

Constipation in Children.

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Abstract: Constipation, defined as a delay or difficulty in defecation, present for 2 or more weeks, is a common pediatric problem encountered by practitioners. Most childhood constipation results from intentional withholding of stool following a painful experience with defecation. Constipation and encopresis typically are categorized as functional GI disorders. As discussed in detail later, increasing evidence suggests that dietary, lifestyle, cognitive, emotional/behavioral, and broader psychosocial factors may all play a role in the etiology, maintenance, and clinically effective treatment of functional GI disorders. Because of the multifactorial nature of constipation, a holistic approach to its assessment and treatment, treatment should include education, evacuation of the rectum with oral or rectal laxatives if an impaction is present, laxatives to ensure soft stools and behavior modification.

INTRODUCTION

Constipation is a common problem which is encountered in adults as well as children, approximately 3% of general pediatric outpatient visits and 25% of pediatric gastroenterology. Consultations are related to a perceived defecation disorder¹.

Yet, only a small minority of children has an organic cause for constipation. Beyond the neonatal period, the most common cause of constipation is functional and has been called idiopathic constipation, functional fecal retention, and fecal withholding.

In most cases the parents are worried that the child's stools are too large, too hard, painful, or too infrequent. The normal frequency of bowel movements at different ages has been defined (Table 1). Infants have a mean of 4 stools per day during the first week of life. This frequency gradually declines to a mean average of 1.7 stools per day at 2 years of age and 1.2 stools per day at 4 years of age^{2,3}. Some normal breast-fed babies do not have stools for several days or longer⁴. After 4 years, the frequency of bowel movements remains unchanged.

Table 1: Normal Frequency of bowel movements

Age	Bowel Movement/week	Bowel Movement/Day
0-3 month Breast fed	5-40	2.9
0-3 Months Formula fed	5-28	2.0
6-12 Months	5-28	1.8
1-3years	4-21	1.4
More than 3 years	3-14	1.0

DEFINITION

Constipation is defined as delay or difficulty in defecation, present for 2 or more weeks, sufficient to cause significant distress to the patient⁵.

It is also defined as Frequency of bowel movements less than 3 per week, more than 1 episode of fecal incontinence per week, large stools in the rectum or palpable on abdominal examination, passing of stools so large that they obstruct the toilet, retentive posturing and withholding behavior, and painful defecation⁶.

ETIOPATHOGENESIS

Disruption of the normal physiology leads to constipation. Constipation may, result from defective or impaired propulsion, defective or impaired sensation or outlet obstruction

Defective/Impaired Propulsion

- Diet deficient in bulk-producing fiber

- Milk protein allergy
- Neuropathy or myopathy of the gastrointestinal tract
- Metabolic abnormalities such as hypo/hypercalcemia, hypothyroidism, Cystic fibrosis, celiac disease
- Genetic predisposition
- Medications such as narcotics, psychotropics and anticholinergics

Defective/Impaired Sensation

- Primary sensory impairment such as from spinal cord abnormalities
- Secondary sensory impairment as in case of megarectum resulting from chronic fecal retention.

Outlet Obstruction

- Mechanical as in anal stenosis, Hirschsprung's disease, imperforate anus, pelvic or sacral mass, anal or colonic stricture, anteriorly displaced anus.
- Functional as in intentional fecal retention, pelvic floor dyssynergia

Constipation seen in childhood is usually functional in 97% of children with frequency equal in male and females⁷.

However prior to labeling as functional one has to look for congenital anorectal malformations, underlying neurological, endocrinal and metabolic causes.

Several hypotheses have been made with constipation, functional constipation usually starts as a painful bowel movement due to various reasons which make the child withhold stool in fear of pain next time it moves its bowel, and this becomes a cycle as withholding stool makes the stool even harder and takes more pain and time to pass.

In functional constipation it's seen that child responds to the urge to defecate by voluntarily contracting the external anal sphincter and glutei muscles to withhold the stool. Child adopts various postures like standing with legs crossed and straining to hold stool which is known as fecal withholding⁸, with time this lead to inhibition of reflex defecation and reduced rectal movement and rectum is filled with harder stool and fecal soling follows.

EVALUATION OF A CHILD WITH CONSTIPATION

A thorough history is very important part of complete evaluation of a child with constipation. Important information includes the time after birth of the first bowel movement, what the family or child

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means when using the term constipation, the length of time the condition has been present, the frequency of bowel movements, the consistency and size of the stools, whether defecation is painful, whether blood has been present on the stool or the toilet paper, and whether the child experiences abdominal pain. Fecal soiling may be mistaken for diarrhea by some parents. A history of stool-withholding behavior reduces the likelihood that there is an organic disorder. Medications are an important potential cause of constipation.

During evaluation we should attempt to identify Red flag signs which favor Organic diseases, these red flag signs are:

- Failure to thrive
- Abdominal distension
- Lack of lumbosacral curve
- Pilonidal dimple covered by a tuft of hair
- Midline pigmentary abnormalities of the lower spine
- Sacral agenesis
- Flat buttocks
- Anteriorly displaced anus
- Patulous anus
- Tight, empty rectum in presence of palpable abdominal fecal mass
- Gush of liquid stool and air from rectum on withdrawal of finger
- Occult blood in stool
- Absent anal wink
- Absent cremasteric reflex
- Decreased lower extremity tone and/or strength
- Absence or delay in relaxation phase of lower extremity deep-tendon reflexes

The physical examination should include all body systems so as to exclude any systemic illness complicated by constipation

Apart from the detailed systemic examination some important examination points to be included are

- Abdomen
 1. Distension; 2. Palpable liver and spleen; 3. Fecal mass
- Anal
 1. inspection; 2. Position; 3. Stool present around anus or on clothes; 4 Perianal erythema; 5. Skin tags; 6. Anal fissures
- Rectal examination
 1. Anal wink; 2. Anal tone; 3. Fecal mass; 4. Presence of stool; 5. Consistency of stool; 6. Other masses; 7. Explosive stool on withdrawal of finger; 8. Occult blood in stool
- Back and spine examination
 1. Dimple; 2. Tuft of hair;
- Neurological examination
 1. Tone; 2. Strength; 3. Cremasteric reflex; 4. Deep tendon reflexes

ROLE OF X-RAY AND TRANSIT STUDY IN CONSTIPATION

An abdominal radiograph is not indicated to establish the presence of fecal impaction if the rectal examination reveals the presence of large amounts of stool. A retrospective study was done in children manifesting encopresis showed that a moderate to large amount of stool found on rectal examination has high sensitivity and positive predictive value (greater than 80%) for fecal retention determined by abdominal radiograph, even using the radiologist's subjective interpretation ⁹.

As per current recommendation of NASPGHAN when ever there is

doubt about whether the patient is constipated, a plain abdominal radiograph is reliable in determining the presence of fecal retention in the child who is obese or refuses a rectal examination, or in whom there are other psychological factors (sexual abuse) that make the rectal examination too traumatic. It may also be helpful in the child with a good history for constipation who does not have large amounts of stool on rectal examination ¹⁰.

Some patients have a history of infrequent bowel movements but have no clear findings of constipation, the history obtained may also be not as clear and in these patients an evaluation of Colonic transit time with radiopaque markers can be helpful ¹¹. The quantification of transit time shows whether constipation is present and provides an objective evaluation of bowel movement frequency. If the transit time is normal; the child does not have constipation. If the transit time is normal and there is no soiling, the child needs no further evaluation. If the transit study is abnormal or fecal impaction is present, further evaluation is needed.

TREATMENT

Patients with an identifiable organic cause for constipation should have the underlying cause appropriately treated medically or surgically

Management of children with functional constipation:

The management of the child with functional constipation includes the following steps:

1. Determine whether fecal impaction is present, treat the impaction if present
2. Initiate treatment with oral medication,
3. Provide parental education and close follow-up,
4. Adjust medications as necessary

DISIMPACTION

Fecal impaction is present if hard mass is felt in the lower abdomen identified during physical examination, a dilated rectum filled with a large amount of stool found during rectal examination, or excessive stool in the colon identified by abdominal radiography.

It can be done by either oral or rectal routes, In few uncontrolled clinical trials, disimpaction by the oral route, the rectal route, or a combination of the 2 has been shown to be effective ¹². However there are no randomized studies that compare the effectiveness of 1 with the other. The oral approach is not invasive and gives a sense of power to the child, but adherence to the treatment regimen may be a problem. The rectal approach is faster but is invasive.

Polyethylene glycol is ideal for oral disimpaction, in a dose of 20ml/kg/hr and can be repeated the next day if required. Single dose prokinetic agent like metaclopramide may be given half an hour prior to lavaging.

Rectal disimpaction may be performed with phosphate soda enemas, saline enemas, or mineral oil enemas followed by a phosphate enema. The use of soap suds, tap water, and magnesium enemas is not recommended because of their potential toxicity. Rectal disimpaction has also been effectively performed with glycerin suppositories in infants and bisacodyl suppositories in older children.

MAINTENANCE THERAPY

After disimpaction treatment should aim to prevent re-impaction by maintenance therapy. This treatment consists of dietary interventions, behavioral modification, and laxatives to assure that bowel movements occur at normal intervals with good evacuation.

Dietary changes are commonly advised, particularly increased intake of fluids and absorbable and non-absorbable Carbohydrate. There

Laxatives	Dosage	Side effects/Issues
Osmotic Lactulose	1-3 mL/kg/day in divided doses; available as 70% solution.	Flatulence, abdominal cramps; hypernatremia has been reported when used in high dosage for hepatic encephalopathy; case reports of nontoxic megacolon in elderly
Sorbitol	1-3 mL/kg/day in divided doses; available as 70% solution	Same as above
Barley malt extract	2-10 mL/240 mL of milk or juice	Unpleasant odor. Suitable for infants drinking from a bottle
Magnesium hydroxide	1-3 mL/kg/day of 400 mg/5 mL.	Infants are susceptible to magnesium poisoning. Overdose can lead to hypermagnesemia, hypophosphatemia and secondary hypocalcemia
Magnesium citrate	<6 Years, 1-3 mL/kg/day; 6-12 years, 100-150 mL/day; 9-12 years, 150-300 mL/day; in single or divided doses.	Infants are susceptible to magnesium poisoning. Overdose can lead to hypermagnesemia, hypophosphatemia and secondary hypocalcemia.
PEG 3350	Disimpaction: 1-1.5 g/kg/day for 3 days, Maintenance 1 g/kg/day	
Osmotic enema Phosphate	<2 Years old: to be avoided; >2 years old: 6 mL/kg up to 135 mL	Risk of mechanical trauma to rectal wall, abdominal distention or vomiting. May cause severe and lethal episodes of hyperphosphatemia hypocalcemia, with tetany
Lavage Polyethylene Glycoelectrolyte solution	For disimpaction: 25 mL/kg/hr (to 1000 mL/hr) by nasogastric tube until clear or 20 mL/kg/hr for 4 hr/day. For maintenance: (older children): 5-10 mL/kg/per day	Difficult to take. Nausea, bloating, abdominal cramps, vomiting, and anal irritation. Aspiration, pneumonia, pulmonary edema, allergy Y Weiss tear. Safety of long-term maintenance not well established
Lubricant Mineral oil	<1 Year old: not recommended. Disimpaction: 15-30 mL/yr of age, up to 240 mL daily. Maintenance: 1-3 mL/kg/day	Lipoid pneumonia if aspirated. Theoretical interference with absorption of fat/soluble substances, but there is no evidence in the literature. Foreign-body reaction in intestinal mucosa.
Stimulants Senna	2-6 years old: 2.5-7.5 mL/day; 6-12 years old: 5-15 mL/day.	Idiosyncratic hepatitis, Melanosis coli, Hypertrophic osteoarthropathy, analgesic nephropathy
Bisacodyl	2 Years old: 0.5-1 suppository 1-3 tablets per dose.	Abdominal pain, diarrhea and hypokalemia, abnormal rectal mucosa, and (rarely) proctitis. Case reports of urolithiasis
Glycerin suppositories		No side effects
Bulking Agent: Psyllium	Age (yrs) + 5 gms	

are conflicting reports about the role of dietary fiber, with evidence that constipated children have a lower, equivalent or higher intake of dietary fiber ^{13,14,15,16}.

Behavioral Modification is a important component of treatment and it also includes a regular toilet habits. Unhurried time on the toilet after meals is recommended. As part of the treatment of constipation, it is usually helpful to have children and their caregivers keep diaries of stool frequency.

Medications are usually necessary to help constipated children achieve regular bowel movements. A prospective, randomized trial done showed that the addition of medications to behavior management in children with constipation is beneficial ¹⁷. Children who received medications achieved remission significantly sooner than children who did not. The use of laxatives was most advantageous

for children until they were able to maintain regular toilet habits. Below is a list of commonly used laxatives with there does and specific side effects:

EDUCATION

The education of the family and giving an explanation of the pathogenesis of constipation, are the most important steps in treatment. If fecal soiling is present, would always attempt to remove negative attributions. It is especially important for parents to understand that soiling from overflow incontinence is not a willful and defiant maneuver. Parents are encouraged to maintain a positive and supportive attitude in all aspects of treatment.

FOLLOW UP

The successful management of functional constipation in childhood depends on close follow-up till normal bowel movement is achieved and this is flowed by a periodic revive every 2-3 months for next 2-3 years and then yearly afterwards.

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