

# *Functional Constipation and Incontinence*

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# NORMAL STOOLING PATTERN

- ▶ Stool frequency changes in children with age.
- ▶ The stool frequency gradually declines from more than four stools per day during the first week of life to one to two stools per day by the age of 4 years.
- ▶ Differences in stooling frequency have been observed between healthy breast-fed and formula-fed infants

# EPIDEMIOLOGY

- ▶ Constipation is a common symptom in children, accounting for 3% to 10% of general pediatric outpatient visits and up to 25% of visits to pediatric gastroenterologists
- ▶ The worldwide prevalence varies from 0.7% to 29.6%.

## **BOX 11-1** *Rome III Criteria for Pediatric Functional Constipation*

Diagnostic criteria must include:

- Two or more criteria for at least 1 month in infants up to 4 years
- Two or more symptoms for at least once per week for at least 2 months in children at least 4 years
  1. Two or fewer defecations per week
  2. At least one episode of fecal incontinence per week
  3. History of retentive posturing or excessive 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 stool that may obstruct the toilet
  7. Additional criteria: without fulfilling irritable bowel syndrome criteria

## TABLE 11-1 CAUSES AND RISK FACTORS OF CONSTIPATION

Intestinal causes	Hirschsprung's disease Anorectal malformation Neuronal intestinal dysplasia
Neuropathic conditions	Spinal cord abnormalities Spinal cord trauma Neurofibromatosis Static encephalopathy Tethered cord
Metabolic, endocrine causes	Hypothyroidism Diabetes mellitus Hypercalcemia Hypokalemia Vitamin D intoxication
Drugs	Opioids Anticholinergics Antidepressants
Other causes	Anorexia nervosa Sexual abuse Scleroderma Cystic fibrosis Dietary protein allergy

# CLINICAL EVALUATION AND DIAGNOSIS

- ▶ The physician should be aware of symptoms and signs of organic causes or red flag symptoms.
- ▶ It is important to emphasize that constipation and fecal incontinence are clinical diagnoses that are primarily based on symptoms in the absence of red flag symptoms, and therefore in the majority of patients no further testing is needed.

# HISTORY

- ▶ The medical history should include questions about the time of the first bowel movement after birth.
- ▶ It is well known that more than 99% of term newborns pass meconium in the first 48 hours of life.
- ▶ Because maturation of the intestinal motor function is delayed in preterm infants, they consequently may have a delay in the passage of the first stool.
- ▶ In addition, failure to pass the meconium within the first 24 hours of life raises the suspicion for HD.

# HISTORY

- ▶ Other important questions include the age of onset; frequency, consistency, and size of stools; whether the child experiences pain during defecation or exhibits retentive posturing; and whether blood is present on the toilet paper.
- ▶ Large caliber stools, which may be large enough to clog the toilet, may cause anal fissures, commonly manifested as blood on the toilet paper.
- ▶ Information about the incontinence frequency and day and/or nighttime soiling must be obtained.
- ▶ Fecal incontinence can be mistaken for diarrhea by some parents

# HISTORY

- ▶ Physicians should ask about the presence of abdominal pain or distension, loss of appetite, fever, nausea, vomiting, weight loss or poor weight gain, problems with neuromuscular development, and psychological or behavioral problems.
- ▶ Dietary history and the history of previous treatment strategies for constipation should be investigated.
- ▶ Finally, it is essential to ask about important life events that might contribute to the development of retentive behavior such as death in family, birth of a sibling, school problems, and sexual abuse.

# PHYSICAL EXAMINATION

- ▶ A thorough physical examination should be performed in all children and should start with measurement of weight and height.
- ▶ Obesity is a clear predisposing factor for developing chronic constipation, and metabolic or endocrine disorders may lead to short stature and growth restriction.
- ▶ Abdominal examination provides valuable information concerning the accumulation of gas or feces.
- ▶ Palpable fecal masses are present in 50% of children with chronic constipation.

# PHYSICAL EXAMINATION

- ▶ Evaluation of the perianal region provides valuable information about the position of the anus, evidence of fecal incontinence, skin irritation, eczema, fissures, hemorrhoids, and signs of possible sexual abuse.
- ▶ The anorectal digital examination assesses the perianal sensation, anal tone, size of the rectum, and the contraction and relaxation of the anal sphincter.
- ▶ The lumbosacral area should be inspected for the presence of a sacral dimple, a tuft of hair, or asymmetry of the buttocks, which may indicate spina bifida occulta.

# LABORATORY INVESTIGATIONS

- ▶ The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) and the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) formulated in their recommendations that routine laboratory testing to screen for hypothyroidism, celiac disease, and hypercalcemia is not recommended in children with constipation in the absence of alarm symptoms.

- ▶ Evidence is conflicting for allergy testing to diagnose cow's milk protein (CMP) allergy in children with functional constipation.

# RADIOLOGIC INVESTIGATIONS

## ▶ Abdominal Radiography

- ▶ The sensitivity and specificity of abdominal radiography in diagnosing childhood constipation range from 60% to 80% and from 43% to 90%, respectively.
- ▶ On the basis of currently available evidence, the National Institute for Health and Care Excellence guideline and the new ESPGHAN/NASPGHAN constipation guidelines concluded that abdominal radiography should not be recommended as an additional test for constipation in children, and therefore has no role in the diagnosis of functional constipation.
- ▶ Radiography is useful only for determining the presence of a fecal rectal mass when there is uncertainty as to whether the patient is constipated and **rectal examination is not possible because of obesity, refusal, or psychological factors (sexual abuse) that make a rectal examination too traumatic**

# Colonic Transit Time

- ▶ Consequently, CTT is assumed to be decreased in children with idiopathic constipation in comparison to healthy children.
- ▶ CTT can be measured with the following noninvasive techniques: radiopaque Sitz (plastic) markers

- ▶ Three different patterns of CTT can be described on colonic transit studies.
  - ▶ normal colonic transit
  - ▶ colonic inertia (also known as slow-transit constipation with slow propagation throughout all colonic segments)
  - ▶ outlet obstruction (delay is mainly in the rectosigmoidal region).
- ▶ Outlet obstruction is the most commonly encountered form in pediatric functional constipation.
- ▶ However, a CTT study is not recommended for diagnosing constipation, and may only be useful for discriminating between functional constipation and FNRFI and in situations in which the diagnosis is not clear.
- ▶ Furthermore, it is important to emphasize that CTT may be normal in up to 50% of children with constipation and in 90% of the children with FNRFI.



**Figure 11-3.** Delayed colonic transit time. Abdominal radiograph shows sitz markers throughout the colon.

# ULTRASONOGRAPHY

## ▶ Abdominal Ultrasonography

- ▶ Based on the assumption that fecal retention is one of the main features of constipation, assessment of stool retention and size of rectum and colon are measured using abdominal ultrasonography.
- ▶ A rectal diameter larger than 30 mm is considered as enlarged, and some studies have demonstrated that the diameter of the rectum is significantly larger among constipated children compared to healthy children.
- ▶ On the other hand, transabdominal ultrasound has been shown to be a reliable alternative to assess the rectal filling state, and might replace digital rectal examination in the evaluation of fearful children with constipation

# CONTRAST ENEMA

- ▶ Contrast enema is a radiologic technique using contrast to visualize the anal canal and rectum.
- ▶ This technique is useful in identifying anatomic abnormalities but is unnecessary in uncomplicated constipation.
- ▶ A contrast enema is often used in the diagnostic work-up of HD, in which a transition zone between aganglionic and ganglionic bowel may be observed.

# MANOMETRY

## ▶ Anorectal Manometry

- ▶ Anorectal manometry is only indicated to demonstrate the presence of the rectoanal inhibitory reflex, which is absent in children with anal achalasia or in children with HD.
- ▶ When the rectoanal inhibitory reflex is absent, the diagnosis of HD must be confirmed by histochemical evaluation of the rectum.
- ▶ Anorectal manometry can be useful in differentiating between constipation-associated fecal incontinence and FNRFI.
- ▶ It has been shown that children with constipation associated Fecal incontinence have higher thresholds for rectal sensation than those with FNRFI.

# ▶ Colonic Manometry

- ▶ Colonic manometry is a diagnostic test performed only in specialized motility centers to differentiate between normal colonic motor function and colonic neuromuscular disorders in the evaluation of children with intractable constipation.
- ▶ This test is used in clinical practice in children with severe constipation when medical therapy fails to identify children who may benefit from surgery, such as the creation of an antegrade continence enema.

# MAGNETIC RESONANCE IMAGING

- ▶ To date, evidence does not support the use of magnetic resonance imaging (MRI) of the spine in patients with intractable constipation without other neurologic abnormalities.
- ▶ A recent study involving children with defecation disorders (constipation, constipation-associated fecal incontinence, and FNRFI) reported spinal cord abnormalities (such as an intradural lipoma or tethered cord) in only 3% of affected children.
- ▶ Imaging of the spinal cord is therefore recommended only in children presenting with neurologic complaints or physical symptoms, such as gluteal cleft deviation, suggestive of spinal cord abnormalities.

# TREATMENT FOR CONSTIPATION

- ▶ Acute constipation is traditionally treated with a high fiber diet and sufficient fluid intake, filling out a bowel diary, and toilet training
- ▶ The recently published ESPGHAN/NASPGHAN guidelines includes four important phases in the treatment of chronic constipation:
  - ▶ (1) education
  - ▶ (2) disimpaction
  - ▶ (3) prevention of reaccumulation of feces
  - ▶ (4) follow-up

# Goal of treatment

**To have a daily regular bowel movement with**

**soft stools without pain, fear or encopresis.**

# Phase 1: Education

- Effective education of the parents and child with constipation is crucial in changing chronic behavior patterns.
- Treatment requires a team approach involving the patient, family, and health-care provider.

# Education

- ☞ A primary goal is to remove negative attributions.
- ☞ The parent or caretaker must understand the soiling due to overflow incontinence does not constitute willful and defiant behavior by child.
- ☞ The child should not be scolded, or otherwise punished for soiling episodes.

## Phase 2: Disimpaction

- ☞ In children with fecal retention, disimpaction and/or catharsis are usually necessary before maintenance therapy can begin.
- ☞ Disimpaction and catharsis can be effectively accomplished with oral or nasogastric medications, rectal

# Disimpaction

- The parents and child should be involved in the decision regarding the appropriate route.
- Disimpaction can usually be performed in the outpatient setting.

# Disimpaction

## 1. Infants (< 1 year)

- Glycerin enema: 6 ml/kg (max 135 ml) every 12-24 hrs, one to three times, No side effects

## 2. Children (> 1 year)

### A. Enema: - Glycerin

- Mineral oil
- Normal saline: 10-20 ml/kg/dose
- Hypertonic phosphate: 3 ml/kg  
(max: 135 ml), every 12 hrs ×3 doses

# Maintenance therapy

Oral administration

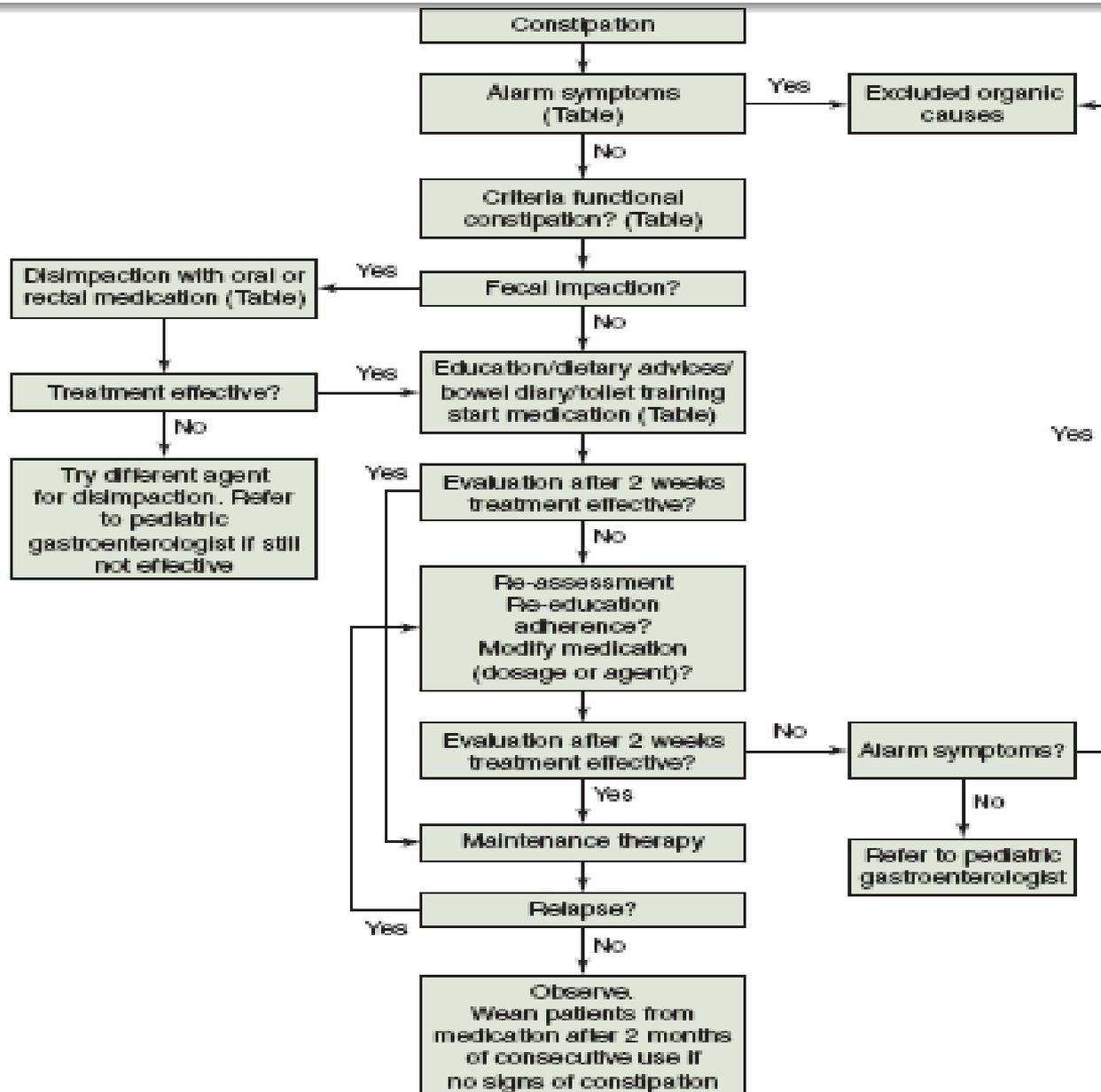
1. lubricant laxative:

- Mineral oil : 1-3ml/kg/day

2. Osmotic laxatives:

- Lactulose: 1-3 ml/kg/day
- Mag. Hydroxid (MOM): 1-3 ml/kg/day
- PEG: 0.4 to 0.8 gr/kg/day (max 1 g/kg/day)
- Sorbitol: 1-3 ml/kg/day

- Mineral oil is contraindicated in infants less than 12 months of age and in children with a risk of pulmonary aspiration (CNS problem, GER) .



**TABLE 11-3 DOSAGES OF MOST FREQUENTLY USED ORAL AND RECTAL LAXATIVES**

Oral Laxatives	Dosages
<i>Osmotic laxatives</i>	
Lactulose	1 to 2 g/kg, once or twice/day
-PEG 3350	maintenance: 0.2 to 0.8 g/kg/day
-PEG 4000	fecal disimpaction: 1 to 1.5 g/kg/day (with a maximum of 6 consecutive days)
Milk of magnesia (magnesium hydroxide)	2 to 5 y: 0.4 to 1.2 g/day, once or divided 6 to 11 y: 1.2 to 2.4 g/day, once or divided 12 to 18 y: 2.4 to 4.8 g/day, once or divided
<i>Fecal softeners</i>	
Mineral oil	1 to 18 y: 1 to 3 mL/kg/day, once or divided, max: 90 mL/day
<i>Stimulant laxatives</i>	
Bisacodyl	3 to 10 y: 5 mg/day >10 y: 5 to 10 mg/day
Senna	2 to 6 y: 2.5 to 5 mg once or twice/day 6 to 12 y: 7.5 to 10 mg /day >12 y: 15 to 20 mg/day
Sodium picosulfate	1 month to 4 y: 2.5 to 10 mg once/day 4 to 18 y: 2.5 to 20 mg once/day
<i>Rectal Laxatives/Enemas</i>	
Bisacodyl	2 to 10 y: 5 mg once/day >10 y: 5 to 10 mg once/day
Sodium docusate	<6 y: 60 mL >6 y: 120 mL
Sodium phosphate	1 to 18 y: 2.5 mL/kg, max: 133 mL/dose
NaCl	neonate <1 kg: 5 mL, >1 kg: 10 mL
Mineral oil	>1 y: 6 mL/kg once or twice/day 2 to 11 y: 30 to 60 mL once/day >11 y: 60 to 150 mL once/day

## **BOX 11-2** *Rome III Criteria for Pediatric Functional Nonretentive Fecal Incontinence*

Diagnostic criteria must include all of the following in children at least 4 years of age, for at least 2 months prior to diagnosis

1. Defecation into places inappropriate to the social context at least once per month
2. No evidence of an inflammatory, anatomic, metabolic, or neoplastic process that explains the symptoms
3. No evidence of fecal retention

## TABLE 11-2 CAUSES OF FECAL INCONTINENCE IN CHILDREN

### Functional causes

Functional constipation associated fecal incontinence

Functional nonretentive fecal incontinence (FNRFI)

### Organic causes

Repaired anorectal malformation

Postsurgical Hirschsprung's disease

Spinal dysraphism

Spinal cord trauma

Spinal cord tumor

Cerebral palsy

Myopathies affecting the pelvic floor and external anal sphincter

# TREATMENT FECAL INCONTINENCE

- ▶ The treatment consists of education, keeping a bowel diary, and toilet training four times a day following meals and immediately after arriving home from school.
- ▶ To date, there are no clinical trials evaluating dietary changes in FNRFI.
- ▶ described earlier, the primary aim of medical treatment for constipation associated fecal incontinence is to empty the impacted rectum and to maintain soft stools during follow-up.
- ▶ In contrast, FNRFI responds poorly to laxatives.
- ▶ The softened stools may even worsen symptoms of fecal incontinence.
- ▶ Sometimes antidiarrheal drugs, such as loperamide, are prescribed for children with fecal incontinence to reduce the fecal output.
- ▶ Loperamide is an opiate receptor agonist that reduces diarrhea by mechanisms related to transport of water and electrolytes.