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Childhood Constipation: A Global Problem and its Management Guideline

Dr. Md. Nazrul Islam[1*], Dr. Soheli Alam[2], Dr. A.M. Shahinoor[3], Dr. Mohammad Mahabubul Alam[4], Dr. Shahin Reza[5], Dr. Mafia Afsin Laz[6], Dr. Md. Zamil Hossain[7], Dr. Suman Bikram Adhikari[8], Dr. Taslima Akter[9], Dr. Mohammad Saiful Islam[10]

[1]Consultant, Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[2]Assistant Professor, Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[3]Medical Officer, Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[4]Assistant Professor, Department of Paediatric Surgery, Cumilla Medical College, Bangladesh
[5]Assistant Professor, Department of Paediatric Surgery, Dhaka Medical College Hospital, Bangladesh
[6]Assistant Professor, Department of Paediatric Surgery, Sir Salimullah Medical College Hospital, Bangladesh
[7]Residential Surgeon, Department of Paediatric Surgery, Rajshahi Medical College Hospital, Bangladesh
[8]Consultant, Department of Paedaitric Surgery, Nepal National Hospital, Kathmandu, Nepal
[9]Associate Professor, Department of Paediatric Surgery, Holy Family Red Crescent Medical College, Bangladesh
[10]Professor, Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University, Bangladesh

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***Corresponding author:** Dr. Md. Nazrul Islam
Consultant, Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University, Bangladesh

Abstract **Original Research Article**

***Introduction: Background*:** Constipation is a symptom, not a disease, every person in this world experiences constipation at some point in their real life. However, the prevalence of constipation in childhood is more but it is still under-appreciated in paediatric age group. Considering childhood constipation being one of the underappreciated and mismanaged health problems, the faculty members of paediatric surgery department, BSMMU approved a consensus of guideline of management of childhood constipation. It thus assists health care workers in the management of all of the children with constipation in all the level of care i.e. primary, secondary, and tertiary care. ***Methods*:** The faculty members of paediatric surgery department of BSMMU addressed the problem of constipation in infants and children who had no previously established medical condition. To develop the initial evidence-based guideline, articles on constipation published in English were found using Medline, Embase and Cochrane Database of Systematic Reviews. ***Result*:** The guidelines provide recommendations for the diagnostic evaluation of children presenting with constipation and treatment of children with functional constipation to standardize and improve their quality of care. In this study, two guidelines were developed, the first guideline for the evaluation and treatment of infants <6 months. The second guideline is for the evaluation and treatment of children > 6 months of age. ***Conclusion*:** Constipation is globally underappreciated problem and should be evaluated thoroughly. Constipation due to functional or organic cause should be identified. Management protocol should be adapted as per the guideline shown in fig. 1 and fig. 2. Emphasis should be laid on toilet-training, feeding habit and importantly in counselling particularly related to long term usage of medical therapy.

Keywords: Childhood constipation, habitual constipation.

INTRODUCTION

Constipation is a symptom, not a disease. The symptoms vary from mild and short lived to severe and chronic with fecal impaction and encopresis. Constipation is often associated with infrequent and/or painful defecation, fecal incontinence, and abdominal pain; causes significant distress to the child and family; and has a significant impact on health care cost. Although our understanding of pathophysiology has grown rapidly in recent decades, the causes and management of constipation in childhood remain obscure. Every person in this world experiences constipation at some point in their life. It is estimated that around 17-40% children experience constipation in the first year of life [1]. Although constipation may have several etiologies, in most children presenting with this symptom no underlying medical disease

responsible for the symptom can be found. The Incidence of functional constipation is about 90% [2]. The Prevalence of functional constipation worldwide is around 3% [3]. Nevertheless, it is still under-appreciated in paediatric age group. This may be due to lack of data related to constipation in paediatric age group like variation of symptoms and sign in children, lack of standard criteria for defining constipation, proxy reports by parents and due to multiple risk factors (socieconomical, environmental, psychological, anatomical etc). Bangladesh has large and dense population, illiteracy, poverty, lack of resources and access to healthcare facility. Along with the developing health care that is yet to be organized in system and standardized in practice, healthcare providers' lack of knowledge, supervision, responsibility, accountability, inexperience and negligence predispose to misevaluation and mismanagement of constipation. Even though, some of these have deep roots and are therefore, quite inevitable, exploring the part played by guideline of functional constipation might help in initiating the process of evaluation and management of children with constipation. Considering childhood constipation being one of the underappreciated and mismanaged health problems, the faculty members of paediatric surgery department, BSMMU approved a consensus of guideline of management of childhood constipation. It thus assists health care workers in the management of all of the children with constipation in all the level of care i.e. primary, secondary and tertiary care. This guideline provides recommendations for the diagnostic evaluation of children presenting with constipation and treatment of children with functional constipation.

Definition

One of the key problems in studies concerning the management of childhood constipation is the lack of a generally accepted definition for paediatric constipation. This derives mainly from the fact that constipation is a symptom rather than a disease. Constipation is often differently interpreted by patients and physicians [4]. In children it is even more difficult to define, because, the physician must rely upon the interpretation of symptoms as told by the parents [5]. Iowa- criteria [6], ROME II criteria [7] and ROME III criteria [3] (box 1) are used worldwide for defining constipation but still its definition varies from author to author.

Box 1: Rome III diagnostic criteria for functional constipation

In the absence of organic pathology, >2 of the following must occur For a child with a developmental age <4 years * 1. >2 defecations per week 2. At least 1 episode of incontinence per week after the acquisition of toileting skills 3. History of 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 stools that may obstruct the toilet Accompanying symptoms may include irritability, decreased appetite, and/or early satiety, which may disappear immediately following passage of a large stool
For a child with a developmental age _4 years with insufficient criteria for irritable bowel syndrome # 1. >2 defecations in the toilet per week 2. At least 1 episode of fecal incontinence per week 3. History of retentive posturing or excessive volitional stool retention 4. History of painful or hard bowel movements 5. Presence of a large fecal mass in the rectum 6. History of large-diameter stools that may obstruct the toilet.

*Criteria fulfilled for at least 1 month.

#Criteria fulfilled at least once per week for at least 2 months before diagnosis.

Intractable Constipation

Constipation not responding to optimal conventional treatment for at least 3 months.

Fecal Impaction

A hard mass in the lower abdomen identified on physical examination or a dilated rectum filled with a large amount of stool on rectal examination or excessive stool in the distal colon on abdominal radiography.

Encopresis

Passages of stool in an inappropriate place, occurring in toilet trained children (>4 yrs age), with no evidence of constipation on history or examination OR seepage of liquid stool around the fecal mass in a chronically distended rectum which may occur at any age.

Acute Constipation

Constipation with less than 1 month duration.

Chronic Constipation

Constipation with above 1 month duration.

MATERIALS AND METHODOLOGY

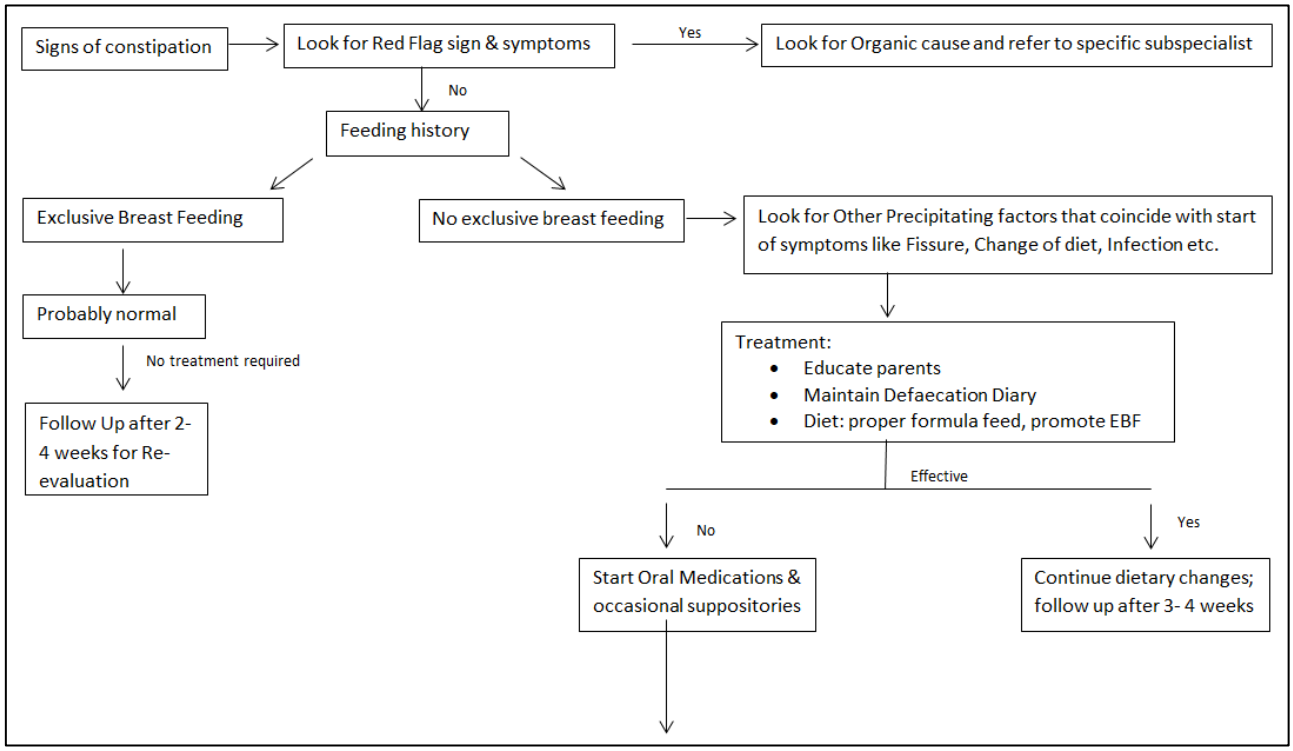
The faculty members of paediatric surgery department of BSMMU addressed the problem of constipation in infants and children who had no previously established medical condition. Neonates less than 72 hours old and premature infants of less than 37 weeks' gestation were excluded from consideration. This guideline has been designed to assist primary, secondary, and tertiary care pediatricians in the management of children with constipation in both inpatient and outpatient settings. Constipation was defined as a delay or difficulty in defecation, present for 2 or more weeks, and sufficient to cause significant distress to the patient. The desirable outcome of optimal management was defined as a normal stooling pattern, with interventions that have few or no adverse effects, and with resultant resumption of functional health. To develop the initial evidence-based guideline, articles on constipation published in English were found using Medline, Embase and Cochrane Database of Systematic Reviews. Considering childhood constipation being one of the underappreciated and mismanaged health problems, faculty members of paediatric surgery department, BSMMU approved a consensus of guideline of management of childhood constipation. The guidelines provide recommendations for the diagnostic evaluation of children presenting with constipation and treatment of children with functional constipation to standardize and improve their quality of care. Two guidelines were developed (Figs. 1 and 2) in this study. The first guideline for the evaluation and treatment of infants <6 months. The second guideline is for the evaluation and treatment of children > 6 months of age.

Figure 1 functional constipation in Infants less than 6 months' old.

Red Flag sign & symptoms in Constipation

- Delayed passage of meconium > 48 hours.
- Constipation starting extremely early in life (<1 month).
- Family history of Hirschsprung Disease.
- Small caliber stools.
- Per rectal bleeding in absence of anal fissure.
- Bilious vomiting.
- Severe Abdominal distension.
- Failure to thrive.
- Abnormal thyroid gland.
- Abnormal position of anus.
- Perianal fistula.
- Sacrum: tuft of hair or dimple on sacral spine area.
- Absent anal or cremasteric reflex.
- Decreased lower extremity strength/ tone/ reflex.
- Gluteal cleft deviation.
- Anal scar.

Figure 2 functional constipation in children more than 6 months of age.



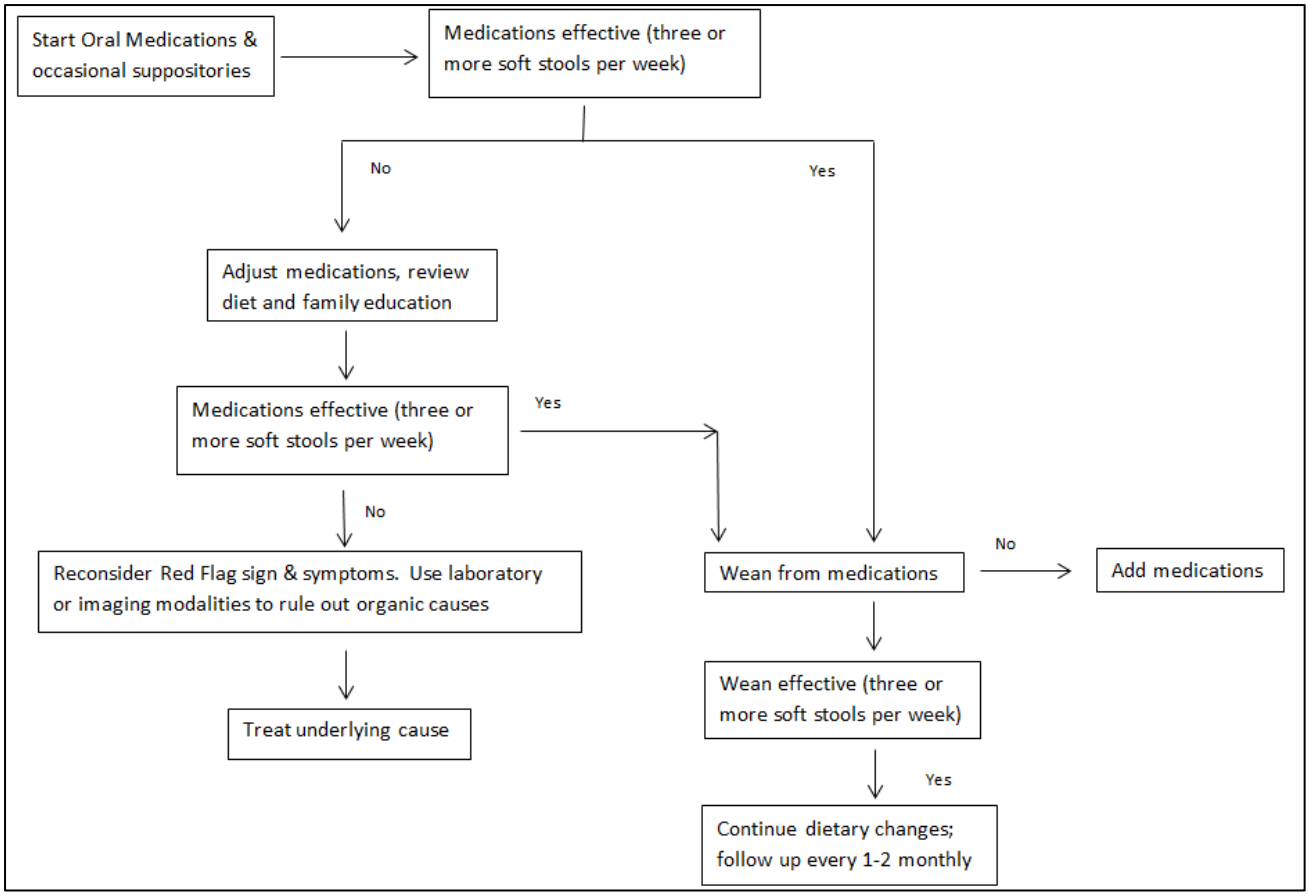
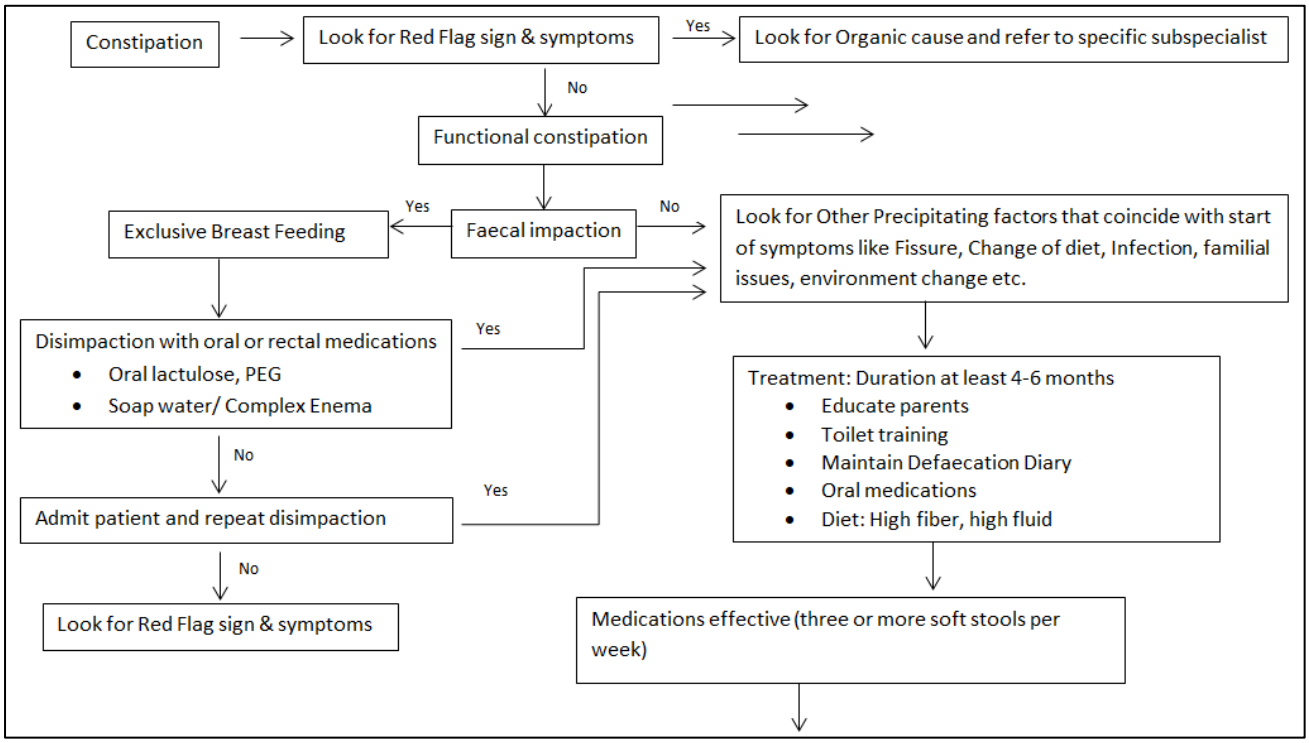


Figure 1: Guideline for the evaluation and treatment of infants <6 months of age



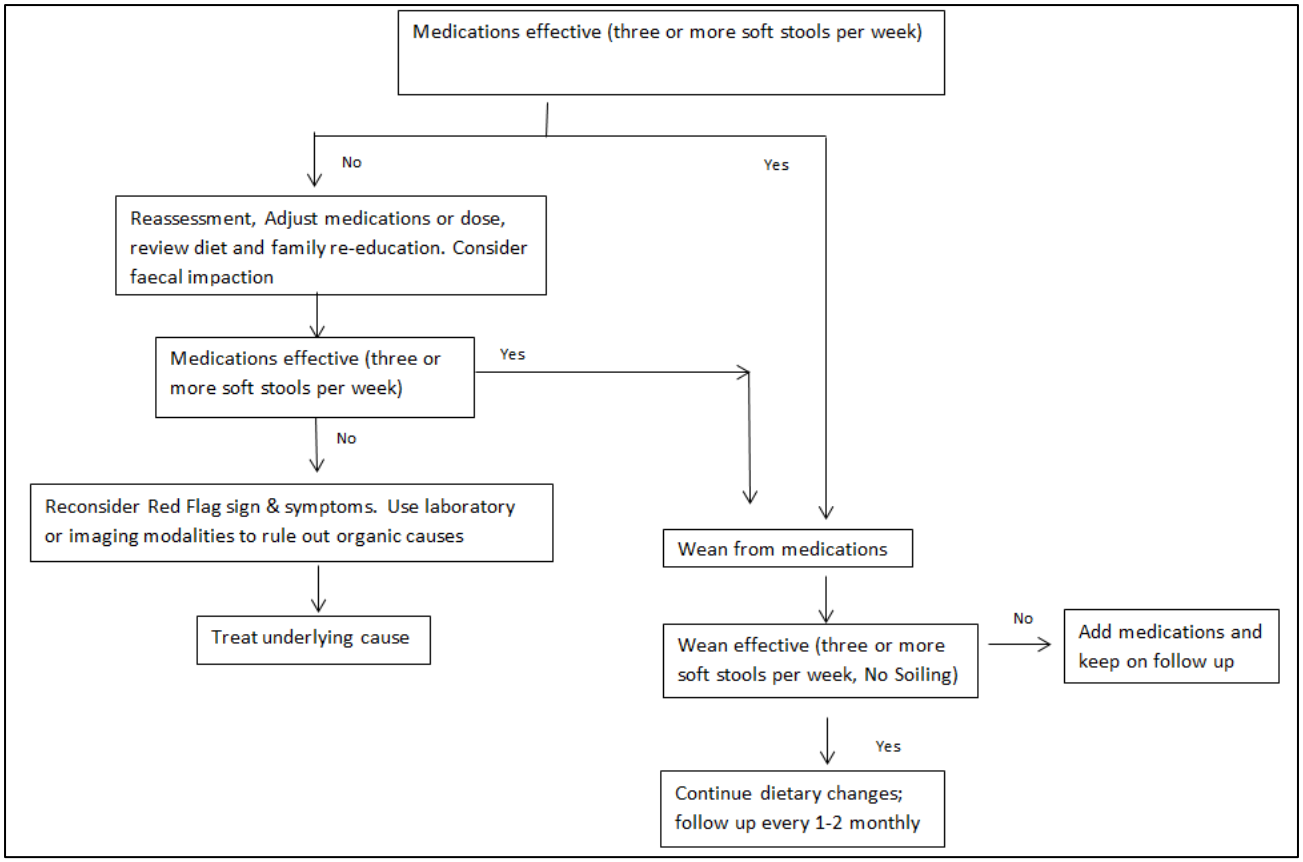


Figure 2: Guideline for the evaluation and treatment of children > 6 months of age

Laboratory Investigations:

- Thyroid function test (TSH, T4).
- S. C alcium, Magnesium.
- S. Electrolytes.

Imaging Investigations:

- Plain X-Ray Abdomen Erect view.
- Barium Enema.
- X- Ray LumboSacral region AP/Lateral View.
- MRI Pelvis.

Others

- Full thickness Rectal Biopsy.
- Anal Manometry (If available).
- Colonic Transit Time Study (If available).

History and Examination

History and examination are relevant in making a diagnosis of constipation, differentiating functional and organic constipation, looking for precipitants of functional constipation and eliciting issues relevant to management like incontinence, impaction, past treatment, treatment compliance and response to treatment. Clinical features and their interpretation are shown in Table I.

Table 1: Characteristics of Functional and Organic Constipation

Clinical features	Interpretation
Age at onset of constipation and time of passage of first meconium after birth	If onset is in early infancy: organic causes more likely. Normally, meconium is passed within first 48 hours of birth (in term babies); delayed passage is seen in Hirschsprung disease and other organic causes like cystic fibrosis
Stool characteristics Consistency Frequency Size small/ large Painful defecation Blood with defecation (streak on surface, drops after stooling)	Pasty stool in Hirschsprung disease and large or hard stools in functional constipation. Blood with painful defecation suggests anal fissure in vast majority and in older children painless bleeding occurs due to hemorrhoids or solitary rectal ulcer syndrome.
Retentive postures: the child hides behind furniture or goes to a corner; stands on toes with	Such posturing suggests holding of stools, a characteristic of functional constipation. Though it is often interpreted by parents

Clinical features	Interpretation
legs crossed and may be red faced.	as if the child is straining to pass stools.
Urinary symptoms in the presence of constipation: urinary frequency, burning, crying during micturition, urinary retention / incontinence [15]	Known to occur with impacted stools as a part of constipation. Lately described as a part of Dysfunctional elimination syndrome (DES) wherein bladder-bowel dysfunction sets in due to several reasons like bladder instability due to fecaloma pushing urinary bladder or compression over bladder neck which inhibits bladder emptying [16]
Features suggestive of common organic causes	
Developmental delay, open posterior fontanel in young infants; lethargy, dry skin, cold intolerance in older children	Hypothyroidism
Abdominal distention, enterocolitis (fever, diarrhea, blood in stools, failure to thrive, suggestive per rectal findings)	Hirschsprung disease
Frequent falls after 1 year of age, abnormal gait, delayed walking, spinal dimple / tuft of hair or any abnormal neurological examination (power, tone and reflexes of lower limbs, anal tone and perianal reflex)	Spinal cord abnormalities: Spinal dysraphism, tethered cord, spinal cord tumour, sacral agenesis
Developmental delay, regression of mile stones, seizures, feeding difficulties	Cerebral palsy, Down syndrome, Neurodegenerative disorders
Meconium ileus, recurrent respiratory infections, failure to thrive	Cystic fibrosis
Abdominal pain, distension and bilious vomiting	Mechanical intestinal obstruction, post-surgical intestinal adhesions (history of prior abdominal surgery), pseudoobstruction (megaduodenum, megaureter)
Rare causes should be suspected in definite clinical settings particularly when there is a failure of response	Celiac disease in the presence of anemia and growth failure. Lead poisoning presents with pain abdomen, blue gum lines and pallor.
Drugs	Antispasmodics for abdominal pain: dicyclomine, drotaverine Anti-diarrheal agents like loperamide Antitussives (opioid analogues) in respiratory infection: codeine, dextromethorphan Anticholinergics for bladder instability in spinal disorders (oxybutynin, tolterodine)

Dietary History

Details of diet should be taken: intake of fruits and vegetables and refined foods (e.g., bakery products), beverages etc. in older children, nature of feeds (breast vs top feeds) and details of supplementary feeds in younger babies. Exclusive and prolonged milk intake with minimal solids in young infants is a major factor causing functional constipation in India (unanimous opinion). These children are at an increased risk of iron deficiency anemia.

Important precipitating factors of functional constipation: The following are the most common factors which initiate constipation in children: [8] (a) premature initiation of toilet training (normally toilet training should start not before 24 months in a developmentally normal child) (b) drugs (Table I) and inter-current illnesses, (c) quick and abrupt transition of diet e.g. liquid to solid, breastfeeding to bottle feeding and (d) change in local environment (start of schooling) and psychosocial factors.

Evaluation

Patients should be examined thoroughly with proper growth assessment to rule out an organic etiology (Table I). Lower abdomen should be palpated for fecoliths (soft or hard indentable masses). In the absence of abdominal fecoliths, anal fissure or anal malformations, digital rectal examination (index finger in an older child or little finger in an infant) helps in the following: (a) presence of fecal impaction (seen in 50-70% children with functional constipation and is diagnosed in the presence of a hard mass (fecal mass) in the lower abdomen or presence of large, hard stools (fecolith) on Digital rectal examination (DRE), (b) diagnosis of Hirschprung's disease (empty rectum, gush of stools/air on withdrawal of finger), and (c) sacral mass lesion (palpable mass). DRE is not essential in all cases or at all visits. It is recommended in the following instances: (a) red flag symptoms or signs, (b) onset < 6 months of age, (c) non-responders despite good compliance to therapy, and (d) patients presenting with fecal incontinence to differentiate between constipation related and non-retentive incontinence [9-11].

Red flags suggestive of organic constipation: delayed passage of meconium, onset in early infancy, ribbon or pellet stools, bilious vomiting, uniform abdominal distension, failure to thrive, recurrent lower respiratory infections, cold intolerance, neuro-developmental delay or regression, gush of stools on DRE, anal malformations, abnormal neurological examination (paraspinal, lower limbs and anorectal reflexes). Details are given in Table I. Investigations: 95% children with constipation have functional constipation and do not need any investigations. Children with red flags (as above) suggestive of organic etiology or those who are diagnosed as functional constipation but fail to respond to therapy need diagnostic evaluation. A plain erect X-ray abdomen or barium enema is not required as a routine investigation in all cases [12-14].

Management of Constipation

The following points should be addressed: patient counseling, toilet training, modifications in diet, drug management, and follow-up and if necessary surgical interventions.

Patient Counseling

Salient pathophysiological aspects inclusive of objective of treatment should be explained to the parents. Parents should be clearly explained the cause of functional constipation, preferably with a diagram. Any precipitating factors identified should be eliminated or modified by appropriate advice (e.g. in a child with exclusive milk feeding, (semi) solid diet supplementation should be instituted; drugs causing constipation should be stopped; any psychosocial factor operating needs to be addressed).

Toilet-Training

Toilet training should not be started before 24 months of age; however, there is a variation in recommended age of training between 3-4 years. Follow the 'Rule of 1': Toilet training to be done by one person, one routine (5 min after each major meal), one place, one word e.g. pooh/potty etc. In a child with constipation: (a) make the child sit in the toilet, 2-3 times a day for 5-10 minutes after meals (within 30 minutes of meal intake), (b) make the defecation painless by treating anal fissures, if present, (c) sit in squatting position in the Indian toilet or with foot rest in English toilet/potty seat to have appropriate angulation of knees and thighs to facilitate expulsion of stools, (d) reward system (positive reinforcement) helps in motivating the child and avoiding child-parent conflict.

Diet, Fiber and Water Intake

There are no well-conducted randomized controlled studies of diet and treatment of constipation. Daily fiber requirement is 0.5 gm/kg/day. Adequate intake of fiber rich diet (cereals, whole pulses with bran, vegetables, salad and fruits) is recommended at the initial counseling. High fiber diet chart should be given to parents (as per local practice). Restrict milk and encourage intake of semi solids and solids in younger children. Ensure adequate intake of water. Normal activity is recommended.

Medical Therapy

It consists of initial phase of disimpaction in patients with fecal impaction and a maintenance phase with laxatives.

Disimpaction

Rationale of disimpaction: Completely clear the colon so that no residual hard fecal matter is retained. Thereafter the maintenance laxative therapy can keep the bowel moving and empty so that there is no retention. This enables rectum to achieve the normal diameter and tone for proper anorectal reflexes and pelvic floor coordination to facilitate normal stool expulsion.

Options for Disimpaction: There are two ways of disimpaction (a) one-time hospital based (100% success) (b) home based in split doses (68-97% success) [17-19]. Rarely rectal enemas can be used as supplementary therapy to clear the heavily hard loaded colorectal region. Oral route is preferred as it non-invasive, has better patient acceptability, cleans the entire colon and is equally effective as rectal disimpaction. Manual evacuation of rectum is rarely required in patients failing oral and rectal disimpaction but it should be performed under anaesthesia. Children undergoing disimpaction should be reviewed within one week of disimpaction to assess for re-impaction. Maintenance therapy should be started only after effective disimpaction.

Maintenance therapy

There are different classes of laxatives used for constipation (osmotic and stimulants):

- **Osmotic Laxatives:** These are the mainstay of maintenance therapy in children. These laxatives draw water into the stool thereby making the stools softer and easy to pass. The two main osmotic laxatives are polyethylene glycol (PEG) and lactulose. Based on the literature, and the experience of the group, the recommendations are: (i) PEG is the first line of therapy and is more effective as compared to lactulose/ lactitol. However in children <1 yr of age, the only drug recommended is lactulose. (ii) In case of nonresponse or intolerance due to non- palatability to PEG, the second line of treatment is lactulose/lactitol which is safe for all ages. (iii) Two osmotic agents like PEG and lactulose/lactitol should not be given simultaneously. Combinations therapy with two classes of laxatives is not recommended for children [3].
- **Stimulant Laxatives:** Stimulant laxatives are used only as rescue therapy No randomized

controlled trials are available in children regarding their efficacy. Stimulants are usually required as rescue therapy (an acute or sudden episode of constipation while being on regular compliant maintenance therapy). These stimulants are given for a short duration of 2-3 days to tide over the acute episode of constipation, and then stopped [20].

Behavioral Therapy and Biofeedback

These are helpful when constipation is associated with behavioral comorbidity or pelvic floor dysfunction in older children and adolescents. This requires referral to centers with expertise.

Follow-up

Regular follow-up is essential. At each follow up, record the stool history, associated symptoms, compliance with diet, medications and toilet-training. It is important to have a stool diary for proper follow-up. Parents should maintain a stool diary for objective assessment of response to therapy related to stool frequency and consistency. First follow-up is advised at 14 days to assess compliance. Subsequently, 1-2 monthly follow-up till normal bowel habit is attained or physician is satisfied with response as defined below as 'successful outcome'. Further, 3-monthly follow-up for a minimum period of one year. While on follow-up, the maintenance dose may be increased or decreased to achieve daily passage of stools, keeping in view the features of successful outcome. Successful outcome of treatment should be defined as (a) stool normalcy while on laxatives for a period of at least 4 weeks of initiation of therapy, and (b) achievement of stool normalcy for a minimum period of 6 months before tapering. Normalcy of stools should define as daily, not hard, nor loose watery stools, with absence of pain, straining, bleeding, posturing or incontinence.

When to stop laxatives

No clear guidelines exist and only expert opinions are available. Based on the natural history, child should have been symptom-free while on maintenance therapy for at least 6 months before attempting to taper the laxatives. It is then advisable to taper gradually over a period of 3 months. Laxatives should never be stopped abruptly. In the developmental stage of toilet training, medication should only be stopped once toilet training and establishment of a regular stooling pattern is achieved. Dietary and toilet training advice should continue even after stoppage of laxatives. Triggers and precipitating factors of functional constipation should have been adequately addressed. Parents should have the knowledge about the management and also risk of relapse of symptoms on stoppage of medication.

Surgical Interventions

Those patients not responding to a sustained optimal medical management of functional constipation should be investigated for hypothyroidism, Hirschprung disease, Cow milk protein allergy in young children and spinal abnormalities. These children also need evaluation for presence of slow colonic transit, pelvic dyssynergia and pseudo- obstruction, in centers with expertise. If surgical causes present, then those patient should be treated surgically promptly.

CONCLUSION

Constipation is globally underappreciated problem and should be evaluated thoroughly. Constipation due to functional or organic cause should be identified. Management protocol should be adapted as per the guideline shown in Fig. 1 and Fig 2. Emphasis should be laid on toilet-training, feeding habit and importantly in counselling particularly related to long term usage of medical therapy.

Limitation

It is intended to serve as a general guideline and should not be considered a substitute for clinical judgment or used as a protocol applicable for all patients. This guideline is also not aimed at the management of patients with underlying organic medical conditions causing constipation, but rather just for functional constipation.

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