



## Management of childhood constipation

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### ABSTRACT

A normal bowel pattern is thought to be a sign of good health. Constipation is a symptom rather than a disease. The exact prevalence of the disorder is difficult to be estimated. The differential diagnosis of childhood constipation can be extensive. Constipation is recognized and diagnosed by most practitioners based on the child's clinical presentation. Herein, we present a useful guide to the organization of pediatric constipation and appraise the current suggestion for treatment regimens, to help the clinician in treating a situation that can be distressing and has a significant influence on affected families.

### Introduction

A normal bowel pattern is thought to be a sign of good health.<sup>1</sup> In the general population, constipation is frequently reported; resulting in 2.5 millions of physician visits in the United States and a total health care cost of \$2752 per patient treated.<sup>1,2</sup>

Each baby who is not able to pass meconium in the first 48 hours after birth is associated with abdominal distension and any child who passes less frequent and hard stool is suffering from constipation.<sup>2</sup> There are other definitions about constipation:

The North American Society of Gastroenterology, Hepatology, and Nutrition (NASPGHAN) define constipation as "a delay or difficulty in defecation, present for two

weeks or more, and sufficient to cause significant distress to the patient".<sup>3,4,5,6</sup>

The Paris Consensus on Childhood Constipation Terminology (PACCT) defines constipation as "a period of 8 weeks with at least two of the following symptoms: defecation frequency less than three times per week, fecal incontinence frequency greater than once per week, passage of large stools that clog the toilet, palpable abdominal or rectal fecal mass, stool withholding behavior, or painful defecation."<sup>7</sup>

Childhood constipation is often a long-term problem requiring treatment over months or years.<sup>8</sup> The high prevalence rates, economic cost and adverse implications on the quality of

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life and health state, make constipation a major public health issue.<sup>9</sup>

## Types of Constipation

Constipation is a symptom rather than a disease.<sup>6</sup> Some studies suggest that in 90 to 95 percent of children, no specified organic etiologies could be found for constipation and only 5 to 10 percent of patients have defined organic etiologies that are found in different age groups. In both sexes, the organic causes are in the second degree. So the prevalence of organic type constipation in boys and girls are 85.12% and 19.9%, respectively.

Constipation due to organic etiologies, such as mechanical obstruction, spinal cord injury, stroke, Parkinson's disease, hypothyroidism, diabetes and local neurogenic disorders, e.g. Hirschsprung's disease is consisted only a minority of patients.<sup>4,9</sup>

Medications are causes of constipation in 5% of the boys and 8.2% causes of constipation in girls.

The majority of cases are attributed to functional disorders.<sup>9</sup> Functional constipation is the most common cause of chronic constipation (more than 90% of patients) that no organic, anatomical or drug causes has been found so far.<sup>4,10</sup>

In a study conducted by the authors, the highest prevalence of functional constipation was observed among 48% of the group aged one to four years and 42% of the patients who were 5 to 11 years of age.<sup>6</sup>

In young infants, functional constipation often develops at the time of a dietary transition (eg, from breast milk to formula, the addition of solid foods into the diet, from formula to whole milk). In toddlers, functional constipation often develops near the time of toilet training. In toddlers and young children, constipation may

develop following an illness associated with either a severe diaper dermatitis or dehydration.<sup>1,6</sup>

In most patients, constipation is short duration with short-term consequences, but sometimes it lasts more than 6 months and cannot be resolved with current treatments. This condition is considered chronic constipation and its prevalence have been reported to 5% in healthy children.<sup>4</sup>

Internal anal sphincter achalasia (IASA) is an uncommon cause of treatment-resistant constipation that is clinically difficult to differentiate from functional constipation.<sup>4</sup> The disease that has been already called very short Segment Hirschsprung's disease is hardly differentiated from functional constipation clinically.<sup>4</sup> Pathogenesis and pathophysiology of this disease is not so clear, but may be due to disruption on neuromuscular junction, rectoanal inhibitory reflex does not exist in internal anal sphincter and sphincter pressure remains high even in resting state, which leads to difficult and painful stool excretion and creates a vicious cycle.<sup>4</sup>

## Frequency

Only a small proportion of patients suffering from constipation seek medical advice; thus, the exact prevalence of the disorder is difficult to be estimated. A systematic review of studies on the epidemiology of constipation in North America recorded various prevalence rates from a low 1.9% to a high 27.2%. However, most of the included studies, report rates between 12% and 19% (9). The prevalence of constipation defined as defecation frequency of < 3/wk varied from 0.7% to 29.6%.<sup>11</sup> Of all visits to the pediatrician, 3% are in some way related to this complaint and constipation is one of the 10 most common problems seen by general pediatricians.<sup>4, 8</sup> At least 25% of visits to a

pediatric gastroenterologist are due to problems with constipation.<sup>4</sup>

### Differential diagnosis

The differential diagnosis of childhood constipation can be extensive and may include Hirschsprung disease (ie, congenital megacolon), spinal or neuromuscular abnormalities (eg, spinal muscular atrophy, tethered cord, Currarino triad (rectal stenosis, hemi sacrum, presacral mass), cerebral palsy (static encephalopathy), hypothyroidism, anal stenosis, imperforate anus with fistula, anterior displacement of the anus (this is a controversial diagnosis), allergy or sensitivity to cow's milk, celiac disease, Abdominal Hernias, Anxiety Disorders, Appendicitis, Chagas Disease (American Trypanosomiasis), Colon Cancer, Adenocarcinoma, Colonic Obstruction, Crohn Disease, Depression, Diverticulitis, Hypopituitarism (Panhypopituitarism), Ileus, Intestinal Motility Disorders, Surgical Perspective, Intra-abdominal Sepsis, Irritable Bowel Syndrome, Multiple Endocrine Neoplasia, Type 2, Ogilvie Syndrome. Other conditions to consider include mitochondrial disorders, neuronal intestinal dysplasia, and prune-belly syndrome.<sup>5,1</sup>

The relatively common causes of constipation in the first few months of life are anti spasmotic drugs consumption for children with abdominal colic. These drugs reduce the frequency of bowel movements in infants and cause parental concerns. Pseudo intestinal obstruction can also cause chronic constipation.<sup>6</sup>

### Diagnosis

Constipation is recognized and diagnosed by most practitioners based on the child's clinical presentation (eg, a patient has difficulty passing stool or has not passed stool in 1-3 days). The

most important part of the physical examination is the rectal examination.<sup>1</sup>

Laboratory studies are generally unnecessary unless an underlying condition is suspected to be the cause, in which case diagnostic tests should be obtained as appropriate.<sup>1</sup> The most important radiologic study for the evaluation of patients with bowel problems is plain abdominal radiography.<sup>1</sup> Anorectal manometry can be useful in discriminating between functional constipation and Hirschsprung disease.<sup>1</sup>

History is often helpful in discriminating functional constipation from Hirschsprung disease. Asking parents when their child passed his or her first bowel movement after birth is particularly important. Most children with Hirschsprung disease have difficulties with constipation dating to birth or shortly after birth. In most published series, more than half of infants with Hirschsprung disease do not pass meconium during the first 36 hours of life and are diagnosed with constipation within the first 4-6 months of life.<sup>1</sup>

A set of criteria, such as patient age, onset of constipation, the presence or absence of abdominal distension, abnormal weight gain, meconium pass status at birth can be helpful in the early diagnosis of constipation and the next point is that in some cases of organic constipation mainly in children under 1 year, it can be manifested with milder symptoms later in life. For this reason, it is necessary in all cases where the patient does not response to conventional therapy, undiagnosed organic causes should be considered.<sup>6</sup> In a study conducted by the author, organic constipation is usually diagnosed in children under 1 year and constipated children older than 1 year are often suffering from functional constipation.<sup>6</sup> Chronic abdominal pain is one of the special manifestation of constipation in children, as the pattern of defecation should be evaluated in any

children with abdominal pain longer than 3 months.<sup>12</sup>

Rectal biopsy and rectal manometry are the definitive means of establishing or excluding Hirschsprung disease. Although the diagnosis ultimately relies on histologic demonstration of an absence of ganglion cells in the affected colon, the diagnosis is often suggested by single-contrast barium enema.<sup>2</sup>

## Treatment

There is no single treatment; many children do not respond and continue to have chronic problems. This lack of response is multifactorial, but it is most likely related to the fact that the exact pathophysiology of constipation in children is not known.<sup>13</sup>

The role of internists, gastroenterologists or pediatricians is, first of all, to exclude the possibility that the constipation may be secondary to another condition, including cancer of the colon in adults. After this first step, if there are no data indicating secondary constipation a therapeutic trial with fiber and/or simple laxatives is proposed.

Dietary changes, such as increasing the child's intake of fluids and carbohydrates, are commonly recommended as part of the treatment of constipation.<sup>14</sup>

Although randomized controlled trials have not been conducted to examine the effects of increasing the intake of fluids, nonabsorbable carbohydrates, or fiber on childhood constipation, recommending a balanced diet that includes whole grains, fruits, vegetables, and an abundance of fluids seems appropriate.<sup>1</sup> Lacono et al found that among 27 Italian children aged 5-36 months who had chronic constipation, the constipation resolved in 78% of the children when soy milk was substituted for cow milk; in most cases, the constipation recurred when cow milk was reintroduced.<sup>15</sup> If further treatment is required,

several laxatives at progressively higher dosages can be used.<sup>16</sup> In several randomized trials, laxatives have been shown to be beneficial in the treatment of chronic childhood constipation.<sup>17,18</sup> Studies have also shown that polyethylene glycol<sup>19</sup>, mineral oil, magnesium hydroxide, and lactulose are effective and can be used for prolonged time periods without risk.<sup>1</sup> However, this approach does not cure the constipation in a considerable number of patients. In children, indeed, it has been reported that at the end of a 5-year follow-up study, 35–45% of the patients had not recovered<sup>1</sup>, but other studies showed that most constipated children, with or without fecal incontinence, experienced improvement regardless of the type of laxative chosen, with 1-year recovery rates ranging from 31% to 59%.<sup>20, 21, 22, 23</sup>

Liquid paraffin (mineral oil) is widely accepted and recommended as a fundamental component of regimens for the management of constipation in North America and Australia.<sup>24</sup> Extensive experiences with long-term uses of mineral oil have shown its efficacy and safety<sup>25</sup> and North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGN) clearly identify liquid paraffin as a medication of first choice in the management of pediatric constipation.<sup>25</sup> This drug combines ease of titration with tolerability and sustained effect despite prolonged uses and make it attractive for use in childhood constipation encopresis.<sup>26</sup> Mineral oil is not recommended for infants less than 1 year old due to the risk of aspiration and development of lipid pneumonia.

In one randomized clinical trial demonstrated that both PEG 3350 and liquid paraffin were effective in increasing defecation frequency and decreasing encopresis significantly during the 4 month treatment period.<sup>10</sup> The results of this study demonstrated that PEG 3350 was at least as effective as liquid paraffin to

treat pediatric functional constipation and with less adverse drug events. Reviewing the results of the present investigations and other studies with regard to clinical efficacy and safety, revealed that PEG 3350 can be drug of choice for treatment of chronic constipation in majority of children.

Loening-Baucke and et al., in a randomized, prospective, and comparative study found that PEG was similar in efficacy to MOM for the long-term treatment of children with functional constipation and fecal incontinence.<sup>27</sup> Compared to all other laxatives, PEG achieved more treatment success, but results on defecation frequency were conflicting.<sup>14</sup>

When there is evidence of a fecal impaction, initial therapy should be directed to evacuate the colon. Aggressive use of oral cathartics such as polyethylene glycol, sodium phosphate, magnesium citrate, or a balanced electrolyte solution with polyethylene glycol or a series of enemas can accomplish disimpaction. In a 2009 controlled trial, disimpaction by the oral route or the rectal route was found to be equally effective.<sup>28</sup>

In young children, eliminating any pain associated with the passage of bowel movements is extremely important.<sup>1</sup>

Consultation with a pediatric gastroenterologist or pediatric surgeon is appropriate if the child's history or examination findings suggest an underlying organic cause (eg, Hirschsprung disease) or when the child fails routine therapy and the management is therefore complex.<sup>4</sup>

The only therapeutic approach in Hirschsprung's disease is Pull-throug anastomosis of ganglionic bowel with anal canal.<sup>2</sup> In a study conducted by Khan et al. during five years, from 182 children and infants with constipation who underwent surgical biopsies, 25 patients (14%) were diagnosed with Hirschsprung's disease.<sup>29</sup>

In a study by Koszutski et al., from 70 children with chronic constipation who referred to

surgery clinic in a three-year period, 21 cases (30%) reported Hirschsprung's disease. They found that surgical intervention in this group of children were efficient.<sup>30</sup>

In a six-year study performed by Proctor and colleagues which assessed the rate of accommodation of radiological findings with the extension of aganglionic bowel in Hirschsprung's disease, 97 Hirschsprung's disease cases were reported.<sup>31</sup> Lewis and his colleagues had a diagnosis of Hirschsprung's disease in 50 (19%) of cases among 265 studied infants or children with constipation via rectal biopsy during a six-year period.<sup>32</sup> According to the study conducted by the author entitled "The Diagnostic Value of barium enema in Hirschsprung disease." all three aspects of clinical findings, barium enema and rectal biopsy in the diagnosis of the disease should be considered and, of course, the most of diagnostic value was related to intestinal biopsy.

Until now, common treatment of internal sphincter anal achalasia was internal sphincter myectomy. Using this method, the symptoms of the patient improved, but complications such as fecal incontinency due to permanent damage to the sphincter was very common and worrisome.<sup>32</sup> Intrasphincteric botulinum toxin injection is considered as a replacement therapy and conducted studies indicate that it is equally effective as myectomy with fewer complications due to the absence of permanent damage of the sphincter.<sup>4</sup>

In previous author study, therapeutic response of botox injection was excellent in 35% of patients after a month, average in 60% and bad in 5%, and at the end of follow-up it was excellent in 50% and average in 40% and 10% of the assessment was bad. In this study, response to treatment was assessed in boys and girls separately, ages under 5 years, equal or more than 5 years, children affected under 2 years and equal or more than 2 years. In all

subgroups mentioned above, response to treatment was appropriate and statistically significant, but there was no significant difference in each patient between the two groups. This result was unique in our study compared with other studies. Thus, our findings in coordination with previous studies, indicates the effectiveness of the treatment and transient complications. Another advantage of this treatment is to be very short term admission period, and if botulinum toxin is accessible, treatment is going to be easily repeatable.<sup>10</sup>

## Conclusion

Constipation remains a common presentation to paediatricians, with important health source implications. We present a useful guide to the organization of paediatric constipation and appraise the current suggestion for treatment regimens, to help the clinician in treating a situation that can be distressing and has a significant influence on affected families.

## Conflict of Interest

None declared.

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