



Chronic Constipation: from Evaluation to Treatment

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Constipation is a common symptom. It affects virtually everyone at some point in their life. Occasional constipation may result from changes in diet or from inactivity and will generally respond to simple lifestyle measures. However, constipation that is chronic (constant or long-lasting) or recurrent may indicate the need to see a doctor for evaluation and treatment.

There is no single, generally accepted definition of constipation. The term “constipation” can refer to infrequent evacuation (bowel movement), difficult evacuation, incomplete evacuation, or evacuation of small or hard stools. Among these symptoms, only stool frequency is easily quantifiable and is usually defined as fewer than three bowel movements per week. Physicians often associate constipation with reduced stool frequency. Patients, however, typically define constipation as the occurrence of one of more symptoms of infrequent stools or difficult stool passage including hard or lumpy stools, straining, a feeling of incomplete evacuation, excessive time spent on the toilet, or the need to manually facilitate stool passage. Researchers frequently use the Rome III criteria to define constipation. (Appendix, A)

Given the various possible definitions of constipation, it is hardly surprising that the reported prevalence of constipation is quite variable. Studies from North America show prevalence rates of 2–27%, with most estimates ranging from 12–19%. Estimates based upon symptom self-reporting are significantly higher than those using Rome criteria. Risk factors for the development of constipation include increasing age, female gender, nonwhite race, and lower socioeconomic status.

“Functional” refers to a disorder or disease where the primary abnormality is an alteration in the way the body works (physiological function). It characterizes a disorder

Table 1: Major Causes of Constipation

- **Congenital** (present at birth)
 - Meningocele
 - Hirschsprung’s disease
- **Mechanical**
 - Obstructing colorectal cancer
 - Extracolonic malignant obstruction
 - Stricture
 - Acquired megacolon/megarectum
 - Rectocele
- **Dietary**
 - Inadequate fiber or water intake
- **Environmental**
 - Compromised mobility
 - Inadequate toileting facilities
- **Myopathic** (problem arising in the muscles)
 - Amyloidosis
 - Systemic sclerosis
- **Neurogenic** (problem arising in the nerves) **or psychogenic**
 - Autonomic neuropathy
 - Brain tumor
 - Chagas’ disease
 - Cognitive impairment
 - Depression
 - Eating disorder
 - Multiple sclerosis
 - Paraplegia/quadruplegia
 - Parkinson’s disease
 - Sexual abuse
 - Spinal cord injury or tumor
 - Stroke
- **Endocrine/metabolic**
 - Diabetes mellitus
 - Hypercalcemia
 - Hyperparathyroidism
 - Hypomagnesemia
 - Hypokalemia
 - Pregnancy
 - Scleroderma
 - Uremia
- **Pharmacologic**
 - Anticholinergics
 - Anticonvulsants
 - Antidepressants
 - Antipsychotics
 - Antihypertensives
 - Diuretics
 - Narcotics
- **Functional/idiopathic**
 - Normal transit constipation
 - Slow-transit constipation
 - Pelvic floor dysfunction

that generally cannot be diagnosed in a traditional way; that is, as an inflammatory, infectious, or structural abnormality that can be seen by commonly used examination, x-ray, or blood test.

The *pelvic floor* is composed of a group of muscles that span the underlying surface of the bony pelvis, which function to allow voluntary defecation and urination.

Causes

The major identifiable causes of constipation are listed in Table 1. Despite the many different possible causes of constipation, most cases seen in clinical practice are *functional* in origin, and they are often made worse by such factors as inadequate water or fiber intake, or the use of constipating medications. Many cases of constipation may in fact have several contributing factors. Constipation can be broadly divided into 3 classes based upon the underlying physiologic cause; 1) normal-transit constipation, 2) slow transit constipation, and 3) pelvic floor dysfunction. In normal-transit constipation, colonic motility (the way muscles contract and relax to move contents through the colon) is unaltered; stool moves through the colon at a normal rate. However, patients with normal-transit constipation may experience other difficulties in stool passage, for example due to harder stools. In contrast, in slow-transit constipation colonic motility is decreased and bowel movements are infrequent, leading to more severe symptoms of straining and harder stools.

Persons with pelvic floor dysfunction have a functional outlet obstruction, a defect in the coordination necessary for stool evacuation. This usually occurs due to the failure of the pelvic floor muscles (including the anal sphincter) to relax appropriately during evacuation efforts, thus making stool passage much more difficult regardless of whether stool transit in the colon is normal or delayed. In some cases, individuals contract their pelvic muscles instead of relaxing them. This condition is known variously as “pelvic floor dyssynergia,” “paradoxical pelvic floor/puborectalis contraction,” or “anismus.” The majority of persons seen by a doctor have normal-transit constipation, followed by pelvic floor dysfunction, and slow-transit constipation. As noted, some patients can have a combination of slow transit and pelvic floor dysfunction (functional outlet obstruction).

Consulting a Doctor for Evaluation

The most important step by the physician in the evaluation of constipation in an individual is to obtain a complete patient history. When talking to a doctor it is helpful to be prepared to describe the nature of the symptoms, when symptoms started and how long they have persisted, past medical procedures, and any medications being taken.

The doctor will gather information from the patient about the nature of his or her condition: is the complaint of infrequency of stool, hard stools, painful evacuation, or difficult evacuation? For example, infrequent call to stool (not feeling the need to have a bowel movement) may suggest slow-transit constipation, while the perceived need to defecate but with an inability to evacuate is more suggestive of a functional outlet obstruction.

The onset of the constipation is an important consideration. Most patients describe a longstanding problem. A more sudden onset should alert the clinician to the possibility of a serious underlying cause. Other symptoms of concern include rectal bleeding, a decrease in bowel movement diameter, a constant sense of the need to defecate, unexplained weight loss, nausea, and vomiting. The presence of such symptoms, or a significant family history of colorectal cancer, mandates complete colonic evaluation, preferably by *colonoscopy*.

Colonoscopy is a fiber optic (endoscopic) procedure in which a thin, flexible, lighted viewing tube (a colonoscope) is threaded up through the rectum for the purpose of inspecting the entire colon and rectum and, if there is an abnormality, taking a tissue sample of it (biopsy) for examination under a microscope, or removing it.

Age of onset is another important factor: severe constipation presenting in childhood raises the question of a congenital disorder such as meningocele (a birth defect in which the tissue that lines the spinal cord protrudes through an opening in the spinal column),

Hirschsprung's disease (absence of colonic ganglion [nerve] cells), or the presence of a painful anal fissure (a split or tear in the skin at the anal opening) that can lead to voluntary avoidance of defecation. Functional fecal retention – the holding back of stool because of fear of a painful bowel movement – in children can lead to encopresis (fecal soiling). Encopresis may present as diarrhea or incontinence due to seepage of liquid stool around a fecal impaction (a build-up of hard stool packed so tightly in the colon or rectum that normal pushing action is not enough to expel the stool). Social or environmental factors, such as lack of available toilet facilities, may contribute to constipation both in children and adults and should be considered as a possible cause.

The physician should obtain a complete past medical history. Numerous underlying diagnoses can cause or contribute to constipation (Table 1), and these should be noted or excluded as appropriate. Patient medications should be carefully reviewed for possible causative or contributory drugs. (Table 2)

A complete physical examination should be performed to identify possible conditions that contribute to the constipation. Attention is focused on examination of the perineum (the area between the anus and the genitals), anus, and rectum. The physician will look for signs that suggest the presence of rectal prolapse, a condition in which the rectum turns inside out and protrudes between the buttocks. This condition may be perceived by the patient as incomplete evacuation. In women, a rectocele can be identified as a bulge in the back of the vaginal wall while the patient strains, or as a noticeable defect between the rectum and vagina on digital examination (exam in which the doctor inserts his or her finger). Digital rectal examination can be useful to disclose abnormalities that may be present such as hemorrhoids, anal fissures, pelvic descent, and paradoxical puborectalis contraction when bearing down.

Table 2: Medications Associated with Constipation

Note: Many medications list constipation as a side effect and not all are listed here. Be sure to tell your doctor about any drugs or supplements being taken, both prescription and over-the-counter.

CLASS	EXAMPLES
Prescription Drugs	
Opiates	Morphine
Anticholinergic agents	Librax, belladonna
Tricyclic antidepressants	Amitriptyline, nortriptyline
Calcium channel blockers	Verapamil hydrochloride
Antiparkinsonian drugs	Amantadine hydrochloride
Sympathomimetics	Ephedrine, terbutaline
Antipsychotics	Chlorpromazine
Diuretics	Furosemide
Antihistamines	Diphenhydramine
Nonprescription Drugs	
Antacids, especially aluminum-containing	Maalox, Mylanta
Iron supplements	
Antidiarrheal agents	Loperamide, attapulgite
Nonsteroidal anti-inflammatory agents	Ibuprofen, naproxen

Several standard tests can be of use in the diagnosis of the constipated patient. In the case of sudden onset, an abdominal series of x-rays may disclose the presence of a bowel obstruction or fecal impaction. Should “alarm” symptoms be present (e.g., weight loss, blood reported in stool), or if the patient is 50 years of age or older, a full colonic evaluation is mandatory to examine for organic disease. This evaluation is generally best performed by colonoscopy, but barium enema (a test in which the

large intestine is coated with x-ray contrast [barium] to visualize abnormalities) can be done to screen for abnormalities if colonoscopy is not readily available, although a follow-up colonoscopy may become necessary if an abnormality is found. For some patients, blood tests should be done to exclude abnormalities that can cause constipation, such as high calcium levels, low potassium or magnesium levels, or low thyroid hormone levels.

Specialized Testing

Specialized testing is reserved for patients with constipation that is severe or difficult to treat. All such patients should undergo colonoscopy or barium enema to exclude an anatomic cause as well as the basic series of blood tests outlined above. If these studies are normal, a series of additional investigations should be undertaken. The simplest and most readily accessible

test is a *radiopaque marker study* to evaluate colonic transit. This involves ingesting 24 small markers treated so that they will be visible on an x-ray; these are commercially available prepackaged in a gelatin capsule. Methods vary, but in our practice an abdominal x-ray is taken on day 5. Retention of greater than 20% of the ingested markers is indicative of delayed transit. Prior to and during the test period, patients are instructed to avoid laxatives, enemas, and any medication that might interfere with normal bowel function (Table 2). A normal marker study,

nonetheless, does not exclude a diagnosis of functional outlet obstruction. Similarly, a prolonged transit study result does not prove that the colon is the sole source of the delay; impaired emptying of the stomach or slowed small bowel transit can each contribute to an abnormal result.

Colonic transit can also be measured using *colonic scintigraphy*. Patients ingest a meal containing a small amount of a radioactive substance (radioactive isotope) and images formed are recorded at specified time

intervals using a special camera. During the next 24–48 hours, this test shows what proportion of the ingested meal has progressed through the colon. However, in contrast to the universally available marker study, colonic scintigraphy is generally available only in specialized centers.

An *anorectal manometry* test is frequently used in the evaluation of patients with suspected pelvic floor evacuation difficulties. Manometry can be used to measure resting and squeezing anal sphincter pressures, rectal sensation, and sphincter response. Anal canal resting and squeeze pressure can be normal, high, or low. The test can provide one indication of paradoxical sphincter contraction if anal pressure rises, rather than lowers, as the patient attempts to bear down.

Manometry is also used to assess rectal sensation; inflating a balloon in the rectum and recording the

volumes associated with initial sensation can assess the urge to defecate and the feeling of uncomfortable fullness. Additionally, manometry is used to confirm the presence of a normal rectoanal inhibitory reflex, which is relaxation of the internal anal sphincter in response to balloon distension in the rectum. This reflex is absent in patients with Hirschsprung's disease, or with Chagas' disease (a tropical disease caused by a parasite that destroys the rectal nerves).

Constipation and Irritable Bowel Syndrome

Irritable bowel syndrome (IBS) is a functional disorder characterized by symptoms of abdominal discomfort or pain, usually in the lower abdomen (although the location and intensity are variable, even at different times within the same person), and altered bowel habit (change in frequency or consistency) – chronic or recurrent constipation, diarrhea, or both in alternation.

People with irritable bowel syndrome may have symptoms that overlap with functional constipation. However, patients with functional constipation may not have the abdominal discomfort or pain that is required to make a diagnosis of IBS, and would not have intervals of normal bowel habit and diarrhea with loose stools that can occur in IBS. (Appendix, B)

The ability of the rectum to empty can be assessed in a number of ways. Failure of the sphincter to relax during attempted defecation is the most important cause of functional outlet obstruction. Inappropriate contraction (or non-relaxation) of the anal sphincter mechanism can be diagnosed with manometry, defecography, and *electromyography* (EMG – a test that uses electrodes to assess the health of muscles and the nerves controlling the muscles). Each of these techniques documents sphincter contraction during a straining

effort. However, the results of these individual studies do not always agree with each other, so the results must be interpreted with caution. In addition, some individuals fail to understand the test instructions or are unable to relax in the laboratory setting, either of which situation can lead to a false positive result.

Rectal emptying can be accessed directly by the balloon expulsion test and by defecography. The *balloon expulsion test* in its simplest form involves inflating a rectal balloon with 50 ml (about 2 ounces) of water or air and asking the patient to expel it into a toilet. In some centers balloon expulsion tests are performed, while the patient is lying down on their left side, with the addition of weights to the balloon to help quantify the severity of the defecation disorder.

Defecography is a dynamic x-ray test in which the patient's rectum is filled with barium paste. The individual is seated on a commode and is asked to expel the rectal contents. X-ray images of the attempted defecation are recorded on videotape and evaluated. This test demonstrates both the ability of the sphincter mechanism to relax and the ability of the rectum to empty. In addition, the test is able to diagnose such associated conditions as internal intussusception (a condition in which the intestine or rectum folds into itself in a telescope fashion, causing obstruction), rectal prolapse, and rectocele.

At the end of the evaluation, the physician should have enough information to assign the patient's condition to the appropriate diagnostic subgroup: normal transit constipation, slow-transit constipation, or defecation disorder (functional outlet obstruction). In addition, some patients may have an overlap syndrome, such as slow-transit constipation with functional outlet obstruction.

Treatment

Treatment of constipation is best managed by first assigning the patient's condition to the appropriate diagnostic subgroup. Treatment will vary depending upon the subgroup assigned. For example, initial treatment of milder chronic constipation with normal transit generally involves a recommendation to increase fiber intake, but there is evidence that only a minority of

patients with slow-transit constipation or defecation disorders benefit from fiber therapy.

Normal transit constipation – In addition to increasing their fiber intake, patients with normal-transit constipation are often advised to increase their water consumption and physical activity. However, there are several caveats to be noted with this approach. Although many Americans consume only a fraction of the recommended 20–35 gm of fiber daily, some patients are already taking adequate quantities of fiber. Many others tolerate fiber supplementation poorly, especially if fiber intake is dramatically increased over a short time period. Side effects can include bloating, gassiness, and cramping, any of which may be perceived by the patient as worse than the constipation itself. Adding fiber gradually and slowly over one to two weeks may reduce or eliminate the discomfort. Individuals may tolerate dietary and various commercial fiber supplements differently, so substitution of one fiber source for another may prove helpful. At least one small study has suggested that addition of a regular exercise program alone had little benefit in the treatment of chronic idiopathic (of unknown cause) constipation.

Should simple conservative measures fail, the addition of a laxative is the next step in treating chronic constipation. Patients should start with an osmotic laxative, which works by drawing water into the colon. Examples of this class include polyethylene glycol or PEG (e.g., MiraLax), magnesium hydroxide (e.g., Milk of Magnesia), magnesium citrate (e.g., Citroma, Citro-Mag), sorbitol, and lactulose (e.g., Acilac, Enulose). Osmotic laxatives must be used with care in patients with a reduction in kidney function (renal insufficiency) and cardiac disorders. Stimulant laxatives are the second choice in constipation therapy. This class of drugs includes senna (e.g., Senokot, Ex-Lax), cascara sagrada, and bisacodyl (e.g., Dulcolax, Correctol). Although chronic use of these drugs has been thought to cause damage to the intestine's nervous system, it is now believed this concern has been overstated.

Lubiprostone (Amitiza) is a prescription drug used to relieve stomach pain, bloating, and straining and produce softer and more frequent bowel movements in men and women who have chronic idiopathic (functional) constipation. It is also prescribed to treat irritable bowel syndrome with constipation in women

who are at least 18 years of age. Lubiprostone helps promote secretions through chloride channels in the bowel. It works by increasing the amount of fluid that flows into the bowel and allowing the stool to pass more easily.

Prucalopride is a highly selective serotonin 5-HT₄ receptor agonist. It is available for the treatment of women with chronic constipation in Canada and a number of countries in Europe, but not in the United States.

Linaclotide (a GC-C receptor agonist) is a newer medication being studied to treat chronic constipation and IBS with constipation. The U.S. Federal Drug Administration (FDA) is currently reviewing the New Drug Application (NDA) for linaclotide with a decision expected in September 2012.

Slow-transit constipation – Initial treatment of slow transit constipation is based on escalating doses of laxatives. Unfortunately, many patients are on multiple agents with poor results at the time they consult a physician. Under the guidance of their doctor, some patients will benefit from simplification and standardization of their laxative regimen; for example, by discontinuing all but a single agent, such as polyethylene glycol, taken daily in an adequate dose to achieve the desired effect. Alternatively, a trial of lubiprostone (as outlined above) may be considered.

A small number of selected patients with well documented slow-transit constipation that is resistant to medical treatment, and without evidence of functional outlet obstruction may be candidates for colon resection – surgical removal of the colon with connection of the small intestine to the remaining rectum. This procedure, called total abdominal colectomy with ileorectal anastomosis, can be performed using either standard open surgery or laparoscopic surgery, which is performed with special instruments using several small incisions. The operation reliably increases the frequency of bowel movements; patient satisfaction ranges from 39–100%.

Biofeedback is a neuromuscular reeducation tool used to tell if certain processes in the body are working correctly. It is a painless process that uses sensors, a computer, and a video monitor to measure and display bodily functions that persons usually are not aware of. A therapist helps the patient use this displayed information to modify or change abnormal responses to more normal patterns.

Despite these results, there are a number of important issues that must be considered before deciding upon total abdominal colectomy. First, while the operation does increase bowel movement frequency, it does not reliably decrease such symptoms as abdominal pain, bloating, or distension. Second, the frequency of bowel movements after surgery is not entirely predictable. A few patients may have persisting constipation. Others develop unacceptable diarrhea. In addition to excessive stool frequency, a minority of patients are unable to control the high volume of liquid stool that is presented to the rectum after surgery, and thus are faced with fecal incontinence. Patients with risk factors for incontinence (such as history of impaired continence, obstetrical injury, or anal surgery such as fistulotomy or sphincterotomy) require careful evaluation before colectomy can be considered. Indeed, while excessive bowel movement frequency and incontinence may each improve during the first postoperative year, patients must understand that the operation is irreversible, and functional failure could lead to creation of a permanent ileostomy, a surgically created opening of the abdominal wall to the small intestine, allowing the fecal waste to empty into a bag. Finally, colectomy for constipation appears to be associated with a relatively high incidence of intestinal blockage, either from adhesions or due to poor motility in the remaining small intestine.

Another procedure, the Malone antegrade continent enema (ACE), involves the creation of a small opening (stoma) in the appendix, upper colon, or small intestine by an open or laparoscopic technique. This stoma is flushed on a regular schedule to empty the large bowel. The technique has seen most use in children with either incontinence or severe constipation. However, a limited experience has now been reported in constipated adults, with success rates of approximately 50% being reported. A more recent approach has been to create a continent conduit from the lower (sigmoid) colon, which is used to provide access for colonic irrigation. While successful results have been reported, experience to date with this technique is highly limited. Finally, in rare cases of severe refractory constipation, creation of an ileostomy may prove to be the best option.

Pelvic floor dysfunction (Outlet obstruction) –

Biofeedback therapy is the first step for patients with functional outlet obstruction, mainly for pelvic floor dyssynergia (anismus). The main goal of the therapy is to break the pattern of inappropriate (paradoxical) sphincter contraction by teaching patients to relax their pelvic floor muscles during straining efforts. This pelvic floor retraining may be accompanied by training to improve the efficiency of the abdominal pushing effort, as well as sensory training to improve perception of stool in the rectum. Approximately two-thirds of constipated patients treated with biofeedback are reported to have successful results, but larger controlled clinical trials are needed.

There have been anecdotal reports of botulin toxin (Botox) injection to alleviate non-relaxation or paradoxical contraction of the puborectalis muscle with straining. While some cases appear to have been successfully treated, no formal endorsement of this therapy can be offered until additional data become available.

Surgical options for outlet obstruction constipation are limited. Rectocele repair can be helpful in patients with large rectoceles who must support the back of the vagina with their fingers in order to effect defecation (“splinting”). Complete preoperative evaluation (preferably including defecography to demonstrate improved rectal emptying with vaginal support) and careful patient selection are critical to ensure optimal outcomes.

Combined slow-transit constipation and functional outlet obstruction

Patients with combined slow-transit constipation and pelvic floor dyssynergia should first undergo biofeedback. With constipation that persists after successful pelvic floor retraining, subtotal colectomy can be considered if medical treatment options including laxatives and other drugs fail to relieve symptoms. Good results can be achieved with this treatment, but some patients continue to suffer from poor rectal emptying after treatment.

Conclusions

The term constipation includes a complex of symptoms related to slow, impaired, difficult, or painful defecation. Because constipation is a symptom and not a disease,

patients should be evaluated for possible underlying causes. “Alarm” symptoms in particular should trigger a complete colonic evaluation to exclude serious underlying cause.

Most cases of functional constipation can be treated based on symptoms, with or without the addition of laxatives. Patients with constipation resistant to initial treatment should undergo specialized evaluation to determine the presence of impaired colonic transit or outlet obstruction. Treatment of these conditions may require medication, biofeedback, or surgery. However, most constipated patients can be successfully treated when a complete evaluation is performed and a rational treatment plan pursued in partnership between the individual patient and his or her physician.

Appendix

A) Rome III Diagnostic Criteria for Functional Constipation[1]

1. Must include *two or more* of the following:
 - a. Straining during at least 25% of defecations
 - b. Lumpy or hard stools in at least 25% of defecations
 - c. Sensation of incomplete evacuation for at least 25% of defecations
 - d. Sensation of anorectal obstruction/blockage for at least 25% of defecations
 - e. Manual maneuvers to facilitate at least 25% of defecations (e.g., digital evacuation, support of the pelvic floor)
 - f. Fewer than three defecations per week
 2. Loose stools are rarely present without the use of laxatives
 3. Insufficient criteria for irritable bowel syndrome
- *Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

B) Rome III Diagnostic Criteria* for Irritable Bowel Syndrome[1]

Recurrent abdominal pain or discomfort** at least 3 days/month in the last 3 months associated with *two or more* of the following:

1. Improvement with defecation
2. Onset associated with a change in frequency of stool

3. Onset associated with a change in form (appearance) of stool

*Criterion fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

**“Discomfort” means an uncomfortable sensation not described as pain

Reference:

1) Drossman DA, Corazziari E, Delvaux M, et al. *Rome III: the functional gastrointestinal disorders* (3rd edition).

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