrupt fun activities or avoid using the school toilet, which causes the onset and possibly persistence of constipation [9]. Gradual dilatation of the rectum leads to overflow fecal incontinence as an additional symptom in 75%–90% of patients [1]. In this series, fecal incontinence was observed in half of the patients. Fecal incontinence is not only a socially difficult situation for the child but also imposes difficulties on the family. This makes treatment and follow-up more difficult in this group of patients compared with other constipated patients.

The first step in providing an effective and adequate treatment for functional constipation should be the identification of the underlying cause [8]. The Rome IV criteria recommend the use of specific diagnostic techniques to identify the underlying cause in patients with intractable constipation [6]. ARMM, a safe and non-invasive technique, is one such recommended method [1].

In children, ARMM is predominantly used for assessing RAIR, which has a high diagnostic value in HD [10]. Absence of RAIR is more common in patients without HD and with chronic constipation problems. In our series, RAIR was present in all patients. However, the RAIR relaxation percentages showed significant intergroup differences. RAIR relaxation percentage was reported to be higher in healthy individuals than in those with DD [10]. We believe that prospective studies are needed to explain the reason for the intergroup difference observed in the presented series.

ARMM is also used in clinical practice for the evaluation of DD [11]. DD is defined as paradoxical contraction or impaired relaxation of the pelvic floor muscles during defecation in children. This results in an incomplete evacuation of fecal material from the rectum. These patients usually do not respond to conservative medical therapy, and the condition adversely affects their quality of life. The prevalence of DD among patients undergoing investigation for chronic constipation ranges from 13% to 81% [6]. In this study, this rate was 75.6%, which is consistent with the literature.

Another notable finding in this study, which involved evaluation of patients with similar demographic characteristics, was the lack of any difference in resting and squeezing pressures between the groups. Maximum urge volumes differed between the groups in ARMM during the compliance test. These values were higher in patients without DD. Therefore, DD–resulting from a paradoxical pattern during defecation–is an acquired behavioral disorder independent of resting and squeezing pressures that develop as a result of delayed defecation. Dyssynergic defecation, categorized among functional defecation disorders, is widely recognized as a behavioral disorder. The patients showed no anatomical defects. The relationship between megarectum caused by idiopathic constipation and dyssynergic defecation remains unclear. We believed that the decreased sensation of rectal distention in patients who experienced outlet obstruction because of an enlarged rectum could be associated with this condition [11].

Biofeedback therapy is indicated for DD and teaching patients to relax the pelvic floor and anal muscles while straining proves effective [11]. Because biofeedback acts locally and improves constipation by removing the mechanical barrier caused by paradoxical contraction of the pelvic floor [6]. All patients with DD in this series were referred to biofeedback therapy, but only one-quarter of them completed the therapy program. Of the patients who completed the therapy, all had a complete resolution of their symptoms, indicating that DD is a treatable cause of chronic constipation.

Another important intervention in patients with constipation unresponsive to therapy is to provide psychosocial support [1]. Indeed, constipation can be the cause and the consequence of behavioral problems, and psychological comorbidities are common in these patients [8]. This may make constipation treatment more challenging, especially in older children due to obstinate behavior [12]. Indeed, 40% of patients with functional constipation who do not respond to two months of medical therapy for constipation may reportedly benefit from a multidisciplinary approach [5]. For patients with persistent constipation, undergoing an early manometric evaluation can also prevent unnecessary and prolonged use of laxative treatments. In this study, 13 patients were already being followed up by a pediatric psychiatrist for various psychological problems before presentation. Despite concurrent fecal incontinence, attempts to ensure adherence and compliance to treatment had been unsuccessful, leading to the decision to refer patients to the pediatric psychiatry clinic for further support. In fact, surgical outpatient clinics may not be adequately equipped to evaluate such patients due to high levels of anxiety, family–child conflict, and other similar causes. In patients with chronic constipation accompanied by fecal incontinence, relationships with parents deteriorate, and these children struggle with psychological problems that persist into adulthood [11]. A timely and effective management of childhood constipation can reduce potential morbidity that can occur later in adulthood.

The major limitation of this study is the low proportion of patients who completed the biofeedback therapy program. While this retrospective study did not allow us to determine the exact reasons for therapy noncompliance, this seems to be a problem that needs to be addressed in future studies.

Conclusion

Functional constipation in children and adolescents is a common problem worldwide. In these patients, intractable constipation and/or fecal incontinence may cause psychosocial distress. Biofeedback therapy is known to be beneficial in patients in whom DD is common, but the success of this therapy relies on adherence and compliance to treatment. Psychiatric support is also part of the treatment in this age group in whom mood disorders are quite common.

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