Medical Management of Constipation

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Abstract

Constipation is a common clinical problem. Initial management of chronic constipation should include lifestyle maneuvers, and increased fiber and fluids. Polyethylene glycol, sodium picosulfate, bisacodyl, prucalopride, lubiprostone, and linaclotide were all more effective than placebo for treating chronic idiopathic constipation. Many commonly used agents lack quality evidence supporting their use.

Keywords

- constipation
- laxatives
- fiber
- osmotic agents
- polyethylene glycol
- 5-ht4 agonists

Objectives: On completion of this article, the reader should be able to summarize the medical treatment options in the management of chronic constipation.

Chronic constipation affects up to 20% of the population,[1] and has a large negative impact on quality of life and causes significant psychological distress.[2,3] Health care costs are estimated at $821 million spent annually on over-the-counter (OTC) laxatives and visits to physicians.[3] Constipation can be divided into slow-transit constipation, dysfunctional constipation that is treated with biofeedback and medications,[3] and constipation-predominant irritable bowel syndrome (IBS). The focus of this review is available therapeutic options utilizing lifestyle modifications, medications, and biofeedback.

Lifestyle Modifications

The initial management of constipation should involve lifestyle modifications, reassurance of their concept of a healthy or "regular" bowel movement, and biofeedback. Identification of patients that need psychological support should be undertaken because constipation may be aggravated by stress or may be a manifestation of emotional disturbance. Patients should be encouraged to set aside a regular time for defecation, to use proper sitting positions, and to monitor their bowel habits by using a diary of the characteristics of their stools to assess and direct treatment interventions. Dietary modifications include a high-fiber diet, water intake, and fruits. Although exercise and water intake is of benefit for treating constipation, there is no data to support that increases in physical activity and fluid intake appear to improve chronic constipation except in situations of dehydration.[1–3]

Treatment

When nonpharmacologic management does not improve symptoms, then laxatives should be added to the management of constipation. The choice of initial laxative has been developed on the basis of whether constipation is "slow transit" or "normal transit."[4] However, given the burden of radiographic testing and inconvenience to the patient, laxative therapy can probably be safely initiated before additional diagnostic evaluation by starting with fiber. A reasonable approach is shown in ►**Table 1**.

Bulk Laxatives

Fiber

Constipation has been associated with a deficiency of dietary fiber in Western society for decades. A correlation between increasing the daily fiber intake and fecal weight as well as colonic transit time has been demonstrated.[5,6] Dietary fiber appears to be effective in relieving mild to moderate, but not severe constipation. The recommended amount of dietary fiber is 20 to 35 grams per day (g/d) and this can be obtained from whole wheat bread, unrefined

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Table 1 Laxatives

Bulk laxatives
Dietary fiber, psyllium, polycarbophil, methylcellulose, carboxymethylcellulose
Osmotic agents
Saline laxatives: Magnesium, sulfate, potassium and phosphate salts
Poorly absorbed sugars: Lactulose, sorbitol, mannitol, lactose, glycerine suppositories
Polyethylene glycol (PEG): PEG 3350 laxative
Stimulant laxatives
Surface-active agents: Docusate, bile salts
Diphenylmethane derivatives: Phenolphthalein, bisacodyl, sodium picosulfate
Ricinoleic acid: Castor oil
Anthraquinones: Senna, cascara sagrada, aloe, rhubarb
Emollients
Mineral oil
Neuromuscular agents
5-HT4 Agonists: Cisapride, norcisapride, prucalopride, tegaserod
Colchicine
Prostaglandin agent: Misoprostol
Cholinergic agents: Bethanechol, neostigmine
Opiate antagonists: Naloxone, naltrexone
Investigational agents
Recombinant methionyl human brain-derived neurotrophic factor (r-metHuBDNF), neurotropin-3

cereals, citrus fruits, and vegetables. Insoluble fiber, such as cereal bran, may cause significant abdominal gas and bloating, creating discomfort. In some patients, these agents also delay gastric emptying and depress appetite. To improve the tolerance and adherence you may start with low doses of fiber and increase their dietary fiber intake gradually over the next weeks until ~20 to 25 g/d. If the constipation has not improved, then commercially available fiber supplements should be tried. Patients also must be encouraged to drink water and maintain hydration when increasing fiber intake.[7]

Ispaghula (Psyllium)

Ispaghula comes from an Asian plant that has high water-binding capacity and is fermented in the colon. In an observational study with psyllium, the response to treatment was poor among patients with slow colonic transit, whereas 85% of patients without abnormal physiology improved or became symptom-free. Side effects include delayed gastric emptying and loss of appetite in some patients.[8] Also, there have been some reports of serious acute allergic reactions, cough, and asthma.[9]

Methylcellulose

Methylcellulose[10] is a synthetic fiber polymer that is methylated. This results in resistance to bacterial fermentation. Mainly, it absorbs water into the colonic lumen, which increases fecal mass promoting motility and reduction in the colonic transit time.[8] In one study, the patients showed an increase in solid stool mass with 1, 2, and 4 g of methylcellulose per day, but fecal water increased only with the 4-g dose. Despite the fact that bowel frequency was increased, the patients did not report marked improvement in the consistency or passage of stools.[10]

Calcium Polycarbophil

Calcium polycarbophil is a hydrophilic resin that is resistant to bacterial degradation and thus may be less likely to cause gas and bloating. In patients with IBS with features of constipation, calcium polycarbophil seems to improve overall symptoms and passage of stool, but not abdominal pain.[11]

Osmotic Agents

In patients unresponsive to bulk agents alone, the addition of other laxatives is often the next step in the management of constipation. There are different forms of laxatives that can be selected based on the patient's symptoms and preferences.[12]

Poorly Absorbed Ions-H_2

Magnesium and Sulfate

Magnesium, sulfate, and phosphate ions are poorly absorbed by the gut and thereby create a hyperosmolar intraluminal environment.[13] Magnesium oxide has been considered safe to use on a regular basis in mildly constipated patients. Standard doses of 40 to 80 mmol of magnesium ion usually provokes a bowel movement within 6 hours. Magnesium sulfate is a more potent laxative that tends to produce a large volume of liquid stool and abdominal distention.[14] The use of magnesium in older adults should be used with caution because the high profile of gastrointestinal side effects and magnesium toxicity. Other side effects include hypermagnesemia-induced paralytic ileus and hypermagnesemia in patients with renal failure. Magnesium containing laxatives are not recommended in patients with renal insufficiency or cardiac dysfunction because the high risk of developing electrolyte disturbances and volume overload from the absorption of magnesium or phosphorus. Even patients who are otherwise healthy may develop these complications as a result of excessive use.

Sodium sulfate is a component of some bowel lavage solutions for colon cleansing prior to diagnostic and surgical procedures,[15,16] but significant absorption may occur in the jejunum that may cause electrolyte disturbances.

Phosphate

Phosphate can be absorbed by the small intestine, and a high dose must be ingested to produce an osmotic laxative effect. Complications have been reported with sodium phosphate and OTC use is no longer available in the United States. Some

of the complications reported include hyperphosphatemia, especially in patients with renal insufficiency and acute renal injury if used in large amounts as in bowel preparations.[15] Risk factors include advanced age, dehydration, and use of angiotensin-converting enzyme inhibitors or nonsteroidal antiinflammatory drugs.

As with the other ion preparations, oral phosphate products are not recommended for use in patients with renal insufficiency or cardiac dysfunction.

Poorly Absorbed Sugars

Lactulose

Lactulose is a poorly absorbed synthetic disaccharide of galactose and fructose. This nonabsorbable carbohydrate becomes a substrate for colonic bacterial fermentation that produces hydrogen and methane, and lowers fecal pH, carbon dioxide, water, and fatty acids.[1] These products are osmotic agents that promote intestinal motility and secretion. The recommended dose of lactulose for adults is 15 to 30 mL once or twice daily. The time to onset of action is between 24 to 72 hours, longer than for other osmotic laxatives. Lactulose increases stool frequency in chronically constipated patients and is dose dependent because it is fermented by colonic bacteria, gas and bloating usually limit its clinical use.[17]

Sorbitol

Sorbitol is a poorly absorbed sugar alcohol that may produce effects similar to lactulose if taken in sufficient dosages. Sorbitol is commonly found as an artificial sweetener. It has been shown that as little as 5 g can cause a rise in breath hydrogen from bacterial fermentation, and 20 g produces diarrhea in about half of normal patients. Sorbitol is as effective as lactulose and less expensive. A randomized, double-blind, crossover trial of lactulose (20 g/d) and sorbitol (21 g/d) showed no difference in regards frequency of bowel movements and patient preference. Patients using lactulose had more nausea compared with sorbitol. Mannitol is another sugar alcohol that can be used as a laxative.

Polyethylene Glycol

Polyethylene glycol (PEG) is a isosmotic laxative that is metabolically inert, which binds to water and keeps water retention inside the lumen.[18] PEG is commonly used in solutions for colon cleansing as polyethylene glycol electrolyte lavage solutions (PEG-ELS) and sulfate-free electrolyte lavage solution (SF-ELS).[1] These solutions have electrolytes added to avoid side effects from dehydration and electrolyte disturbances and have been shown to be safe for preparation for diagnostic colonoscopy, barium x-ray examinations, and colon surgery.[16] Most of these solutions has been shown to be dose dependent, increasing the amount of stools with increasing dosage of PEG.

PEG has been shown to be effective in the treatment of chronic constipation. A study with 70 patients followed for 4 weeks treated with a PEG-electrolyte solution, 250 mL once or twice daily, there was marked improvement in bowel frequency, stool consistency, and straining on defecation. The same patients were randomized to continue PEG or a placebo for 20 weeks. This study showed a complete improvement from chronic constipation in 77% of patients that used PEG versus 20% of patients in the placebo group. PEG solutions may be useful for the short-term treatment of fecal impaction in patients that are refractory to other medications and can be used safely.

PEG 3350 (MiraLAX®, Merck & Co., Whitehouse Station, NJ), is a common OTC laxative used in the treatment of chronic constipation that does not contain any salt that can be absorbed. A study that followed patients with chronic constipation for 6 months showed benefit of PEG compared with placebo and no electrolyte abnormalities or intestinal malabsorption. The greatest efficacy for PEG is noted during the second week of therapy, although higher doses have been used successfully for the overnight treatment of constipation.

A randomized multicenter trial that compared standard and maximum doses of PEG 3350 and PEG 4000 showed most patients had their first stool within one day of initiating PEG treatment. The lowest dose of PEG produced the most normal stool consistency, whereas if PEG was used in higher doses it produced more liquid stools.

Low-dose PEG has been shown in studies to be more effective than lactulose in the treatment of chronic constipation.

The most common adverse effects of PEG include abdominal bloating and cramps. However, there are some case reports of severe pulmonary edema that have been reported with the use of PEG.[18–20]

Stimulant Laxatives

Stimulant laxatives increase intestinal motility and intestinal secretion. They begin working within hours and often are associated with abdominal cramps. Stimulant laxatives include anthraquinones (e.g., cascara, aloe, senna) and diphenylmethanes (e.g., bisacodyl, sodium picosulfate, phenolphthalein). Castor oil is used less commonly because of its side-effect profile and poor palatability. The effect of stimulant laxatives is dose dependent. Low doses prevent absorption of water and sodium, whereas high doses stimulate secretion of sodium, followed by water, into the colonic lumen.

Stimulant laxatives sometimes are abused, especially in patients with an eating disorder, even though at high doses they have only a modest effect on calorie absorption. Although a cathartic colon (i.e., a colon with reduced motility) has been attributed to prolonged use of stimulant laxatives, no animal or human data support this effect.[21–23] Rather, cathartic colon, as seen on a barium enema examination, is probably a primary motility disorder.

Overall, stimulant laxatives are well tolerated if used in doses that produce normal, soft, formed stools. They act rapidly and are particularly suitable for use in a single dose for temporary constipation. Most clinicians are cautious about recommending indefinite daily dosing of stimulant laxatives for chronic constipation. Large doses produce abdominal cramping and liquid stools. Stimulant laxatives vary widely in clinical effectiveness, and some patients with severe constipation are not helped by stimulant laxatives.

Anthraquinones

Anthraquinones, such as cascara, senna, aloe, and frangula, are produced by a variety of plants. The compounds are inactive glycosides that when ingested, pass unabsorbed and unchanged down the small intestine and are hydrolyzed by colonic bacterial glycosidases to yield active molecules. These active metabolites increase the transport of electrolytes into the colonic lumen and stimulate myenteric plexuses to increase intestinal motility. The anthraquinones typically induce defecation 6 to 8 hours after oral dosing.

Anthraquinones cause apoptosis of colonic epithelial cells, which then are phagocytosed by macrophages and appear as a lipofuscin-like pigment that darkens the colonic mucosa, a condition termed *pseudomelanosis coli*. Whether anthraquinone laxatives given over the long term cause adverse functional or structural changes in the intestine is controversial. Animal studies have shown neither damage to the myenteric plexus after long-term administration of sennosides nor a functional defect in motility. A case-control study in which multiple colonic mucosal biopsy specimens were examined by electron microscopy showed no differences in the submucosal plexuses between patients taking an anthraquinone laxative regularly for one year and those not taking one. An association between use of anthraquinones and colon cancer or myenteric nerve damage and the development of cathartic colon has not been established.[23,24]

Senna has been shown in controlled trials to soften stools and to increase the frequency and wet and dry weights of stool. The formulations available for clinical use vary from crude vegetable preparations to purified and standardized extracts to a synthetic compound.

Diphenylmethane Derivatives

Diphenylmethane compounds include bisacodyl, sodium picosulfate, and phenolphthalein. After oral ingestion, bisacodyl and sodium picosulfate are hydrolyzed to the same active metabolite, but the mode of hydrolysis differs. Bisacodyl is hydrolyzed by intestinal enzymes and thus can act in the small and large intestines. Sodium picosulfate is hydrolyzed by colonic bacteria. Like anthraquinones, the action of sodium picosulfate is confined to the colon, and its activity is unpredictable because its activation depends on the bacterial flora.

The effects of bisacodyl, and presumably sodium picosulfate, on the colon are similar to those of the anthraquinone laxatives. When applied to the colonic mucosa, bisacodyl induces an almost immediate, powerful, propulsive motor activity in healthy and constipated subjects, although the effect is sometimes reduced in the latter. The drugs also stimulate colonic secretion.[25]

Like the anthraquinone laxatives, bisacodyl leads to apoptosis of colonic epithelial cells, the remnants of which accumulate in phagocytic macrophages, but these cellular remnants are not pigmented. Aside from these changes, bisacodyl does not appear to cause adverse effects with long-term use.[26]

Bisacodyl is a useful and predictable laxative, especially suitable for single-dose use in patients with temporary constipation. Its possible effect on the small bowel is a disadvantage in contrast to anthraquinones and sodium picosulfate. Long-term use of bisacodyl or related agents is sometimes necessary for patients with chronic severe constipation. In the doses used, liquid stools and cramps tend to result, and it is difficult to adjust the dose to produce soft, formed stools.

Phenolphthalein inhibits water absorption in the small intestine and colon by effects on eicosanoids and the Na^+/K^+-ATPase pump present on the surface of enterocytes. The drug undergoes enterohepatic circulation, which may prolong its effects. It has been removed from the U.S. market because it is teratogenic in animals.

Ricinoleic Acid (Bisacodyl and Castor Oil)

Castor oil comes from the castor bean. After oral ingestion, it is hydrolyzed by lipase in the small intestine to ricinoleic acid, which inhibits intestinal water absorption and stimulates intestinal motor function by damaging mucosal cells and releasing neurotransmitters. Cramping is a common side effect.

Stimulant laxatives, such as bisacodyl and senna exert their primary effects through alteration of electrolyte transport by the intestinal mucosa[8] and generally work within several hours. In his classification, Schiller refers to this class of drugs as "secretagogues and agents with direct effects on epithelial, nerve, or smooth muscle cells."[8] Following their use, it is not uncommon for patients to report symptoms of abdominal discomfort and cramping.[21] This grouping includes surface-active agents, diphenylmethane derivatives, ricinoleic acid, and anthraquinones (►**Table 1**). Although stimulant laxatives may be associated with occasional side effects such as salt overload, hypokalemia, and protein losing enteropathy, data does not support the theory that they cause a so-called cathartic colon.[22] Melanosis coli, a pigmentation of the colonic mucosal due to the accumulation of apoptotic epithelial cells phagocytosed by macrophages, may develop in patients who chronically ingest anthraquinone-containing stimulant laxatives.[23] Despite prior theories to the contrary, neither anthracoid laxative use nor macroscopic or microscopic melanosis coli are associated with any significant risk for the development of colorectal adenoma or carcinoma.[24] Phenolphthalein, no longer marketed in the United States, has been associated with fixed-drug eruption, protein-losing enteropathy, Stevens-Johnson syndrome, and lupus reactions.[8] Castor oil, containing ricinoleic acid, alters intestinal water absorption and motor function,[8] and side effects often include cramping and nutrient malabsorption.[25]

Stool Softeners

Stool softeners allow passage of water into the stool mass by lowering the surface tension of the stool mass. Little available evidence supports their chronic use, however.

Docusate Sodium

Docusate sodium is a widely available stool softener and is a detergent agent that stimulates fluid secretion by the small and large intestine. Like most available OTC agents,

conflicting evidence supports its use. One study showed no change in volume of stool output in patients with ileostomy or weight of stool in normal subjects. A small double-blind crossover study showed improvement in bowel frequency in one third of the studied patients. Other studies showed docusate to be less effective than psyllium for chronic idiopathic constipation.[26,27]

Emollients

Mineral oil is an indigestible lipid compound which provides lubrication and emulsification of the fecal mass. In addition to being unpalatable, long-term use can cause malabsorption of fat-soluble vitamins, seepage, incontinence, and rarely lipoid aspiration pneumonia.

Enemas and Suppositories

Enemas general act by causing rectal distention and sometimes irritation of the rectal mucosa. Although generally safe, enemas may cause serious damage to the rectum by misinsertion resulting in trauma to the rectal mucosa.

Phosphate Enemas

Commercially available sodium phosphate enemas are hypertonic solutions, which cause stimulation and some degree of macro and microscopic irritation of the rectal mucosa. Like most other OTC agents, there is little convincing evidence of their efficacy, mostly because of lack of well-designed trials.

It is important to ensure that a patient using a phosphate enema can evacuate promptly as hyperphosphatemia has been described in multiple case reports, sometimes life-threatening in severity.

Saline, Tap Water, and Soapsuds Enemas

Saline, tap water, and soapsuds enemas also cause rectal distention, prompting evacuation. As a group, they are less irritating to the rectal mucosa if used in small volumes. With larger volumes, water intoxication has been reported with tap water enemas. Similarly, electrolyte disturbances have also been reported with larger volume soapsuds enemas. Saline enemas have been proposed as a survival technique in situations without pure freshwater.

Stimulant Suppositories and Enemas

Glycerin and bisacodyl are available without prescription as suppositories for use in constipation. Glycerin appears to work by stimulating an osmotic effect in the rectum. Bisacodyl exerts its action on neurons in the rectum, prompting defecation. Few if any clinical trials support their use.

Prokinetic Agents (5-HT4 Agonists)

Prokinetic agents induce contractions in the gastrointestinal tract. Recently, most attention in the development of prokinetic agents has focused on the 5-HT4 serotonin receptor, given prior toxicities of drugs with other targets (metoclopramide and cisapride in particular).

Tegaserod showed particular promise in the treatment of chronic constipation, but was withdrawn from the U. S. market due to observed cardiovascular toxicities; however, it remains available in other parts of the world. Newer 5-HT4 agonists are under development and appear promising as treatments for chronic constipation.[28,29]

Prucalopride is a full 5-HT4 agonist that has been shown to increase colonic contractions in animals and accelerate colonic transit in humans. There have been multiple large phase III trials demonstrating efficacy and safety of prucalopride versus placebo in patients with chronic constipation.

In these studies, patients have experienced increase in complete spontaneous bowel movement (CSBM)/week, as well as improvement in secondary endpoints, including satisfaction with bowel function and other measurements of health-related quality of life. Aggregate data from clinical trials would suggest that prucalopride does not have significant cardiovascular toxicities.

Unfortunately, prucalopride is not yet available in the United States.[30]

TD-5108, also known as velusetrag, is also a full 5-HT4 agonist. It has shown promise in phase II studies as an agent for chronic constipation. Despite positive results of early studies published around 2007, no phase III studies have been published and there may be issues with tachyphylaxis that may limit its utility for chronic constipation.[31]

Chloride Channel Activator

Lubiprostone

Lubiprostone is a chloride channel activator that increases intestinal fluid secretion and decreases colonic transit time. Lubiprostone, at doses of 8 and 24 µg twice daily has been shown to increase the number of CSBMs, decrease straining, and improve stool consistency. Common side effects include nausea, headache, and diarrhea. Lubiprostone at 24 µg twice daily is approved for men and women with chronic constipation. Lubiprostone at 8 µg twice daily is only approved for women with constipation-predominant IBS.[32]

Peripheral µ-Opioid Antagonists

Methylnaltrexone

Methylnaltrexone is a peripheral µ-opioid receptor antagonist that was U.S. Food & Drug Administration- (FDA-) approved in 2008 for opioid-induced constipation in patients with late-stage illness who receive opioids on a continuous basis. Most patients in clinical trials had limited life expectancy. Results are usually brisk, with almost half of patients having a bowel movement within 4 hours of the first dose. In the clinical trials, methylnaltrexone did not appear to precipitate opioid withdrawal.[33]

Alvimopan

Alvimopan is FDA approved to hasten bowel recovery after surgery. Like methylnaltrexone, it is also a µ-opioid receptor antagonist. It may also be useful in opioid-induced constipation.[34]

Other Agents

Clostridium Botulinum Toxin Type A (Botox)

Clostridium botulinum toxin has been used to relieve outlet dysfunction defecatory disorders. Usually it is injected into the puborectalis muscle. Controlled trials are lacking and it is not FDA approved for this indication.

Bethanechol

Cholinergic agents have been used in the treatment of constipation. Bethanechol appears to be beneficial in patients whose constipation results from tricyclic antidepressants. Use outside of this setting lacks evidence of efficacy. Neostigmine is clearly beneficial in colonic pseudo-obstruction, but given the severity of side effects its use in chronic constipation would likely be problematic or intolerable.

Colchicine

Colchicine is commonly used for constipation in practice. Again though, there is limited evidence in the form of quality clinical trials to support its use. One study did demonstrate increased bowel movement frequency, but patients treated with colchicine had more abdominal pain than controls.

Misoprostol is also used in treating chronic constipation, but given that its mechanism is probably similar to lubiprostone and its toxicities are likely greater, its regular clinical use is probably not warranted.

Newer Agents

Linaclotide

Linaclotide targets the guanylate cyclase C protein and is minimally absorbed. In clinical trials, it has been shown to be safe, well-tolerated, decrease abdominal pain, accelerate colon transit, and improve bowel function and CSBM. Despite recent high-profile publications demonstrating its efficacy, it is unclear when or if FDA approval will occur.[35]

R-Methunt-3

Another promising approach in the management of chronic constipation is targeting neurotrophins, a family of proteins that may induce nerve growth, nerve transmission, and consequently improve colonic and/or GI tract transit times. Thus far, the only agent studied is R-metHuNT-3 (recombinant human neurotrophic factor 3). It appears to offer improvement in gut transit, but suffers from some significant toxicities (injection site reactions and paresthesias).[36]

Alternative Treatment

Defecation Training

Defecation training may be helpful, but few specially trained instructors are available. The process involves teaching and supportive listening as well as encouragement of progress in follow-up sessions. The basics are teaching patients not to suppress the urge to defecate, setting aside time for regular bowel habits, and correct body positioning while defecating (including raising the feet above the floor when using Western-style toilets).

Anorectal Biofeedback

Anorectal biofeedback can be similarly beneficial, but finding qualified therapists may be challenging. The process usually involves several sessions performed with either surface electromyogram (EMG) electrodes or an anorectal manometry catheter. Patients are taught coordinated movements to promote successful defecation. The process is usually beneficial—a pooled analysis estimated about two thirds of patients improved, but insurance coverage usually is an obstacle to its use.

Laxative Use in Special Circumstances

Children

Treatment of constipation in children is similar to that of adults, and usually includes education, lifestyle modification, disimpaction, and maintenance therapy. A high-fiber diet is usually the initial management strategy of choice, as in adults. Of the pharmacologic agents available, PEG 3350 has the most supporting evidence and is frequently used in pediatric practice. PEG 3350 is FDA approved for children from 6 months to 15 years of age.[2,37–41]

Table 2 Treatment Algorithm for Chronic Constipation

Initial options
Fiber
Magnesium hydroxide
PEG-3350
Tegaserod
Severe infrequent or acute constipation
PEG-3350
Saline laxative (magnesium hydroxide)
Bisacodyl
Senna
Tegaserod
Severe idiopathic constipation
Larger doses of osmotic laxatives (saline or PEG)
Lactulose
Neuromuscular drugs (tegaserod)
Combination therapy
Outlet obstruction
Liquify stool with osmotic laxatives
Enemas
Pregnancy
Fiber and bulk laxatives
PEG
Lactulose
Bisacodyl

Pregnancy

Most obstetricians prefer to have their patients avoid laxatives during pregnancy and prescribe stool softeners instead. Fiber and bulk laxatives are probably safest during pregnancy.[42] Other agents, including PEG, sorbitol, glycerin, senna, etc., are all also probably beneficial and safe. PEG 3350 is not FDA approved for pregnancy, but is so minimally absorbed that toxicity is unlikely.[43] Other agents, including tegaserod, misoprostol, and colchicine should not be used in pregnancy. Castor oil reportedly can stimulate uterine contractions and should be avoided. Magnesium salts and phosphate agents can cause fluid retention.[44]

Conclusion

Constipation is a common clinical problem. Its medical management has been reviewed in this article, and recommendations are summarized in ►**Table 2**.

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