Etiology and evaluation of chronic constipation in adults

AUTHOR: Arnold Wald, MD
SECTION EDITOR: Nicholas J Talley, MD, PhD
DEPUTY EDITOR: Shilpa Grover, MD, MPH, AGAF

All topics are updated as new evidence becomes available and our peer review process is complete.

Literature review current through: **Sep 2023.**
This topic last updated: **Feb 17, 2022.**

INTRODUCTION

Constipation is the most common digestive complaint in the general population, and is associated with substantial economic costs [1-3]. The causes of chronic constipation are varied (table 1). Infrequently, constipation is the first manifestation of metabolic (diabetes mellitus, hypothyroidism, hypercalcemia, heavy metal intoxication), neurologic, or obstructive intestinal disease; more often, it occurs as a side effect of commonly used drugs (table 2).

The definition, etiology, and evaluation of chronic constipation will be reviewed here. Treatment of this disorder is discussed separately. The recommendations in this topic are largely consistent with guidelines from the American Gastroenterological Association (AGA) and American Society for Gastrointestinal Endoscopy [4,5]. (See "Management of chronic constipation in adults".)

DEFINITION OF CONSTIPATION

Constipation is often treated on the basis of a patient's impression that there is a disturbance in bowel function. However, the term constipation has varied meanings for different people. Stools may be too hard or too small for some, while for others defecation is too difficult or infrequent. The first three complaints are difficult to quantify in clinical practice; the last can be measured and compared to the general population.

Constipation has been defined as a stool frequency of less than three per week based upon epidemiological studies in the United States and the United Kingdom. However, this definition is not universally applicable. One complicating factor is that the frequency of bowel movements is usually underestimated [6]. This has led some investigators to propose that only the use of daily diaries can define constipation adequately. Another problem is that up to 60 percent of patients in one survey who reported themselves to be constipated had daily bowel movements [6]. These individuals most often complained of defecatory straining or a sense of incomplete defecation.

These observations have led to the use of more expansive criteria of functional constipation. An international working committee recommended diagnostic criteria (Rome IV) for functional constipation [7,8]. The diagnosis should be based upon the presence of the following for at least three months (with symptom onset at least six months prior to diagnosis).

(1) Must include two or more of the following:

- Straining during more than 25 percent of defecations.
- Lumpy or hard stools (Bristol Stool Scale Form 1-2) in more than 25 percent of defecations [9].
- Sensation of incomplete evacuation for more than 25 percent of defecations.
- Sensation of anorectal obstruction/blockage for more than 25 percent of defecations.
- Manual maneuvers to facilitate more than 25 percent of defecations (eg, digital evacuation, support of the pelvic floor).
- Fewer than three spontaneous bowel movements per week.

(2) Loose stools are rarely present without the use of laxatives

(3) There are insufficient criteria for IBS. (See "Clinical manifestations and diagnosis of irritable bowel syndrome in adults".)

Although patients with functional constipation may have abdominal pain and/or bloating, they are not the predominant symptoms.

EPIDEMIOLOGY

Estimates of the prevalence of chronic constipation in North America have varied between 2 to 27 percent depending in part upon the criteria used to define it [10]. A prevalence of 12 to 19 percent (average 15 percent) has been reported in most studies [10,11]. Prevalence rates have been lower in studies using Rome II criteria to define constipation compared with studies based

upon self-reporting. A systematic review estimated that 63 million people in North America fulfilled the Rome II criteria for constipation [11].

Self-reported constipation in the United States and the United Kingdom is more prevalent in females and those over age 60. After adjusting for these factors, it is more common in individuals with little daily physical activity, low income, and poor education [12]. Surveys of physician visits for constipation have also found more visits by females, those with lower incomes, and patients with less than 12 years of education [13].

The prevalence of chronic constipation rises with age, most dramatically in patients 65 years of age or older [11,13,14]. In this older age group, approximately 26 percent of males and 34 percent of females complain of constipation [14,15]. Constipation appears to correlate with decreased caloric intake in older adults but not with either fluid or fiber intake [12,16,17]. (See "Constipation in the older adult", section on 'Epidemiology and risk factors'.)

ETIOLOGY AND PATHOPHYSIOLOGY

Constipation may be conceptually regarded as disordered movement of stool through the colon or anorectum since, with few exceptions, transit through the proximal gastrointestinal tract is often normal. Slowing of colonic transit may be idiopathic or may be due to secondary causes.

Secondary causes of chronic constipation — Diseases associated with constipation include neurologic and metabolic disorders, obstructing lesions of the gastrointestinal tract, including colorectal cancer, endocrine disorders such as diabetes mellitus, and psychiatric disorders such as anorexia nervosa (table 1). Constipation may also be due to a side effect of drugs (table 2). (See "Diabetic autonomic neuropathy of the gastrointestinal tract" and "Anorexia nervosa in adults and adolescents: Medical complications and their management", section on 'Constipation'.)

Other abnormalities leading to impairment of defecation include aganglionosis (Hirschsprung disease) and functional outlet disorder (known as dyssynergic defecation or pelvic floor dyssynergia). In addition, patients with irritable bowel syndrome often complain of periods of constipation, which may alternate with periods of diarrhea or normal bowel function. (See "Clinical manifestations and diagnosis of irritable bowel syndrome in adults".)

Colonic and anorectal motor functions are coordinated by enteric, sympathetic, and parasympathetic nerves. Thus, diseases of the central and peripheral nervous systems are often associated with constipation [18].

- The distal colon receives parasympathetic innervation from the sacral nerves that pass through the pelvis and enter the bowel wall in the rectum. Transection of these nerves or lesions in the cauda equina may produce constipation associated with hypomotility, colonic dilatation, decreased rectal tone and sensation, stasis of the distal colon, and impaired defecation.

- Similar findings may occur with injury to the lumbosacral spine, with a meningomyelocele, and following low spinal anesthesia.

- Constipation may also be a result of high spinal cord damage. However, in contrast to lower cord damage, colonic reflexes are intact and defecation can often be triggered by digital stimulation of the anal canal. (See "Chronic complications of spinal cord injury and disease", section on 'Gastrointestinal complications'.)

The high prevalence of constipation in multiple sclerosis and Parkinson disease may be worsened by physical inactivity or the use of medications with constipating side effects [19]. Severely constipated patients with advanced multiple sclerosis appear to have absent colonic motor responses after eating a meal, and other characteristic changes that may result from interruption of normal cortical inhibition of colonic motor activity [20].

Hirschsprung disease is a congenital disorder characterized by obstipation from birth and colonic dilatation proximal to a spastic, non-relaxing and nonpropulsive segment of distal bowel. Functional obstruction of the distal bowel is due to absent intramural ganglion cells of the submucosal and myenteric plexuses, a result of arrest of the caudal migration of neural crest cells during embryonic development. One genetic defect identified in patients with this disorder is an inactivating mutation in the RET proto-oncogene; another is a mutation in the endothelin B receptor [21,22]. Interestingly, activating mutations in RET lead to multiple endocrine neoplasia type 2 and familial medullary thyroid cancer. (See "Classification and genetics of multiple endocrine neoplasia type 2".)

Severe idiopathic chronic constipation — Severe idiopathic chronic constipation in adults is predominantly a disease of females [23]. Abdominal pain is uncommon and megacolon is rare. Patient complaints include infrequent defecation, excessive straining when defecating, or both; these symptoms often fail to improve with fiber supplements or mild laxatives.

There are several subtypes of severe idiopathic chronic constipation, which can be distinguished by studies of bowel function:

Normal colonic transit — Some patients who complain of infrequent defecation and are unresponsive to laxatives and fiber supplements have normal colonic transit [24]. Those with

normal transit constipation may misperceive bowel frequency and often exhibit increased psychosocial distress [24,25]. Some of these patients demonstrate abnormalities of anorectal sensory and motor function that are indistinguishable from those in patients with slow transit constipation; the relationship of these findings to the patient's complaints is unclear.

Colonic inertia — The majority of patients with severe constipation with slow colonic transit are said to have colonic inertia, defined as the delayed passage of radiopaque markers through the proximal colon in the absence of a defecation abnormality. Patients with colonic inertia have a resting colonic motility that is similar to normal controls but have little or no increase in motor activity after meals or with the administration of bisacodyl [26,27], and a blunted response to cholinergic agents [28].

These findings suggest dysfunction in the enteric nerve plexus. Decreased volume of interstitial cells of Cajal in the myenteric plexus have been demonstrated in resected colon specimens from some of these patients who have had colon resections [29]. These cells are believed to play an important role in governing colonic motility.

Controversy exists regarding the validity of the term "colonic inertia." Criteria for this disorder are imprecise since colonic stasis can occur as a result of decreased propulsion (hypomotility) or increased distal motility with retropulsion (hypermotility) of markers. The term colonic inertia should be reserved for cases in which transit in the proximal colon is delayed without evidence of a defecatory disorder by appropriate testing. A more precise term to use in clinical practice is slow transit constipation, which encompasses a number of different mechanisms. (See 'Dyssynergic defecation' below.)

Outlet delay — The term outlet delay designates a form of idiopathic constipation in which markers move normally through the colon but stagnate in the rectum [30]. This pattern may also be seen in Hirschsprung disease, in patients with fecal impaction, in megarectum, and in persons who demonstrate abnormal responses of the pelvic floor muscles during defecation [31-33]. The last entity, also known as dyssynergic defecation or pelvic floor dyssynergia, provides another plausible mechanism by which constipation can occur.

Dyssynergic defecation — Defecation normally involves the coordinated relaxation of the puborectalis and external anal sphincter muscles, together with increased intraabdominal pressure and inhibition of colonic segmenting activity. (See "Fecal incontinence in adults: Etiology and evaluation", section on 'Physiology of defecation'.) In patients with dyssynergic defecation, ineffective defecation is associated with a failure to relax, or inappropriate contraction of, the puborectalis and external anal sphincter muscles (figure 1) [34]. This narrows the anorectal angle and increases the pressures of the anal canal so that evacuation is

less effective. Relaxation of these muscles involves cortical inhibition of the spinal reflex during defecation; thus, this pattern may represent a conscious or unconscious act.

The pathogenesis of dyssynergic defecation is not completely understood but is probably multifactorial. It is thought to be an acquired, learned dysfunction rather than an organic or neurogenic disease. Studies indicate that rectosphincteric dysfunction often occurs in constipated patients with normal transit as well as in those with colonic inertia or outlet delay. Furthermore, it appears to be variable from one test to another, and is less likely to occur with ambulatory monitors at home than in the lab [35]. Manometric diagnostic criteria for dyssynergic defecation include inappropriate contraction of the pelvic floor or less than 20 percent relaxation of basal resting sphincter pressure with adequate propulsive forces during attempted defecation [36]. Manometry alone is insufficient for this diagnosis to be made but is best made in conjunction with an abnormal balloon expulsion test.

The relative frequency of the different abnormalities that can produce severe idiopathic chronic constipation was evaluated in 277 patients who underwent colon transit studies, measurement of anal canal pressures and reflexes, anorectal angle movements, and the efficiency of evacuation [23]. Balloon expulsion studies, electromyography (EMG) of the pelvic floor, and defecating proctograms were also performed. The following causes of constipation were noted:

- Slow transit constipation – 11 percent
- Dyssynergic defecation – 13 percent
- A combination of the two – 5 percent
- Irritable bowel syndrome – 71 percent

Megacolon and megarectum — Only a small percentage of patients with constipation have megacolon or megarectum. Conversely, most patients with a dilated colon or rectum have constipation or defecatory difficulties. Megacolon and megarectum can occur together or separately. Although radiographic criteria exist to diagnose these entities [37], radiologic assessment does not always correlate with manometric evaluation [38].

Primary megacolon is thought to be associated with neurogenic dysfunction, although histologic changes may not be evident without specialized neurohistologic staining. In contrast, secondary megacolon and megarectum often develop later in life and may occur in response to chronic fecal retention. These patients have increased rectal compliance and elasticity, blunted rectal sensation, and an increased threshold and smaller degree of relaxation of the internal anal sphincter in response to rectal distension [38].

Megarectum may be associated with fecal impaction and soiling, which often occurs in children and in physically and mentally impaired older adults [31,39]. Megarectum can also be seen in

Hirschsprung disease, meningomyelocele, lesions of the lumbosacral cord, and in patients with poor toileting routines. The sensory and motor abnormalities associated with megarectum may be reversible with appropriate therapy in some patients, although abnormalities can persist long after successful treatment in children. In addition, it has not been readily reversible in older adults.

EVALUATION

The initial evaluation of the patient with chronic constipation includes a careful history and physical examination. Laboratory evaluation, endoscopic evaluation, and radiology studies should be performed only in selected individuals. A systematic review concluded that there was insufficient evidence to support the routine use of blood tests (including serum calcium and thyroid function tests), radiography, or endoscopy in the routine evaluation of patients with constipation without alarm features such as hematochezia, weight loss of ≥10 pounds, a family history of colon cancer or inflammatory bowel disease, anemia, positive fecal occult blood tests, or acute onset of constipation in older adults [10,40]. Thus, empiric treatment (patient education, trial of dietary changes, and a trial of fiber) without diagnostic testing can be considered when alarm features are absent. (See "Management of chronic constipation in adults", section on 'Patient education' and "Management of chronic constipation in adults", section on 'Dietary changes and bulk-forming laxatives'.)

In patients in whom the cause of constipation is not found with the above evaluation and a trial of conservative management fails, additional studies should be performed to assist in the diagnostic workup. These tests are discussed below and are largely consistent with guidelines from the American Gastroenterological Association [41]. The need for specialized testing (such as anorectal manometry) often requires referral to a diagnostic center.

History — An important part of the history includes defining the nature and duration of constipation. Determining if the patient's concerns arise from misconceptions regarding normal bowel habits may be aided by obtaining a two-week bowel diary [25]. Reassurances regarding the broad range of normal bowel frequency may be all that is necessary in some cases.

The history should also focus upon identifying secondary causes of constipation. Most patients with idiopathic constipation are otherwise asymptomatic.

- A careful drug history is important, particularly the temporal relationship between starting a particular drug and the onset of constipation (table 2).

- Many systemic or neurologic disorders that impair colonic motility affect organs outside of the gastrointestinal tract (table 1); thus, patients with these disorders may have other symptoms in addition to constipation.

- Local processes (eg, tumors) often produce other symptoms such as abdominal pain or rectal bleeding.

A recent and persistent change in bowel habits, if not associated with a readily definable cause of constipation (eg, medications), should prompt an evaluation to exclude structural bowel changes or organic diseases. This is particularly important in older adults who complain of excessive straining or a sense of incomplete evacuation, or who also exhibit anemia or occult gastrointestinal bleeding. A diagnosis of functional constipation should be considered only after these other diseases have been excluded.

Physical examination — The general physical examination is not helpful in most patients presenting with chronic constipation. In contrast, a rectal examination may be quite useful:

- It can identify fissures or hemorrhoids which may be caused by constipation, or which can be painful and thereby lead to voluntary stool retention and secondary constipation.

- A gaping or asymmetric anal opening may suggest that a neurologic disorder is impairing sphincter function.

- Responses of the puborectalis and external anal sphincter muscles may be evaluated by asking the patient to strain during the rectal examination; this is particularly useful in identifying patients with possible dyssynergic defecation.

To perform the examination, have the patient lay in the left lateral decubitus position with his/her hips flexed to 90 degrees.

During the digital examination with the right hand, the examiner feels for rectal tenderness, masses, strictures, and stool. If stool is present, the consistency should be noted. Resting sphincter tone is categorized as normal, weak, or increased. The examiner then places the left hand on the patient's abdomen to assess the push effort while the patient bears down, as if having a bowel movement. Normally, the contraction of the abdominal muscles is accompanied by relaxation of the external anal sphincter and puborectalis muscles and perineal descent. In patients with dyssynergia, there may be an inability to contract the abdominal muscles, inability to relax the anal sphincter, paradoxical contraction of the anal sphincter, or the absence of perineal descent. In one study, the sensitivity and specificity of digital rectal examination for diagnosing dyssynergic defecation were 75 and 87 percent, respectively [42].

Rectal prolapse may be identified by asking the patient to strain in a squatting position if none is apparent when the patient is recumbent. A rectocele may be identified by asking the patient to strain with the examining finger oriented anteriorly in a woman.

Laboratory data — Complete blood cell count, serum glucose, creatinine, calcium, and thyroid-stimulating hormone should be performed in patients with hematochezia, weight loss of ≥10 pounds, a family history of colon cancer or inflammatory bowel disease, anemia, or positive fecal occult blood tests, as well as a person with short-term history of constipation.

Endoscopy — Flexible sigmoidoscopy and colonoscopy can identify lesions that narrow or occlude the bowel; they also permit biopsy specimens to be obtained and polypectomy to be performed. We suggest diagnostic colonoscopy in patients with constipation in the following settings [4,5]:

- Patients aged >50 years presenting with constipation who have not previously had colon cancer screening. This age is younger in patients with a family history of colorectal cancer.
- Patients with constipation and alarm features (rectal bleeding, heme-positive stool, iron deficiency anemia, weight loss of ≥10 pounds, obstructive symptoms, recent onset of constipation in persons without an obvious explanation, family history of colorectal cancer or inflammatory bowel disease).
- Prior to surgery for constipation.

Radiography — Plain films of the abdomen can detect significant stool retention in the colon and suggest the diagnosis of megacolon. They also are used to monitor bowel cleansing in patients with fecal retention. However, a diagnosis of constipation should not be made based on the basis of a single radiograph alone.

Barium radiographs will show the aganglionic distal bowel with proximal dilatation of the colon in classic Hirschsprung disease and should be obtained when this disorder is suspected because of constipation beginning shortly after birth and persisting, especially in males. Bowel cleansing should not be ordered prior to radiography in those with possible Hirschsprung disease so that the characteristic changes will be accentuated. In addition, the insertion catheter should be removed to identify a short aganglionic segment.

Colon transit studies — Colonic transit studies are most useful in the evaluation of patients whose major complaint is infrequent defecation [18]. A colonic transit study is indicated for patients with chronic constipation which is refractory to laxatives and other conservative

measures to differentiate slow from normal colonic transit. Colonic transit time (CTT) is defined as the time it takes for stool (feces) to pass through the colon.

Radiopaque marker study — The radiopaque marker study is commonly performed by measuring movement of radiopaque markers through the gut. Several different approaches have been used including single or multiple marker ingestion. A less commonly used method is scintigraphy [43]. Both these methods provide a quantitative assessment of colonic transit [44,45].

The patient ingests a high fiber diet (20 to 30 g per day) while abstaining from laxatives, enemas, and medications that may affect bowel function for two to three days prior to the test. Radiopaque markers are swallowed, and their passage through the colon is monitored by abdominal radiographs. Markers are counted in the right, left, and rectosigmoid colons (defined by certain anatomical landmarks) and are followed as they move distally until expelled [46].

For routine clinical purposes, a single capsule with 24 markers is administered on day 1 and followed by single x-ray on day 6 (after 120 hours) (image 1). However, these tests are not standardized and cannot measure regional transit time.

Patients can be categorized according to patterns of marker movement:

- Transit in the right colon or left colon is delayed in patients with slow transit constipation.
- Markers progress normally through the proximal colon but stagnate in the rectum in those with outlet delay.
- Many patients with chronic constipation will have normal colonic transit. These patients may consciously or unconsciously misrepresent their bowel habits and, as a group, exhibit psychologic profiles that differ from those of patients with slow transit constipation [24]. These findings have potentially important ramifications with respect to treatment. (See "Management of chronic constipation in adults".)

Retention of more than five markers on day 6 is considered abnormal and indicative of slow transit constipation. As patients with dyssynergic defecation may also retain markers, a diagnosis of slow transit constipation should only be made after excluding dyssynergia.

Wireless motility capsule — Wireless motility capsule (WMC) is a method of assessing regional (gastric emptying, small bowel transit) and CTT and whole gut transit times (WGTT). It is indicated for patients with chronic constipation which is refractory to laxatives and other conservative measures to differentiate slow from normal colonic transit. The sensitivity, and specificity and receiver-operating characteristics have been shown to be similar with those of

radiopaque marker tests and scintigraphic gastric emptying [47]. The WMC has been validated against the radiopaque marker test in patients with chronic constipation [48,49]. WMC is well tolerated, has good compliance, and avoids the risks of radiation exposure. However, the WMC is more expensive than the radiopaque marker study and it is not clear that it provides added clinical value in most patients.

Defecography — Defecography is an imaging study which provides information about anatomical and functional changes of the anorectum. Defecography is most helpful when looking for potential anatomic causes of symptoms (eg, enterocele and intussusceptions) or when findings of manometry are at variance with the balloon expulsion test (see 'Motility studies' below).

Patients may find this test embarrassing and impaired mobility may make this test difficult to perform in the older adult. In addition, defecography is operator dependent and has poor reliability. Therefore, defecography should be regarded as an adjunct to clinical and manometric assessment of anorectal function and not as a sole test (see 'Motility studies' below) [50].

Defecography is performed by placing approximately 150 mL of thickened barium into the patient's rectum and having the patient squeeze, cough, and bear down. Evacuation of the barium can be monitored by fluoroscopy or videotape while the patient sits on a specially constructed commode. Assessment of the anorectal structures, including the anorectal angle, is obtained at rest and during expulsion of the barium mixture. Pelvic floor dyssynergia is diagnosed by the presence of insufficient descent of the perineum (<1 cm) and less than a normal change in the anorectal angle (<15 degrees).

Tests such as magnetic resonance (MR) and dynamic MR defecography can evaluate global pelvic floor anatomy and sphincter morphology and assess dynamic motion, thereby providing more valuable information without radiation. These tests are expensive, not widely available, and have uncertain added clinical value compared to standard defecography.

Motility studies

Anorectal manometry — By assessing various anorectal pressure relationships, anorectal manometry (ARM) provides comprehensive information regarding the anal sphincter function at rest and during defecatory maneuvers as well as reflex activation of the pelvic floor [38,46,51]. The parameters that can be measured using ARM are rectal sensation and compliance, reflexive relaxation of the internal anal sphincter, and manometric patterns produced upon attempted expulsion of the apparatus (pseudodefecation). ARM therefore helps with the diagnosis of dyssynergic defecation, rectal sensory problems, and the assessment of response to biofeedback therapy [52]. (See "Overview of gastrointestinal motility testing".)

Pressures recorded by the rectal balloon provide some indication of intraabdominal pressures generated during expulsion efforts, while pressure recordings of the anal sphincter transducers indicate relaxation or inappropriate contraction of the external anal sphincter. Manometry can identify abnormal sphincter responses during attempted expulsion of the manometer [34].

The characteristic normal pattern is an increase in intrarectal pressure and decrease in external sphincter pressure during expulsion of the manometer. In patients with dyssynergic defecation, there is an increase in external sphincter pressure during attempted expulsion of the manometer (figure 1). Manometric demonstration that the internal anal sphincter relaxes following rectal distension excludes Hirschsprung disease from diagnostic consideration.

High resolution manometry (HRM) uses 12 circumferential sensors spaced at 1 cm intervals (figure 2) [53]. This provides greater physiologic resolution and minimizes motion artifact. A high definition 3D anorectal manometry system using 256 circumferential transducers can be used to define anal pressure profiles with greater precision [54]. There is no evidence that HRM is superior to conventional manometry for clinical purposes. Moreover, studies with HRM indicate that many non-constipated individuals have patterns similar to those of constipated patients with dyssynergia; this brings into question the specificity of manometric patterns thought to be abnormal [55].

Colonic manometry — Colonic manometry evaluates intraluminal pressure activity of the colon and rectum and provides detailed information about the qualitative aspects such as pattern of motor activity and quantitative aspects of colonic motility. It can be combined with a barostat apparatus to assess colonic tone, compliance, and sensation [56]. Patients can be identified to have normal, myopathic, or neuropathic colon as well as sensory dysfunction. As yet, there is no evidence that such information has added value to the management of adults with chronic constipation in clinical practice and this test is available for clinical use in only selected centers.

Balloon expulsion — The balloon expulsion test is a simple, physiologic assessment of defecation that assesses a subject's ability to expel simulated stool [56,57]. The methodology for this test has not been standardized. Expulsion of a 50 mL water-filled balloon provides some information about defecation and can be used as a simple office screening test of defecatory dysfunction. In one study, results of the balloon expulsion test were evaluated in 286 consecutive patients with chronic constipation and 40 healthy controls. In this study, the balloon was expelled by 37 (93 percent) healthy controls within one minute and all controls in less than two minutes [58]. Among patients with constipation, 148 (52 percent) passed the balloon within five minutes (110 passed the balloon in 1 minute, 35 passed it in 1 to 2 minutes, and 3 passed it in 2 to 5 minutes). On repeat testing after 30 days of conservative treatment for constipation,

the test results were reproducible in 280 (98 percent) patients with constipation, when a time of greater than two minutes was considered abnormal. If the balloon is expelled in less than one minute, it is unlikely that dysfunction exists, although sensitivity of the test was only 90 percent in one report [57]. However, a normal test does not exclude this possibility. There is also some overlap between dyssynergic defecation and slow transit constipation [34]. Therefore, the results of this test should be interpreted along with the results of other tests of anorectal function.

Other tests

- **Breath test for intestinal methanogen overgrowth** – We do not routinely test for intestinal methane overgrowth in patients with constipation. Constipation is associated with elevated levels of breath methane and stool *Methanobrevibacter smithii,* the predominant methanogen in the human gut. Studies suggest that there may be an association between intestinal methane producing organisms and constipation [59]. However, it is unclear if it is causal. While testing for intestinal methane overgrowth has been suggested in some guidelines, it is also unclear if treatment can improve constipation [60]. (See "Small intestinal bacterial overgrowth: Clinical manifestations and diagnosis", section on 'Diagnosis'.)

- **Rectal barostat test** — The rectal barostat test is an assessment of rectal sensation, tone, and compliance. A highly compliant balloon is placed in the rectum and connected to a computerized pressure distending device (barostat). This test can be useful for detecting rectal hyposensitivity and for identifying patients with normal, impaired, or hypercompliant rectum, and detection of megarectum. Rectal barostat studies can also reveal rectal hypersensitivity in patients with IBS-C. The clinical significance of such findings in clinical practice is uncertain. Rectal barostat testing is not available for clinical use.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Constipation".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading

level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Constipation in adults (The Basics)")
- Beyond the Basics topics (see "Patient education: Constipation in adults (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- The general approach to a patient with chronic constipation is summarized in the following algorithm and tables (algorithm 1 and table 1 and table 2).
- Evaluation of constipation should begin with a detailed history and physical examination that includes a rectal examination. (See 'History' above and 'Physical examination' above.)
- In patients with alarm symptoms or suspicion of organic disease (hematochezia, weight loss of ≥10 pounds, a family history of colon cancer or inflammatory bowel disease, anemia, positive fecal occult blood tests, or the recent onset of constipation in persons without an obvious explanation), blood tests (including serum calcium and thyroid function tests), radiography, or endoscopy should be considered. (See 'Laboratory data' above and 'Radiography' above and 'Endoscopy' above.)
- In patients without alarm symptoms or suspicion of organic disease, if the history and physical examination and a trial of conservative management do not reveal the cause of chronic constipation, we suggest an imaging study of the colon and rectum to exclude mass lesions, strictures, megacolon, and megarectum. (See 'Radiography' above.)
- A normal imaging study should lead to evaluation of colonic transit and pelvic floor dysfunction. A diagnosis of dyssynergic defecation should not be made unless at least two of the following studies are positive: anorectal manometry; anal sphincter

electromyography (EMG); defecography; and impaired balloon expulsion from the rectum. (See 'Colon transit studies' above and 'Defecography' above and 'Motility studies' above.)

REFERENCES

1. Singh G, Lingala V, Wang H, et al. Use of health care resources and cost of care for adults with constipation. Clin Gastroenterol Hepatol 2007; 5:1053.
2. Stewart WF, Liberman JN, Sandler RS, et al. Epidemiology of constipation (EPOC) study in the United States: relation of clinical subtypes to sociodemographic features. Am J Gastroenterol 1999; 94:3530.
3. Sethi S, Mikami S, Leclair J, et al. Inpatient burden of constipation in the United States: an analysis of national trends in the United States from 1997 to 2010. Am J Gastroenterol 2014; 109:250.
4. Bharucha AE, Pemberton JH, Locke GR 3rd. American Gastroenterological Association technical review on constipation. Gastroenterology 2013; 144:218.
5. ASGE Standards of Practice Committee, Cash BD, Acosta RD, et al. The role of endoscopy in the management of constipation. Gastrointest Endosc 2014; 80:563.
6. Sandler RS, Drossman DA. Bowel habits in young adults not seeking health care. Dig Dis Sci 1987; 32:841.
7. Longstreth GF, Thompson WG, Chey WD, et al. Functional bowel disorders. Gastroenterology 2006; 130:1480.
8. Mearin F, Lacy BE, Chang L, et al. Bowel Disorders. Gastroenterology 2016.
9. Blake MR, Raker JM, Whelan K. Validity and reliability of the Bristol Stool Form Scale in healthy adults and patients with diarrhoea-predominant irritable bowel syndrome. Aliment Pharmacol Ther 2016; 44:693.
10. Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. Am J Gastroenterol 2011; 106:1582.
11. Higgins PD, Johanson JF. Epidemiology of constipation in North America: a systematic review. Am J Gastroenterol 2004; 99:750.
12. Sandler RS, Jordan MC, Shelton BJ. Demographic and dietary determinants of constipation in the US population. Am J Public Health 1990; 80:185.
13. Sonnenberg A, Koch TR. Physician visits in the United States for constipation: 1958 to 1986. Dig Dis Sci 1989; 34:606.

14. 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.
15. Talley NJ, O'Keefe EA, Zinsmeister AR, Melton LJ 3rd. Prevalence of gastrointestinal symptoms in the elderly: a population-based study. Gastroenterology 1992; 102:895.
16. 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.
17. Müller-Lissner SA, Kamm MA, Scarpignato C, Wald A. Myths and misconceptions about chronic constipation. Am J Gastroenterol 2005; 100:232.
18. Wald A. Approach to the patient with constipation. In: Textbook of Gastroenterology, 2nd e d, Yamada T (Ed), JB Lippincott, Philadelphia, PA 1995. p.864.
19. Hinds JP, Wald A. Colonic and anorectal dysfunction associated with multiple sclerosis. Am J Gastroenterol 1989; 84:587.
20. Glick ME, Meshkinpour H, Haldeman S, et al. Colonic dysfunction in multiple sclerosis. Gastroenterology 1982; 83:1002.
21. Edery P, Lyonnet S, Mulligan LM, et al. Mutations of the RET proto-oncogene in Hirschsprung's disease. Nature 1994; 367:378.
22. Puffenberger EG, Hosoda K, Washington SS, et al. A missense mutation of the endothelin-B receptor gene in multigenic Hirschsprung's disease. Cell 1994; 79:1257.
23. Nyam DC, Pemberton JH, Ilstrup DM, Rath DM. Long-term results of surgery for chronic constipation. Dis Colon Rectum 1997; 40:273.
24. Wald A, Hinds JP, Caruana BJ. Psychological and physiological characteristics of patients with severe idiopathic constipation. Gastroenterology 1989; 97:932.
25. Ashraf W, Park F, Lof J, Quigley EM. An examination of the reliability of reported stool frequency in the diagnosis of idiopathic constipation. Am J Gastroenterol 1996; 91:26.
26. Waldron D, Bowes KL, Kingma YJ, Cote KR. Colonic and anorectal motility in young women with severe idiopathic constipation. Gastroenterology 1988; 95:1388.
27. Preston DM, Lennard-Jones JE. Pelvic motility and response to intraluminal bisacodyl in slow-transit constipation. Dig Dis Sci 1985; 30:289.
28. Bassotti G, Chiarioni G, Imbimbo BP, et al. Impaired colonic motor response to cholinergic stimulation in patients with severe chronic idiopathic (slow transit type) constipation. Dig Dis Sci 1993; 38:1040.
29. He CL, Burgart L, Wang L, et al. Decreased interstitial cell of cajal volume in patients with slow-transit constipation. Gastroenterology 2000; 118:14.

30. Martelli H, Devroede G, Arhan P, Duguay C. Mechanisms of idiopathic constipation: outlet obstruction. Gastroenterology 1978; 75:623.
31. Read NW, Abouzekry L, Read MG, et al. Anorectal function in elderly patients with fecal impaction. Gastroenterology 1985; 89:959.
32. Gattuso JM, Kamm MA. Clinical features of idiopathic megarectum and idiopathic megacolon. Gut 1997; 41:93.
33. Preston DM, Lennard-Jones JE. Anismus in chronic constipation. Dig Dis Sci 1985; 30:413.
34. Rao SS, Welcher KD, Leistikow JS. Obstructive defecation: a failure of rectoanal coordination. Am J Gastroenterol 1998; 93:1042.
35. Voderholzer WA, Neuhaus DA, Klauser AG, et al. Paradoxical sphincter contraction is rarely indicative of anismus. Gut 1997; 41:258.
36. Bharucha AE, Wald A, Enck P, Rao S. Functional anorectal disorders. Gastroenterology 2006; 130:1510.
37. Preston DM, Lennard-Jones JE, Thomas BM. Towards a radiologic definition of idiopathic megacolon. Gastrointest Radiol 1985; 10:167.
38. Wald A, Caruana BJ, Freimanis MG, et al. Contributions of evacuation proctography and anorectal manometry to evaluation of adults with constipation and defecatory difficulty. Dig Dis Sci 1990; 35:481.
39. Read NW, Timms JM. Defecation and the pathophysiology of constipation. Clin Gastroenterol 1986; 15:937.
40. Rao SS, Ozturk R, Laine L. Clinical utility of diagnostic tests for constipation in adults: a systematic review. Am J Gastroenterol 2005; 100:1605.
41. Barnett JL, Hasler WL, Camilleri M. American Gastroenterological Association medical position statement on anorectal testing techniques. American Gastroenterological Association. Gastroenterology 1999; 116:732.
42. Tantiphlachiva K, Rao P, Attaluri A, Rao SS. Digital rectal examination is a useful tool for identifying patients with dyssynergia. Clin Gastroenterol Hepatol 2010; 8:955.
43. Nullens S, Nelsen T, Camilleri M, et al. Regional colon transit in patients with dys-synergic defaecation or slow transit in patients with constipation. Gut 2012; 61:1132.
44. Metcalf AM, Phillips SF, Zinsmeister AR, et al. Simplified assessment of segmental colonic transit. Gastroenterology 1987; 92:40.
45. Grotz RL, Pemberton JH, Talley NJ, et al. Discriminant value of psychological distress, symptom profiles, and segmental colonic dysfunction in outpatients with severe idiopathic

constipation. Gut 1994; 35:798.

46. Diamant NE, Kamm MA, Wald A, Whitehead WE. AGA technical review on anorectal testing techniques. Gastroenterology 1999; 116:735.
47. Agency for Healthcare Research and Quality (AHRQ). Wireless motility capsule versus other diagnostic technologies for evaluating gastroparesis and constipation: A comparative effectiveness review (No. 110). Available at: http://effectivehealthcare.ahrq.gov/ehc/products/392/1498/Constipation-gastroparesis-wireless-capsule-report-130520.pdf (Accessed on June 07, 2013).
48. Camilleri M, Thorne NK, Ringel Y, et al. Wireless pH-motility capsule for colonic transit: prospective comparison with radiopaque markers in chronic constipation. Neurogastroenterol Motil 2010; 22:874.
49. Rao SS, Kuo B, McCallum RW, et al. Investigation of colonic and whole-gut transit with wireless motility capsule and radiopaque markers in constipation. Clin Gastroenterol Hepatol 2009; 7:537.
50. Whitehead W, Wald A, Diamant N, et al. Functional disorders of the anus and rectum. Gut 1999; 45:55.
51. Wald A. Severe constipation. Clin Gastroenterol Hepatol 2005; 3:432.
52. Rao SS. Dyssynergic defecation and biofeedback therapy. Gastroenterol Clin North Am 2008; 37:569.
53. Bharucha AE, Fletcher JG. Recent advances in assessing anorectal structure and functions. Gastroenterology 2007; 133:1069.
54. Jones MP, Post J, Crowell MD. High-resolution manometry in the evaluation of anorectal disorders: a simultaneous comparison with water-perfused manometry. Am J Gastroenterol 2007; 102:850.
55. Basilisco G, Bharucha AE. High-resolution anorectal manometry: An expensive hobby or worth every penny? Neurogastroenterol Motil 2017; 29.
56. Rao SS, Singh S. Clinical utility of colonic and anorectal manometry in chronic constipation. J Clin Gastroenterol 2010; 44:597.
57. Minguez M, Herreros B, Sanchiz V, et al. Predictive value of the balloon expulsion test for excluding the diagnosis of pelvic floor dyssynergia in constipation. Gastroenterology 2004; 126:57.
58. Chiarioni G, Kim SM, Vantini I, Whitehead WE. Validation of the balloon evacuation test: reproducibility and agreement with findings from anorectal manometry and electromyography. Clin Gastroenterol Hepatol 2014; 12:2049.

59. Jahng J, Jung IS, Choi EJ, et al. The effects of methane and hydrogen gases produced by enteric bacteria on ileal motility and colonic transit time. Neurogastroenterol Motil 2012; 24:185.

60. Pimentel M, Saad RJ, Long MD, Rao SSC. ACG Clinical Guideline: Small Intestinal Bacterial Overgrowth. Am J Gastroenterol 2020; 115:165.

Topic 2637 Version 28.0

GRAPHICS

Causes of chronic constipation

Neurogenic disorders
Peripheral
Diabetes mellitus
Autonomic neuropathy
Hirschsprung disease
Chagas disease
Intestinal pseudoobstruction
Central
Multiple sclerosis
Spinal cord injury
Parkinson disease
Irritable bowel syndrome
Drugs
See separate table

Non-neurogenic disorders
Hypothyroidism
Hypokalemia
Anorexia nervosa
Pregnancy
Panhypopituitarism
Systemic sclerosis
Myotonic dystrophy
Idiopathic constipation
Normal colonic transit
Slow transit constipation
Dyssynergic defecation

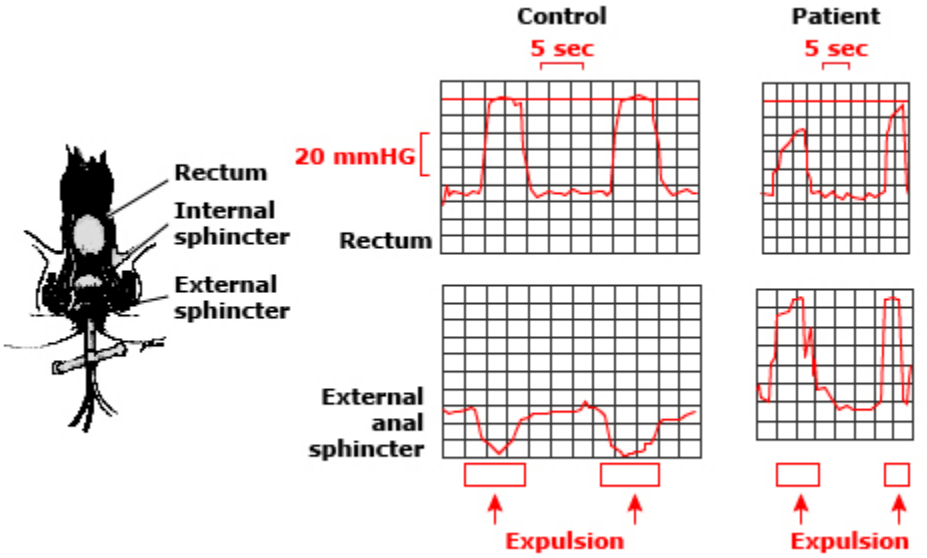
Graphic 70425 Version 1.0

Drugs associated with constipation

Analgesics
Anticholinergics
Antihistamines
Antispasmodics
Antidepressants
Antipsychotics
Cation-containing agents
Iron supplements
Aluminum (antacids, sucralfate)
Barium
Neurally active agents
Opiates
Antihypertensives
Ganglionic blockers
Vinca alkaloids
Calcium channel blockers
5HT3 antagonists

Graphic 62307 Version 2.0

Dyssynergic defecation

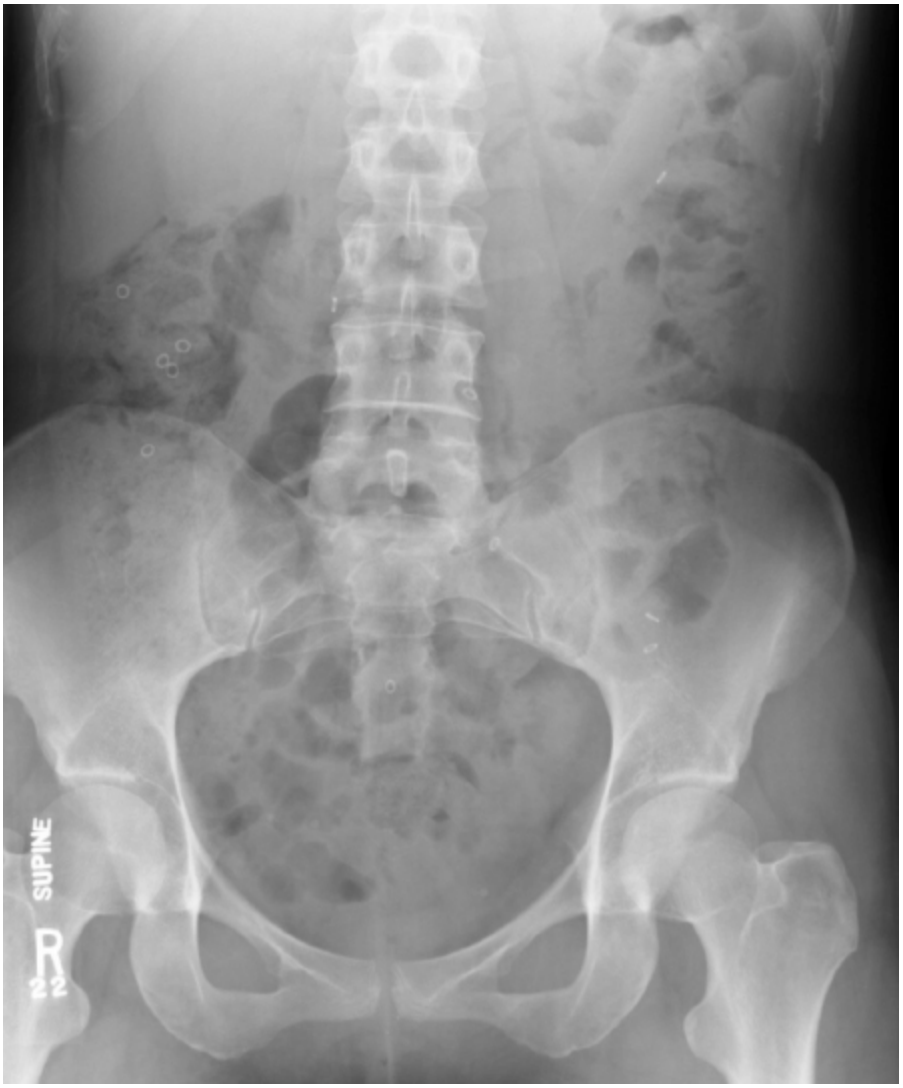


Defecation normally involves the coordinated relaxation of the puborectalis and external anal sphincter muscles as pressure is building in the rectum (control panel, left). However, in patients with dyssynergic defecation (patient panel, right), ineffective defecation is associated with a failure to relax, or inappropriate contraction of, the puborectalis and external anal sphincter muscles as pressure increases in the rectum.

Adapted from: Preston DM, Lennard-Jones JE, Dig Dis Sci 1985; 30:413.

Graphic 54087 Version 3.0

Radiopaque marker study

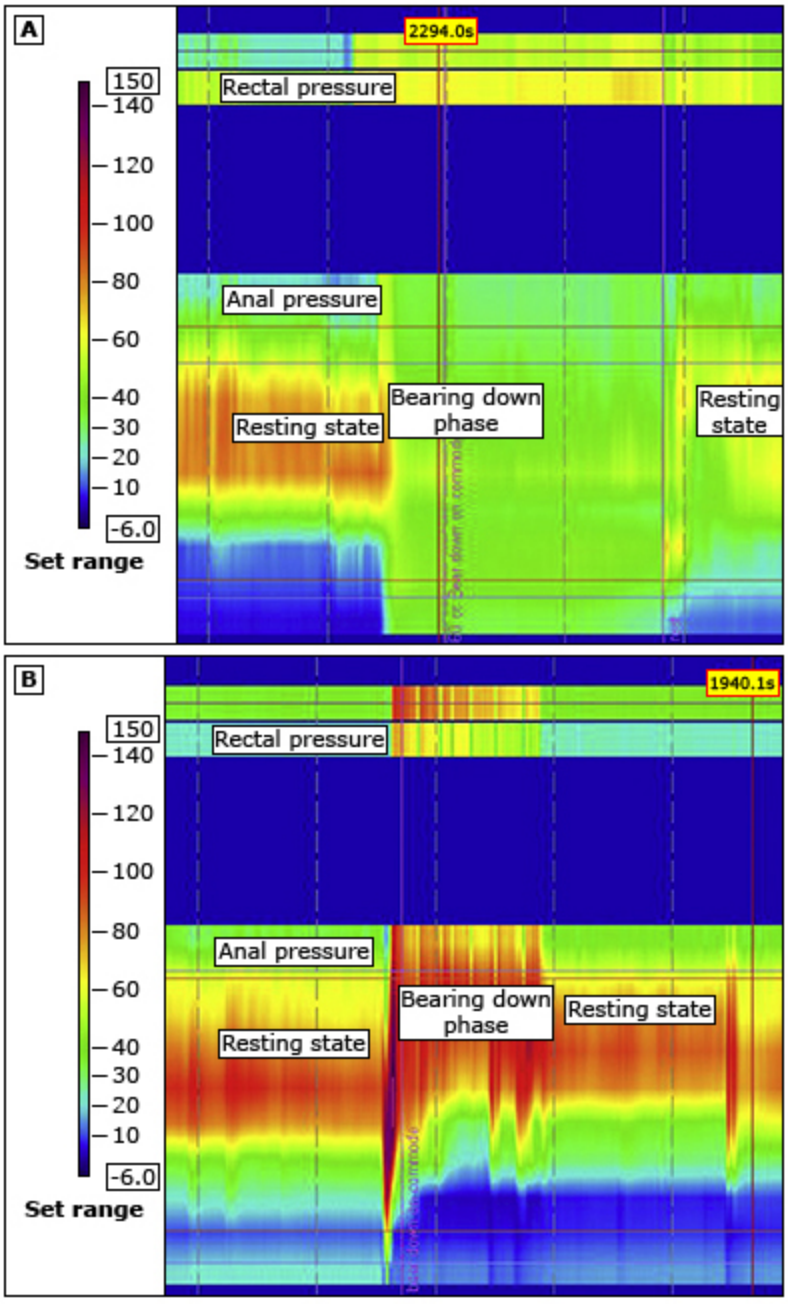


Radiopaque marker transit study showing >5 radiopaque markers on x-ray taken on day 6, indicating slow transit.

Courtesy of Satish S Rao, MD, PhD, FRCP, and Narasimha M Palagummi, MD.

Graphic 68354 Version 1.0

High resolution manometry images showing patterns of defecation

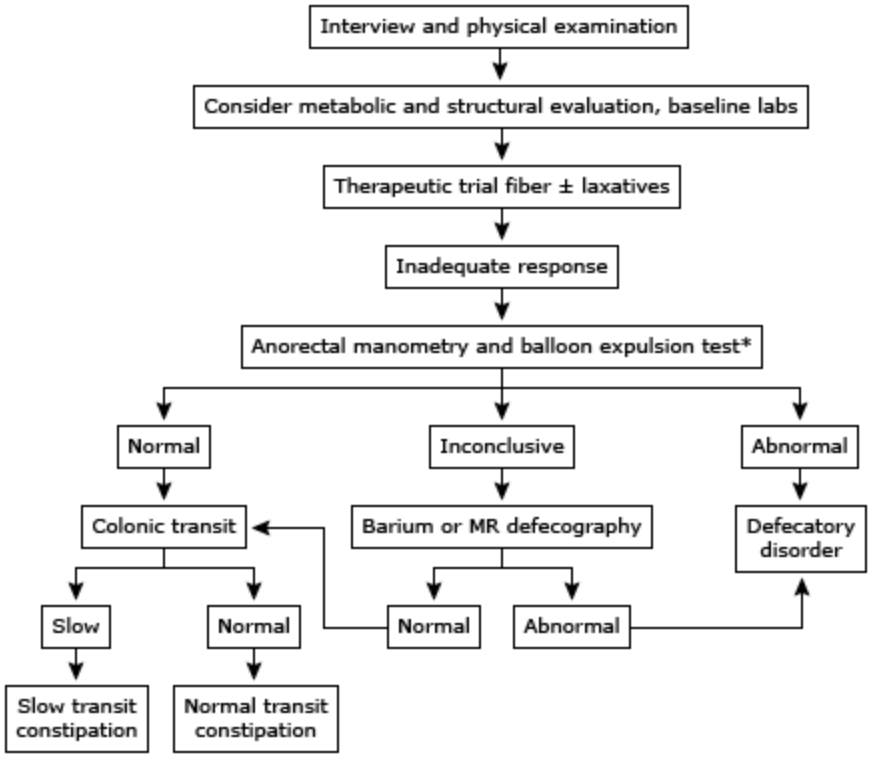


High resolution manometry images showing (A) normal pattern of defecation in a healthy subject and (B) an incoordinated or dyssynergic pattern of defecation in a subject with constipation and dyssynergic defecation. In the normal subject the anal pressure decreases (Green color: Pressure = 20 mmHg), whereas in the dyssynergic subject there is paradoxical increase in anal sphincter pressure (Red color: Pressure = 100 mmHg). The rectal pressure increases in both subjects.

Reproduced from: Rao SSC, Meduri K. What is necessary to diagnose constipation? Best Pract Res Clin Gastroenterol 2011; 25:127. Illustration used with the permission of Elsevier Inc. All rights reserved.

Graphic 64486 Version 1.0

Evaluation algorithm for chronic constipation



MR: magnetic resonance.

* Because anorectal manometry, rectal balloon expulsion test may not be available in all practice settings, it is acceptable in such circumstances to proceed to assessing colonic transit with the understanding that delayed colonic transit does not exclude a defecatory disorder.

Graphic 88130 Version 1.0

Contributor Disclosures

Arnold Wald, MD No relevant financial relationship(s) with ineligible companies to disclose. **Nicholas J Talley, MD, PhD** Patent Holder: Australian Provisional Patent [Diagnostic marker for functional gastrointestinal disorders]; Biomarkers of irritable bowel syndrome [Irritable bowel syndrome]; Mayo Clinic [Dysphagia questionnaire]; Mayo Clinic [Bowel Disease questionnaire]; Nepean Dyspepsia Index [Dyspepsia]; Nestec [Irritable bowel syndrome]; Singapore Provisional Patent [BDNF Tissue Repair Pathway]. Grant/Research/Clinical Trial Support: Alimetry [Gastric mapping device research collaboration]; Allakos [Gastric eosinophilic disease]; AstraZeneca [Eosinophilic gastritis, eosinophilic gastroenteritis]; Intrinsic Medicine [Bowel syndrome with constipation]; NHMRC Centre for Research Excellence in Digestive Health [NHMRC Investigator grant]. Consultant/Advisory Boards: Adelphi Values [Functional dyspepsia]; Allakos [Gastric eosinophilic disease, AK002]; AstraZeneca [Eosinophilic gastritis, eosinophilic gastroenteritis]; AusEE [Eosinophilic gut diseases]; Bayer [Inflammatory bowel syndrome]; BluMaiden [Microbiome Ad Board]; Comvita Mānuka Honey [Digestive health]; Dr Falk Pharma [Eosinophilia]; GlaxoSmithKline Australia [Educational speaker eosinophilic gut disease]; Glutagen [Celiac disease]; International Foundation for Functional Gastrointestinal Disorders [Advisory board, functional GI disorders]; Intrinsic Medicine [Human milk oligosaccharide]; IsoThrive [Esophageal microbiome]; Planet Innovation [Gas capsule, inflammatory bowel syndrome]; Progenity Inc [Intestinal capsule]; Rose Pharma [IBS]; Viscera Labs [Inflammatory bowel syndrome, diarrhea]. Other Financial Interest: Elsevier textbook royalties [Medical education]. All of the relevant financial relationships listed have been mitigated. **Shilpa Grover, MD, MPH, AGAF** No relevant financial relationship(s) with ineligible companies to disclose.

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

Conflict of interest policy

→