REVIEW ARTICLE

Approach to Constipation in Children

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Purpose: There is a scarcity of literature, and prevalent misconceptions about constipation in India.

Methods: A literature search in PubMed was conducted with regard to epidemiology, clinical features, and management of constipation. Special emphasis was paid to functional constipation and refractory constipation. English language studies available full text over the last 25 years were considered and relevant information was extracted.

Conclusions: Estimated prevalence of constipation is 3% among toddlers and pre-school children worldwide and 95%, of them are considered functional. A careful history and thorough physical examination is all that is required to diagnose functional constipation. Management includes disimpaction followed by maintenance therapy with oral laxative, dietary modification and toilet training. A close and regular follow-up is necessary for successful treatment. In most of the cases laxative needs to be continued for several months and sometimes years. Early withdrawal of laxative is the commonest cause of recurrence. Refractory constipation is less common in primary care set up. Radiological colon transit study is useful in picking up Slow transit constipation. Antegrade continence enema plays an important role in the management of slow transit constipation.

Key words: *Functional constipation; Laxative; Refractory; Slow transit constipation.*

Constipation is a common problem in children and it accounts for 3% of visits to general pediatric clinics and as many as 30% of visits to pediatric gastroenterologists in developed countries [1]. There is very little information about its prevalence from developing countries. However, some recent reports from south Asia have suggested that it is not uncommon in Asia [2-4]. The common perception in South Asia is that functional constipation is uncommon as diet here is rich in fiber. Hence many children with constipation are subjected to detailed investigations to rule out Hirschsprung disease. However, whatever limited information we have from Asia shows that functional constipation is the commonest type of constipation in Asia as well [2-4]. The prevalence, etiology, pathogenesis, assessment and management of constipation in children is discussed in this review.

STOOL PATTERN OF NORMAL INFANTS

Normal variation in stool frequency and consistency often leads to over-diagnosis of constipation especially in infants. Two recent studies from the Europe (12,984 healthy children, 1-42 months from UK [5] and 600 healthy infants from Netherlands [2]) have shown that the median stool frequency at 1 month of age was 3 (0-9) per day and it decreased significantly at 3 months of age to 2 (0-6) per day. Moreover, there was a significant difference in stool frequency between breastfed and formula-fed babies at 1 month of age [4 (0-9) *vs.* 1 (0-5) per day, respectively, $P<0.01$] but there was no difference at 3 months of age [2 (0-6) *vs.* 1 (0-5) per day] [5,6]. Another study from Turkey in 911 children aged 0 to 24 months has shown that the median defecation frequency at 1 month of age was 6 per day and by 4-6 months of age it became 1 per day. The most interesting observation of this study is that the stool frequency was <1 per day (once in 2-3 days but soft stool) in 39.3% babies in 2-6 months of age [7]. Hence, while considering constipation we should remember the normal variations of stool frequency and consistency in healthy infants and variations as per their feeding pattern (breast fed *versus* bottle fed).

DEFINITION OF CONSTIPATION

In view of wide variations in stool frequency and consistency in normal healthy children, ROME III criteria [8,9] have included other variables besides frequency of stool to define constipation in children. As per ROME III criteria, functional constipation is defined as presence of two or more of the following in absence of any organic pathology and the duration should be at least one month in <4 years of age, and at least once per week

for at least 2 months in ≥4 years of age; (*i*) two or less defecations per week, (*ii*) at least one episode of fecal incontinence per week, (*iii*) history of retentive posture or stool withholding maneuver, (*iv*) history of painful or hard bowel movement, (*v*) presence of large fecal mass in the rectum, (*vi*) history of large-diameter stools that may obstruct the toilet. In children <4 years of age, the history of retentive posture or stool withholding maneuver is being replaced by history of excessive stool retention as retentive posture is difficult to assess in younger children.

BOX I CAUSES OF CONSTIPATION IN CHILDREN

- *Functional* constipation of childhood
- *Motility related:* Hirschsprung disease, myopathy
- *Congenital anomalies:* Anal stenosis, anteriorly located anus, spinal cord anomalies (meningomyelocele, myelomalacia, spina bifida)
- *Neurological:* Cerebral palsy, mental retardation
- *Endocrine/metabolic:* Hypothyroidism, renal tubular acidosis, diabetes insipidus, hypercalcemia
- *Drugs:* Anticonvulsants, antipsychotic, codein containing anti-diarrheal.

PREVALENCE

Constipation is a common problem in children and an estimated prevalence of functional constipation is 3% worldwide [1,10,11]. Though we do not have any prevalence data from Asia, in a study from our center we reported 138 cases of constipation diagnosed over a period of six years and 85% of them were functional [2]. In next 8 years (2007 to 2014), we managed another set of 330 children with constipation and the proportion of functional constipation was 82% (270 of 330) [unpublished data]. Hence, constipation is not uncommon in the Indian subcontinent. It is commonly seen among toddlers and preschool children, and in 17% to 40% of cases, constipation starts in first year of life [12,13].

ETIOLOGY

The common perception in South Asia is that functional constipation is uncommon as diet in South Asia is rich in fiber. In our study [2], we have shown that this perception is incorrect. Constipation is quite common in India and functional constipation is the commonest cause. Common causes of constipation in children are given in ***Box* I**. In fact 95% cases are due to functional and only 5% are due to some organic causes [14]. Among the organic causes, Hirschsprung disease is the most common and important cause [2].

Pathogenesis of functional constipation **(*Fig.* 1)**

The initiating event in functional constipation is a painful bowel movement which leads to voluntary withholding of stools by the child who wants to avoid unpleasant defecation [15]. Events that lead to initial painful defecation are change in routine like timing of defecation or diet, stressful events, inter-current illness, non-availability of toilets (travel etc.), child's postponing defecation because he or she is too busy (morning school), and forceful toilet training (too early). All these events give rise to large, hard stool and passage of such stool leads to stretching of the pain sensitive anal canal, and that frightens the child. As a result of which the child fearfully determines to avoid defecation by all of means. Such children respond to the urge to defecate by contracting their external anal sphincter and gluteal muscles, in an attempt to withhold stool. Withholding of feces leads to prolonged fecal stasis in the rectum, with resultant absorption of fluids and harder stools. Successive retention of stools in rectum make them larger. As the cycle is repeated, successively greater amounts of larger and harder stools are built up in the rectum and passed with even greater pain accompanied by severe "stool withholding maneuvers". Thus a vicious cycle sets in (***Fig.* 1**). These children develop a "stool-withholding maneuver" or retentive posture which parents erroneously think it as an attempt to defecate. They feel that the child is trying hard (straining) in an attempt to pass stool when the child is actually trying his best to stop it. In response to the urge, they refuse to sit on the toilet, rather rise on their toes, hold their legs and buttocks stiffly and often rock back and forth, holding on to a furniture, scream, turn red until a bowel movement finally takes place. With time, such retentive behavior becomes an automatic reaction. They often perform this while hiding in a corner. Eventually, liquid stool from the proximal colon may percolate around

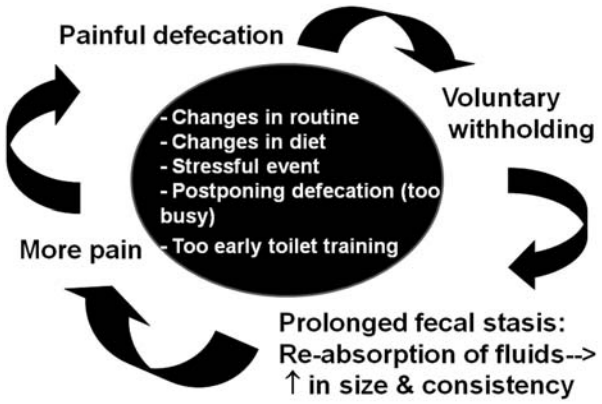

FIG. 1 *Pathogenesis of functional constipation.*

hard retained stool and pass per rectum involuntarily (fecal incontinence). Sometimes this fecal incontinence is mistaken as diarrhea. In fact almost 30% children with functional constipation develop fecal incontinence [12]. Eventually, with more and more stasis, the rectum becomes dilated and redundant, and the sensitivity of the defecation reflex and the effectiveness of peristaltic contractions of rectal muscles decrease. This is the stage when it becomes more difficult to have a normal defecation due to fecal impaction.

ASSESSMENT OF A CHILD WITH CONSTIPATION

A careful history and thorough physical examination (including digital rectal examination) are all that is required to diagnose functional constipation provided there are no "red flags" like fever, vomiting, bloody diarrhea, failure to thrive, anal stenosis, and tight empty rectum [16]. Abnormal physical findings, which help to distinguish organic causes of constipation from functional, are failure to thrive, lack of lumbo-sacral curve, sacral agenesis, flat buttock, anteriorly displaced anus, tight and empty rectum, gush of liquid stool and air on withdrawal of finger, absent anal wink and cremasteric reflex. Features which differentiate Hirschsprung disease from functional constipation are given in ***Table* I**. The most important features in the history, which help to distinguish Hirschsprung disease from functional consti-pation, are onset in first month of life and delayed passage of meconium beyond 48 hours and the most important examination finding is empty rectum on digital rectal examination. It has been shown that 99% healthy, term neonates and 50% babies with Hirschsprung disease pass meconium in first 48h of life [17,18]. In fact, in a classical case of functional constipation, no investigation is required to make the diagnosis. There is no need to do barium enema in all cases of constipation to rule out Hirschsprung disease. If the clinical suspicion of Hirschsprung disease is strong (based on history of delayed passage of meconium and empty rectum on digital rectal examination) then only one may consider getting barium enema done. However, to diagnose Hirschsprung disease, rectal biopsy is a must. The common mistake that leads to further confusion is delayed film (24 hours) showing retention of barium which is a common finding in functional constipation as well. The interpretation of barium enema should be on the basis of reversal of recto-sigmoid ratio (sigmoid becomes more dilated than rectum) and documentation of transition zone and not on mere presence of barium in rectum after 24 hours (***Fig.* 2**).

MANAGEMENT

Most children with functional constipation get benefited from a precise, well-organized treatment plan, which includes cleaning of fecal retention, prevention of further retention and promotion of regular bowel habits. The general approach includes the following steps: (*a*) determine whether fecal impaction is present, and treat the impaction if present, (*b*) initiate maintenance treatment with oral laxative, dietary modification, toilet training, and (*c*) close follow up and medication adjustment as necessary [16]. Suggested approach to constipation is given in ***Fig.* 3**.

TABLE I DIFFERENCES BETWEEN FUNCTIONAL CONSTIPATION AND HIRSCHSPRUNG DISEASE

Features	*Functional constipation*	*Hirschsprung disease*
Delayed passage of meconium	None	Common
Onset	After 2 years	At birth
Fecal incontinence	Common	Very rare
History of fissure	Common	Rare
Failure to thrive	Uncommon	Possible
Enterocolitis	None	Possible
Abdominal distension	Rare	Common
Rectal examination	Stool	Empty
Malnutrition	None	Possible

Disimpaction

First step in the management of constipation is to decide whether the child has fecal impaction or not. This can be accomplished by abdominal examination (in half of the cases hard fecal mass or fecalith is palpable in the lower abdomen) [19], by digital rectal examination (rectum is usually loaded with hard stools), or rarely by abdominal *X*-ray. Routinely abdominal *X*-ray is not required to detect fecal impaction. However, if the child refuses rectal examination, if he/she is obese, or if there is a doubt

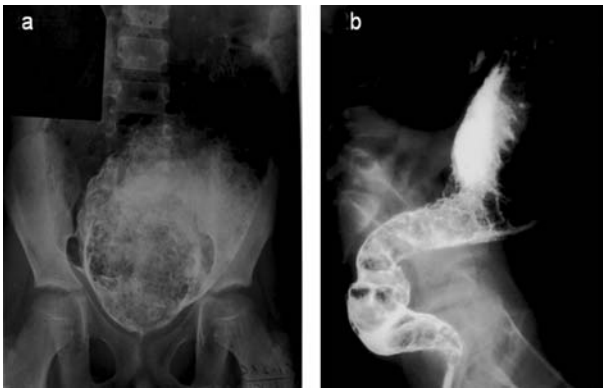

FIG. 2 (*a*) *Barium enema (delayed film) of functional constipation; (b) Barium enema of a patient with Hirschsprung disease.*

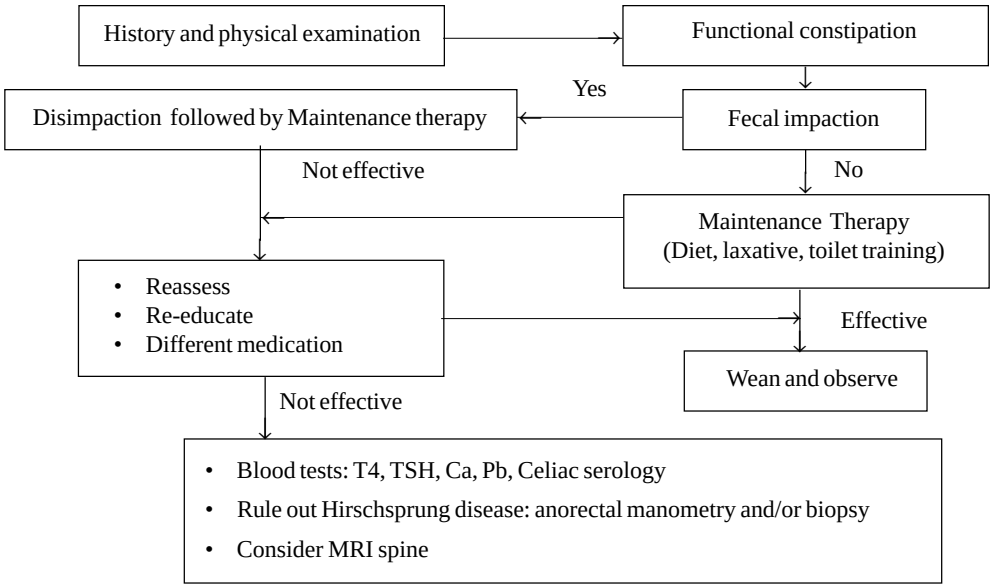

FIG. 3 *Suggested approach to functional constipation: modified from ESPGHAN recommendations.*

about the diagnosis of constipation then only an abdominal *X*-ray is required to document excess fecal matter in the colon.

If there is fecal impaction (most of the children with functional constipation do have), then the first step in the management is disimpaction, means clearing or removal of retention from the rectum. This can be achieved by oral or by rectal route. Oral route is non-invasive, gives a sense of power to the child but compliance is a problem. Polyethylene glycol (PEG) lavage solution is given orally (1-1.5g/kg/day for 3-6 days) or by naso-gastric tube (25mL/kg/hour, reconstituted PEG solution) until clear fluid is excreted through anus. Adequate disimpaction means both output (stool) and input (lavage solution) should be of same color in case of naso-gastric tube disimpaction [16]. Successful disimpaction for home-based regimen (3-6 days) is defined as either empty or a small amount of soft stool on rectal examination and resolution of the left lower quadrant mass if it was there [20, 21].

Rectal approach (enema) is faster but invasive, likely to add fear and discomfort that the child already has in relation to defecation. This may aggravate defecation avoidance or retention behavior and usually not preferred. However, if PEG is not available then enema can be used for disimpaction (sodium phosphate enema [proctoclysis]: 2.5 mL/kg, maximum 133ml/dose for 3-6 days) [16]. In a retrospective chart review of 223 children, Guest, *et al*. [22] have shown that 97% children treated with PEG were successfully disimpacted compared to 73% of those who received enemas and suppositories (P<0.001). In a randomized controlled trial, Bekkali, *et al*. [20] have compared 6 days enemas with dioctylsulfosuccinate sodium (60 mL in <6 years and 120 mL in ≥6 years) in 46 children with PEG in 44 children and showed that both were equally effective for disimpaction. However, two retrospective studies have shown that the reimpaction rate after initial disimpaction with enemas was much more than that with PEG [22,23]. For infants, glycerine suppositories are to be used for disimpaction as enemas and lavage solution are not indicated in them [16].

Maintenance therapy

To prevent re-accumulation after removing impaction maintenance therapy in the form of dietary modification, toilet training and laxatives needs to be started immediately after disimpaction or if there is no impaction, then as a first step.

Dietary modification: The diet of most children with functional constipation lacks fiber. Many of them are predominantly on milk with very little complementary food. The children with functional constipation should be encouraged to take more fluids, absorbable and non-absorbable carbohydrate as a method to soften stools. Non-absorbable carbohydrate (sorbitol) is found in some fruit juices like apple, pear and prune juices. A balanced diet that includes whole grains, fruits and vegetables is advised. The recommended daily fiber intake is age (in years) + 5 in g/day. In our practice, where most children are predominantly on milk diet, we counsel the parents to

restrict milk so that the child starts eating solid foods. Though cow milk protein allergy (CMPA) was proposed as one the common causes of constipation [24], subsequent studies [16,25] and our experience did not substantiate that claim.

Toilet training: It should be imparted after 2 to 3 years of age. Too early and vigorous toilet training may be detrimental for the child. The child is encouraged to sit on the toilet for 5 to 10 minutes, 3 to 4 times a day immediately after major meals for initial months [26]. The gastro-colic reflex, which goes into effect shortly after a meal, should be used to advantage [27]. Children are encouraged to maintain a daily record *(stool diary)* of bowel movements, fecal soiling, pain or discomfort, consistency of stool and the laxative dose. This helps to monitor compliance and to make appropriate adjustment in the treatment program. Parents are instructed to follow a reward system. Children should be rewarded for not soiling and for regular sitting on the toilet. This acts as a positive reinforcement for the child.

Laxatives: ***Table* II** [28] presents the doses and side effects of various laxatives. It has been shown that lactulose, sorbitol, milk of magnesia (magnesium hydroxide), and mineral oil (castor oil), all are equally effective in children. Milk of magnesia and mineral oil are unpalatable and due to the risk of lipoid pneumonia mineral oil is contraindicated in infants. The commonly used laxative in children so far was lactulose, until the introduction of PEG. The study by Loening-Baucke [26] has shown that low volume (0.5 to 1g/kg/day) polyethylene glycol (PEG) without electrolytes is as effective as milk of magnesia in the long-term treatment of constipation in children. Low volume PEG has been compared with lactulose in the treatment of childhood functional constipation and a meta-analysis of five RCTs comprising of 519 children has shown that PEG was more effective than lactulose with equal tolerability and fewer side effects [29]. Side effects, especially bloating and pain are less with PEG. With long term use, lactulose loses its efficacy due to change in gut flora but PEG does not [30]. The dose of laxative should be adjusted to have one or two soft stools/day without any pain or soiling. Once this target is achieved, the same dose should be continued for at least 3 months to help the distended bowel to regain its function. Point to be remembered here is that laxative needs to be continued for several months and sometimes years at the right dose. Early and rapid withdrawal is the commonest cause for recurrence. Stimulant laxatives (senna, bisacodyl) are not used routinely and are contraindicated in infants. They may be used for a short course in refractory cases as a rescue therapy [16].

Follow-up schedule

A close and regular follow-up is a key to the success of treatment of functional constipation. Initial follow-up should be monthly till a regular bowel movement is achieved. After that it should be 3 monthly for 2 years and then yearly [26]. On each visit, by reviewing stool records

TABLE II LAXATIVES–DOSAGE AND SIDE EFFECTS (MODIFIED FROM NASPGHAN POSITION STATEMENT) [28]

Drugs	*Dose*	*Side effects*
Lactulose	1-2 g/kg, 1-2 doses	Bloating, abdominal cramps
Sorbitol	1-3 mL/kg/d, 1-2 doses	Same as lactulose
Milk of magnesia	1-3 mL/kg/d, 1-2 doses	Excess use leads to hypocalcemia, hypermagnesemia, hypophosphatemia
PEG for disimpaction	25 mL/kg/hour (R/T) or 1-1.5 g/kg for 3-6 d	Nausea, bloating, cramps, vomiting
PEG for maintenance	5-10 mL/kg/d or 0.4 to 0.8 g/kg/d	Nausea, bloating, cramps, vomiting
Mineral oil for disimpaction	15-30 mL/y of age (max. 240mL)	Lipoid pneumonia, interference with absorption of fat soluble vitamins
Mineral oil for maintenance	1-3 mL/kg/d	Lipoid pneumonia, interference with absorption of fat soluble vitamins
Senna	2-6 yrs: 2.5-7.5 mL/day (8.8 mg/5mL) 6-12 yrs: 5-15 mL/d	Melanosis coli, hepatitis, hypertrophic osteoarthropathy, neuropathy
Bisacodyl	0.5-1 suppository (10 mg)1-3 tabs /dose (5mg)	Abdominal pain, diarrhea, hypokalemia

PEG: Polyethylene glycol; R/T: Ryle's tube

and repeating abdominal and (if required) rectal examination, progress should be assessed. If necessary, dosage adjustment is to be made. Once a regular bowel habit is established, the laxative dosage is to be decreased gradually before stopping.

Outcome

In a long-term follow up study (mean 6.9 ±2.7 years) on 90 children, who were <4 years at diagnosis, Loening-Baucke [31] showed that 63% had recovery but symptoms of chronic constipation persisted in one third of cases 3 to 12 years after initial evaluation and treatment. In another study, it has been shown that 50% of patients were off laxative at 1 year, another 20% at 2 years and the remaining 30% were on laxative for many years [14]. von Ginkel, *et al*. [32] in a long-term follow up (mean 5 years) study on 418 cases have also shown that 60% were successfully treated at one year but 30% of cases in the 16 years or older age group continued to have constipation. They found that age at onset of constipation (<4 years) and associated fecal incontinence were poor prognostic factors. In a large study on 300 children, Clayden [33] has shown that 22% required laxative for <6 months, 44% for <12 months and 56% for >12 months. By summarizing all these studies it can be said that half to two thirds of children with functional constipation had successful outcome with laxative therapy for 6 to 12 months but the remaining one thirds require long-term therapy and they may continue to have constipation as an adult. Recurrence of constipation after initial recovery is common (50% may have relapse within a year of stopping therapy) but they respond well to retreatment [12]. Poor prognostic factors are; early onset (<4 years), associated with fecal incontinence, and longer duration of symptoms (>6months) [16].

REFRACTORY CONSTIPATION

A case of constipation is labeled as refractory when there is no response to optimal conventional treatment for at least 3 months [16]. The prevalence of refractory constipation is said to be 20-30% [16, 34] but the prevalence is much higher in India at primary care pediatrician level due to lack of awareness about optimal conventional treatment. At primary care level, disimpaction is hardly practiced and as a result of which the response of laxative therapy is not optimal. The second important reason is early discontinuation of therapy which leads to refractoriness of constipation. The true refractory constipation is extremely uncommon in primary care set up. Even at tertiary care centers, refractory constipation is uncommon [2].

Besides organic causes of constipation, motility disorders (like slow transit constipation), disorders of stool expulsion like dyssynergic defecation, internal anal sphincter achalasia and sphincter dysfunction in children with Hirschsprung disease which persist after surgery are important causes of refractory constipation [34]. While approaching refractory constipation common organic causes (***Fig.2***) like Hirschsprung disease, hypothyroidism, celiac disease, hypercalcemia, spinal cord abnormalities should be ruled out first and then motility studies (like colon transit time [CTT], anorectal manometry with balloon expulsion test, colonic manometry) to be done to find out motility disorders [34, 35]. The simplest and the most informative of all these tests is colon transit time (CTT) study which can be done by radio-opaque markers and by radionuclide scintigraphy (NTS or nuclear transit studies) [34]. In radiographic CTT study, a capsule containing 20 radio-opaque markers (different shape in different days) are given daily for 3 days and plain x-ray abdomen is taken on day four and if required on day 7 (when all markers are retained on day 4). From *X*-ray, markers are counted in right colon, left colon and recto-sigmoid regions and the mean segmental time is calculated. Slow transit constipation is defined as retention of markers for 62 hours or more [36, 37]. As per the CTT study, constipation can be divided into three categories; (*i*) normal transit constipation, (*ii*) functional outlet obstruction or dyssynergic defecation (retention of markers in rectosigmoid region) and (*iii*) slow transit constipation (retained markers are distributed all over) (***Fig. 4a*** and ***4b***). In a study of 225 children (135 pediatric constipation, 56 non-retentive fecal incontinence and 24 recurrent abdominal pain) Benninga, *et al*. [36,37] have shown that 56% of constipated children had normal CTT, 24% had functional outlet obstruction and just 20% had slow transit constipation. In another study on 85 children with functional constipation with rectal fecal impaction by Bekkali, *et al*. [20] have shown that 93% had delayed CTT and as expected majority (83.5%) of them had delayed rectosigmoid segment CTT. As the basic pathophysiology of functional constipation is voluntary withholding of feces, it is expected that most children with functional constipation will have either functional outlet obstruction/ dyssynergic defecation or normal transit constipation.

In normal defecation there is synchronized relaxation of puborectalis muscle (makes ano-rectal angle straight) and external anal sphincter along with generation of propulsive force through contraction of colon and increased in intra-abdominal pressure, which propels stools out of rectum. In dyssynergic defecation there is paradoxical contraction or failure of relaxation of external anal sphincter and puborectalis muscle with or without increased rectal pressure (propulsive force) [38].

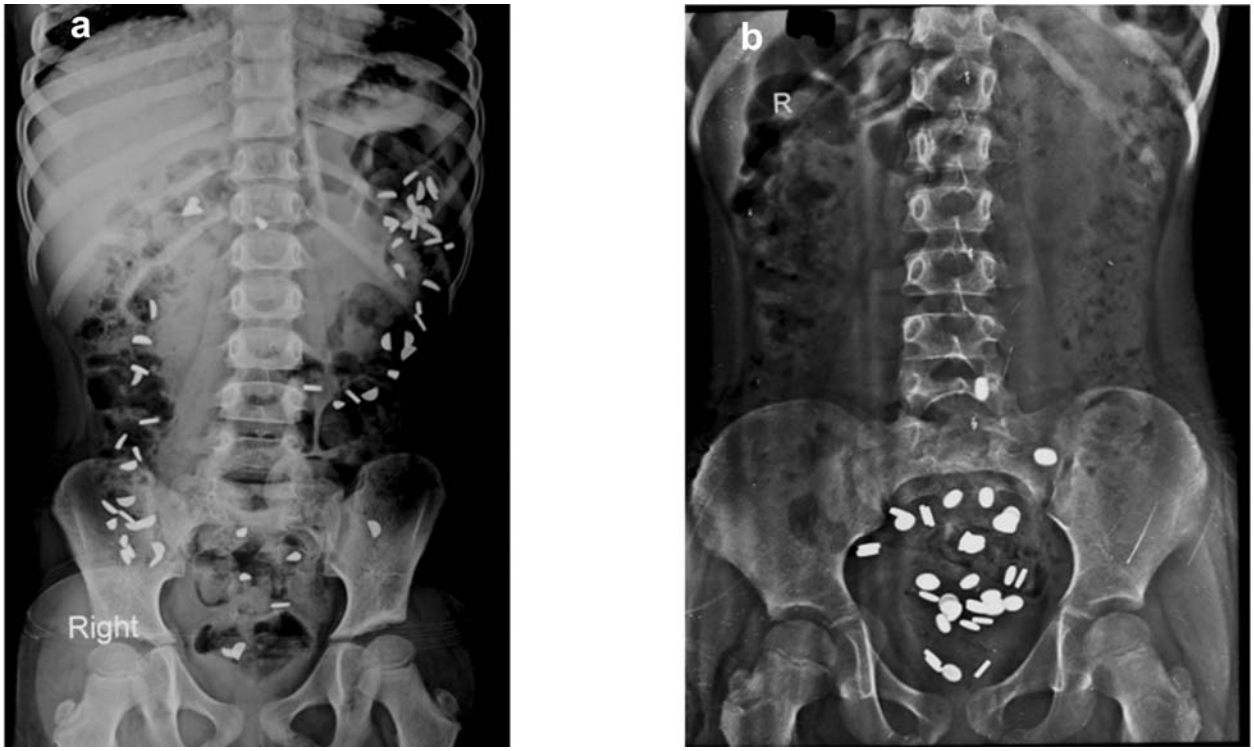

FIG. 4 *(a) Colon transit time (CTT) study by radio-opaque markers showing slow transit constipation; 4(b) Functional outlet obstruction.*

These features are detected on anorectal manometry. Therapeutic option of refractory constipation due to dyssynergic defecation is biofeedback (to restore the normal pattern of defecation) and for slow transit constipation is to enhance colonic transit with newer drugs like colon-specific prokinetics like prucalopride (5HT4 agonist) [39] and intestinal secretagogue (lubiprostone) [40], which increases intestinal chloride secretion and accelerates small intestinal and colonic transit. Antegrade continence enema helps in refractory slow transit constipation cases [41].

Most reports of slow transit constipation in children are from Australia and the clinical presentations of this subset of patients are different from functional constipation (***Box* 2**). In a study of 100 children with slow transit constipation, Hutson, *et al*. [42,43] have shown that a history of delayed passage of meconium was seen in 30% of cases, onset of severe constipation in infancy in 63% and half (52%) of those presenting after 2 years of age had history of soiling (fecal incontinence) and failure of toilet training, and the majority (90%) had no hard fecal mass in rectosigmoid area. The management of slow transit constipation is quite difficult as they do not respond to conventional laxative therapy and the main concern is soiling. Fiber therapy is contraindicated (as the motility is slow), the newer drugs like colon specific prokinetics like prucalopride [39] and chloride channel activator (lubiprostone) [40] are still investigational drugs in children. The only effective therapy for this subset of patients is antegrade continence enema. Here, appendix is used as conduit to insert cecostomy button (Chait trapdoor button) to give enema [44,45]. It has minimal scar and just a button at right iliac fossa which is used in the morning to give antegrade enema and the whole day patient remains dry (no soiling). In a recent study on 203 cases (median age 10 years, follow up 5.5 years, 62% due to refractory chronic idiopathic constipation) of this modality, Randall, *et al*. [41] showed good result in 93%, soiling prevented in 75% and symptoms resolved (no longer on antegrade continence enema) in 26% (81% of them were chronic idiopathic constipation).

Colonic manometry plays an important role in guiding both medical and surgical treatment in refractory constipation. In fact it has been shown that the success of antegrade continence enema procedure depends on colonic manometry results [46]. If there is generalized colonic dysmotility (absence of high-amplitude propagating contraction [HAPC] in the entire colon) then there is no point in putting cecostomy catheter. Similarly,

BOX 2 CLINICAL FEATURES OF SLOW TRANSIT CONSTIPATION IN CHILDREN [42]

- High frequency of delayed passage of meconium
- Onset of symptoms early in first year and/or failure to toilet training
- Feces soft rather than rock hard
- Failure of high fiber diets (they tend to make symptoms worse)
- Global delay in colonic transit on transit study.

colonic manometry results can dictate the type of surgery following colonic diversion; subtotal colectomy if small bowel motility is normal but whole colonic motility is abnormal, left hemicolectomy if only left colonic motility is abnormal and reanastomosis if colonic motility is normal [47].

A relatively less common but important cause of refractory constipation is internal anal sphincter achalasia. In a study of 332 patients with severe constipation, De Caluwe, *et al*. [48] have reported this as a cause in just 4.5% of cases. This subset of patients usually present with severe constipation (99.7%) which often associated with fecal incontinence (46%) and are diagnosed by absence of anorectal inhibitory reflex (ARIR) on anorectal manometry along with presence of ganglion cell on rectal biopsy [49]. The treatment options for internal anal sphincter achalasia are posterior anal sphincter myectomy and intrasphincteric botulinum toxin injection. In a recent meta-analysis, it has been shown that former is better [49].

CONCLUSIONS

Constipation is quite common in Asia, and most often of functional origin. Detailed history and proper physical examination, including digital rectal examination, can easily differentiate functional from organic constipation. There is no need to do any investigation before starting treatment in functional constipation. Disimpaction with oral polyethylene glycol is the main step in the management and skipping this step leads to refractoriness of constipation. Polyethylene glycol is shown to be superior to lactulose in the management of constipation. In most cases, prolonged (months to years) laxative therapy is required and early withdrawal leads to recurrence. Radiological colon transit time study plays an important role in the management of refractory constipation. Slow transit constipation is altogether a different entity and antegrade continence enema helps in this subset of patients.

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