

Implementation of a bowel management program in the treatment of incontinence in children for primary healthcare providers

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Objectives Our surgical team has devised a bowel management program (BMP) as a basic approach for primary healthcare providers with the least use of resources.

Background Soiling in children is a major problem that has a serious impact on the child's social and psychological life. Causes vary from idiopathic constipation to postoperative or neuropathic causes as meningomyelocele.

Participants and methods Seventy five children suffering from fecal incontinence were assessed and divided into true incontinence and pseudoincontinence groups. The BMP was applied to both categories in the form of proper diet control, enemas, drugs, and bowel habit alteration. The program was fashioned according to the age, type, severity, and response of each case. A fecal incontinence scoring system was used to assess the results.

Results All cases with pseudoincontinence attained 50% or more improvement in incontinence score whereas the

true incontinence cases attained excellent results except in post high anorectal malformation repairs and neurologic groups.

Conclusion Most of the cases suffering from constipation with pseudoincontinence can be treated properly by BMPs, whereas the minority suffering from true incontinence need multidisciplinary work to achieve acceptable results. *Ann Pediatr Surg* 13:21–25 © 2017 Annals of Pediatric Surgery.

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Introduction

Soiling in children is a major problem, which has a serious impact on the child's social and psychological life. Soiling is present in 3% of the pediatric population and constipation counts for 25% of pediatric referrals [1]. Causes for incontinence vary from postoperative anorectal malformations, Hirschsprung's disease or other colorectal surgeries, neurogenic causes such as meningomyelocele, and idiopathic causes.

The Pediatric Surgery Department at Cairo University Specialized Pediatric Hospital started a colorectal unit to treat various colorectal problems, including the long-standing persisting problem of incontinence. There is no consensus on the exact management of incontinence, especially in our region with limited resources. The solution to incontinence lies in implementing a bowel management program (BMP) following the principles adopted by experienced centers [2].

Our aim was to create a universal approach to treating incontinence with the least resources that can be readily used as the primary management strategy by pediatricians or pediatric surgeons, with referral of refractory cases to a tertiary center. These refractory cases can undergo further investigations and assessment for a redo surgery.

Indications for the management of postoperative incontinence have changed over the years. Even experts have modified the indication for operative intervention [3],

which has encouraged the use of a conservative approach before adopting surgical procedures for management. The aim of the BMP was to establish daily soft stools that can be painlessly excreted and/or keep the rectum clear in between evacuation times to lead a normal life. In this study we will assess the results of our proposed conservative management.

Participants and methods

A prospective study was conducted for children older than 4 years of age who were suffering from stool incontinence and were referred to the Cairo University Specialized Pediatric Hospital outpatient clinic. The children were assessed by proper history taking, clinical examination, and investigations to differentiate between true incontinence and pseudoincontinence (constipation with overflow). They were divided into two groups: group A and group B. Group A included true incontinence cases that had an organic problem resulting from anorectal surgery, especially anorectal malformations (ARM) or Hirschsprung's disease (HD), or had an underlying neurological impairment such as meningomyelocele. Group B included idiopathic constipation cases that had functional problems.

Data on history included detailed family history, dietary habits, behavioral history, and surgical history. All cases received a psychiatric evaluation and were deemed normal. Examination of the abdomen included digital rectal examination; in case of fecal impaction, enemas were prescribed. Stool

analysis was done to detect parasitic infestations. Radiological studies were limited to abdominal radiographic and contrast studies. Informed consent was taken and a short survey was conducted to evaluate the degree of incontinence at first session at the clinic. The Wexner score [4] was used for evaluation before and after implementing the BMP (Table 1).

The BMP was implemented in both groups in the form of proper diet control, drugs, and bowel habit alteration. The program was fashioned according to age, type, severity, and response over a period of sessions for each case. The printed BMP had three instruction points for the parents, which were thoroughly explained to them. The points addressed were habit modifications, diet, and drugs.

Strict bowel habituation schedule was enforced. The parents were instructed to encourage the children to try evacuating twice daily, for at least half an hour, without punishment. The children were instructed to try half an hour after each meal to use gastrocolonic reflex [5].

The diet was modified to include more fibers in the form of vegetables and fruits. Processed foods such as chocolates, chips, and sweets had to be avoided. Liquids and juices were allowed in plenty.

The following drugs were given: antiparasitic drugs in case of positive stool analysis for parasitic infestation, lactulose to soften the stool and if a fissure is present, and lignocaine gel. In case of fecal impaction, enema was given for 3 days for disimpaction in both groups. Laxatives were used more cautiously in true incontinence cases in combination with the enemas. In cases with hypermotility, Smecta was used as the constipating agent. Bisacodyl suppositories were used in advanced cases once daily.

The BMP results were followed up in sessions after 1, 3, and 6 months at the outpatient clinic and a full clinical assessment was performed at each visit and the results were assessed. The BMP protocol was assessed at each of the three sessions and modified according to response to treatment. Success of treatment was measured at 50–70% improvement in incontinence score.

Results

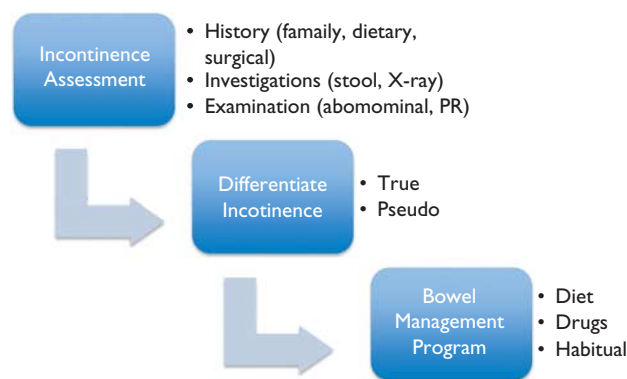
There were 75 cases during the period 2013–2014. All patients complained of soiling and were divided after clinical and radiological assessment into two groups: group A for true incontinence and group B for pseudoincontinence (Fig. 1). They were further subgrouped according to pathology (Table 2). Statistical analysis was performed

Table 1 The Wexner incontinence scoring system 4

| Type of incontinence | Frequency | | | | |
|----------------------|-----------|--------|-----------|---------|--------|
| | Never | Rarely | Sometimes | Usually | Always |
| Solid | 0 | 1 | 2 | 3 | 4 |
| Liquid | 0 | 1 | 2 | 3 | 4 |
| Gas | 0 | 1 | 2 | 3 | 4 |
| Wears pad | 0 | 1 | 2 | 3 | 4 |
| Lifestyle alteration | 0 | 1 | 2 | 3 | 4 |

Never, 0. Rarely, <1 per month. sometimes <1 per week, ≥ 1 per month. Usually, <1 per day, ≥ 1 per week. Always ≥ 1 per day. 0, perfect. 20, complete incontinence.

Fig. 1



Flow diagram for the implementation of bowel management program.

using Microsoft Excel and Fisher's exact test for significance. A *P* value less than 0.05 was considered significant.

Group A (true incontinence cases) consisted of 32 children (25 boys and 7 girls; ratio 3.57:1). Group B (pseudoincontinence cases) consisted of 43 children (30 boys and 13 girls; ratio 2.3:1). The duration of symptoms averaged 68.9 months in group A and 19.5 months in group B. The mean age in group A was 92 months and that in group B was 86.6 months.

In group A, anorectal malformation cases of high type had undergone a posterior sagittal anorectoplasty at our institution or elsewhere, whereas the low-type cases had undergone anoplasty. The five patients with Hirschsprung's disease had undergone a complete transanal endorectal pull-through, one laparoscopic assisted and one combined abdominal and transanal pull-through. The neurological cases had meningocele with associated urinary incontinence. Three cases had been operated upon elsewhere for rectal prolapse through unclear procedures. One case had undergone a pelvic neuroblastoma resection (with suspected iatrogenic anal sphincter injury) and one case had received multiple surgeries for treatment of infective perineal fistula.

Group B cases were divided into patients with positive stool analysis for parasitic ova [$n = 11$ (26%)] and negative cases; the latter were diagnosed as having idiopathic constipation with soiling. These patients had not complained of constipation and soiling before the start of the events.

The applied BMP is tabulated in Table 3.

The results according to improvement are given in Tables 4 and 5.

Discussion

There has been no definitive treatment for idiopathic constipation as no procedure or management has proven superior to others with regard to outcome. However, the BMP has shown superior results [6] in already mal-developed and postoperative children with true incontinence, which has encouraged us to expand its spectrum of management to treat functional constipation, with some modifications to fit our resources. All incontinence

Table 2 Cases divided into 2 groups and subgroups according to original pathology

| Pathology | Number of cases | Mean age at referral (months) | Mean duration of symptoms (months) |
|--------------------------------|-----------------|-------------------------------|------------------------------------|
| Group A | | | |
| Post-ARM (high) | 14 | 87.3 | 55 |
| Post-ARM (low) | 2 | 117 | 99 |
| Post-HD | 7 | 86.9 | 58.6 |
| Neurological | 4 | 99.5 | 93.6 |
| Postpelvic tumor resection | 1 | 61 | |
| Postrectal prolapse | 3 | 95.7 | 24 |
| Other | 1 | 138 | |
| Group B | | | |
| Idiopathic Constipation | 32 | 86.1 | 20.4 |
| Positive parasitic infestation | 11 | 88 | 17.1 |

ARM, anorectal malformations; HD, Hirschsprung's disease.

Table 3 Applied bowel management program (n=number of cases)

| | First session | | Second session | | Third session | |
|---------------------|---------------|-------------|----------------|-------------|---------------|-------------|
| | Group A (n) | Group B (n) | Group A (n) | Group B (n) | Group A (n) | Group B (n) |
| Diet | 32 | 43 | 32 | 43 | 22 | 39 |
| Oral Laxatives | 26 | 43 | 9 | 37 | 7 | 24 |
| Enemas | 24 | 36 | 16 | 1 | 8 | 0 |
| Smecta | 3 | 0 | 4 | 0 | 4 | 0 |
| Antiparasitic drugs | 0 | 11 | 0 | 2 | 0 | 2 |
| Lignocaine gel | 0 | 1 | 0 | 1 | 0 | 1 |
| Bisacodyl sup. | 0 | 0 | 5 | 9 | 5 | 7 |

Table 4 Degree of improvement in incontinence score after applying the bowel management program

| | Pre-BMP score (mean) | Post-BMP score (mean) | Improvement >70% (% of cases) | Improvement >50% (% of cases) |
|--------------------------------|----------------------|-----------------------|-------------------------------|-------------------------------|
| Group A | | | | |
| Post-ARM (high) | 10.8 | 4.33 | 42.86 | 71.4 |
| Post-ARM (low) | 6.5 | 0 | 100 | 100 |
| Post-HD | 10.3 | 2.2 | 85.714 | 100 |
| Neurological | 11.8 | 5.67 | 25 | 50 |
| Postpelvic tumor resection | 13 | 3 | 100 | 100 |
| Postrectal prolapse | 6 | 1.5 | 66.667 | 100 |
| Other | 11 | 0 | 100 | 100 |
| Total | 10.2 | 3.38 | <i>P</i> =0.195 | <i>P</i> =0.392 |
| Group B | | | | |
| Idiopathic constipation | 8.7 | 0.667 | 84.4 | 100 |
| Positive parasitic infestation | 9.55 | 0.18 | 91 | 100 |
| Total | 8.95 | 0.54 | <i>P</i> =0.676 | <i>P</i><0.0005 |
| Both groups | 9.49 | 1.64 | <i>P</i>=0.007 | <i>P</i>=0.0024 |

ARM, anorectal malformations; BMP, bowel management program; HD, Hirschsprung's disease.
Bold values are in significant.

Table 5 Duration needed to improve as assessed at follow-up

| | Mean duration of improvement (months) |
|--------------------------------|---------------------------------------|
| Group A | |
| After ARM (high) | 3.53 |
| After ARM (low) | 3.5 |
| After HD | 3.17 |
| Neurological | 4.5 |
| After pelvic tumor resection | 2 |
| After rectal prolapse | 5.5 |
| Group B | |
| Idiopathic constipation | 4 |
| Positive parasitic infestation | 2.99 |
| Both groups | 3.41 |

ARM, anorectal malformations; HD, Hirschsprung's disease.

cases followed the Rome III criteria [7] with modification to include the organic causes of incontinence.

Parent counseling and education until normal bowel motion is important, which can take up to years [1]. Compliance with instructions to ensure daily evacuation is crucial to

overcome the withholding behavior and the vicious circle of constipation and soiling [8]. This type of behavioral modification has been our mainstay, together with diet, to avoid being drug or enema dependent. Several previous trials have tried behavioral modification through rewards for the child [9,10], which have given good results.

The trigger that causes a vicious circle of constipation and soiling, as pelvic floor spasm, can be modulated by behavioral therapy [5,11]. There have been no controlled studies that have shown the superiority of diet manipulation over habitual modification. In our experience the triad of habitual modifications, diet, and drugs should be used simultaneously to ensure good results. The BMP should address those three arms for effective management.

Some authors have reported a 20% incidence of fecal soiling without constipation. These patients might have an underlying psychological problem but none was proven,

and further studies are needed to investigate the matter [12,13]. This validates the importance of pretreatment psychiatric evaluation implemented in our study.

The initiation of soiling in group A started after closure of colostomy in high ARM patients and was postoperative in the HD and low ARM cases. The HD cases were considered as having enterocolitis whenever there was any soiling. The neurologic group had been symptomatic almost since birth, with associated urinary incontinence. In group B, incontinence was related to the time of weaning, toilet training initiation, and its mismanagement.

Contrast enemas were performed at the time of primary evaluation to assess colonic motility (postevacuation films) and rectal reservoir and direct to the exact diet protocol [14]. Manometry and other advanced investigations were not performed as there was no added value [1,14,15] and also to simplify the diagnostic criteria.

Diet alteration to a high fiber and more natural diet proved successful in our series. Processed foods such as sweets, chips, and chocolates seem to defer patients from eating the healthier options and thus start constipating. Other series have reported giving a constipating diet [6,16], which was not tried in this study, except in a few cases ($n = 4$). We tried as much as possible to provide a more natural diet rather than a constipating one.

The frequency of parasitic infections in group B was compared with other studies of chronic constipation patients which report an incidence of 5.4% [17] while other studies of the Egyptian population report 47.3 and 31.5% [18]. Parasitic infestations were treated with the corresponding drugs and these infestations were considered trigger factors for constipation because of anal fissuring, proctalgia, and alteration of bowel habits. These drugs were safe to use [19] until a negative stool analysis was obtained.

Laxatives were limited to lactulose for its ease of application as a syrup, appeal to children for its sweetness, and easy availability, although no randomized controlled studies have shown any superior efficiency to any other laxative [20]. The benefits from laxatives in improving the child's quality of life [21] outweigh its possible side effects.

Smecta was given with caution as described by other authors [2] in cases of soiling and empty colon on radiograph. These cases were deemed to have hypermotility of the colon and needed a constipating diet [22]. Also, Bisacodyl suppositories were started in some cases ($n = 14$) that did not respond to the first line of treatment [23]. Phosphate enemas (Enemax) were most convenient to use as they are readily available in prepared containers and are affordable for most patients [5,22,23].

Trials of effective scoring systems such as the Baylor continence score in pediatrics [24] were tried before, but the Wexner scoring system seemed the most appropriate for being filled out by our junior staff and has shown better clinical subjectivity when compared with others [25].

Many factors have affected the outcome in both groups. In group A there was no significant improvement beyond 50% in 26 cases, which is far behind the levels of more

experienced centers [6]. The poor result could be because of absence of toilet training in ARM patients [1], the type of anorectal malformation (high ARM cases have less control of their bowel movement and poorer results) [26], and the anal position [27] in cases of low ARM cases. In cases of HD, the type of repair definitely affected the outcome [28].

In group B, there was significant improvement in more than 50% of the cases ($P < 0.0005$), both with and without any parasitic infestations. There was significant improvement when the BMP was applied to all cases of incontinence, with success rate above 70% ($P = 0.007$). If the normal population carries a risk of 25% for constipation and of 3% for soiling then the colorectal population would have higher rates as these children miss normal toilet training and suffer painful surgical and postsurgical procedures that worsen their fear of defecation [5]. This emphasizes the importance of a management protocol that suits the different reasons for incontinence.

Conclusion

Fecal incontinence in children is a major problem in the field of pediatric colorectal surgery for which multidisciplinary work is needed to achieve acceptable results. A conservative BMP provides excellent results for both types of incontinence. Refractory incontinence cases should be investigated for rare causes of constipation and more advanced investigations such as manometry and surgeries are to be studied.

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Conflicts of interest

There are no conflicts of interest.

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