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Constipation in Children: An Example of A Conflict Situation

Author(s)

Derya Altay

Affiliation(s)

Erciyes University Faculty of Medicine, Department of Pediatric Gastroenterology, Kayseri, Turkey

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Abstract

Constipation is a prevalent issue in the pediatric population and is predominantly of functional origin. It often presents with symptoms such as abdominal pain, vomiting, and anorexia, making it a significant complaint among young patients. A comprehensive patient history and physical examination are typically sufficient for the diagnosis of functional constipation. Early intervention and patient and parent education are crucial for the success of treatment, which involves dietary adjustments, toilet training, and medical interventions. This review outlines an approach to managing constipation in children.

Keywords: Constipation, functional, pediatrics

Introduction

Constipation is a common public health concern worldwide, with its impact evident in both general pediatric outpatient visits (3%) and pediatric gastroenterology outpatient visits (30%).[1] Contrary to parental expectations, most constipated children have normal large intestines. Approximately 95% of constipation cases in childhood are of functional origin, with organic pathologies typically diagnosed during the early stages of life. The diagnosis of functional constipation is based on the Rome IV criteria (**Table 1**). The major causes of constipation in children are listed in **Table 2**, and the risk factors differentiating organic constipation from functional constipation are outlined in **Table 3**.[2,3]

Frequency of Defecation

The frequency of defecation varies among healthy infants, with exclusive breastfeeding often associated with more frequent bowel movements in the early weeks of life. Breastfed newborns may have as many as 1-8 defecations daily during the first weeks of life.[4,5] A study conducted in our country found that approximately one-fourth of infants fed both breast milk and formula defecate once a week in the second month.[6] Healthy children in our country defecate 3-4 times a day during the first 6 months, twice a day between 1 and 2 years, and once a day between 3 and 6 years.[7] Although there is variability in defecation frequency, normal stool consistency is the key distinguishing factor, and infrequent defecation

Correspondence: Derya Altay, Erciyes University Faculty of Medicine, Department of Pediatric Gastroenterology, Kayseri, Turkey
E-mail: dr.deryaaltay@gmail.com **ORCID:** 0000-0002-7415-1595

with normal stool consistency is not classified as constipation.

Constipation Can be Confused with Infant Dyschezia

Infant dyschezia is a functional gastrointestinal disorder in infants under 9 months of age and is characterized by the inability to relax pelvic floor muscles during defecation. Soft stool typically follows at least 10 min of straining, and this disorder typically resolves as infants grow.[8]

Main periods of stool withholding behavior patterns in childhood:[9,10]

1- Complementary feeding period in infancy due to the transition to solid foods

2- During toilet training by strict parents

3- Starting school because of fear or feeling uncomfortable using any toilet outside the home

Children may experience constipation during any of these periods or exhibit withholding behavior following painful and hard defecation for any reason.

Pathophysiology of Constipation

The majority of children with constipation experience functional constipation because of low-fiber diets and stool withholding behaviors without an organic cause.[11] Hard, painful defecation leads to the persistence of withholding behaviors. Children may assume back-arching positions or engage in specific behaviors such as standing on their toes, extending their legs, or rocking back and forth in response to hard, painful, and large defecation.[12] Chronic withholding behavior can lead to fecal impaction. Prolonged retention of stool in the large intestine and rectum results in stool hardening due to water absorption, causing liquid stool from the proximal colon to leak around the hard stool into the underwear, potentially leading to fecal incontinence without the patient's awareness. As withholding behavior continues, compliance increases in the rectum, which can result in megarectum development, with larger stool volumes remaining in the rectum and longer defecation intervals.

Slow transit constipation, which is categorized as a functional disorder, is caused by disturbances in the autonomic and enteric nervous systems. These disturbances result from an increased concentration of

Table 1.
Functional constipation diagnostic criteria (Rome IV criteria)

<4 years of age, at least two of the following for at least one month:
1- Two or fewer defecations per week
2- History of excessive stool accumulation
3- Painful and difficult defecation
4- Large-scale defecation
After acquiring toilet skills, it should includethe following:
1- History of fecal incontinence at least once a week
2- A history of large-scale defecation that may even clog the toilet

Table 2.
Etiology of constipation in children[2]

Functional	**Intestinal**	**Neurological**
	Hirschsprung disease	Spinal cord trauma, anomalies, and tumor
	Anorectal malformation	Neurofibromatosis
	Neuronal intestinal dysplasia	Cerebral palsy
	Celiac disease	Tethered cord
	Cow's milk protein allergy	
	Cystic fibrosis	
Metabolic	**Drugs**	**Others**
Hypothyroidism	Opioids	Anorexia nervosa
Diabetes mellitus	Anticholinergics	Sexual abuse
Hypercalcemia	Antidepressants	Scleroderma
Hypokalemia	Diuretics	Heavy metal ingestion (lead, mercury)
Vitamin D intoxication		

Table 3.
Risk factors for organic constipation[3]

Early-onset constipation (<1 month)	Anal position abnormality
Abdominal distension	Thyroid gland abnormalities
Delayed meconium passage (>48 h)	Megarectum
Ribbon stools	Gluteal cleft deviation
Visible or occult blood in stool	Absence of the anal reflex
Failure to thrive	Decreased lower extremity reflex
Fever	Spina bifida
Bilious vomiting	Perianal fistula/scars
Lack of a lumbosacral curve	Family history of Hirschsprung disease

colonic mast cells contributing to visceral hypersensitivity and a decrease in colonic Cajal cells, often referred to as pacemaker cells. Chronic withholding behavior can lead to slow transit constipation. Slow transit constipation also plays a role in constipation-predominant irritable bowel syndrome.[13]

Although approximately half of the children with functional constipation have a positive family history, no genetic mutation is typically identified. Family history assumes more significance when organic diseases, such as cystic fibrosis and Hirschsprung disease, are considered. Family history is also relevant to functional constipation because of shared social environments and nutritional habits within the family. Low dietary fiber intake, excessive consumption of junk food, and insufficient physical activity have been associated with constipation.[14]

Chronic constipation may lead to fecal incontinence (encopresis). Fecal incontinence can be categorized as retentive or non-retentive, with the former being more common. Non-retentive fecal incontinence is characterized by a lack of fecal accumulation in the rectum, normal fecal consistency, and fecal leakage due to inadequate toilet training, psychiatric issues, rectosigmoid colon surgery, or proctitis.[15]

Diagnosis of Constipation

The differentiation between functional and organic constipation was initially established through a comprehensive patient history and physical examination. The Rome IV criteria are valuable for diagnosing functional constipation. Laboratory assessments are essential, especially for children with risk factors for organic constipation. In cases of intractable constipation, it is advisable to evaluate serum calcium and phosphorus levels, thyroid function tests, and celiac serology.[16]

Signs such as delayed meconium passage, failure to thrive, and abdominal distension may suggest Hirschsprung disease or neuronal intestinal dysplasia. Although contrast enema can offer diagnostic clues for Hirschsprung disease, rectal biopsy is necessary to distinguish between these two conditions. Histopathologically, Hirschsprung disease is characterized by the absence of ganglion cells in the submucosal and myenteric plexus, whereas neuronal intestinal dysplasia shows hyperplasia in the submucosal nerve plexuses.[17]

Neurogenic bowel dysfunction results in chronic constipation, particularly in patients with spina bifida and spinal cord anomalies. The initial diagnostic assessment for these patients involves medical history and examination of the anal sphincter tone, with absent anal reflexes indicating spinal cord injury below the L1 vertebrae.[18]

Cow's milk protein allergy is the most common non-IgE-related food allergy, which affects gastrointestinal motility. This condition typically results in diarrhea, but constipation can also occur. Constipation may develop because of the early introduction of cow's milk after breastfeeding. Inflammation, stool-withholding behavior, and abnormal anal sphincter function contribute to food allergy-related constipation. Allergy tests are not diagnostic because the immune reaction is not IgE-related. Treatment typically involves an elimination diet.[19]

Routine use of abdominal radiography, transabdominal rectal ultrasonography, or colonic scintigraphy for the diagnosis of constipation is not recommended because of insufficient evidence. Similarly, spinal MRI is not recommended for children without neurological disorders.[11] Colon transit time, a method based on the passage time of radio-opaque plastic markers through the colon via X-ray imaging on the fourth day after ingestion, can be employed to differentiate functional constipation from functional non-retentive fecal incontinence. However, it is not routinely used for diagnosing functional constipation.[11] Anorectal manometry can measure sphincter function and anorectal coordination, and colonic manometry can predict the effectiveness of antegrade continence enema. However, due to their invasiveness and limited data in children, these tests are not typically included in the diagnosis of constipation. The wireless motility capsule is a non-invasive, non-radioactive method that can offer insights into colonic motility; however, research in children remains limited.[2]

Treatment Strategies for Constipation

Treating constipation requires addressing fecal impaction before proceeding to maintenance therapy. Patient education on daily defecation, prevention of fecal impaction, regular toilet use, and adherence to medical treatment is crucial. Explaining the constipation mechanism through illustrations to patients and their families can enhance treatment compliance. Patience is a fundamental aspect of treatment.

A low-fiber diet significantly contributes to functional constipation, underscoring the importance of ensuring sufficient daily fiber intake. A rule of thumb is to provide fiber intake equivalent to the child's age in years plus 5-10 g/day for children older than two years. **Table 4** illustrates the fiber content of the various foods. Adequate water intake is also essential for children.

Toilet training should be conducted with a supportive and positive approach between 18 and 24 months of age, avoiding insistence during constipation. Children should be encouraged to sit on the toilet 1-3 times a day for 5 min after meals. For children, using a step stool and decorating the toilet with their favorite cartoon characters can create a more welcoming environment. With increased dietary fiber intake and medical treatment, withholding behavior gradually diminishes as defecation becomes painless.

Although most patients experience functional constipation, organic diseases may be diagnosed in a small portion of cases and treated accordingly. In infants, the treatment of functional constipation involves ensuring adequate fiber intake and limiting excessive dairy consumption. Rectal stimulating objects are not recommended because of potential anal mucosal trauma. Mineral oil, bisacodyl, and enemas containing phosphate are also discouraged in infants, with lactulose

Table 4.
Dietary fiber contents of some foods (fiber g/100 g edible part of food)[20]

Food	Fiber	Food	Fiber	Food	Fiber
Wheat bran	33.75	Avocado	9.70	Flaxseed	35.06
Bread wheat	12.66	Pear	3.50	Black cumin	37.14
Ashura wheat	13.80	Carrot	2.58	Carob	25.83
Einkorn wheat	11.30	Apple	1.91	Sesame	19.88
White bread	4.32	Orange	1.89	Coconut (dry)	18.91
Gluten-free read	5.44	Peach	1.82	Pestil	3.06
Dry beans	32.17	Cherry	1.89	Garlic	2.64
Chickpea	23.03	Banana	1.69	Tahini	12.78
Lentils	25.99	Strawberry	1.98	Raisins	7.20
Bulgur	6.79	Apricot	1.24	Blueberries	2.73
Semolina	4.57	Pineapple	3.15	Leaf wrap	3.86
Rice	3.46	Watermelon	0.54	Prune (dry)	12.18
Apricot kernel	17.67	Artichoke	4.74		
Peanuts	12.54	Pumpkin	1.63		
Almond	12.00	Potato	1.54		
Nuts	11.54	Tomato	1.10		
Walnut	11.50	Green beans	2.08		
Fig	10.06	Spinach	2.27		
		Okra	3.36		
		Lettuce curly	2.09		

and glycerin suppositories serving as effective treatment options for this age group

Osmotic laxatives constitute the first-line treatment by increasing the osmotic load in the lumen and retaining water, thus softening stool consistency. Stimulant laxatives, considered second-line therapy, enhance intestinal motility and prevent epithelial water and electrolyte transport. It is important to note that laxatives may have side effects such as diarrhea and abdominal cramping, which can be mitigated through dose adjustments. **Table 5** lists the medical treatment options for constipation.

In cases with fecal impaction (hard feces accumulation in the rectum), fecal disimpaction should be performed before starting maintenance treatment to ensure the success of treatment and patient compliance. Polyethylene glycol is the preferred choice for disimpaction. Rectal applications for disimpaction should be avoided whenever possible because of their invasiveness and traumatic nature. For children with chronic intractable constipation or neurogenic bowel dysfunction, treatment options may include transanal irrigation, antegrade colonic enema, or surgical methods such as resection or ostomy.[21]

Medical treatment should be continued for a minimum of two months, with no complaints of constipation for one month before considering treatment reduction and discontinuation.[11] Non-pharmacological treatments, such as prebiotics, probiotics, synbiotics, biofeedback, abdominal massage therapy, and alternative medicine, are not recommended for treating functional constipation.[11] **Figure 1** shows the approach to constipation in children.

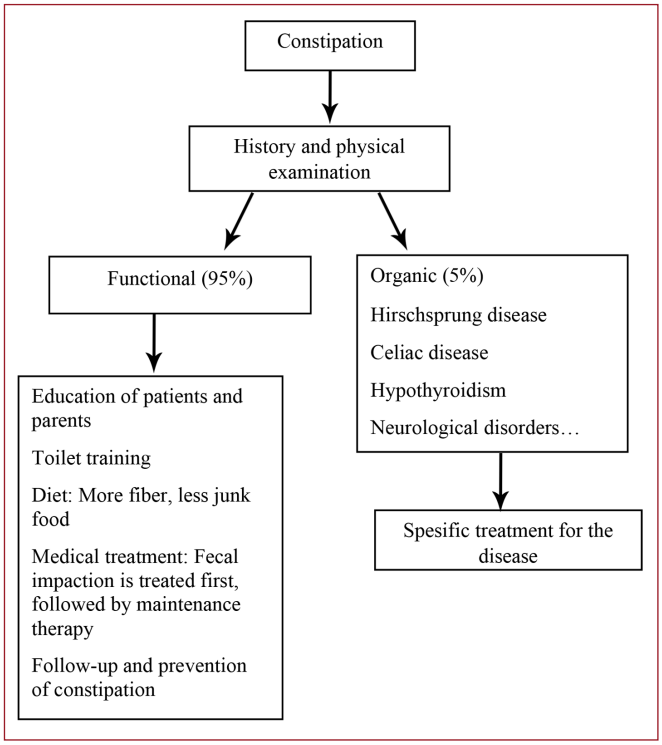

Figure 1. Approach to constipation in children

Children with Neurological Disorders: Patients Prone to Constipation

Constipation is a frequent issue among children with neurological disorders, particularly in tube-fed patients. Prolonged immobility, inadequate fiber intake, and antiepileptic medications contribute to constipation. Diagnosis in these cases involves a comprehensive history, abdominal and perineal examination, evaluation

Table 5.
Medical treatment options for constipation[2]

Osmotic laxatives	Stimulant laxatives	Rectal enemas
Lactulose (any age) 1-2 mL/kg/day	Senna (>2 years) 7.5-15 mg/kg/day	Sodium phosphate (>1 year) 2.5 mg/kg
PEG (any age) 0.4-0.8 g/kg/day; 1-1.5 g/kg/day for fecal impaction	Bisacodyl (>2 years) 5-10 mg/day	Bisacodyl 5 mg/day for 2-12 years; 5-10 mg/day for more than 12 years
Magnesium hydroxide (>2 years) 1-3 mL/kg/day	Sodium picosulfate 3 mg/day for 4-5 years; 4-6 mg/day for more than 6 years	Saline enema 5 mL for <1 kg, 10 mL for more than 1 kg; 6 mL/kg/day for more than 1 year
	Glycerine suppository (<1 yr) half of the pediatric form/day	

PEG; Polyethylene glycol

of anal reflex, and assessment of the density of feces in the rectum through rectal touch. In cases where the diagnosis is uncertain, plain abdominal radiography may be performed. Colon transit time testing can provide quantitative evaluation, with the delay in colonic transit time correlating with the severity of neurological impairment. Treatment typically involves enemas followed by laxatives, although these may be less effective in patients not receiving sufficient fluids and fiber. It is essential to consider the risk of aspiration pneumonia when using laxatives, particularly in patients with neurological disorders. For cases that are unresponsive to standard medical therapy, antegrade continence enema may be a viable option.[22]

In conclusion, constipation is a common symptom in children and is mainly of functional origin. Preventing constipation, which is typically functional, should be a priority. Ensuring adequate fiber and fluid intake and conducting sensitive toilet training for children are critical in this regard. In cases of constipation occurring before six months of age, healthcare professionals should evaluate potential organic causes such as Hirschsprung disease, anatomical anomalies, metabolic disorders, cow's milk protein allergy, and neurological issues. A thorough patient history and physical examination are generally sufficient to distinguish between functional and organic pathologies. Informing patients and their families about the nature of constipation plays a vital role in treatment compliance.

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