

# Encopresis in children

## Outcome and predictive factors of successful management

Adnan A. Mohammed, MD, DGS, Farag M. Mekaël, MD, PhD.

### ABSTRACT

**الأهداف:** توضيح نتائج علاج البداة (سلس البراز) مع التأكيد على العوامل التي تنبئ بنجاح العلاج الطبي

**الطريقة:** أُجريت هذه الدراسة الاستطلاعية خلال الفترة من سبتمبر 2003 إلى سبتمبر 2011م في قسم جراحة الأطفال، مستشفى الثورة التعليمي والبيضاء ومركز البطانان الطبي التعليمي، طبرق، ليبيا.

**النتائج:** شملت الدراسة 132 مريض (127 ذكر، و15 أنثى)، وكانت أعمار المرضى تتراوح ما بين 4-9 أعوام. لقد تراوحت أعمار 30 مريض (22.7%) ما بين 4-5 عاماً، و61 (46.2%) ما بين 6-7 عاماً، و41 (31%) ما بين 8-9 عاماً. لقد كان هناك 36 مريض (27.2%) مصاب بسلس البراز الغير احتباسي (المجموعة 1-)، و96 (72.8%) مصاب بسلس البراز الاحتباسي (المجموعة 2-). ولقد كان 87 مريض (65.9%) من المرضى لديهم تاريخ مرضي في قله شرب السوائل، و91 (68.9%) مريض لديهم قله في تناول غذاء غني بالألياف. وكان هناك 99 (75%) مريض لديهم تأخر في تعلم دخول الحمام. لقد وُلد جميع المرضى ولادة طبيعية، ولا يوجد لديهم أي مضاعفات أثناء الحمل ولا بعد الولادة. ولقد كانت النسبة الكلية لنجاح العلاج الطبي هي 70.5%، ونسبة نجاح العلاج في المجموعة 1- كانت 94.4%، ونسبة نجاح العلاج في المجموعة 2 هي 61.5%. لقد كانت نسبة المرضى الذين تم رجوع سلس البراز لديهم 18.2%. وكانت العوامل التي وُجدت في هذا البحث والتي قد تنبئ بنجاح العلاج الطبي هي: تعاون المريض وعائلته، وعمر المريض أكثر من 5 سنوات، وكون المريض أنثى، وأخيراً سلس البراز الغير احتباسي.

**خاتمة:** يبقى سلس البراز مشكل لكل من المريض وعائلته للتعامل معها، وبعد الفحص السريري الشامل مهم جداً. ويعتمد الوصول إلى نتائج علاجية جيدة على النصائح التي تُعطى للعائلة مع الحرص على تطبيقها، وقد شملت العوامل التنبؤية بنجاح العلاج الطبي تعاون العائلة والمريض على تطبيق النصائح المعطاة، الجنس الأنثوي، وعمر المريض أكبر من خمس سنوات، وأخيراً سلس البراز الغير الاحتباسي.

**Objectives:** To elucidate our experience and outcome in the management of childhood encopresis, and to emphasize the factors that may predict successful management.

**Methods:** This prospective study was carried out between September 2003 and September 2011 in the Department of Pediatric Surgery, Al-Thoura Teaching Hospital, Al-Beida and Al-Butnan Medical Teaching Center, Tobruk, Libya.

**Results:** One hundred and thirty-two patients (117 male, 15 female) took part of the study. The male and female ratio was 7.8:1. The participants were patients aged 4-9 years. There were 30 (22.7%) patients between 4-5 years, 61 (46.2%) between 6-7 years, and 41 (31%) between 8-9 years. Nonretentive encopresis patients were 36 (27.2%) (Group I) and 96 (72.8%) patients had retentive encopresis (Group II). Patients with low fluid intake were 87 (65.9%) and low fiber diet were 91 (68.9%). Patients with delayed toilet training were 99 (75%). The total rate of successful conservative treatment was 70.5%. The rate of successful treatment in Group I was 94.4% and in Group II was 61.5%. We observed 18.2% of the patients had recurrence of encopresis. The factors found to predict good resolution rate after medical treatment included: cooperation of the parent and patient, female gender, ages above 5 years, and nonretentive encopresis.

**Conclusion:** Encopresis remains a problem for the parents and the patients. Clinical evaluation is indispensable. Good outcome can be achieved effectively. Cooperative parents and patient, female gender, age above 5 years, and nonretentive encopresis are predictors for good response to medical treatment.

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*From the Department of Pediatric Surgery (Mohammed), and the Department of Surgery (Mekaël), Medical Faculty, Omar Al-Mukhtar University, Al-Beida, Libya.*

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*Address correspondence and reprint request to: Dr. Adnan A. Mohammed, Medical Faculty, Omar Al-Mukhtar University, Al-Beida, PO Box 919, Libya. Tél. +218 925527003. E-mail: dr.adnanmoh@gmail.com*

Encopresis (fecal soiling) with or without constipation represents a common problem, as well as a clinical entity to pediatricians and pediatric surgeons. Its common association with chronic constipation, may be due to spontaneous relaxation of the anal sphincters precipitated by rectal distension due to fecal impaction.<sup>1</sup> Otherwise, healthy children may have encopresis without either constipation nor any underlying primary organic disease.<sup>2</sup> The basic understanding of defecation dynamic in children is indispensable to know the pathogenesis of encopresis as well as if the above 2 variants of encopresis are of the same etiology or not. The pathogenesis of encopresis still not well understood, there is no single factor that can be regarded as a basic causative factor. Most cases have normal anal tone, normal anal position, and normal barium contrast study of the colon.<sup>3</sup> Additionally, there are many contributing factors; some of these factors may increase the probability of failure and poor outcome of medical treatment. Detailed medical history and thorough physical examination are indispensable in the diagnostic work-up. Many treatment plans are used in the treatment of encopresis, but some of them makes them very difficult to identify. Most cases can be managed conservatively, provided that the therapeutic errors are avoided, and the underlying precipitating factors are eliminated. However, the management requires prolonged support from the physician, parents and most importantly child cooperation. Intractability to medical treatment is multi-factorial. A more complex management may be needed, or an organic underlying pathology has to be suspected when the usual medical treatment is failed.<sup>4</sup> The aim of the current issue is to elucidate our experience and outcome of management of childhood encopresis and to emphasize on the factors which may predict successful management.

**Methods.** This prospective study was carried out between September 2003 and September 2011 in the Department of Pediatric Surgery, Al-Thoura Teaching Hospital, Al-Beida and Al-Butnan Medical Teaching Center, Tobruk, Libya. A child was considered to have encopresis when he had functional fecal incontinence at 4 years of age and older. Patients were categorized into: Group I (patients with encopresis without constipation

[non-retentive encopresis]) and Group II (patients with encopresis and constipation [retentive encopresis]). The data collected included: age, gender, onset, weight, daily fluid and dietary fibre intake, bowel movement per week, soiling episodes, state and onset of toilet training, positive family history, school performance, history of multiple care-taker, and prompt physical examination. The treatment strategy included: high fluid intake more than 1-2 liter per day, high dietary fiber intake, scheduled bathroom sitting 3-4 times/day, 15-20 minutes each sitting under supervision of the parents with the use of incentive during their sittings.

In Group I, anti-diarrhea agents were used, and in Group II oral cathartics (lactulose and magnesium sulphate) after 4-5 days followed by per-rectal laxatives (Glycerine suppositories). The later were used 3-4 times daily until the palpable fecal mass disappeared as well as per-rectal examination showed empty rectum. Patients were re-evaluated every 2 weeks. The treatment was considered successful when fecal soiling was absent or there were 2 or less per month and the bowel motion in Group II were 3 times, and more per week with the absence of any discomfort irrespective of laxative use. The response to the conservative management was considered as an early response (complete resolution within 2-6 weeks), delayed response (complete resolution after 6 weeks) and no response (failure of treatment). Those who failed to respond to the conventional treatment were sent for additional psychotherapy. The Stunting Score<sup>5</sup> was used to classify patients with malnutrition into mild, moderate, and severe form of malnutrition. The outcome was assessed at 6 weeks, 12 weeks, 3 months, 6 months, and one year respectively. The factors, which were found to increase the probability of successful conservative management, were assessed. The rate of successful and failure conservative management and remission rate in Group I and Group II were calculated.

**Inclusion criteria.** All patients who had retentive or non-retentive encopresis, provided there were no underlying primary organic disease. Additionally the age of the patients was limited between 4-12 years only.

**Exclusion criteria.** All patients with fecal soiling with associated underlying primary organic disease were excluded from the study. The later included patients with neuromuscular disease, postoperative soiling following operation for Hirschsprungs' disease or imperforated anus and mentally retarded patients. Furthermore, patients under the age of 4 years and above the age of 12 years were excluded from the study. The policy of the 2 hospitals where the study was carried out, and according to the rules

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of the Ministry of health in our country, which regarded the maximum age for a pediatric patient is 12 years.

Ethical approval was not necessary and we submitted a letter of no objection from the scientific committee of the 2 mentioned hospitals. Informed consent was not obtained from the source case because the article does not report any experimental investigations. The study was carried out according to the principle of Helsinki declaration.

**Statistical analysis.** Data were analyzed using the free Simple Interactive Statistical Analysis (SISA).

**Results.** One hundred and thirty-two patients (117 male, 15 female) took part of the study. The male and female ratio was 7.8:1. The age ranged between 4-9 years. There were 30 (22.7%) patients between 4-5 years, 61 (46.2%) between 6-7 years, and 41 (31%) between 8-9 years. There were 55 (41.7%) patients first seen by our department and 77 (58.3%) patients were referred to our department due to failure of response to conservative management or the parent looking for other treatment or opinion. There were 83 (62.8%) patients presented after 1-3 weeks from the onset of symptoms, and 49 (37.2%) patients presented after 4-9 weeks from the onset of symptoms. There were 36 (27.2%) patients in Group I and 96 (72.8%) in Group II. Twenty-six patients had one attack of stool soiling every other day, 42 patients had stool soiling once every day, and 64 had twice and more stool soiling every day. There was no significant difference between Group I and Group II regarding the stool soiling. In Group II, 57 (59.4%) patients had bowel motion every 4-5 days, 14 (14.6%) had bowel motion every 6-7 days, and 25-26% patients had bowel motion every 8 days and more. Additionally, there were only 8 (6%) patients had a history of parental constipation. Moreover, the consistency of the stool was semisolid, but large in amount. Eighty-seven (65.9%) patients had history of low fluid intake of less than 30 ounce/day and 91 (68.9%) patients had history of intake of high-fiber diet. There was no significant difference between Group I and Group II patients regarding intake of fluid and high fiber diet. The starting of toilet training

ranged between 38-48 months. Nine (6.8%) patients still had no toilet training at the age 5 years, and they were still on diaper, while 24 (18%) had irregular toilet training, and 99 (75%) had delayed toilet training more than 42 months. Additionally, there was no significant difference between the groups I and II regarding toilet training. All the patients had a history of normal vaginal delivery, without prenatal, perinatal, and postnatal complications. Thirty-seven (28%) patients whom they were the first baby and 51 (38.6%) patients whom they were the last baby of the family. Twelve (9%) patients had history of complete absence of the mother with multiple caretaker, and 28 (21.2%) had their mothers absent in part of the day. Forty-six (34.8%) patients had mild form of malnutrition, of the later there were 4 (8.7%) from Group I and 42 (91.3%) from Group II. All patients whom they attended the school had good school performance. Ninety-three (70.5%) patients responded to medical treatment. The total rate of successful conservative treatment was 70.5%.

The response to medical treatment, recurrence rate and rate of successful medical treatment in Group I and in Group II are shown in Table 1. The rate of failure of medical treatment was 29.5%; 2 (1.5%) from Group I and 37 (28%) from Group II.

The rate of successful treatment and gender with age distribution are shown in Table 2. Those who failed were sent for psychotherapy. Seventeen (43.6%) patients we could follow them, the other we lost contact with them,

**Table 2** - The relation of age and gender with the rate of successful medical treatment.

Variables	Rate of successful treatment n (%)
<i>Gender</i>	
Male	94 (80.3)
Female	14 (93.3)
<i>Age (years)</i>	
4-5	13 (43.3)
6-7	44 (72.0)
>8	36 (87.8)

**Table 1** - Response, recurrence and successful medical treatment of Group I and Group II.

Groups	Early response n (%)	Delayed response n (%)	No response n (%)	Recurrence rate n (%)	Successful rate (%)
Group I	30 (83.3)	4 (11.1)	2 (5.5)	2 (5.5)	94.4
Group II	12 (12.5)	47 (48.9)	37 (38.5)	15 (15.6)	61.5
Total	42 (45.2)	51 (54.8)	39 (29.5)	17 (18.2)	70.5

of the former cases there were only 4-23.5% patients responded to treatment. The factors, which were found to predict a good resolution rate after medical treatment included: cooperation of the parents and patient, female gender, age above 5 years old, and non-retentive encopresis.

**Discussion.** Although encopresis is usually responds to management, yet sometimes an intractable case becomes a problem for the doctor and parents to deal with. Understanding the mechanism of defecation and careful evaluation of possible contributing factors is essential. However in the absence of a clear single causative factor and the multiple plans of treatment indicate that the management of encopresis is not always easy. Many etiological factors have been implicated in the pathogenesis of encopresis. Isolated impairment of rectal sensation<sup>2</sup> and the imbalance in the neuromuscular control mechanism as a consequence of increased time to recovery and duration of relaxation of the internal sphincters<sup>6</sup> seem to be important etiological factors. Additionally, children with encopresis have a higher prevalence of intestinal bacterial growth, elevated basal methane level, and higher methane production. The later is associated with severe chronic colonic impaction; whether methane production is a primary or secondary factor in the pathogenesis of encopresis still not settled.<sup>7</sup> Patients with severely increased rectal compliance have lower defecation frequency ( $p=0.3$ ), more fecal soiling ( $p=0.4$ ), and more rectal fecal impaction ( $p>0.01$ ).<sup>8</sup> Reduced fluid and low fiber intake, late toilet training were found to be a common contributing factors in most children with encopresis. The prevalence of encopresis varies; it affects an estimated 1.5%-7.5% of children between the age of 5-12 years.<sup>9,10</sup> The mean age was 8.6 years.<sup>2,11</sup> The prevalence of encopresis is 4.1% between the age 5-6 years and 1.6% between the age of 11-12 years.<sup>9</sup> It is more common in male than in female.<sup>12</sup> There is no significant difference in the age and gender distribution in children with retentive and non-retentive encopresis.<sup>6</sup> However, boys with chronic constipation have a high rate of encopresis than girls with chronic constipation.<sup>13</sup> Encopresis is usually associated with dietary changes including low fiber diet and low intake of fluids as well as late toilet training. The appropriate diet rich in fibers is beneficial in the management of both retentive and non-retentive encopresis, yet its efficacy in children needs to be assessed and evaluated. Additionally, appropriate dietary modification by increasing the consumption of fluids in the form of water and juices of at least 60 ounces/day is effective in the management plan.<sup>3,14</sup> In our study, we noticed

that value of toilet training was underestimated by the mother, as well as it is valued little by the pediatricians. Parents had no idea about the age at which diapers can be withdrawn and the age at which the baby needs to be trained. Most children start the bowel training between 24-36 months of age with trends towards a later completion than previous generation.<sup>15</sup> In the United States, the age at which bowel training begins increased from 18 months to 21-36 months of age.<sup>16</sup> Children initiated toilet training early, completed training earlier than those who started later and children who show stool toileting refusal at the beginning completed bowel training later than those do not ( $p<0.001$ ), and those who exhibited elimination signals for bowel movement completed bowel training earlier than those do not ( $p<0.001$ ).<sup>17</sup> Lack of successful bowel training at the age of 42 months will result in retentive encopresis. Additionally, the behavior of hiding while defecation before completion of toilet training is associated with stool toileting refusal and stool withholding, these behaviors may make toilet training more difficult.<sup>18</sup> Generally, girls completed bowel training at age earlier than boys.<sup>16</sup> Management of encopresis is typically involves an approach consisting of combination of family education, nutritional and medical management along with behavioral modification when needed. The medical management includes stool disimpaction followed by colonic evacuation, toilet training and well-balanced diet.<sup>2,3,10,19,20</sup> There is uncertainty about the best treatment; however, patients are benefited from a strict treatment plan. The cornerstone in the management of encopresis depends on the positive cooperation of the parents and patients. The parents and the patient must understand and follow the instructions. Additionally, the parents have to realize that the treatment may extend several weeks with scheduled visits. The following was clearly noticed in our study: the absence of parental motive, incomplete or discontinuation of medical therapy due to ignorance of the parents or the parents did not trust the simple instructions for the treatment of the condition which has a marked psychological impact on both the parents and patient. Stool disimpaction by the use of polyethylene glycol (PEG) is effective and well tolerated.<sup>21</sup> Polyethylene glycol 3350 with electrolytes provides higher success rate with fewer side effects than lactulose (56% versus 29%).<sup>22,24</sup> Additionally, PEG accepted better by children than milk magnesia with compliance rates (95%, 65%) and with improvement on PEG better than milk magnesia (62% versus 43%).<sup>24</sup> Regarding toilet training, numerous toilets training methods are available including child-oriented training structured and point-oriented training<sup>15</sup> and



lastly, the enhanced toilet training which seems more effective in treating childhood encopresis than the other medical therapy.<sup>11</sup> Older age, non-Caucasian race, and female gender are best predictors of completing toilet training.<sup>25</sup> Encopresis is sometimes associated with psychological and behavioral problems, aggression, inattention, and difficulty following direction at school are common.<sup>3</sup> Additionally, children who have soiling have a greater risk of being bullied at school.<sup>26</sup> Moreover, children who soil frequently have significantly more psychological and social problems than those who soil occasionally.<sup>27</sup> However, minority of children with encopresis demonstrate clinically significant elevation in the psychological parameter,<sup>28</sup> which indicates, comparable with our study that psychological therapy is not mandatory in all cases unless it is indicated. More new study shows that identification of psychological and social issues may enhance the treatment of encopresis.<sup>10</sup> In cases of non-retentive encopresis anti-diarrhea agents can increase the consistency of the stool and facilitates continence.<sup>20</sup> Almost every patient on the long run will experience dramatic improvement in encopresis. Recovery rates are 30-50% after one year and 48-75% after 5 years.<sup>29</sup> However, some children do not respond to the above treatment regimens. Additionally, significant number of children with initially good response will relapse later on. Long-term relapse is more frequent in children having retentive encopresis or children under the age of 4 years at the onset of symptoms.<sup>1</sup> Patients with intractable encopresis should be referred to further diagnostic and therapeutic management.

**Study limitations.** The negative cooperation of some parents and patients in following and applying the advices. We could not investigate the way of behavioral intervention, which was used in some patients because of the lack of communication with the psychiatrist. The loss of contact with some patients after we referred them for psychotherapy. Lack of availability of some investigations, like ano-rectal manometry or radionuclide rectal transit study.

In conclusion, encopresis remains a problem for the parents and the patient to deal with. Prompt clinical evaluation is indispensable. Good outcome can be achieved effectively with an approach consisting of family education, colonic disimpaction, and stool evacuation, well balanced diet, bowel training and behavioral management if indicated. Cooperative parents and patient, female gender, age above 5 years and non-retentive encopresis are predictors for good response to medical treatment. Further, researches are needed for the development of an improved therapeutic regimen to promote a good resolution of the problem.

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