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GUIDELINES AND CONSENSUS STATEMENTS

Mexican consensus on the diagnosis and treatment of constipation in the pediatric population

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Abstract Chronic constipation is a common condition seen in pediatrics. In recent years, new diagnostic and treatment measures have been applied, motivating the *Asociación Mexicana de Gastroenterología* to bring together a panel of national and international experts, for the aim of unifying concepts, providing recommendations on the use of complementary studies, and proposing the most appropriate treatment. A systematic search of the literature in

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Refractory constipation;
Pediatrics

English and Spanish was carried out for each statement formulated, utilizing Medline/PubMed, Cochrane Database, EMBASE (Ovid), and LILACS. The Delphi method was used for developing the consensus. Ten questions and 43 statements were discussed, establishing a recommendation grade and evaluating the quality of evidence. Different concepts, diagnostic methods, and pharmacologic and surgical therapeutic measures were discussed, and following three voting rounds, the recommendations based on current clinical evidence were established.

PALABRAS CLAVE
Estreñimiento;
Estreñimiento crónico;
Impactación fecal;
Estreñimiento refractario;
Pediatría

Consenso mexicano sobre el diagnóstico y tratamiento del estreñimiento en población pediátrica

Resumen El estreñimiento crónico es un padecimiento común en la edad pediátrica, en los últimos años se ha observado la aplicación de nuevas medidas de diagnóstico y tratamiento, por ello la Asociación Mexicana de Gastroenterología reunió a un panel de expertos nacionales e internacionales con el objetivo de unificar conceptos, brindar recomendaciones sobre el uso de estudios complementarios y proponer el tratamiento más conveniente. Se llevó a cabo una búsqueda sistemática de la literatura en inglés y español para cada oración generada utilizando Medline/PubMed, Cochrane Database, EMBASE (Ovid) y LILACS; y se utilizó el método Delphi para el desarrollo del consenso. Se discutieron 10 preguntas y 43 enunciados a los cuales se les estableció un grado de recomendación y se evaluó la calidad de la evidencia, posteriormente, se sometieron a tres votaciones donde se analizaron y discutieron los diferentes conceptos, métodos diagnósticos, así como medidas terapéuticas farmacológicas y quirúrgicas, estableciendo las recomendaciones basadas en la evidencia clínica publicada hasta el momento.

Introduction

Importance of the theme and current problems

Constipation is a common condition in the pediatric population, and its presentation varies from nonspecific abdominal pain to pain associated with nausea, vomiting, headache, malnutrition, and hyporexia, among other symptoms.

The use of the Rome IV criteria for its diagnosis is useful but coming up against situations, such as fecal impaction, refractory constipation, and fecal incontinence, is frequent, making it necessary to broaden the diagnostic and therapeutic approach.

General aim of the consensus

The aim of this document was to unify concepts, make recommendations on the use of complementary studies, and propose treatments in accordance with patient characteristics.

Table 1 summarizes the recommendations issued in this consensus.

Methodology

Working group

In January 2024, the executive board of the *Asociación Mexicana de Gastroenterología*, in coordination with the association's scientific committee, presented an initiative with the aim of updating the ''Guidelines for diagnosis and treatment of constipation in Mexico. D) Evaluation and treatment of constipation in pediatric population'', published in 2011.[1] Three specialists in pediatric gastroenterology and nutrition (RFS, EMTM, and MARC) were designated as coordinators and they invited 12 specialists from different institutions in Mexico and 5 international experts to participate.

Consensus process

The Delphi method was utilized to develop the consensus.[2] A systematic search of the literature in English and Spanish was carried out for each statement formulated by the coordinators, using Medline/PubMed, the Cochrane Database, EMBASE (Ovid), and LILACS. The search strategy included

Table 1 Summary of the concepts and recommendations issued in the Mexican consensus on the diagnosis and treatment of constipation in the pediatric population.

Recommendation	Level of agreement	Grade of recommendation
Definitions of constipation		
1. Constipation is defined as a condition characterized by a decrease in the number of bowel movements, hard or large stools that may be accompanied by other manifestations, such as difficult or painful defecation, incomplete bowel movements, retentive posturing, and fecal incontinence.	*In complete agreement* 100%	Does not apply
2. Our task group proposes defining refractory constipation as that in which organic etiology has been ruled out, and that does not improve, despite treatment with an adequate dose, optimized and supervised by an expert, regardless of the amount of time involved.	*In complete agreement* 86.7%; *in partial agreement* 13.3%	Does not apply
3. Fecal impaction is defined as the finding of a lower abdominal mass detected by palpation or digital rectal exam that impedes spontaneous intestinal evacuation.	*In complete agreement* 100%	Does not apply
4. We refer to fecal incontinence as the repeated expulsion of stool, involuntary or intentional, in inadequate places, when the child already has sphincter control.	*In complete agreement* 100%	Does not apply
Alarm signs and symptoms		
5. During the evaluation of the pediatric patient with symptoms of constipation, the presence of signs and symptoms of an underlying disease (abnormalities of the colon and rectum, systemic diseases, defects in neural tube closure, neuropathic intestinal disorders, abnormal abdominal musculature, and drugs, among others) should be assessed.	*In complete agreement* 100%	Does not apply
Diagnosis of nonorganic constipation		
6. Digital rectal examination is not recommended for diagnosing constipation, but it may be useful in children under two years of age that have alarm symptoms.	*In complete agreement* 66.7%; *in partial agreement* 26.7%; *in complete disagreement* 6.7%	Does not apply
7. Plain abdominal x-ray in the diagnosis of constipation may be useful for detecting complications, when there is a discrepancy between symptoms and findings in the physical examination or when a physical examination cannot be performed.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Does not apply
8. Colonic transit in the diagnosis of constipation enables retentive fecal incontinence and nonretentive fecal incontinence to be differentiated and the distribution of feces in the colon to be identified. However, because of observer variability, it is not recommended in all cases.	*In complete agreement* 100%	Does not apply
9. There is insufficient evidence on the utility of transabdominal rectal ultrasound in the diagnosis, treatment, or prognosis of constipation in the pediatric population.	*In complete agreement* 100%	Does not apply
Diagnosis of organic constipation		
10. Routine testing is not recommended for diagnosing cow's milk protein allergy, hypothyroidism, celiac disease, or hypercalcemia, in the absence of symptoms.	*In complete agreement* 100%	Does not apply
11. Anorectal manometry should be carried out when HD is suspected.	*In complete agreement* 100%	Does not apply
12. A barium enema and rectal suction biopsy should be performed when HD is suspected.	*In complete agreement* 80%; *in partial agreement* 20%	Does not apply

Table 1 (*Continued*)

Recommendation	Level of agreement	Grade of recommendation
Diagnosis of refractory constipation		
13. A barium enema should be performed when anatomic abnormalities are suspected in patients with refractory constipation.	*In complete agreement* 100%	Does not apply
14. Anorectal manometry should be performed to evaluate anorectal function (RAIR, resting anal sphincter pressure, defecation dynamics, and rectal sensitivity tests in patients with refractory constipation, suspected of presenting with HD.	*In complete agreement* 100%	Does not apply
15. Colonic manometry should be considered in patients with severe defecation disorders, suspected of having colonic dysmotility, and/or to plan surgical interventions.	*In complete agreement* 86.7%; *in partial agreement* 13.3%	Does not apply
16. Magnetic resonance imaging of the lumbar spine should be carried out in patients presenting with clinical signs and/or suspected of having neural tube closure defects.	*In complete agreement* 100%	Does not apply
17. Rectal biopsy is indicated in patients with a suspected diagnosis of HD or achalasia of the internal anal sphincter.	*In complete agreement* 100%	Does not apply
18. Colonic scintigraphy may be considered an alternative to radio-opaque marker studies, for evaluating colonic transit (normal, slow and/or segmental transit)	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Does not apply
19. Video defecography may be indicated in patients with signs of treatment-refractory dyssynergic defecation and in patients suspected of presenting with anatomic pelvic floor problems.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Does not apply
Nonpharmacologic treatment		
20. A cow milk protein-free diet should be considered when there is clinical suspicion of constipation.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Quality of evidence, very low; recommendation, weak, in favor of the intervention
21. Intake of the age-appropriate quantity of fiber is recommended and its administration in supplements should be avoided.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, strong, in favor of the intervention
22. Intake of the age-appropriate quantity of water is recommended.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, strong, in favor of the intervention
23. Physical activity should be recommended in all cases, as part of a healthy lifestyle.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, strong, in favor of the intervention

Table 1 (*Continued*)

Recommendation	Level of agreement	Grade of recommendation
24. The use of probiotics, prebiotics, synbiotics, and postbiotics is not recommended as part of treatment.	*In complete agreement* 100%	Quality of evidence, low to moderate; recommendation, weak, against the intervention
25. Cognitive behavioral therapy may be useful in pediatric patients with behavioral alterations.	*In complete agreement* 100%	Quality of evidence, low; recommendation, weak, in favor of the intervention
26. Biofeedback is useful in cases of dyssynergic defecation.	*In complete agreement* 100%	Quality of evidence, low to moderate; recommendation, weak, in favor of the intervention
27. The multidisciplinary management of physiotherapy and psychologic therapy is not better than conventional therapy.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, weak, in favor of the intervention
28. Alternative medicine is not recommended as part of treatment.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, weak, in favor of the intervention
Pharmacologic treatment		
29. In the treatment for disimpaction, polyethylene glycol 3350 or 4000 (PEG/macrogol), with or without electrolytes, and enemas are equally as effective at any age.	*In complete agreement* 100%	Quality of evidence, high; recommendation, strong, in favor of the intervention
30. In maintenance treatment, osmotic laxatives are recommended as the first choice. Stimulant laxatives may be added or managed as the second-line choice, if necessary.	*In complete agreement* 86.7%; *in partial agreement* 13.3%	Quality of evidence, high; recommendation, strong, in favor of the intervention
31. Treatment duration can be from 2 months to more than 12 months, depending on symptom severity.	*In complete agreement* 100%	Quality of evidence, low; recommendation, strong, in favor of the intervention

Table 1 (*Continued*)

Recommendation	Level of agreement	Grade of recommendation
New therapies in refractory constipation		
32. Lubiprostone use is not recommended in the pediatric population.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Quality of evidence, moderate; recommendation, weak, in favor of the intervention
33. Prucalopride is not recommended as the first choice.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Quality of evidence, low; recommendation, weak, in favor of the intervention
34. Linaclotide use may be considered an alternative in patients above 6 years of age with refractory constipation.	*In complete agreement* 86.7%; *in partial disagreement* 13.3%	Quality of evidence, moderate; recommendation, weak, in favor of the intervention
35. Appendicostomy and cecostomy are surgical procedures for performing anterograde enemas. Said enemas are mainly indicated in patients with fecal incontinence or who do not respond to adequate medical treatment. They have good results in improving quality of life and fecal continence, even in patients with dyssynergic defecation.	*In complete agreement* 100%	Quality of evidence, low; recommendation, weak, against the intervention
36. Sigmoidectomy is indicated in patients whose quality of life is severely affected and in whom medical and surgical interventions (appendicostomy or cecostomy) have failed.	*In complete agreement* 73.3%; *in partial agreement* 13.3%; *uncertain* 13.3%	Quality of evidence, very low; recommendation, weak, against the intervention
37. Anorectal myectomy is not recommended in any of the cases.	*In complete agreement* 100%	Quality of evidence, very low; recommendation, weak, against the intervention
38. Neuromodulation is indicated in patients with fecal incontinence and poor response to medical treatment.	*In complete agreement* 100%	Quality of evidence, moderate; recommendation, weak, in favor of the intervention
39. The application of botulinum toxin may be useful in patients diagnosed with dyssynergic defecation or anal sphincter achalasia.	*In complete agreement* 86.7%; *in partial agreement* 13.3%	Quality of evidence, very low; recommendation, weak, in favor of the intervention
Prognosis of pediatric patients with constipation		

Table 1 (*Continued*)

Recommendation	Level of agreement	Grade of recommendation
40. Prognosis improves with the early start of treatment and timely referral to a specialist.	*In complete agreement* 93.3%; *in complete disagreement* 6.7%	Does not apply
Dyssynergic defecation		
41. Dyssynergic defecation is defined as the incapacity to coordinate the abdominal muscles and pelvic floor muscles at the moment of defecation.	*In complete agreement* 100%	Does not apply
42. Diagnosis is made using the balloon expulsion test, through anorectal manometry.	*In complete agreement* 100%	Does not apply
43. Treatment is multidisciplinary and should be carried out at specialized centers.	*In complete agreement* 100%	Does not apply

the following MeSH terms: «*constipation*» combined with the following terms: «*epidemiology*», «*incidence*», «*prevalence*», «*pathophysiology*», «*fecal incontinence*», «*diarrhea*», «*diagnosis*», «*differential diagnosis*», «*treatment*», «*probiotics*», «*antibiotics*», «*therapy*», «*neurostimulation*», «*biofeedback*», «*management*», «*surgery*», «*review*», «*guidelines*», «*meta-analysis*» and their Spanish equivalents, in historic articles dating from 1982 to the most current evidence in 2024. The articles included guidelines, original articles, randomized controlled trials, meta-analyses, systematic reviews, and literature reviews, for a total of 110 documents.

The coordinators divided the expert panel into three task groups and were responsible for drafting the statements and recommendations. Forty-three statements were formulated and reviewed. They underwent a first anonymous, electronic voting round (February 2024), to evaluate the wording and content of the statements. The consensus participants voted, according to the following responses: (a) in complete agreement, (b) in partial agreement, (c) uncertain, (d) in partial disagreement, and (e) in total disagreement. After the first voting round, the coordinators made the corresponding modifications. The statements that reached above 75% complete agreement were kept. The statements that had complete disagreement greater than, equal to, or less than 75%, and those with complete agreement equal to or less than 75%, were reviewed and restructured.

The reviewed statements underwent a second anonymous, electronic voting round (March 2024). According to the comments in that round, the statements were reviewed at a hybrid meeting. Those with agreement above 75% were ratified and those that did not reach agreement of 75% were discussed, in an effort to find agreement, and if not possible, to rewrite them. A third voting round was then carried out (April 2024). In total, 10 questions and 43 statements were obtained and none were eliminated.

Application of the GRADE system

One researcher (RPV) was in charge of evaluating the quality of evidence, employing the ''Grading of Recommendations Assessment, Development and Evaluation'' (GRADE) system,[3] through 4 levels of certainty: high (very certain that the true effect lies close to that of the estimate of the effect), moderate (moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different), low (confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect), and very low (very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of the effect) and through the strength of the recommendation (strong or weak, for or against the intervention).

Once all the consensus statements were established, the coordinators formulated the present manuscript, which was reviewed and approved by all the participants. Personal declarations of possible conflict of interest were requested electronically of all participants.

Definitions of constipation

1. Constipation is defined as a clinical condition characterized by a decrease in the number of bowel movements, with hard or large stools, and may be accompanied by other manifestations, such as difficult or painful defecation, incomplete bowel movements, retentive posturing, and fecal incontinence.[4,5]

Level of agreement of the panel: In complete agreement 100%

In the pediatric population, organic constipation may be classified as such, when there is an identifiable cause and it is associated with disorders of gut-brain interaction (formerly known as functional constipation), which represents up to 95% of cases. According to the Rome IV criteria, functional constipation is divided into two groups in relation to age: children under 4 years of age and children over 4 years of age[6,7] (Table 2).

2. Our working group proposes defining refractory constipation as that in which organic etiology (Table 3) has been ruled out, and despite treatment with an adequate dose, optimized and supervised by an expert, does not improve, regardless of the amount of time involved.

Table 2 Rome IV criteria for the diagnosis of functional constipation in pediatrics.

≤ 4 years of age
At least 2 of the following should be included, for at least one month: Two or fewer bowel movements per week A history of excessive stool retention A history of painful or hard bowel movements A history of large-diameter stools Presence of a large fecal mass in the rectum *In children with fecal continence, the following additional criteria may be used:* At least one episode of incontinence per week. A history of large-diameter stools that can clog the toilet.
≥ 4 years of age
Two or more of the following should be included, that occur at least once a week for a minimum of one month, with insufficient criteria for diagnosing irritable bowel syndrome: 1. Two or fewer bowel movements per week. 2. At least one episode of fecal incontinence per week. 3. A history of retentive posturing or excessive volitional stool retention. 4. A history of painful or hard bowel movements. 5. The presence of a large fecal mass in the rectum. 6. A history of large-diameter stools that can clog the toilet. After an appropriate medical evaluation, symptoms cannot be attributed to another condition.

Level of agreement of the panel: In complete agreement 86.7%; *in partial agreement* 13.3%

Importantly, there is still no universally accepted definition for refractory constipation in pediatrics.[8]

3. Fecal impaction is defined as the finding of a lower abdominal mass detected by palpation or digital rectal exam that impedes spontaneous intestinal evacuation.[9]

Level of agreement of the panel: In complete agreement 100%

4. We refer to fecal incontinence as the repeated expulsion of stool, involuntary or intentional, in inappropriate places, when the child already has sphincter control.[10]

Level of agreement of the panel: In complete agreement 100%

In most cases, retentive fecal incontinence is associated with constipation and is secondary to the excessive accumulation of stool, whereas nonretentive fecal incontinence is produced in the absence of fecal retention.[11]

Alarm signs and symptoms

5. During the evaluation of the pediatric patient with symptoms of constipation, the presence of signs and symptoms of an underlying disease (abnormalities of the colon and rectum, systemic diseases, defects in neural tube closure, neuropathic intestinal disorders, abnormal abdominal musculature, and drugs, among others) should be assessed.

Level of agreement of the panel: In complete agreement 100%

Approximately 95% of neonates pass stool within the first 24 h from birth and 99% within the first 48 h. The inability of the neonate to pass the meconium within the first 48 h is a datum that suggests Hirschsprung's disease (HD). Food rejection and biliary vomiting may also coexist.[12]

Growth and development should be evaluated in the physical examination, ruling out goiter. In examining the abdomen, distension and an abdominal mass are also assessed. The perianal region should be inspected, looking for anorectal malformations, stool residue around the anus or in the underwear, erythema, or anal fissures. The lumbosacral region should be inspected for the presence of defects in neural tube closure, deviated gluteal cleft, and sacral agenesis. If indicated, digital rectal examination may determine the presence of anal stricture or fecal mass. Explosive stool passage after removing the examining finger suggests HD (the result of a hypertonic sphincter). Anal and cremasteric reflexes should be examined and the neuromuscular status of the lower limbs (tone, strength, and myotatic reflex) should be evaluated[13,14] (Table 4).

Diagnosis of nonorganic constipation

6. Digital rectal examination is not recommended for diagnosing constipation, but it may be useful in children under two years of age who have alarm symptoms.

Level of agreement of the panel: In complete agreement 66.7%; *in partial agreement* 26.7%; *in complete disagreement* 6.7%

Table 3 Organic causes of constipation in the pediatric population.

Abnormalities of the colon and rectum	Anal or colonic stenoses Imperforate anus Anorectal malformations
Systemic diseases	Hypothyroidism Hyper/hypocalcemia Diabetes mellitus Panhypopituitarism Cerebral palsy Congenital myotonia Connective tissue diseases
Defects in neural tube closure	Occult spina bifida Meningocele Lipomeningocele Sacral agenesis Anchored spinal cord
Neuropathic intestinal disorders	Hirschsprung's disease Intestinal neural dysplasia Pediatric chronic intestinal pseudo-obstruction Chagas disease
Abnormal abdominal musculature	Prune-belly syndrome Gastroschisis
Drugs	Opioids Anticholinergics Antacids Antihypertensives Cholestyramine Psychotropics Diuretics
Others	Cystic fibrosis Celiac disease Heavy metal ingestion (lead, mercury) Spinal cord tumor

Table 4 Alarm signs and symptoms in pediatric patients with constipation.

Clinical history	Physical examination
Delay in the passage of the meconium (> 48 h)	Arrested growth
Early onset of constipation (< 1 month of age)	Severe abdominal distension
A positive family history of Hirschsprung's disease, celiac disease, and/or hypothyroidism	Abnormal or absent anal or cremasteric reflex
Blood in stools in the absence of anal fissures	Abnormal position of the anus or presence of a gluteal cleft
Fever associated with megacolon	Extreme fear of anal examination
Biliary vomiting	Anal scars
	Anal fissures or perianal hematoma
	Perianal fistula
	Decreased strength, tone, or reflexes in the lower limbs
	Tuft of hair in the sacral region
	Sacral dimple or deviated gluteal cleft
	Goiter

It is useful in infants (under 2 years of age) for evaluating the characteristics of the external anal sphincter, the presence of explosive stool passage suggestive of HD, and for documenting the presence or absence of stool in the rectal ampulla.[15]

7. In the diagnosis of constipation, plain abdominal x-ray may be useful for detecting complications, when there is a discrepancy between symptoms and findings in the physical examination or when a physical examination cannot be performed.

Level of agreement of the panel: In complete agreement 93.3%*; in complete disagreement* 6.7%

Prospective studies and systematic reviews do not support the association between clinical symptoms and the amount of fecal material seen in x-rays. A lack of intraobserver and interobserver reliability in the interpretation has also been observed.[16,17]

8. Colonic transit in the diagnosis of constipation enables retentive fecal incontinence and nonretentive fecal incontinence to be differentiated and the distribution of feces in the colon to be identified. However, because of observer variability, it is not recommended in all cases.

Level of agreement of the panel: In complete agreement 100%

There are different protocols and methods for its interpretation. In general, colonic transit time can be up to 36 h and is considered altered, if after 120 h (5 days), more than 20% of the markers remain in the colon. However, significant variability between observers has been demonstrated, as well as normal colonic transit in patients with constipation, and so its use is not recommended in all patients.[18,19]

9. There is insufficient evidence on the utility of transabdominal rectal ultrasound in the diagnosis, treatment, or prognosis of constipation in the pediatric population.

Level of agreement of the panel: In complete agreement 100%

The transverse rectal diameter and mean rectal diameter have been shown to be larger in patients with constipation. Nevertheless, there is insufficient evidence for the usefulness of the imaging technique in the diagnosis, treatment, or prognosis of constipation in the pediatric population.[17,20]

Diagnosis of organic constipation

10. Routine testing is not recommended for diagnosing cow's milk protein allergy, hypothyroidism, celiac disease, or hypercalcemia, in the absence of symptoms.[21–24]

Level of agreement of the panel: In complete agreement 100%

11. Anorectal manometry should be carried out when HD is suspected.

Level of agreement of the panel: In complete agreement 100%

In the absence of the rectoanal inhibitory reflex (RAIR), rectal biopsy is indicated, to confirm the diagnosis.[25–27]

12. A barium enema and rectal suction biopsy should be performed when HD is suspected.

Level of agreement of the panel: In complete agreement 80%*; in partial agreement* 20%

A barium enema with no contrast medium or intestinal preparation is an easily accessible study that is recommended in the approach to patients with suspected HD. It should be kept in mind that the absence of a transition zone does not rule it out. Rectal biopsy, whether by the open or suction technique, is the gold standard for diagnosis and is indicated in patients with suspected HD, the finding of a transition zone in the barium enema, or the absence of the RAIR.[28–32]

Diagnosis of refractory constipation

13. A barium enema should be performed when anatomic abnormalities are suspected in patients with refractory constipation.

Level of agreement of the panel: In complete agreement 100%

Contrast colon studies may be useful for ruling out anatomic abnormalities, such as megacolon and megarectum. In pediatric patients with severe refractory symptoms, said studies are used for guiding surgical interventions because they provide information on the anatomy, length, and dilation of the colon.[29,33]

14. Anorectal manometry should be performed to evaluate anorectal function (RAIR, resting anal sphincter pressure, defecation dynamics, and rectal sensitivity tests in patients with refractory constipation, suspected of presenting with HD.

Level of agreement of the panel: In complete agreement 100%

It is indicated in patients with refractory constipation for evaluating anorectal function (RAIR, resting anal sphincter pressure, defecation dynamics, and rectal sensitivity tests).[34,35] It aids in guiding treatment in this group of patients and prevents their undergoing early surgical procedures. It should be carried out in patients with failed medical treatment and/or before considering surgical treat-

ment. The study requires a high level of patient cooperation because it is performed without anesthesia.[36,37]

The balloon expulsion test is a reliable method for detecting pelvic floor dyssynergy in adults. It is not commonly performed in children under 5 years of age because it requires a high level of patient cooperation.[38] In adults, a 40–50 ml balloon is normally expelled in fewer than 60 seconds.[39] It is an easy, useful test that helps differentiate patients with chronic constipation and those with pelvic floor dyssynergy and can be performed when there is no access to anorectal manometry.

15. Colonic manometry should be considered in patients with severe defecation disorders, suspected of having colonic dysmotility, and/or to plan surgical interventions.

Level of agreement of the panel: In complete agreement 86.7%*; in partial agreement* 13.3%

It is a useful resource for evaluating pediatric patients with severe defecation disorders.[40]

The catheter should be placed through lower gastrointestinal endoscopy to clip it to the mucosa of the colon, requiring general anesthesia. The study should be started 4 h after recovery from the anesthesia. It has a mean duration of 6 h and consists of three phases (fasting, liquid and solid food intake, and stimulation with bisacodyl). The main indications for performing colonic manometry are[41]:

a To differentiate between functional constipation and colonic dysmotility.
b To plan surgical interventions in selected patients with constipation that is refractory to medical treatment.
c To determine whether a patient with colonic diversion would benefit from re-anastomosis or require intestinal resection.
d To evaluate whether colonic dysmotility is improved after the prolonged use of anterograde enemas.
e To evaluate persistent symptoms after surgery due to HD or other anorectal malformations.

Colonic manometry is expensive and has many limitations in the pediatric population. Its routine performance is not recommended for diagnosing constipation.

16. Magnetic resonance imaging of the lumbar spine should be carried out in patients presenting with clinical signs and/or suspected of having neural tube closure defects.[42]

Level of agreement of the panel: In complete agreement 100%

17. Rectal biopsy is indicated in patients with a suspected diagnosis of HD or achalasia of the internal anal sphincter.

Level of agreement of the panel: In complete agreement 100%

It is indicated in patients with refractory constipation and absence of the RAIR, for differentiating between HD and internal anal sphincter achalasia (in the latter, the internal anal sphincter does not relax, despite the presence of ganglion cells). Its routine use is not recommended.[43]

18. Colonic scintigraphy may be considered an alternative to radio-opaque marker studies, for evaluating colonic transit (normal, slow and/or segmental transit).[40]

Level of agreement of the panel: In complete agreement 93.3%*; in complete disagreement* 6.7%

19. Video defecography may be indicated in patients with signs of treatment-refractory dyssynergic defecation and in patients suspected of presenting with anatomic pelvic floor problems.

Level of agreement of the panel: In complete agreement 93.3%*; in complete disagreement* 6.7%

There are very few studies on this modality in pediatric patients, given that it requires patient cooperation and involves exposure to radiation. It may be considered in patients with signs of treatment-refractory dyssynergic defecation and patients suspected of having anatomic pelvic floor problems because it provides dynamic information on pelvic floor function and assesses rectal evacuation efficacy.[37,44]

Nonpharmacologic treatment

20. A cow's milk protein-free diet should be considered when there is clinical suspicion of constipation.

Level of agreement of the panel: In complete agreement 93.3%*; in complete disagreement* 6.7%

Quality of evidence, very low; recommendation, weak, in favor of the intervention

Constipation as a unique symptom in food allergy is rare. However, reports have shown that patients with cow's milk protein allergy may have gastrointestinal motility involvement that leads to constipation.[45] Therefore, a cow's milk protein-free diet should be considered in patients with failed conventional treatment, who do not have alarm symptoms.[46] A food challenge test is recommended when there is clinical suspicion of allergy, to avoid unnecessary restrictive diets.[22]

21. Intake of the age-appropriate quantity of fiber is recommended and its administration in supplements should be avoided.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, strong, in favor of the intervention

There is a low quality of evidence for fiber supplementation in the treatment of constipation in the pediatric population, and so the recommendation is to consume the age-appropriate quantity of fiber and not to prescribe it in supplements.[47] The American Academy of Pediatrics suggests two guides for dietary intake: one based on age (age in years +5 g) and one based on body weight (0.5 g fiber/kg up to 35 g/day).[48]

22. Intake of the age-appropriate quantity of water is recommended.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, strong, in favor of the intervention

In the few studies that have evaluated the advantage of greater water intake in patients with constipation, it has not been shown to contribute to sufficient stool softening or an increase in bowel movement frequency.[49]

23. Physical activity should be recommended in all cases, as part of a healthy lifestyle.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, strong, in favor of the intervention

Pediatric patients who carry out physical activity 4–7 days a week have a lower incidence of constipation, but increasing physical activity has not been shown to improve the defecation pattern.[50]

24. The use of probiotics, prebiotics, synbiotics, and postbiotics is not recommended as part of treatment.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, low to moderate; recommendation, weak, against the intervention

Probiotics improve gastric emptying and intestinal transit, reduce colonic pH, stimulate colonic motility, and promote lactose digestion. Currently, there is insufficient evidence for recommending the administration of probiotics as part of treatment.[51–54] Evidence is still limited regarding prebiotics, synbiotics, and postbiotics.[55]

25. Cognitive behavioral therapy may be useful in pediatric patients with behavioral alterations.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, low; recommendation, weak, in favor of the intervention

It has not been shown to be superior to treatment with laxatives. It may be beneficial if the patient also presents with behavioral alterations, which can be present in children with disorders of gut-brain interaction.[56,57]

26. Biofeedback is useful in cases of dyssynergic defecation.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, low to moderate; recommendation, weak, in favor of the intervention

Pelvic physiotherapy has been shown to be effective in both the short term and long term. It is useful in cases of dyssynergic defecation, given that it works on balance, posture, breathing, relaxation, external anal sphincter contraction, and effective pushing, in addition to increasing anorectal sensation.[58–60] Its utility in the pediatric population is a subject of debate, despite having shown benefits. It is a limited treatment because it is only carried out at specialized centers and requires patient cooperation.

27. The multidisciplinary management of physiotherapy and psychologic therapy is not better than conventional therapy.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, weak, in favor of the intervention

Physiotherapy enables learning good posture during bowel movements, effective pushing, an increase in rectal sensation, and exercising the pelvic floor muscles. Psychologic therapy enables a decrease in fear and the acquisition of an appropriate conduct in relation to defecation. Currently, there is minimal evidence on its added benefits over conventional therapy.[56,58,61,62]

28. Alternative medicine is not recommended as part of treatment.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, weak, in favor of the intervention

There are no studies demonstrating the utility of acupuncture, chiropractic therapy, homeopathy, or mindfulness.

With respect to herbal medicine, *Cassia fistula (Senna alexandrina)* emulsion, from which sennosides are produced, acts as a stimulant laxative and has been shown to be as effective as polyethylene glycol. The consumption of *Flixweed (Descurainia sophia)* seeds, *Xiao'er Biantong* granules, and green banana biomass have not been shown to be more effective than traditional treatment. Despite the above, herbal medicine is not recommended in pediatric patients due to the risk of toxicity.[58]

Regarding abdominal wall massages, they promote the gastrocolic reflex, offering a minimal additional benefit in patients on conventional treatment.

Other alternative therapies, such as reflexology and cupping therapy, have shown no benefit.[62]

Pharmacologic treatment

The treatment for pediatric patients with constipation has two phases. The first consists of fecal disimpaction whose goal is to remove the fecal mass retained in the rectum. The second is the maintenance phase, which attempts to prevent the accumulation of feces, favoring colonic rehabilitation, for achieving spontaneous and satisfactory bowel movements.

29. In the treatment for disimpaction, polyethylene glycol 3350 or 4000 (PEG/macrogol), with or without electrolytes, and enemas are equally as effective at any age.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, high; recommendation, strong, in favor of the intervention

The available options vary, depending on the region (Table 5). High doses of PEG administered orally are associated with a greater frequency of fecal incontinence during the treatment of fecal impaction, compared with the use of enemas. However, given that PEG is administered orally, it is preferred as the first option. Phosphate enemas are not recommended in children under 2 years of age due to the possibility of developing hypomagnesemia. The recommendation is to apply one enema per day for 3–6 days, when PEG is not available. Other osmotic and stimulant laxatives, such as lactulose, magnesium citrate, and sodium picosulfate may be used, but the management scheme, doses, and effectiveness have not been demonstrated in controlled clinical trials.[63–70]

30. In maintenance treatment, osmotic laxatives are recommended as the first choice. Stimulant laxatives may be added or managed as the second-line choice, if necessary.

Level of agreement of the panel: In complete agreement 86.7%; in partial agreement 13.3%

Quality of evidence, high; recommendation, strong, in favor of the intervention

Osmotic laxatives are the first choice because of safety and effectiveness. A stimulant laxative may be added, if necessary (Table 5).

Table 5 Medication doses utilized in constipation.

Laxative	Disimpaction dose	Maintenance dose
Oral administration		
Osmotic agents		
PEG 3350	1—1.5 g/kg/day 6 days	0.2—0.8 g/kg/day in 1—2 doses
PEG 4000	1—1.5 g/kg/day 6 days	
Milk of magnesia (1 g/5 ml)		1 ml/kg; 1—2 times/day
Lactulose (3.33 g/5 ml)		1—3 ml/kg; 1—2 times/day
Stool softeners		
Mineral oil		1—18 years: 1—3 ml/kg/day; maximum 90 ml/day
Stimulants		
Bisacodyl		3—10 years: 5 mg/day > 10 years: 5—10 mg/day
Sennosides		2—6 years: 2.5–5 mg 1—2 times/day 6—12 years: 7.5–10 mg/day > 12 years: 15–20 mg/day
Sodium picosulfate		1 mes-4 years: 2.5—10 mg 1 time/day 4—18 years: 2.5—20 mg 1 time/day
Rectal administration		
Bisacodyl	2—10 years: 5 mg 1 time/day > 10 years: 5—10 mg 1 time/day	
Sodium docusate	< 6 years: 60 ml > 6 years: 120 ml	
Sodium phosphate	1—18 years: 2.5 ml/kg, maximum 133 ml/dose	
Sodium chloride	Neonate < 1 kg: 5 ml, >1 kg: 10 ml > 1 year: 6 ml/kg 1—2 times/day	

PEG: polyethylene glycol.

The dose of the laxative should be adjusted according to each patient's clinical response. When PEG is not available, another osmotic laxative, such as lactulose or milk of magnesia, may be used, mainly in children under 4 years of age, in whom milk of magnesia is equally as effective as PEG. However, lactulose, because it is a fermentable carbohydrate, may produce bloating and abdominal pain. Milk of magnesia has few side effects. If they do present, they are mild and transitory, in general, and diarrhea is the most frequent adverse effect.[64,65,68,71–74]

Stimulant laxatives may be used additionally or as second-line treatment, when osmotic laxatives are not effective. There are two types, anthraquinones (sennosides) and diphenylmethanes (bisacodyl and sodium picosulfate).[37,75,76] They are considered safe and effective, are well tolerated, and their most common side effect is abdominal pain.

31. Treatment duration can be from 2 months to more than 12 months, depending on symptom severity.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, low; recommendation, strong, in favor of the intervention

Treatment should last at least 2 months, but in many cases, it may need to be extended for more than 12 months.

The patient should present with a normal defecation pattern for at least one month before suspending treatment and it should be withdrawn gradually. There is a high probability of relapse, in which case, the treatment should be re-evaluated and re-started.[13,14]

In patients who are in training for sphincter control, the medication should only be interrupted once sphincter control and a normal defecation pattern are achieved.

New therapies in refractory constipation

32. Lubiprostone use is not recommended in the pediatric population.

Level of agreement of the panel: In complete agreement 93.3%; in complete disagreement 6.7%

Quality of evidence, moderate; recommendation, weak, in favor of the intervention

Lubiprostone acts locally on the intestinal tract, activating the type 2 chloride channels, to increase fluid secretion into the intestinal lumen and accelerate intestinal transit time. Despite having been shown to be well tolerated in the pediatric population, it is not superior to placebo when evaluating bowel movement frequency.[77,78]

33. Prucalopride is not recommended as the first choice.

Level of agreement of the panel: In complete agreement 93.3%; in complete disagreement 6.7%

Quality of evidence, low; recommendation, weak, in favor of the intervention

Prucalopride is a high-affinity 5 HT4 receptor agonist with prokinetic activity at the gastrointestinal level, mainly stimulating the large amplitude contractions at the level of the colon. It has not shown superiority to placebo, in the evaluation of bowel movement frequency or episodes of fecal incontinence.[79,80]

34. Linaclotide use may be considered an alternative in patients above 6 years of age with refractory constipation.

Level of agreement of the panel: In complete agreement 86.7%; in partial disagreement 13.3%.

Quality of evidence, moderate; recommendation, weak, in favor of the intervention

It is a guanylate cyclase-C receptor agonist that activates the intracellular conversion of guanosine- 5'-triphosphate to cyclic guanosine monophosphate, producing an increase in intestinal secretion, an increase in intestinal transit, and a decrease in visceral hypersensitivity. In children over six years of age, it has been shown to be well tolerated and efficacious in improving the number of weekly bowel movements and their stool consistency.[81,82]

35. Appendicostomy and cecostomy are surgical procedures for performing anterograde enemas. Said enemas are mainly indicated in patients with fecal incontinence or who do not respond to adequate medical treatment. They have good results in improving quality of life and fecal continence, even in patients with dyssynergic defecation.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, low; recommendation, weak, against the intervention

More evidence is required for determining which patients are candidates for this type of management.[83–86]

36. Sigmoidectomy is indicated in patients whose quality of life is severely affected and in whom medical and surgical interventions (appendicostomy or cecostomy) have failed.[87,88]

Level of agreement of the panel: In complete agreement 73.3%*; in partial agreement* 13.3%*; uncertain* 13.3%

Quality of evidence, very low; recommendation, weak, against the intervention

37. Anorectal myectomy is not recommended in any of the cases.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, very low; recommendation, weak, against the intervention

At present, there is insufficient and inadequate evidence supporting the performance of anorectal myectomy in patients with constipation. It is considered a procedure that damages sphincter anatomy and so is not recommended as a diagnostic or treatment measure.[88,89]

38. Neuromodulation is indicated in patients with fecal incontinence and poor response to medical treatment.

Level of agreement of the panel: In complete agreement 100%

Quality of evidence, moderate; recommendation, weak, in favor of the intervention

The aim of neuromodulation is to improve colonic motility and anorectal sensorial perception. Its possible mechanism of action is not yet clear, but it is postulated that electrical stimulation could activate sensory nerve fibers in the skin, motor and sensory nerves in the spinal cord, sympathetic and parasympathetic nerves, enteric nerves in the intestinal wall, or even interstitial cells of Cajal,[90] and in this manner, modify anal sphincter activity, colonic motility, and pathologic anorectal nociceptive sensitivity.[91]

Transcutaneous neuromodulation is a noninvasive and economic method that may be complementary to or substitute other therapies. It is indicated in patients with fecal incontinence and poor response to treatment. Neuromodulation with a surgical implant is substantially more expensive and associated with a low rate of minor complications. Studies have shown the efficacy of transcutaneous neurostimulation, and with surgical implant, but more studies with a higher number of patients are needed to recommend it in all cases.[92–97]

39. The application of botulinum toxin may be useful in patients diagnosed with dyssynergic defecation or anal sphincter achalasia.

Level of agreement of the panel: In complete agreement 86.7%; in partial agreement 13.3%

Quality of evidence, very low; recommendation, weak, in favor of the intervention

Even though its safety has been demonstrated, there is no evidence on its utility in pediatric patients with constipation. It may be useful in patients with dyssynergic defecation or anal sphincter achalasia. The recommended dose is 5–10 IU/kg, maximum 200 IU.[98–102]

Prognosis of pediatric patients with constipation

40. Prognosis improves with the early start of treatment and timely referral to a specialist.

Level of agreement of the panel: In complete agreement 93.3%; in complete disagreement 6.7%

Studies have shown that starting treatment early (fewer than 3 months from symptom onset) and the timely referral to a specialist in pediatric gastroenterology are associated with better treatment response.[103,104]

Dyssynergic defecation

41. Dyssynergic defecation is defined as the incapacity to coordinate the abdominal muscles and pelvic floor muscles at the moment of defecation.

Level of agreement of the panel: In complete agreement 100%

Dyssynergic defecation is defined as the incapacity to coordinate the abdominal muscles and pelvic floor muscles at the moment of defecation due to paradoxical anal contraction or inadequate anal relaxation. It should be suspected in patients with constipation whose symptoms persist despite appropriate treatment. It is classified into four types: types I and III are characterized by paradoxical contraction or absence of anal sphincter relaxation, whereas types II and IV are characterized by weakness or absence of rectal propulsion. Using this classification in the pediatric population is recommended. Type I is the most frequent.[34,105–108]

42. Diagnosis is made using the balloon expulsion test, through anorectal manometry.

Level of agreement of the panel: In complete agreement 100%

Diagnosis is made using the balloon expulsion test, through anorectal manometry, which is recommended in children above 5 years of age because of the cooperation needed for its performance.[38]

43. Treatment is multidisciplinary and should be carried out at specialized centers.

Level of agreement of the panel: In complete agreement 100%

Treatment is multidisciplinary and should be conducted at specialized centers. In addition to pharmacologic treatment with laxatives, it may include enemas, pelvic physiotherapy, biofeedback therapy, and/or botulinum toxin injection.[59,99,109]

Conclusion

In conclusion, constipation is a frequent clinical entity in pediatrics, and an organic etiology should first be ruled out.

The diagnosis of constipation associated with disorders of gut-brain interaction is made clinically. Early treatment should be given with osmotic laxatives, and in some cases, adding stimulant drugs. Even though there are new drugs for treating constipation, they have not been shown to be superior to conventional laxatives, but their use may be considered in certain patients. When there is a lack of response to laxatives, after optimum dose with adequate supervision, the diagnosis of refractory constipation is made, making it necessary to broaden the approach, in order to determine the etiology. Causes include anatomic abnormalities, alterations in motility or defecation dynamics, and food allergies, among others.

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Declaration of competing interest

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