

Constipation and fecal incontinence in children with cerebral palsy. Overview of literature and flowchart for a stepwise approach

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Abstract

Background and study aims : Constipation and fecal incontinence are common problems in neurologically impaired children. This paper aims to give an overview on bowel problems in cerebral palsy children and to suggest a stepwise treatment approach. A pubmed search was performed looking at studies during the past 20 years investigating bowel problems in neurologically disabled children.

Results : The search revealed 15 articles. Prevalence and presentation was the subject of 8 papers, confirming the importance of the problem in these children. The other papers studied the results of different treatment modalities. No significant differences between treatment modalities could be demonstrated due to small studied cohorts. Therefore, no specific treatment strategy is currently available. An experienced based stepwise approach is proposed starting with normalization of fiber intake. The evaluation of the colon transit time could help in deciding whether desimpaction and eventually laxatives including both osmotic (lactulose, macrogol) as well as stimulant laxatives might be indicated. Or, in case of fast transit loperamide or psyllium can be tried. Surgery should be a last resort option.

Conclusion : Studies investigating constipation and continence in neurologically impaired children are scarce, making it difficult to choose for the optimal treatment. A stepwise treatment approach is proposed, measuring the colon transit time to guide treatment choices. (*Acta gastroenterol. belg.*, 2018, 81, 415-418).

Key words : urinary incontinence, fecal incontinence, children, cerebral palsy, stepwise approach

Introduction

Cerebral palsy (CP) is a neurodevelopmental disability, frequently associated with both urinary and fecal incontinence with or without constipation. Constipation and fecal incontinence have an important negative impact on quality of life. Adult CP patients reported an interference with their life and a negative impact on their quality of life by bowel problems in 50% of studied cases (1). The reported prevalence of constipation varies between 26% and 74% in children with CP (2-4). The prevalence increases with decreasing gross motor function (2,3). An acceptable symptom-based definition of constipation in neurological impaired children is described in a Dutch study (4).

Constipation in CP children might be diagnosed when scybalous, pebble-like, hard stools are present in more than 25% of defecations and defecation frequency is less than three times a week, when large stools are palpable on abdominal examination, or when laxatives or manual desimpaction are used (4).

This paper gives an overview of the current literature of the past 20 years on bowel problems in CP children. An experienced based stepwise approach is suggested.

Method

A Pubmed search in November 2016 using the Mesh terms ‘fecal incontinence and cerebral palsy’, ‘constipation and cerebral palsy’ or ‘constipation and neurological impairment’ led to 111 hits for the past 20 years (Figure 1). Inclusion and exclusion criteria are listed in table 1. After excluding double copies 10 studies were retained. By reviewing the references of obtained studies and reviews 5 extra papers were retained, leading to a total of 15 included papers.

Results

Prevalence and presentation

The prevalence and clinical presentation of bowel problems in CP children was the subject of 8 papers (2-9). The study size varied importantly and results are summarized in Table 2. Definition of constipation

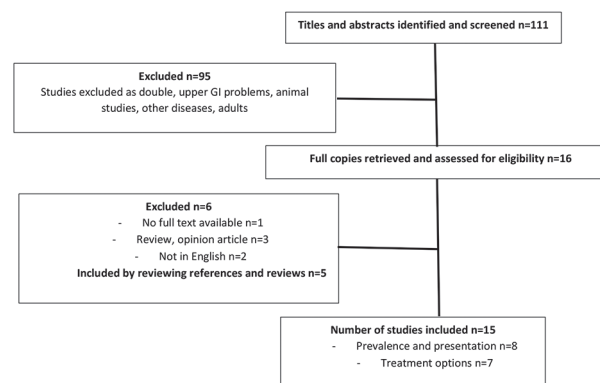


Fig. 1.

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Table 1. — Inclusion and exclusion criteria of the literature search

Inclusion Criteria	Exclusion criteria
Article type	Article type
- Study	- Reviews
- Written in English	- Not written in English
- Full text available	- No full text available
Study population	Study population
- Children	- Adults
- Cerebral palsy	- Animals
Studied Problem	Studied Problem
- Constipation	- Upper gastro-intestinal problems
- Fecal continence	

varied importantly according to the studies going from hard stool consistency (2) to 3 or less bowel movements a week (3). Veugelers *et al.* formulated the, above-mentioned, definition based upon generally accepted definitions in developing children and a definition used in intellectual disabled adults (4). Reported prevalence varied between 25 and 74%. Two articles only reported that it was an important problem, without giving exact numbers (5,6). The CP patients were significantly older than healthy control children when they achieved fecal continence (8). Finally, the importance of constipation was also reflected in the hospitalization indications, studied by Young *et al.* (9). It was the hospitalization indication for 2% of CP youth and 6.4% of young CP adults, which made it one of the top 5 indications for hospital admission in young adults with CP (9).

The etiology of constipation in this group is probably multifactorial. Most studies report an association between the degree of motor impairment and constipation (1,4,8,9). This was confirmed in a large study (n=215) including children as well as adults with an IQ <50,

Table 2. — Overview of the studies describing prevalence of bowel problems in children with CP

Study	Patients (n)	Prevalence
Park ES <i>et al.</i> 2004 (2)	38	Constipation : 10 (26%) CTT
Del Giudice E <i>et al.</i> 1999 (3)	58	Constipation : 43 (74%) CTT
Veugelers R <i>et al.</i> (2010) (4)	152	Constipation : 87 (57%)
Chong SKF <i>et al.</i> (2001) (5)	/	Not described
Singh BK <i>et al.</i> (2006) (6)	55	No specific number stated
Erkin G <i>et al.</i> (2006) (7)	120	Constipation : 30 (25%)
Ozturk M <i>et al.</i> (2006) (8)	45 CP	Constipation : CP: 16 (35%) vs Controls: 6 (8%)
	74 controls	Encopresis : CP: 5 (11%) vs Controls : 2 (3%)
		Continence: CP: 45 m (36-55) vs Controls: 26 m (24-28)
Young NL <i>et al.</i> (2011) (9)	609 CP admissions	2% for constipation

where being non-ambulatory was significantly more frequent in constipated disabled persons (10). Further on the presence of CP, the use of anticonvulsant therapy, benzodiazepines, proton pump inhibitors were also more frequently associated to constipation. In this study, food refusal, an IQ<35 and screaming were also overrepresented in patients with constipation (10). Finally low dietary fiber and fluid intake might also contribute to the constipation observed in CP patients.

The colon transit time (CTT) was studied in only 2 studies using pellets (2,3). The CTT was significantly increased in constipated CP children with a prolongation of the left CTT (2,3).

Table 3. — Overview of the studies looking at treatment options

Study	Patients (n), treatment	Results
Staiano A (2000) (11)	Glucomannan (n=10) vs placebo (n=10)	Stool frequency increase (p<0.01) Laxative use decrease (p<0.01) Clinical stool score decrease (p<0.01) CTT no change
Tse WT (2000) (12)	Increase dietary fiber 2g/d to 17g/d (n=20)	Decreased laxative use (p<0.05)
Tolia V (1997) (13)	Cross-over : tube feeding with/without fiber (n=20)	No significant change: tolerance, stooling, growth, stooling aid
Rivi E (2014) (14)	Standing device (n=1) Cross-over	Significant change in frequency and consistency Less pain reported
Bromley D (2014) (15)	Abdominal massage, by parents 20'/day (n=25)	Constipation symptom relieve: 87.5% Decrease laxative use: 58% Increased dietary intake: 41%
Staiano (1996) (16)	Cisapride (n=10), placebo (n=10)	Stool frequency increased (p<0.05) but was not different from placebo Laxative use decreased (p<0.05) Rectal compliance decreased (p<0.05) No change in CTT
Siddiqui AA (2014) (17)	3 CP patients out of 105 patients, antegrade bowel enemas (ACE)	Successful bowel management increased from 1/3 to 2/3 (ns)

Treatment options

Table 3 gives an overview of the 7 papers studying different treatment options.

Increase of the dietary fiber intake resulted in a decreased need for laxatives, and increased stool frequency (11,12). The third study investigating mainly tube-fed children could not demonstrate a difference between tube feeding with or without fiber in a cross-over design (13). However, only 11 of the 20 included patients completed the study. Tolerance was not an issue in any of the studies increasing fiber intake (11-13).

Since mobility has been shown to have an important impact on constipation, 2 papers looked at the effects of either a standing frame or abdominal massage on the stool frequency (14-15). The use of the standing frame was studied in a single case and could indicate an effect on hard end points such as stool frequency and consistency (14). The abdominal massage performed by parents for 20' a day did have a positive influence on laxative use and constipation-associated symptoms (15).

Keeping the increased CTT in CP children in mind, Staiano et al tested Cisapride. Although stool frequency increased, there was no significant difference with the control group. Furthermore a decreased use of laxatives was observed but no change in CTT could be documented (16).

It is difficult to assess the success of antegrade continence enema (ACE) since only 3 CP patients were included in a study on the use of ACE in children with a variety of underlying diseases (17). The increase of successful bowel management from 1 out of 3 patients to 2 out of 3 patients was not significant.

Suggestion for a stepwise approach

History, physical examination, dietary diary and a stool diary (noting both stool consistency and frequency) are essential before considering treatment for constipation and/or fecal incontinence in a CP child (4). Since many of the frequently used treatments for constipation are not yet studied in CP patients we will have to rely on what is known in constipated children without CP taking into account the specific problems of a child with CP (18). See the flowchart of the suggested experience based stepwise approach (Figure 2).

- The first line treatment consists of achieving a normal fiber intake and stimulating mobility as much as possible. There are 3 articles supporting the use of fibers (11-13). One article has a level III evidence (nonrandomized comparison study) (11) and two articles have a level V (case series without control) (12,13) evidence. Two articles support the importance of mobility, both have a level V (case series without control) (14,15) evidence.

- When the stool diary demonstrates a fixed defecation moment, regular toilet sitting around that moment with or without digital stimulation or glycerin suppository might induce defecation. If intellectual ability allows it,

First line treatment	- Normal fiber intake - stimulating mobility	
Second Line treatment	Fixed defecation moment	- Toilet sitting +/- digital stimulation - Manuel evacuation
	Constipation	- Desimpaction if needed - Osmotic laxatives, stimulant laxatives
	Frequent stools	- Psyllium husk - Loperamide (after colon transit time)
	With holding behaviour	- Not reacting on laxatives - Consider botulinum toxin injection
Third line treatment	- Antegrade colon enema	

Fig. 2.

it is possible to learn how to push on the toilet with help of the physiotherapist. No supporting articles are found in CP patients.

- If a rectal fecal impaction is detected on physical examination, desimpaction should be the first step using either enemas (sodium citrate or sodium acid phosphate) or high dosed macrogol. If needed manual evacuation in a sedated child can be considered. No supporting articles are found in CP patients.

- In case of constipation and after desimpaction it is important to maintain soft stools using either osmotic laxatives (lactulose or macrogol) (18) or stimulant laxatives (senna) if the previous are ineffective. One article was found on the use of cisaprid (level III evidence, nonrandomized comparison study) which is considered to be a stimulant laxative, but the medication is no longer available in Belgium (16). Mineral oils should be avoided in CP patients since aspiration carries the risk of lipoid pneumonia (19).

- Withholding behavior is treated in the same way as constipation with laxatives. However, in case of extreme pain and/or fear, laxatives might be insufficient. Repeated enemas for impaction treatment, will worsen the fear. Therefore, botulinum toxin injection into the anal sphincter might be considered to interrupt the vicious circle, but could increase the risk of incontinence. No supporting articles are found in CP patients.

- If the stool diary shows frequent stool losses during the day without rectal impaction on physical exam psyllium husk, a source of soluble fiber can be tried (20). It is a good stool softener but the stools remains more tied with extra bulging. Loperamide can only be considered if a fast colon transit time has been demonstrated. No supporting articles are found in CP patients.

- When the non-invasive treatment options fail, an ACE procedure can be considered. This gives the opportunity to use large amounts of water into the colon washing outs the stools. However, there are only limited results reported in children with CP. One article is found with

level V evidence (case series without control) on the use of ACE in CP patients (17).

Discussion

To improve the quality of and the comparison between future studies, a uniform definition of constipation and/or fecal incontinence in CP children is mandatory. The definition proposed by Veugelers *et al.*: “scybalous, pebble-like, hard stools in 25% of defecations and defecation frequency less than three times a week, or large stools palpable on abdominal examination, or laxative use or manual desimpaction of feces” seems the most complete and is based on 3 different consensus papers dealing with this problem (4, 18, 21).

A correct diagnosis is made using a history, physical examination and a stool diary, but even then it remains sometimes difficult. Studies on transit time in CP children suggest that CTT can be used as a quantitative measure for constipation and can differentiate the slow transit from the fast transit encopresis (2,3). Even in CP adults this difference in CTT is reported (22).

Although increasing the amount of dietary fiber has an impact on stool frequency and consistency (11,12), it does not influence colon transit time, suggesting that low-fiber intake is not the primary cause of constipation in CP.

As in other patients with constipation, laxatives are frequently used but up till now not studied in CP patients. Since CP children suffer more frequently from slow transit constipation (2,3) the classically used osmotic laxatives, such as lactulose and macrogol, might be less efficient compared to the normal constipated child. Therefore it is worthwhile to try stimulant laxatives (senna) or prokinetics (cisapride) in an attempt to improve CTT (16). Psyllium husk is studied in adults with a great overall laxative effect and efficient stool softening (20). However, all these treatment options should be studied in this specific, difficult to treat patient group.

Considering surgery (ACE) after conventional treatment fails, remains a difficult decision since the literature on the subject remains scarce.

Conclusion

Constipation and fecal incontinence are common in disabled children. Studies are scarce and small making it difficult to propose treatment modalities.

We suggest an experience based stepwise approach, taking into account colon transit time in the choice of treatment options. More double blind placebo-controlled studies and studies examining the effect between different kinds of laxatives are needed to improve patient care.

Conflict of interest

Authors declare no conflict of interest.

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