Treatment of functional constipation in children Re-Evaluating Approaches

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Functional constipation in children
Epidemiology and Causes

Infant/Toddler

- Prevalence from 3 to 27%
- No diference between boys and girls
- Change in diet in the first year of life
- Toilet training

  - pressure to maintain bowel control and/or inappropriate techniques

Child/Adolescent

- Prevalence between 0.7% and 29.6% (median 12%).
- Female gender, increasing age, socioeconomic status and educational level affect constipation prevalence.
- Boys with constipation had higher rates of fecal incontinence than girls
- Pain or social reasons (school, travel)

Beninnga, M.A et al. Childhood Functional Gastrointestinal Disorders: Neonate/Toddler. Gastroenterology, 2016
Hyams, J.S et al. Childhood Functional Gastrointestinal Disorders: Child/ Adolescent. Gastroenterology, 2016

Functional constipation in children
Pathophysiology

- Repeated attempts of voluntary withholding of feces by a child who tries to avoid unpleasant defecation because of fears or pain associated with evacuation.

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- The colonic mucosa absorbs water from the feces and the retained stools become progressively more difficult to evacuate.

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- Vicious cycle of stool retention in which the rectum is increasingly distended, resulting in overflow fecal incontinence, loss of rectal sensation, and ultimately, loss of the normal urge to defecate.

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- Increasing fecal accumulation in the rectum causes decreased motility in the foregut, leading to anorexia, abdominal distention and pain.

Hyams, J.S et al. Childhood Functional Gastrointestinal Disorders: Child/ Adolescent. Gastroenterology, 2016

Rome Criteria for the Diagnosis of Functional Constipation - IV Revision

G7. Functional constipation in **Infants/Toddlers up to 4 years of age**

At least 2 of the following present for at least 1 month:

1. Two or fewer defecations per week
2. History of excessive stool retention
3. History of painful or hard bowel movements
4. History of large diameter stools
5. Presence of a large fecal mass in the rectum

In toilet trained children, the following additional criteria may be used:

6. At least one episode/week of incontinence after the acquisition of toileting skills
7. History of large diameter stools which may obstruct the toilet

In exclusively breastfed babies, stool may occur 1x on every 7 days or 7 times a day.

H3a. Functional Constipation in **Child/Adolescent**

*Must include **two or more** of the following occurring at least once per week for a minimum of 1 month with insufficient criteria for a diagnosis of IBS:*

1. Two or fewer defecations in the toilet per week in a child of a developmental age of at least 4 years
2. At least one episode of fecal incontinence per week
3. History of retentive posturing or excessive volitional stool retention
4. History of painful or hard bowel movements
5. Presence of a large fecal mass in the rectum
6. History of large diameter stools which can obstruct the toilet
7. After appropriate evaluation, the symptoms cannot be fully explained by another medical condition

Beninnga, 2016; Hyes, 2016

Differential diagnoses of constipation

- Anatomic malformations of the anorectal region
- Abnormality of motor activity of the anorectal region
- Spinal cord abnormalities
- Sacral teratoma
- Abnormal abdominal musculature
- Cystic fibrosis
- Celiac disease
- Metabolic abnormalities
- Cow’s milk protein allergy
- Drugs
- Neurological disorders
- Depression

Tabbers, 2013

Warning signs and symptoms in constipation

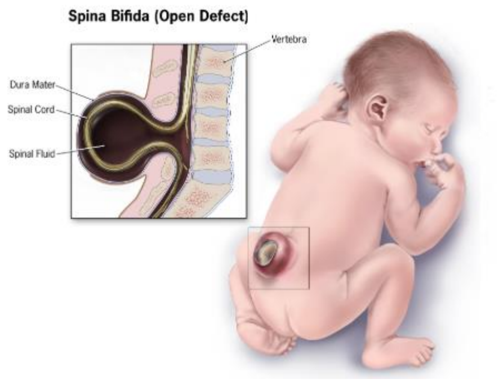
- Delayed passage of meconium by 48 hours
- Onset of symptoms in infants
- Family history of Hirschsprung's disease, empty ampula od digitorectal examination, abnormal position of the anus
- Failure to thrive
- Bilious vomiting
- Blood in the stools in the absence of anal fissures

- Perianal fistula
- Ribbon stools
- Severe abdominal distension
- Absent anal or cremasteric reflex
- Decreased lower extremity strength/tone/reflex
- Sacral dimple
- Tuft of hair on spine
- Gluteal cleft deviation

Tabbers, 2013; Hyes, 2016

Evaluation of a child with functional constipation

- Heteroanamnesis: the timing of passage of the first meconium, age of onset of symptoms, frequency and consistency of stools, pain/bleeding when passing stools, abdominal pain or encopresis, withholding behavior, success/failure of toilet training, dietary history, changes in appetite, nausea/vomiting, weight loss, neurological development.

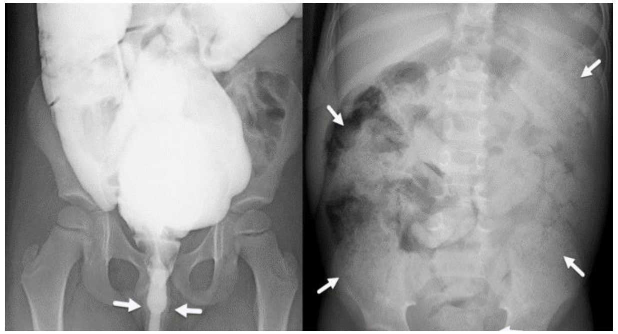


- Clinical examination: BW, BL, abdominal examination, examination of the lumbosacral region, lower limb neuromuscular examination

- Examination of the perianal region (anal position, stool present around the anus or on the undergarments, erythema, anal fissures, digital rectal examination evaluates the presence of an anal stenosis or of a fecal mass, anal sphincter tone).

Tabbers, 2013

Evaluation of a child with functional constipation

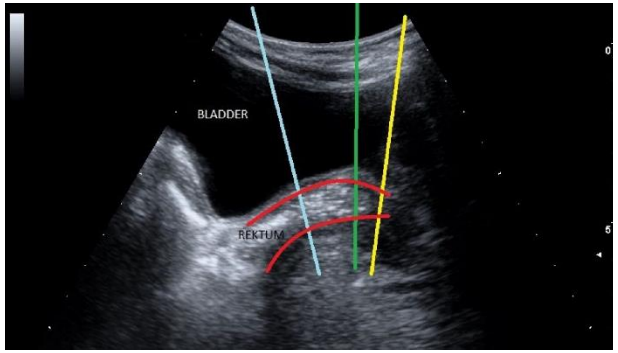


- **Rome criteria are recommended for the definition of FC for all age groups**
- **The diagnosis of FC is based on history and physical examination**
- **Digital rectal examination is not always necessary**

If only one Rome criterion is present and the diagnosis of FC is uncertain, a digital rectal examination is recommended to confirm the diagnosis and exclude underlying medical conditions

- **The routine use of an abdominal radiograph to diagnose functional constipation is not indicated.**

May be used in case of suspected fecal impaction and physical examination is unreliable or impossible



- **Transabdominal Rectal Ultrasonography is not recommended**
- **Routine CMPA testing is not recommended**
- **Testing for hypothyroidism, celiac disease, and hypercalcemia in children with constipation only if alarm symptoms are present.**
- **ARM in the evaluation of intractable constipation is to assess the presence of the RAIR**

Rectal biopsy is the gold standard for diagnosing HD

- **A barium enema should not be used as an initial diagnostic tool for the evaluation of FC**

Tabbers, 2013

Treatment of functional constipation

Treatment of fecal impaction

PEG 1-1.5 g/kg for 3-6 days or

Enema x 1 for 3-6 days

adjusting dose according to the clinical response

Maintenance therapy
(at least 2 months)
PEG (> 6 months) starting dose 0.4 g/kg
Lactuloza (safe in all ages) 1-2g/kg

Additional/second line treatment
Milk enriched with magnesium
Mineral oli

PEG is the first-line treatment for disimpaction and maintenance therapy

In the child with intractable constipation 2 to 4 week trial of avoidance of CMP may be indicated

Tabbers, 2013

PEG 3350/4000

- Osmotic laxative
- Poorly absorbed in the gut
- Does not irritate the intestinal mucosa
- Increase of osmolarity
- Influx of water
- Softening and loosening of stools
- Increase of intestinal stool volume
- Intestinal distention
- Stimulates peristalsis

- Rare side effects:

Abdominal pain, bloating, nausea, vomiting, mild diarrhea, anal irritation

Contraindications:

- Hypersensitivity to ingredients
- Perforation/obstruction of the gastrointestinal system
- Crohn's disease, Ulcerative colitis

SUDANESE JOURNAL OF PAEDIATRICS 2019; Vol 19, Issue No. 1

ORIGINAL ARTICLE

Lactulose versus polyethylene glycol for disimpaction therapy in constipated children, a randomized controlled study

Mohammad Salem Shatnawi (1), Mohammad Mu'azi Alrwalah (1), Abdulla Majed Ghanma (2), Mohammad Lutfi Alqura'an (3), Ehab Nequla Zreiqat (3), Manar Mohammad Alzu'bi (4)

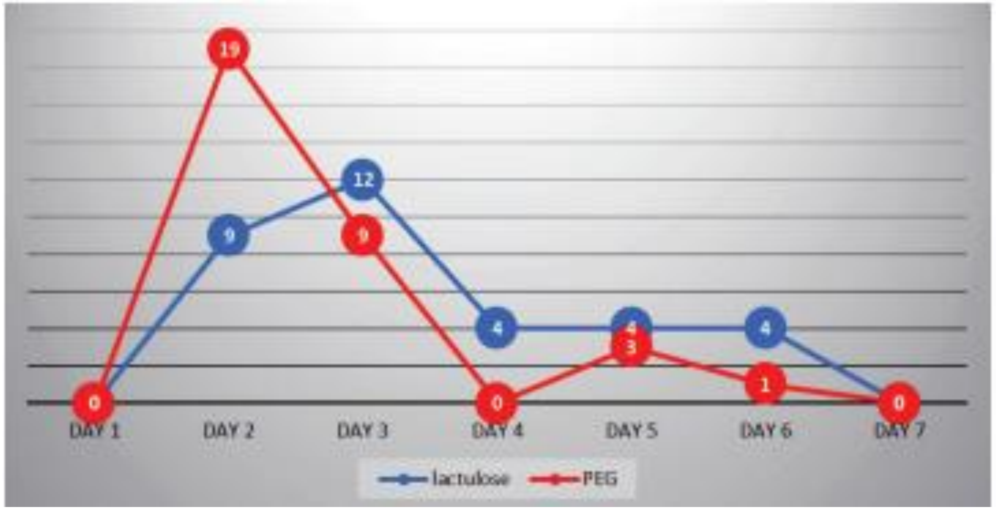


Table 2. Success of disimpaction related to days of therapy.

Group	Lactulose			Total	PEG			Total	*p*-value
Age (years)	1–5	6–10	11–14	33	1–5	6–10	11–14	32	
Patients no.	19	11	3		17	10	5		
Day 1	0	0	0	0	0	0	0	0	1.000
Day 2	5	3	1	9 (9/33)	11	5	3	19 (19/32)	0.001*
Day 3	6	5	1	12 (21/33)	5	3	1	9 (28/32)	0.122
Day 4	2	2	0	4 (25/33)	0	0	0	0 (28/32)	0.266
Day 5	1	2	1	4 (29/33)	1	2	0	3 (31/32)	0.197
Day 6	1	3	0	4 (33/33)	0	0	1	1 (32/32)	1.000

- PEG group showed faster response (p = 0.001) by day 2 of the treatment
- Only three children had mild adverse reactions (diarrhea, vomiting, abdominal pain)

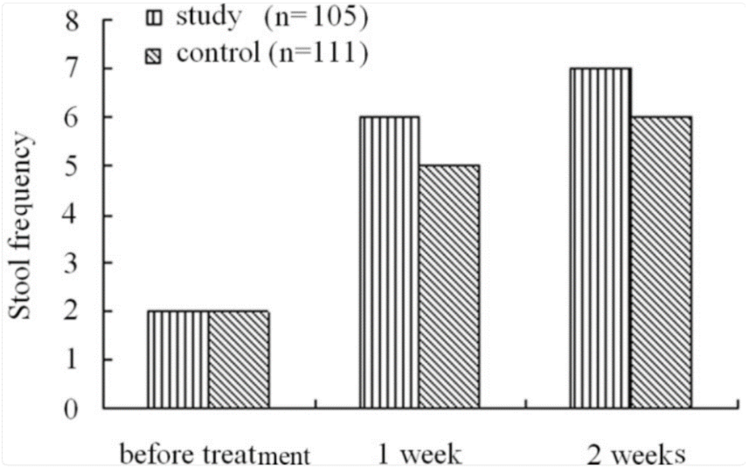
EXPERIMENTAL AND THERAPEUTIC MEDICINE
SPANDIDOS PUBLICATIONS

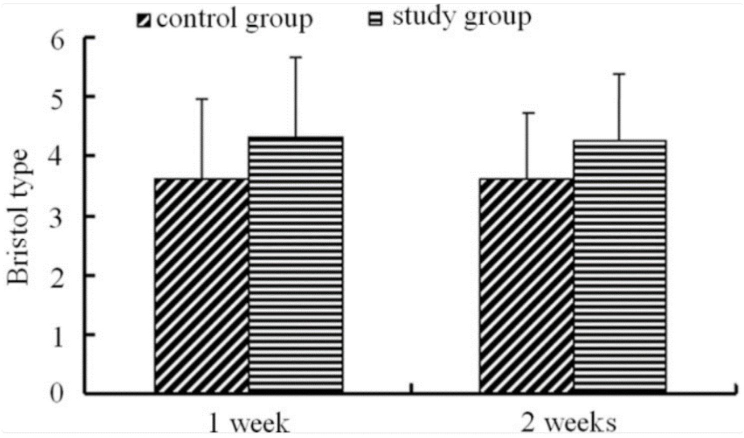
Exp Ther Med. 2012 Feb 17;3(5):853–856. doi: 10.3892/etm.2012.491

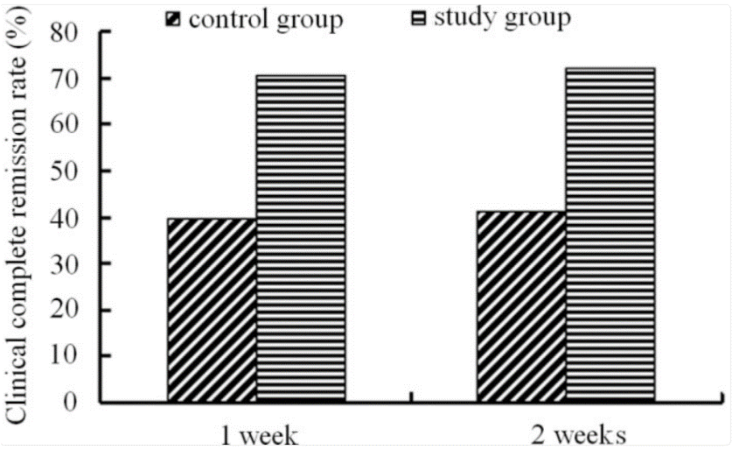
Polyethylene glycol 4000 treatment for children with constipation: A randomized comparative multicenter study

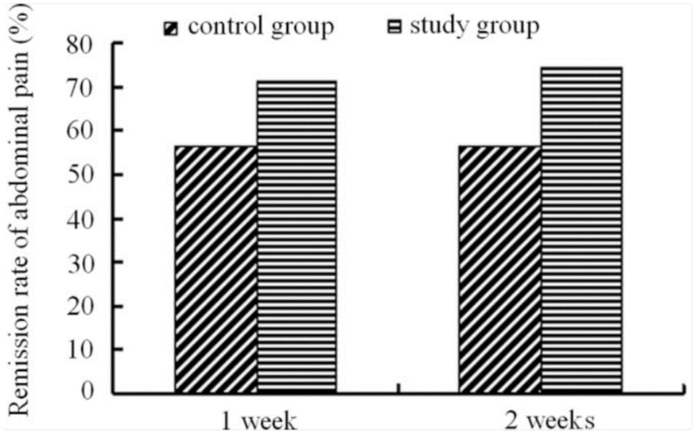
YISHI WANG [1,10,*], BAOXI WANG [1,*], XUN JIANG [1,✉], MIZU JIANG [2], CHUNDI XU [3], CAIHONG SHAO [4], LIYING JIA [5], ZHIHUA HUANG [6], XIAOHUA XU [7], HUA LIU [8], LEI SHANG [9,✉]

- Median stool frequency in the PEG group was significantly higher
- Increase in stool consistency by lactulose was significantly less than PEG group
- Higher remission rate in PEG group than that of lactulose group
- Increased abdominal pain remission in the PEG group
- No significant adverse effects
- Normal results from the blood test and physical examination





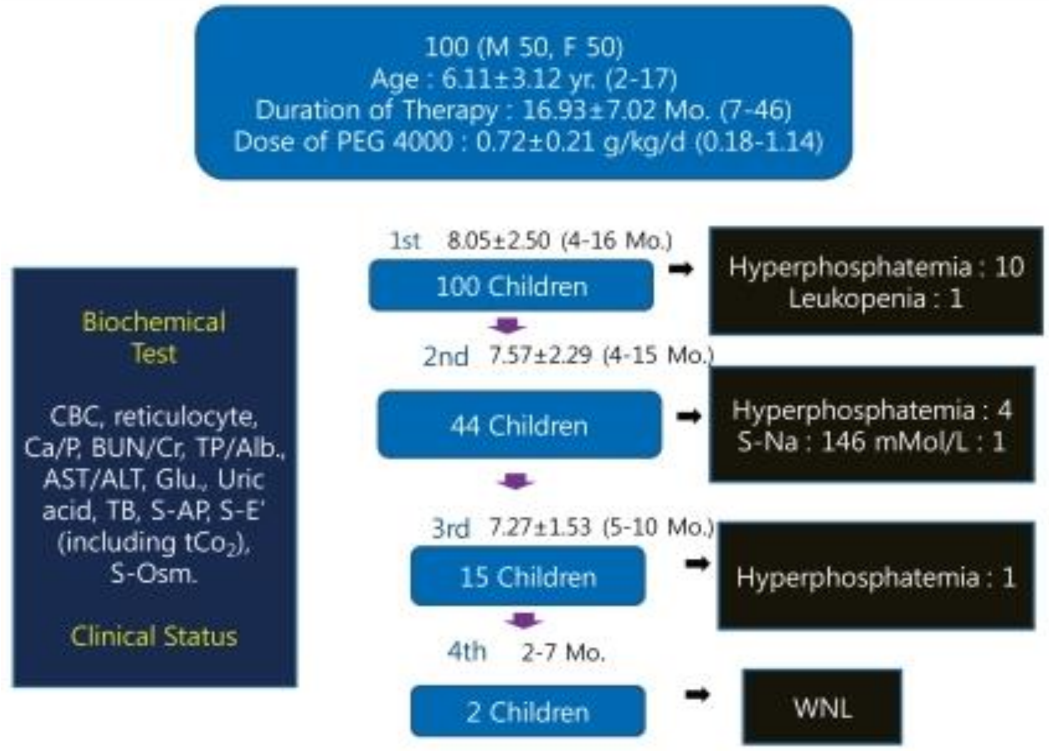




Clin Exp Pediatr > Volume 53(7); 2010

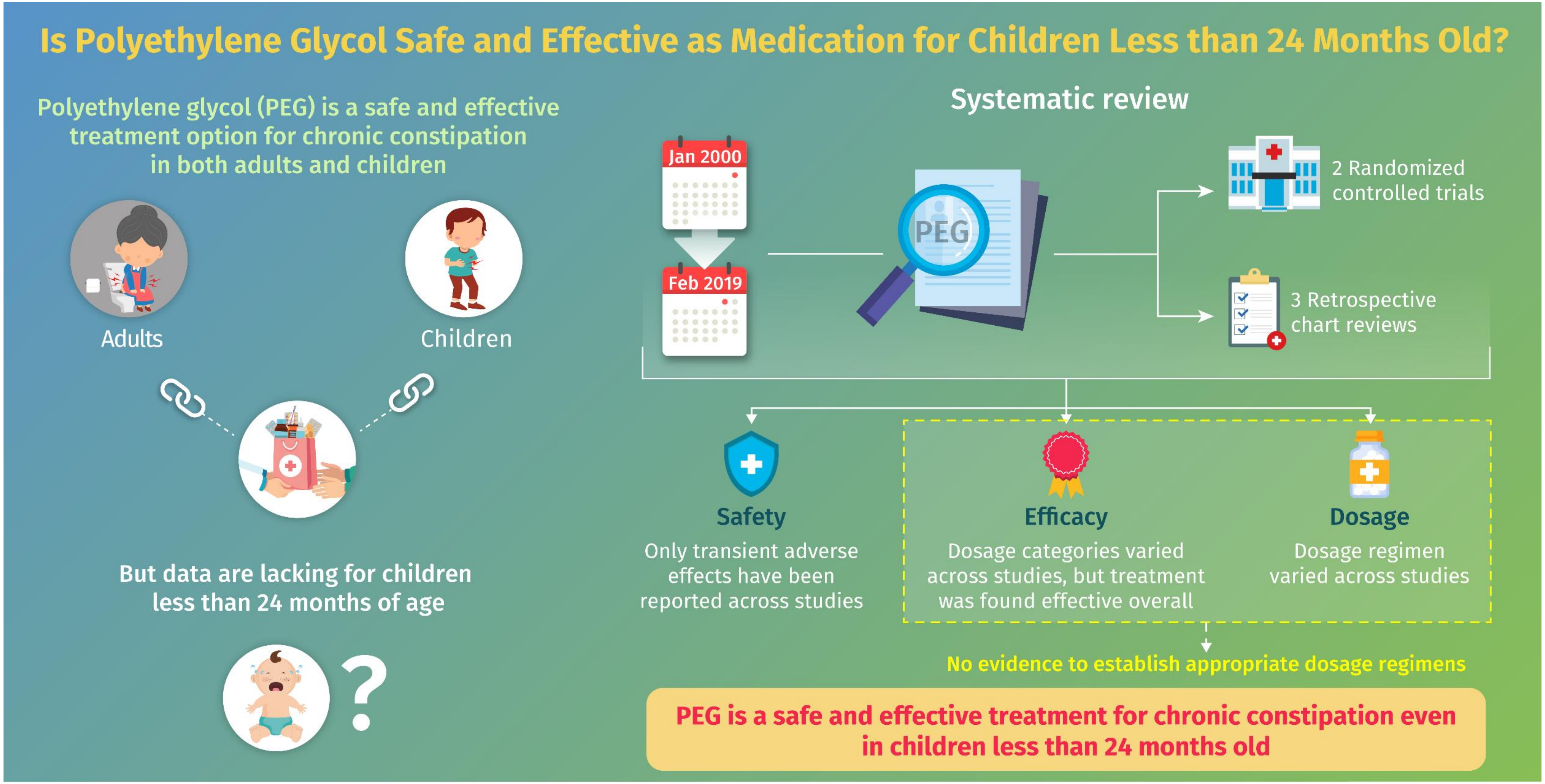
Original Article

Long-term safety of PEG 4000 in children with chronic functional constipation: A biochemical perspective



PEG 4000 is save for long term therapy in children with constipation with respect to biochemical parameters.

Hwan Bae, 2010

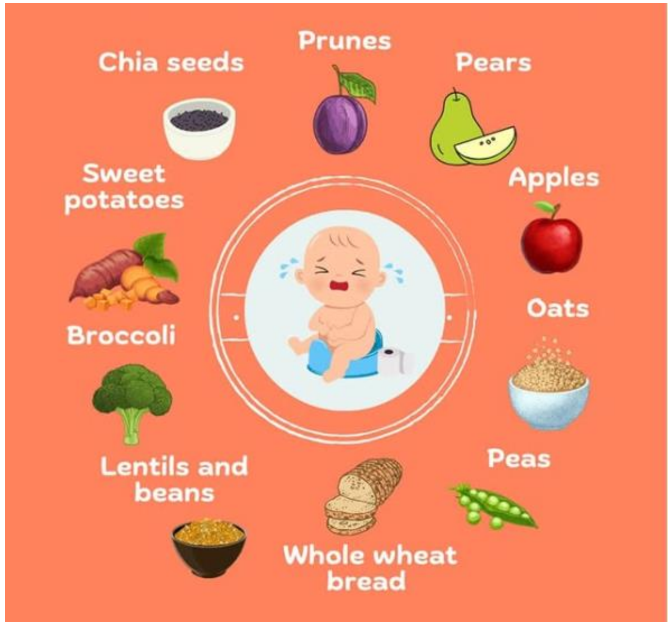


Polyethylene Glycol Dosing for Constipation in Children Under 24 Months: A Systematic Review
Journal of Pediatric Gastroenterology and Nutrition
Rachel et al. (2020)

JPGN Journal of Pediatric Gastroenterology and Nutrition

Nutritional therapy

- Milk formula enriched with Mg + lactose
- Normal fluid intake
- Fiber intake (age + 5 g/day)
- Reduce intake of bananas, potatoes, carrots…
- Normal physical activity



Kranz, 2012; Tabbers, 2013

Toilet training

- Empting the bowels regularly at the same time
- Half an hour after a meal
- Sitting on the potty for about 10 minutes

Who we are?

- Clinical Hospital Stip is the largest hospital in the eastern part of North Macedonia, serving around 400,000 residents.
- The pediatric department at Clinical Hospital Stip is the largest and annually examines around 30,000 children.
- The most common diagnoses in pediatric gastroenterology ambulance are constipation and abdominal pain.
- We treat functional constipation at our department with Macrogol 3350 since 2016 (powder form).
- From february 2024 with Macrogol-4000 (liquid form).
- After starting therapy, we monitor the children at the following intervals:

At the end of the first and second week, after one month, after two months, and further according to the need to continue therapy, as well as one month after stopping therapy.

Department of pediatrics

Parents experience and satisfaction

- Most parents (99%) report that their child has a bowel movement within 24-48 hours.
- The liquid form of macrogol is more acceptable to both children and parents because the method and speed of administration are easier.
- So far, we have not had any complaints from children or parents about side effects of the drug (abdominal pain, distension, diarrhea, vomiting).
- Parents and children are satisfied because in a short time, defecation is facilitated, stomach pain and distension are relieved.
- Pain in the anus area is relieved, fissures heal and the withholding behavior of stool retention stops.

What Is the Prognosis of Functional Constipation in Children?

- Delay in treatment, defined as time between age at onset and first presentation at the department of pediatric gastroenterology, is negatively related to recovery (OR 0.81, 95% CI 0.71–0.91).

Bongers, 2010

- Duration of symptoms <3 months before presentation had a positive effect on recovery.

van den Berg, 2005

- Approximately 80% of the children adequately treated early in their course recovered without using laxatives at 6-month follow-up, compared with only 32% of the children with a delay in treatment.

Tabbers, 2013

What Is the Prognosis of Functional Constipation in Children?

- Among patients referred to pediatric gastroenterologists 50% will recover (≥ 3 bowel movements per week without fecal incontinence) and be without laxatives after 6 to 12 months.

- Approximately an additional 10% are well while taking laxatives, and 40% will still be symptomatic despite use of laxatives.

- A total of 50% and 80% of the children are recovered after 5 and 10 years, respectively, with the vast majority of patients no longer taking laxatives.

- In patients referred to pediatric gastroenterologists ,a delay in initial medical treatment for >3 months from symptom onset correlates with longer duration of symptoms.

Tabbers, 2013

How should we deal with the problem?

- Education of parents and family doctors is needed for early recognition of functional constipation.
- Taking preventive measures to prevent the condition from worsening.
- Educating parents not to give their children medication on their own.
- Educating primary care physicians that the first choice drug for the treatment of functional constipation in children older than 6 months is Macrogol.
- Educating primary care physicians on how to dose Macrogol for disimpaction, what is the maintenance dose, duration of treatment and how to discontinue treatment.