Evaluation and Treatment of Constipation

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Constipation is a common symptom in patients of all ages, but its occurrence is highest among persons 65 years of age or older.[1,2] Constipation has been shown to diminish both quality of life and feeling of well-being.[3-5] Although constipation can have many causes, it is most often functional or idiopathic.[5,6] Furthermore, constipation can lead to serious complications such as malnutrition, fecal impaction, fecal incontinence, colonic dilation and even perforation of the colon.[7]

Definition

Constipation has different meanings to patients and physicians. A patient's perception of constipation may include not only the objective observation of infrequent bowel movements but also subjective complaints of straining with defecation, incomplete evacuation, abdominal bloating or pain, hard or small stools or a need for digital manipulation to enable defecation. Because the definition of constipation can be subjective, an international committee has recommended an operational definition of chronic functional constipation in adults.[8] The Rome II criteria for defining chronic functional constipation in adults are as follows: *Two or more of the following for at least 12 weeks in the preceding 12 months:*

- straining in more than 25% of defecations
- lumpy or hard stools in more than 25% of defecations
- sensation of incomplete evacuation in more than 25% of defecations
- manual maneuvers (e.g., digital evacuation, support of the pelvic floor) to facilitate more than 25% of defecations
- fewer than three defecations per week
- loose stools are not present and there are insufficient criteria for the diagnosis of irritable bowel syndrome.[8]

Epidemiology

A survey of Canadians 18 years or older estimated the prevalence of functional constipation to be 14.9% according to Rome II criteria.[9] The rate of constipation for women was close to twice the rate among men. Of all the subjects with Rome II-defined functional constipation, 26.3% reported using prescribed or over-the-counter medication in the past three months for their constipation.[9]

Pathogenesis

Normal colonic motility combines segmenting contractions that promote mixing of luminal contents, propagating contractions that propel them short distances and high amplitude contractions that transport them long distances.

Although the etiology of constipation is uncertain, it is now known that the frequency of bowel movement is not reduced with normal aging, nor does aging alone seem to slow intestinal transit.[10,11]

Constipation results from disordered movement through the colon and / or anorectum. It may be due to gastrointestinal motility problems (Table 1),[12,13] or it may be secondary to structural, neurological or metabolic abnormalities (Table 2)[12,14-18] or drug therapy (Table 3).[12]

The majority of individuals with constipation do not have an identifiable cause to explain their symptoms. However, it is important to distinguish functional constipation from other disorders that can be associated with altered bowel habits. The history and physical exam frequently provide much of the necessary diagnostic information to determine the cause of constipation. It is particularly important to distinguish recent change in bowel habit (i.e., within the last three to six months) from chronic constipation, as the former is more likely due to one of the causes listed in Tables 1 to 3.

Evaluation

Physical examination

Most chronically constipated individuals do not require an extensive diagnostic evaluation. The initial assessment should incorporate a careful history and examination with an attempt to identify disorders or risk factors that may be associated with constipation. A recent or persistent change of bowel habits should prompt further evaluation for any of the causes listed in Tables 1 to 3. Weight loss and blood in stool require a particularly careful evaluation. Colicky pain or abdominal distension require an evaluation for an obstructive lesion. Urinary symptoms, including stress incontinence, may indicate pelvic floor weakness. A medication history, diet and any relevant social or psychological problems should be explored.[12]

Table 1

Colonic and Pelvic Floor Disorders[12,13]

Functional: Slow transit, irritable bowel syndrome
Obstruction: Intraluminal lesion, strictures, anal stenosis, external compression
Myopathy: Congenital, acquired, internal anal sphincter myopathy
Neuropathy: Aganglionosis, Chagas' disease, paraneoplastic, idiopathic
Structural: Rectocele, pelvic floor weakness

Table 2
Potential Non-gastrointestinal Causes of Constipation[12,14-18]

Endocrine: Hypothyroidism, diabetes
Metabolic: Hypercalcemia, hypokalemia
Neurologic: Parkinson's disease, multiple sclerosis, spinal cord lesions, muscular dystrophies, stroke, autonomic neuropathy
Rheumatologic: Systemic sclerosis
Psychological: Depression, dementia, eating disorders

Diagnostic Studies

Laboratory studies and colorectal imaging are appropriate when constipation is persistent and fails to respond to conservative treatment, or when a particular disorder is suspected. Colonoscopy is excellent for identifying obstructive colonic lesions. An alternative examination is a double-contrast barium enema and flexible sigmoidoscopy, a combination that can demonstrate potentially diagnostic features such as colonic dilatation , strictures and malignancy.[19]

If extracolonic and mechanical causes of constipation are excluded by laboratory studies and colorectal imaging, a complete physiologic evaluation may be warranted, particularly for recent-onset constipation. Possible tests include ano-rectal manometry, defecography and colonic transit time studies.

Anal manometry is performed to assess the anal sphincter, pelvic floor and associated nerves. However, the principal purpose of ano-rectal manometry in the setting of chronic constipation is to exclude adult-onset or short-segment Hirschsprung's disease, which should be suspected in the absence of an ano-rectal inhibitory reflex.[20]

Defecography and colonic transit studies are particularly useful in patients with intractable constipation or pelvic floor disorders.[20]

Management

Treatment should be aimed at relieving constipation and minimizing the impact of the treatment on the patient's life. In general, effective treatment of constipation consists of several strategies: (a) non-pharmacological approaches, such as diet and exercise; (b) pharmacological approaches, such as laxatives; and (c) surgery in selected circumstances.

Non-pharmacological Approaches

Non-pharmacological treatment includes educating the patient about "normal" bowel routine, diet, physical activity and therapy for other conditions.

Patient education includes reassurance and an explanation about normal bowel habits. Ninety-five per cent of the general population have as many as three bowel movements per day or as few as three bowel movements per week.[21,22] Patients should also establish a regular bowel routine by attempting to have a bowel movement at the same time each day. Colonic activity is highest in the morning and after meals, making after breakfast the best time for a bowel movement.

Increase in caloric intake in patients with low-calorie diets has been shown to improve colonic transit time but does not help pelvic floor dysfunction.[12] Dietary fibre is important for the successful long-term management of constipation. In a study of institutionalized elderly subjects, dietary supplementation with 6–15g of bran per day resulted in an increase in the number of bowel movements.[23] Foods high in fibre, such as wheat bran, fruits (especially blackberries and raspberries) and vegetables (such as beans, lentils, peas and squash) retain water. Thus, high-fibre diets lead to softened stool and increased fecal bulk.[24]

Several over-the-counter fibre supplements (or bulk-forming laxatives) are available (Table 4, page 26). Psyllium, polycarbophil and methylcellulose all increase water content and bulk volume of the stool to decrease colonic transit time, increase stool weight and improve stool consistency. Each dose of a bulk-forming laxative should be administered with at

Table 3
Drugs Associated with Constipation[12]

Amantadine	Anticonvulsants
Antidiarrheal agents	Antihistamines
Antipsychotics (e.g., phenothiazines)	Barbiturates
Benzodiazepines	Beta-blockers
Cholestyramine	Clonidine
Calcium channel blockers (verapamil>diltiazem>dihydropyridines)	Diuretics
Lithium	$5HT_3$ antagonists (e.g., ondanestron)
Non-steroidal anti-inflammatory drugs	Opioids
Polystyrene sodium sulfonate	Pseudoephedrine
Vinca alkaloids	Tricyclic antidepressants (e.g., amitriptyline)
Cation-containing agents (aluminum, calcium, iron, bismuth, barium)	

least 250mL (1 glass) of water or juice to prevent fecal impaction and/or esophageal obstruction. These supplements are generally well tolerated but may cause some flatulence and bloating at the start of therapy, which can be minimized by starting with a low dose and gradually increasing.[25] The onset of action of fibre supplements is approximately one to three days. The usual doses are shown in Table 4.

Although convincing data are lacking, an increased level of physical activity is recommended for patients with constipation. Abdominal and pelvic floor muscle-strengthening exercises may provide the additional strength needed for defecation.[12]

When possible, medications that may be constipating should be discontinued or replaced by others. In the case of patients with chronic malignant pain, narcotic analgesics (which often lead to constipation) should be continued at a dosage that controls pain but the routine use of stimulant laxatives may be required to prevent impaction. In patients with narcotic-induced constipation who have not passed a stool in more than three days, impaction should be ruled out before recommending pharmacological treatment.

Pharmacological Approaches

For many patients, a regular regimen of laxatives may be necessary. Nevertheless, caution is advised. Long-term use of cathartics should be avoided in otherwise healthy and active elderly subjects because of the potential for adverse effects, including malabsorption, dehydration, electrolyte imbalances and fecal incontinence. There are five basic groups of laxatives: bulk (described above), osmotic, saline, emollient/lubricant and stimulant (Table 4).

Few trials have compared the efficacy of the different types of laxatives; the data that are available show no statistically significant differences between treatments.[26]

Hyperosmostic Laxatives

Osmotic laxatives include unabsorbed mono- and disaccharides such as lactulose and sorbitol. These are poorly absorbed sugars that are hydrolyzed by coliform bacteria to form low-molecular organic acids. These organic acids draw fluid into the lumen and stimulate peristalsis.[27,28] These agents usually produce soft, formed stool within 24–48 hours, but may also produce abdominal cramping, bloating and flatulence.[27]

Saline Cathartics

Magnesium-containing products are the most common saline cathartics. Magnesium salts draw fluid osmotically into the lumen of the small bowel and colon, thus inducing wall contractions.[29] Magnesium ions are also believed to stimulate the release of cholecystokinin, a hormonal stimulant of intestinal secretion, and of prostaglandins, which are modulators of intestinal motility.[29] The onset of action of these agents is approximately 0.5–3 hours. The use of magnesium citrate is generally restricted to bowel cleansing before investigative or surgical procedures. The laxative dose of magnesium citrate for constipation is one-quarter to one-half the evacuant dose. It is important to recognize that these laxatives may lead to electrolyte imbalances and should be used cautiously in individuals with renal and cardiac impairment.

Emollient/Lubricant Laxatives

Emollients, or so-called stool softeners, soften the stool by reducing surface tension, permitting penetration of the fecal mass by intestinal fluids. Docusate sodium or docusate calcium have not been shown to provide much benefit, although they may be worth a trial in preventing hard stools from forming.[7,26] The onset of action of these agents is about 12–72 hours. Their most useful role is when excessive straining is hazardous; for example, in patients with unstable angina or postoperative states. They have no documented laxative effect and should be restricted to patients with mild constipation.

Mineral oil taken orally lubricates the stool, but if aspirated it can cause lipid pneumonia, which can be fatal.[30] In addition, the long-term use of mineral oil is associated with malabsorption of fat-soluble vitamins. In general, this agent should be avoided in the elderly.

Stimulant Laxatives

Several stimulant laxatives are present in common over-the-counter preparations. These include diphenylmethane derivatives, such as bisacodyl, and anthraquinone derivatives, such as cascara and senna. All these agents act by altering electrolyte transport in the colon, increasing intraluminal fluids and generating propulsive activity.[31] Because of delayed onset of action (6–12 hours), bedtime administration is recommended to avoid nocturnal incontinence. The most common side effects of these medications are cramping, abdominal pain and occasionally hypokalemia. The administration of bisacodyl rectally may cause rectal irritation or burning. It is thought that stimulant laxatives may cause "cathartic colon", the pathophysiololgy of which is poorly understood, but is thought to result from long-term use of stimulant laxatives. This eventually leads to a dependence on increasing doses of stimulant medication for defecation.[32] Melanosis coli (hyperpigmentation of the colonic mucosa) is a common sequela of prolonged use of these laxatives, but it has no clinical significance other than being a signal for use of laxatives.[7]

Enemas

Enemas are indicated in acute constipation, especially in the presence of fecal impaction. A properly administered enema will cleanse the distal colon within an hour. Enemas are used for cleansing the bowel before rectal examination and pre- and post-operatively to relieve fecal impaction. Warm tap water or saline enemas are preferable to soaps which are likely to irritate the colonic mucosa. Hypertonic phosphate enemas (e.g., Fleet® enema) are most efficacious, but they also may be irritating. Furthermore, repeated use of phosphate enemas can cause electrolyte imbalances; the ions may be absorbed from the distal colon, and other ions are lost in the ensuing evacuation. Repeated use of enemas may lead to fluid overload in patients with chronic renal or heart failure.

Suppositories

Rectal suppositories are less effective than enemas but are more acceptable to

Table 4

Medications Recommended for Constipation

Type	Generic Name	Trade Name	Dosage	Side Effects	Time to Onset of Action	Mechanism of Action	Cost
Fibre	Bran	—	1 cup/d	Bloating, flatulence, iron and calcium malabsorption	1–3 days	Increase stool bulk, decrease colonic transit time, increase GI motility	
	Psyllium	Metamucil® Prodiem®	1 tsp q.d.–t.i.d.	Bloating, flatulence	1–3 days		$0.0829/tsp (Metamucil) $0.0238/tsp (Prodiem)
Hyperosmolar	Lactulose	Laxilose®	15–30mL q.d. to t.i.d.	Sweet tasting, transient abdominal cramps, flatulence	24–48 hours	Nonabsorbable disaccharides metabolized by colonic bacteria into acetic acid	$0.44/30mL
	Glycerin suppository		1 supp q.d.	Rectal irritation	0.5–1 hour	Evacuation induced by local rectal stimulation	
Stool softener (emollient)	Docusate sodium	Colace® Soflax®	100mg b.i.d.	Ineffective for treatment of constipation; may be useful in prevention	12–72 hours	Stimulates cells to secrete water, NaCl into lumen	$0.038/cap
	Docusate calcium	Surfak	240mg b.i.d.				$0.1287/cap
Lubricant	Mineral oil		15–45mL q.d.	Lipid pneumonia, malabsorption of soluble vitamins, dehydration, incontinence	6–8 hours	Stool lubricant	$0.80/30mL
Saline laxatives	Magnesium	Milk of Magnesia	15–30mL q.d. to t.i.d.	Magnesium toxicity, dehydration, abdominal cramps, incontinence	0.5–3 hours	Fluid osmotically drawn into small bowel lumen	$0.43/30mL
Stimulants	Bisacodyl	Dulcolax®	5–10mg p.o. q.d.	Incontinence, hypokalemia, abdominal cramps	6–12 hours	Electrolyte transport altered by increased intraluminal fluids; myenteric plexus stimulated; motility increased	$0.0132/5mg tab
			10mg suppositories 3 times/wk q.d.	Rectal burning with suppositories	0.5–1 hour		
	Anthraquinones (senna, cascara)	Senokot®	2–4 tabs p.o. q.d.–b.i.d.	Malabsorption, abdominal cramps, dehydration, Melanosis coli	6–12 hours		$0.595/tab (senna)
Enemas	Mineral oil retention	Fleet® enema	100–250mL per rectum	Incontinence, mechanical trauma	6–8 hours	Stool softened and lubricated	$4.29/bottle
	Tap water		500mL per rectum	Mechanical trauma, fluid overload	5–15 min	Evacuation induced by distended colon; mechanical lavage	
	Phospate enema	Fleet®	1 unit per rectum	Accumulated damage to rectal mucosa, hyperphosphatemia, mechanical trauma	5–15 min		
	Soapsuds enema		1.5L per rectum	Mucosal irritation, fluid overload	2–15 min		

most patients. They act as local lubricants and may be used for evacuating the distal colon but are ineffective if the stool is dry, hard or impacted. Glycerin is the most commonly used suppository. Suppositories can also act osmotically, and have a quick onset of action (30–60 minutes). Suppositories may, however, cause rectal irritation when used chronically.

General Recommendations

For elderly persons with chronic constipation, therapeutic trials of laxatives should be based on their mental capacity, type of constipation and overall function. There are many approaches and combinations of laxatives which can be employed. We highlight one approach.

Fibre is the cornerstone of prophylaxis for constipation. It is also important for the successful long-term management of constipation in those patients able to drink sufficient fluids and ambulate regularly, and who do not have symptoms of obstruction or a history of megacolon, volvulus or recurrent fecal impaction.

For ambulatory, cognitively intact elderly patients with chronic functional constipation, it is recommended to first start a trial of fibre supplementation along with physical activity after meals and a laxative (such as lactulose) as needed. The dose of fibre should be gradually increased every three to five days. If the response is inadequate after a two-to-four week trial, the medication should be discontinued and treatment with magnesium-containing products should be tried next. If this is still ineffective, then either an enema, a suppository or a stimulant laxative should be tried.[30] In some cases, the patient may require both a stimulant and osmotic laxative to prevent and treat constipation. Fecal impaction should be excluded before proceeding with use of laxatives, especially in patients who have abdominal distention or who are frail or immobile. Referral to a gastroenterologist is recommended if: (a) the onset of constipation is acute; (b) weight loss, blood per rectum or anemia is present; (c) conservative management as outlined above is unsuccessful in alleviating symptoms.

Conclusion

Constipation is common and may sometimes have debilitating symptoms. Although usually benign, constipation may have devastating effects on the quality of life of elderly patients. Management of constipation is highly individualized and it must be based on cause and the patient's overall medical condition. Physicians and other health care providers should aim to educate their patients about the wide range of normal bowel habits, the benefits of fibre and the potentially deleterious effects of prolonged use of cathartics. Judicious use of pharmacological agents can effectively treat symptoms of constipation. ◆

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References

1. Sonnenberg A, Koch TR. Physician visits in the United States for constipation: 1958 to 1986. Dig Dis Sci 1989; 34:606-11.
2. Schaefer DC, Cheskin LJ. Constipation in the elderly. Am Fam Physician 1998;58: 907-14.
3. Tedesco FJ, Dipiro JT. American College of Gastroenterology Committee on FDA-related Matters. Laxative use in constipation. Am J Gastroenterol 1985; 80:303-9.
4. Meza JP, Peggs JF, O'Brien JM. Constipation in the elderly patient. J Fam Pract 1984; 18: 695;698-9;702-3.
5. Talley NJ, Fleming KC, Evans JM, et al. Constipation in an elderly community; a study of prevalence and potential risk factors. Am J Gastroenterol 1996; 91:19-25.
6. Talleyn NJ, O'Keefe EA, Zinsmeister AR, et al. Prevalence of gastrointestinal symptoms in the elderly: a population based study. Gastroenterology 1992; 102:895-901.
7. Wald A. Constipation in elderly patients: pathogenesis and management. Drugs and Aging 1993; 3:220-31.
8. Thompson WG, Longstreth GF, Drossman DA, et al. Functional bowel disorders and functional abdominal pain. Gut 1999; 45 (suppl 2): 1143-7.
9. Pare P, Ferrazzi S, Thompson WG, et al. An epidemiological survey of constipation in Canada: definitions, rates, demographics and predictors of Health Care Seeking. Am J Gastroenterol 2001; 96:3130-7.
10. Melkersson M, Anderson H, Bosaeus I, et al. Intestinal transit time in constipated and non-constipated geriatric patients. Scand J Gastroenterol 1983;18:593-7.
11. Mekel IS, Locher J, Burgio K et al. Physiologic and psychologic characteristics of an elderly population with chronic constipation. Am J Gastroenterol 1993;88:1854-9.
12. Wald A. Constipation. Adv Gastroenterol 2000; 84(5):1231-46.
13. Milla PJ, Smith VV. Aganglionosis, hypoganglionosis and hyperganglionosis: Clinical presentation and histopathology. In: Kamm MA, Lennard-Jones JE, editors. Constipation. Petersfield, England: Wrightson Biomedical Publishing, 1994: 183-92.
14. Shafer RB, Prentiss RA, Bond JH. Gastrointestinal transit in thyroid disease. Gastroenterol 1984;86(5 Pt 1):852-5.
15. Battle WM, Snape WJ Jr, Alavi A, et al. Colonic dysfunction in diabetes mellitus. Gastroenterol 1980;79:1217-21.
16. Singaram C, Ashraf W, Gaumnitz EA, et al. Dopaminergic defect of enteric nervous system in Parkinson's disease patients with chronic constipation. Lancet 1995;346:861-4.
17. Weber J, Grise P, Roquebert M, et al. Radiopaque markers transit and anorectal manometry in 16 patients with multiple sclerosis and urinary bladder dysfunction. Dis Colon Rectum 1987;30:95-100.
18. Nowak TV, Ionasescu B, Anuras S. Gastrointestinal manifestations of muscular dystrophies. Gastroenterol 1982; 82:800-10.
19. Winawer SJ, Fletcher RH, Miller L, et al. Colorectal cancer screening: clinical guidelines and rationale. Gastroenterology 1997;112:594-642.
20. Arce DA, Ermocilla Ca, Costa H. Evaluation of Constipation. Am Fam Physician 2002;65:2283-90.
21. Towers AL, Burgio KL, Locher JL, et al. Constipation in the elderly: influence of dietary, psychological and physiological factors. J Am Geriatr Soc 1994;42:701-6.
22. Connel AM, Hilton C, Irvine G, et al. Variation of bowel habit in two population samples. BMJ 1965;2:1095-9.
23. Hull C, Greco RS, Brooks DL. Alleviation of constipation in the elderly by dietary fiber supplementation. J Am Geriatr Soc 1980;28:410-4.
24. Goldstein MK, Brown EM, Holt P, et al. Fecal Incontinence in an elderly man. J Am Geriat Soc 1989;37:991-1002.
25. Taylor R. Management of constipation. 1. High fiber diets work. BMJ 1990;300:1063-4.
26. Tramonte SM, Brand MB, Mulrow CD, et al. The treatment of Chronic Constipation in Adults. A Systematic Review. J Gen Intern Med 1997;12:15-24.
27. Bass P, Dennis S. The laxative effect of lactulose in normal and constipated subjects. J Clin Gastroenterol 1981;3(suppl):23-8.
28. Wessalius-DeCasparis A, Braadbaart S, Bergh-Bohekin GW, et al. Treatment of chronic constipation with lactulose syrup: Results of a double-blind study. Gut 1969;9:84-6.
29. Kinnunen O, Salokannel J. The carry-over effect on the bowel habit in elderly long-term patients of long-term bowel bulk-forming products containing stimulant laxative. Acta Med Scand 1987;222:477-9.
30. Sodeman WA, Stuart BM. Lipiod pneumonia in adults. Ann Intern Med 1946;24:241-53.
31. Mascolo N, Meli R, Autore G, et al. Senna still causes laxation in rats maintained on a diet deficient in essential fatty acids. J Pharm Pharmacol 1988;40:882-4.
32. Harari D, Gurwitz JH, Minaker KL. Constipation in the elderly. J Am Geriatr Soc 1993;41:1130-40.