

Quarterly Reviews

Review of pathogenesis and management of constipation

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ABSTRACT

This article reviews the pathogenesis, classification, mechanism and management of constipation. Constipation is likely to be common in the Indian population. It is difficult to define precisely since perception of patient and doctor may differ. Rome Consensus Criteria may not be applicable in India where we should not define constipation as stool frequency less than thrice a week as normal bowel movement in among Indians is different than that in the West. Constipation may be due to difficulty in evacuation, i.e. dyschezia, or due to a combination of infrequency and dyschezia. Low fibre diet, insufficient fluid intake, irregular toilet habit, lack of exercise, prolonged bed rest and chronic consumption of drugs may all lead to this chronic ailment. Constipation may result from slow colonic transit, faecal evacuation disorders or a combination of both. The first step in management is to exclude organic and anatomic causes. In the elderly, proctosigmoidoscopy or when required, colonoscopy and barium enema should be done. Colonic transit study is useful to screen for slow transit constipation or faecal evacuation disorders. Defecography, the balloon expulsion test, anorectal ultrasound, anorectal manometry, defecometry, anal sphincter electromyography and the pudendal nerve terminal motor latency study may be used to diagnose faecal evacuation disorders. Treatment aims at symptom relief and bettering the quality of life. High fibre diet, physical activity, modification of current therapy (e.g. where the patient is on opioids), and prescription of laxatives may provide relief. Current guidelines for prescribing laxatives suggest bulk agents as first line and osmotic agents as second line therapy. Biofeedback is useful in faecal evacuation disorders. Surgery may also rarely be necessary to correct anatomical abnormalities.

Key words: Constipation, colonic transit study, biofeedback, management.

INTRODUCTION

Constipation is a common complaint at all ages.¹ About 20% of the people in the United States of America suffer from constipation.^{2,3} The exact frequency of constipation in the Indian population is not known; however, it is likely to be

common. Many people manage constipation on their own and do not consult a physician. It is difficult to define it precisely since the perception of patient and doctor differs and some patients may not wholly understand what constipation is.

In the last decade, significant advances have been made in understanding constipation and in particular its pathogenesis.

DEFINITION

Frequency of normal motion differs from thrice a week to up till twice a day, determined by various geographical and ethnic factors.⁴ It is therefore important to classify an individual's symptoms according to the local pattern. Rome consensus criteria defined constipation as less than or equal to three stools/week with straining, excessively hard stools, unproductive urges and feeling of incomplete evacuation.⁵ However, this definition may not apply to Indians as this is based on studies in the healthy western population in whom normal stool frequency is three a week or more. Frequency less than thrice a week would surely be classified as constipation even in Indians. However, many patients may perceive constipation even with a stool frequency of one to two per day. A second point to consider would be difficulty in evacuating the bowel or dyschezia. Patients with this symptom often complain of stool that is hard to pass or pebble-like. This may suggest an outlet obstruction such as an intra-rectal intussusception or anismus. A third pattern is a combination of infrequency and dyschezia. The symptoms of constipation may be subjective and at times there may be discordance between the patient's feeling of constipation and the physician's definition.⁶

PATHOGENESIS

Constipation can result from several factors, some of which are related to the person's life style such as a diet poor in fibre, insufficient fluid intake, irregular and inadequate time in the toilet, lack of exercise, prolonged bed rest and chronic consumption of drugs that can cause constipation.^{1,7} Though correction of the above-mentioned pathophysiological factors improves constipation in a large proportion of patients presenting with the above symptoms, all patients do not benefit from the above measures as they may have a specific defect causing their symptoms. These specific abnormalities may be classified as given below.

Pathophysiologically, constipation may result from slow colonic transit, faecal evacuation disorders (e.g. anismus or puborectal dyssynergia, rectocele and perineal descent syndrome)^{8,9} and a combination of slow colonic transit and faecal evacuation disorder. About 29–50% patients referred to tertiary referral centres in the West may have functional outlet obstruction such as anismus or puborectal dyssynergia.^{10–12} Most of these patients in India might remain undiagnosed throughout their life due to lack of awareness about these disorders among physicians and gastroenterologists and lack of facilities to investigate for these disorders. Constipation predominant irritable bowel syndrome may not fulfill the definition of constipation and has other gastrointestinal and extra-gastrointestinal symptoms of irritable bowel syndrome.

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PATHOPHYSIOLOGICAL ABNORMALITIES

Some of the recent reports suggested that functional constipation might have some subtle organic basis, which could alter colonic motility or rectoanal co-ordination.¹³ Several histologic abnormalities have been demonstrated in resected colon specimens from such patients. These abnormalities include decreased numbers of enteric neuronal elements including interstitial cells of Cajal¹⁴ as well as nuclear abnormalities in the ganglia⁵ and reduction of acetylcholinesterase activity.¹⁵ Others have shown abnormalities in the contractile properties of colonic smooth muscle.⁵ Patients with severe degree of abnormalities including severe visceral myopathy and neuropathy can have a severe degree of slowing of colonic transit called colonic inertia or acquired megacolon and megarectum. Bacterial overgrowth in the small bowel with methane producing flora was recently shown to be associated with constipation,¹⁶ as methane gas might slow gut motility.

Normal defecation involves the coordinated relaxation of the internal anal sphincter, puborectalis and external anal sphincter muscles, together with increased intra-abdominal pressure and colonic motor activity that propels stools towards the rectum. In some patients, ineffective defecation seems to be associated with a failure to relax (or with inappropriate contraction of) the puborectalis and the external anal sphincter muscles.¹⁷ This contraction narrows the anorectal angle and increases the pressure in the anal canal so that evacuation is less effective. In other patients, weak propulsion of the stools can lead to similar effects. In some patients, such disordered patterns can be modified using biofeedback and muscle-retraining programmes.

MANAGEMENT

The first important step in the management of constipated patients with symptoms of obstructed defecation is to exclude organic and anatomic causes such as mechanical obstruction including malignant obstruction and extra-intestinal causes as outlined in the Table I.⁸ Certain symptoms, when present, may suggest functional disorders of the pelvic floor after a mechanical cause has been excluded; these include, manual evacuation, ribbon-like stool, infrequent hard stools passed only with unusual straining, ability to pass stool only with unusual posture and history of onset of symptoms after a difficult childbirth.¹⁸ A loaded rectum despite the urge to pass stools and after attempted evacuation may also suggest functional disorder of faecal evacuation.

Investigation of patients with suspected slow transit constipation or pelvic floor disorders

Table II outlines the diagnostic criteria for various pelvic floor disorders. Since a neoplastic disease always looms in the diagnosis of constipation in the elderly, the first investigation should always be a proctosigmoidoscopy or if necessary a colonoscopy and a barium enema. Fig. 1 presents the outline of a protocol for investigations. Colonic transit study with radio-opaque markers (*SGmark*) is a useful method to screen for slow transit constipation or faecal evacuation disorders.

Table I: Classification and Mechanisms of Constipation⁸

I. Extra intestinal	
1.	Endocrine: hypothyroidism, diabetes
2.	Metabolic: hypercalcemia, hypocalcemia
3.	Neurologic: Parkinson's disease, multiple sclerosis, spinal cord lesions, muscular dystrophies, autonomic neuropathy
4.	Rheumatologic: systemic sclerosis
5.	Psychological: depression, eating disorders
6.	Medications: narcotics, anticholinergics, antipsychotics, calcium channel blockers, anti-Parkinson's therapy, anticonvulsants, tricyclic antidepressants, iron, calcium, aluminum antacids, sucralfate
II. Intestinal	
A. Colon	
1.	Functional: slow transit, irritable bowel syndrome
2.	Organic: neoplasms, polyps, diverticulum disease, strictures, aganglionosis
B. Anorectum and pelvic floor	
1.	Megarectum
2.	Neoplasm
3.	Anal stenosis (post-surgical, post-traumatic, congenital, radiation)
4.	External compression
5.	Aganglionosis
6.	Internal rectal prolapse
7.	Complete rectal prolapse
8.	Mucosal rectal prolapse
9.	Solitary rectal ulcer
10.	Anismus
11.	Descending perineum syndrome
12.	Rectocele
13.	Lack of rectal sensation

The protocol used in the West for colonic transit study using radio-opaque markers may not be suitable for Indians as colonic transit is fast in India and hence it has been modified;¹⁹ according to this modified protocol, 20 markers each are given at 0, 12 and 24 hours and an abdominal radiograph is obtained at 36 and 60 hours (Fig. 2A). Retention of more than 30 and 14 markers at 36 and 60 hours, respectively, is considered abnormal.¹⁹ Faecal evacuation disorders can be screened by the balloon expulsion test; the patient is asked to expel a latex balloon tied to a thin catheter placed inside the rectum subsequently filled with 60ml water, while he is lying in the left lateral position.²⁰ A normal person is usually able to expel it either without or with 200–250 g added weight on the catheter hanging over a pulley; in contrast, a patient with faecal evacuation disorder may not be able to expel it despite addition of higher weight.²⁰ Faecal evacuation disorders are diagnosed best by a defecography, which helps in picking up intrarectal intussusception, pelvic floor descent, puborectal dyssynergia and rectal prolapse. The other techniques include anorectal ultrasound for sphincter anatomy, anorectal manometry, defecometry, anal sphincter electromyography and pudendal nerve terminal motor latency study.^{2,5,21,22} Fig. 2 B,C,D,E shows some of the examples of patients investigated for intractable constipation.

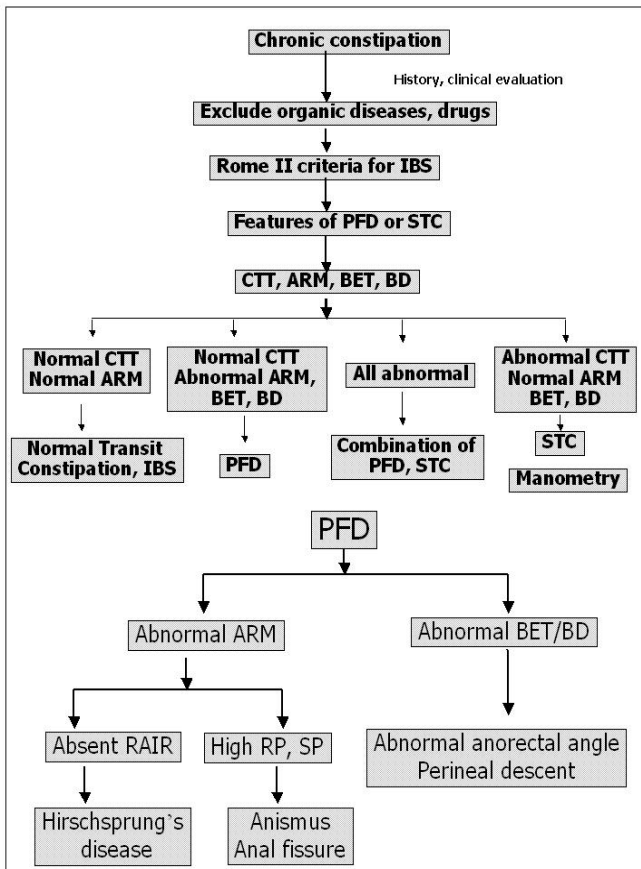


Fig. 1. Flow chart showing a protocol for work-up for patients with refractory constipation (Abbreviation used: IBS: irritable bowel syndrome, PFD: pelvic floor disorder, STC: slow transit constipation, CTT: colonic transit time, ARM: anorectal manometry, BET: balloon expulsion test, BD: barium defecography, RAIR: rectoanal inhibitory reflex, RP: resting pressure of anal sphincter, SP: squeeze pressure.

Table II: Outlines the diagnostic criteria for various pelvic floor disorders.²³

Disorders	Diagnostic criteria
Anismus	Resting anal sphincter pressure >100 mmHg
Puborectal dyssynergia	Abnormal balloon expulsion test Failure of anorectal angle to open by >15° during defecography between resting and defecatory position No relaxation or increase in pressure on attempted defecation
Perineal descent syndrome	Abnormal balloon expulsion test Failure of anorectal angle to open by >15° during defecography between resting and defecatory position Descent of perineum >4 cm during defecation
Rectocele	Herniation of rectal wall with either preferential filling during defecography or failure to empty during defecation
Non-specific syndrome	Symptoms, abnormal balloon expulsion test but other criteria not fulfilled

TREATMENT

Treatment of constipation aims at symptom relief and at improving quality of life.

NON-PHARMACOLOGICAL TREATMENT

Adequate diet replete with nutrition and fibre and physical activity are essential to ensure proper bowel function. Fibre intake in the elderly should be about 20 g/day or more. Physical activity is important to ensure general interest and zest for life, though patients with significant constipation may not benefit from exercise alone.²⁴ Existing therapy may need to be modified; for instance if the patients are on opioids for pain, the drugs may have to be discontinued or reduced or laxative may need to be added. Laxatives are needed in almost all patients with

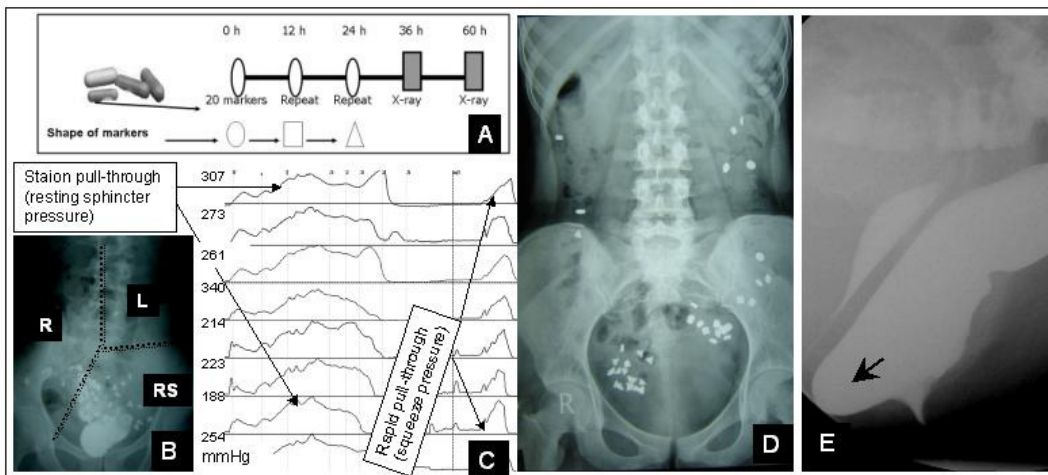


Fig. 2. [A]. Protocol for evaluation of colonic transit using radio-opaque markers (SG-mark), in Indian context. [B]. 60-h abdominal radiograph of a patient with constipation studied using such protocol, which shows that most of the markers are retained in the recto-sigmoid segment (RS) suggesting fecal evacuation disorder. Also note that there is retained barium inside rectum from the study done previously, which also suggest evacuation disorder. [C]. Anorectal manometry of the same patient showed very high resting and squeeze sphincter pressure and hence, anismus was diagnosed. The patient improved with repeated sessions of biofeedback and osmotic laxative. [D]. 60-h abdominal radiograph of another patient with constipation studied using SG-mark, which shows that most of the markers are retained diffusely suggesting slow transit constipation. [E]. Defecography of a patient with constipation, showing a large rectocele (marked with an arrow).

significant constipation. They help in improving the frequency and bulk of stools and thus ease bowel movements. Current guidelines for prescribing laxatives suggest bulk agents as first line and osmotic agents as second line therapy. Stimulant laxatives should generally be used if the other two agents have failed.²⁹ Patients with slow transit constipation should be treated with bulking agents like ispaghula husk (15–20g daily)³⁰ or methyl cellulose (10g daily). Bulk laxatives may, however, lead to bloating and excessive gas formation. If symptoms worsen following bulk laxative, which is not uncommon in patients with slow transit constipation, it should be avoided in them. Patients with faecal evacuation disorders are best treated with osmotic agents such as magnesium sulphate (15–45ml/day), lactulose (15–45ml/day) or polyethylene glycol (17–34 g/day). These are poorly absorbed osmotically active substances, which draw water into the lumen. They modify stool consistency effectively and ease bowel movement. They are relatively safe. Table III summarises commonly used laxatives for treatment of constipation. Milk of magnesia is a cheap and safe medication. Other agents are equally effective and are safer but more expensive. Stool softeners and stimulants are used by many patients habitually, but today they are not required and are best avoided because of danger of cathartic colon or melanosis coli as with senna. Mineral oil and enemas should be avoided as regular therapy, but may be necessary in some patients infrequently. Mineral oils have a particular problem of depleting fat-soluble vitamins, which should then be supplemented.

BIOFEEDBACK PROGRAMS

Biofeedback has proved useful in faecal evacuation disorders in about half to two-thirds of patients.^{31–37} Its role in the treatment of constipation due to other causes such as that due to slow colonic transit and irritable bowel syndrome is limited.³⁴ Psychological impairment was identified in 65% of the patients with evacuation disorder and constipation in a tertiary care

Table III: Drugs commonly used treatment of constipation

Agents	Usual adult oral dose
Bulk-forming laxatives	
Ispaghula husk	15–20 g/d
Natural (e.g. psyllium husk)	7 g/day
Synthetic (e.g. methylcellulose, polycarbophil)	4–6 g/day
Osmotic laxatives	
Polyethylene glycol	8–25 g/day
Lactulose	15–30 ml/day
Lactitol	10–20 g/day
Sorbitol (70%)	15–30 ml/day
Magnesium hydroxide	2.4g (30 ml)
Magnesium citrate	200 ml
Stimulant laxatives	
Anthraquinones: Senna	8.5–17 mg
Diphenylmethanes: Bisacodyl	10–15 mg or 10 mg suppository
Enterokinetics	
Tegaserod	6 mg twice daily

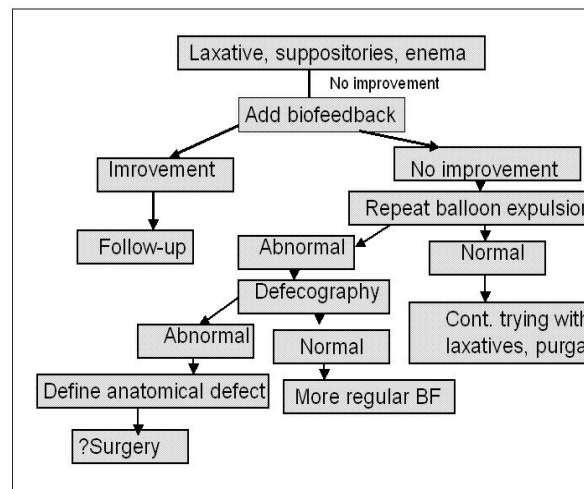


Fig. 3. Outline of treatment protocol for fecal evacuation disorders.^{2,3}

practice, and has a significant negative impact on the outcome of behavioral treatment.³⁸ Proper patient selection, motivation and patient education is important in management of constipation in general and success of biofeedback therapy in particular.^{39–41} We have made an attempt towards patient education, which improves compliance and success of biofeedback using a website www.spread.net.in. Fig. 3 outlines the protocol for management of patients with faecal evacuation disorders.^{2,3} Equipment for home biofeedback are available in several countries, which may improve regularity of biofeedback sessions improving their outcome.

SURGERY

Surgical treatment may rarely be necessary to correct anatomical problems like stenotic diverticulitis or outlet problems or specific disorders like Hirschsprung's disease. Though in other disorders such as puborectal dyssnergia, rectocele and acquired megacolon, one may be compelled to undertake surgical treatment in intractable situations not responding to other forms of therapy, the result may not always be very rewarding.^{42–46}

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