Constipation and Obstructed Defecation

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ABSTRACT

Difficulties with bowel function are common and may be due to several causes including slow colonic transit and obstructed defecation. The anatomical and pathophysiological changes associated with these conditions are varying, often incompletely understood, and in many cases have limited treatment outcomes. Patients present with variable complaints and have previously tried a plethora of over-the-counter medications in an effort to relieve their symptoms. Physicians need an organized approach to manage these patients optimally. Improvements over the past few years in our understanding of the complex process of defecation, along with the increasing use of radiological and anorectal physiology studies, have led to improved treatment results.

KEYWORDS: Constipation, obstructive defecation, rectal prolapse, rectocele

Objectives: On completion of this article, the reader should be able to discuss constipation and obstructive defecation.

Difficulties with bowel function are common and may be due to several causes. Constipation may involve problems with colonic transit or defecation. Defecation is the normal process of evacuating stool from the rectum. It involves a complex interaction of normal motility of the gastrointestinal tract, contractile function of the rectum, coordination of the pelvic floor musculature, and relaxation of the anal sphincter mechanism.

Obstructed defecation is sometimes troublesome for the patient, and it can be difficult to manage even for the most experienced of clinicians. The anatomical and pathophysiological changes that occur with obstructive defecation are varying, often incompletely understood, and in many cases without ideal outcomes. Patients usually present with a general complaint of constipation and have previously tried a plethora of over-the-counter medications in an effort to relieve their symptoms. Patients frequently resort to laxatives, suppositories, or enemas in an effort to relieve symptoms but sometimes with only limited improvement.

Physicians need to have an organized approach to manage these patients optimally. Improvements over the past few years in our understanding of the complex process of constipation and defecation, along with the increasing use of radiological and anorectal physiology studies, have led to improved treatment results.

CONSTIPATION

Accounting for more than 2 million clinic visits per year alone, constipation is one of the most common problems seen by both primary care physicians and colorectal surgeons.¹ Although often described as a separate pathological condition, constipation can be a symptom of other disease processes, medications, or inadequate dietary habits.² However, constipation sometimes has no identifiable cause and is then termed idiopathic or functional.

In broad terms, constipation can be classified as either normal-transit constipation (often coexisting with irritable bowel syndrome), obstructed defecation, or

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slow-transit constipation. Each of these conditions can occur in isolation, or they can coexist. It is often difficult to predict which patients have isolated or concomitant pathologies. For example, patients with anismus have been shown to have rates of constipation equivalent to those of patients without anismus, although the former may have increased awareness of their constipation symptoms.³

In normal-transit constipation, the coordination of the enteric neurons and gastrointestinal muscle is normal and stool moves through the small and large intestine without a problem. However, bowel movements come out hard and pellet-like and are often difficult to evacuate. Patients often complain of bloating and abdominal pain and may occasionally have concomitant constipation and diarrhea.

Obstructed defecation occurs in ~7% of adults,⁴ although isolated defecatory dysfunction is thought to be present in only 25% of patients with chronic constipation.⁵ Obstructed defecation is frequently associated with anatomical abnormalities, such as rectocele, internal rectal prolapse, and solitary rectal ulcer. Patients may have an inability to coordinate the bowel movement with pelvic floor muscles to produce a normal defecation. The abnormal coordination results in inadequate relaxation or paradoxical contraction of the pelvic floor muscles at attempted rectal emptying. In the normal state, the anorectal angle is maintained by the tonic contraction of the puborectalis muscle and the anal sphincter is closed. At defecation, the puborectalis muscle normally relaxes, straightening out the anorectal angle, and, along with relaxation of the anal sphincter, facilitates defecation. Failure of any of these components may result in difficulties in properly evacuating stool. The patient has in essence a functional outlet obstruction and experiences a need for excessive straining to have bowel movements and a sensation of partial or incomplete evacuation.

In slow-transit constipation, decreased motility in the gastrointestinal tract results in less frequent mass movements. Normal colonic motility is characterized by both segmental and higher amplitude contractions, propelling contents forward and at the same time facilitating water and nutrient absorption. Pacemaker cells, the interstitial cells of Cajal, regulate this process within the colon. Slow-transit constipation has been suggested to result from either a lower number of intestinal pacemaker cells or enteric neurons,⁶ but this has been debated.⁷ Patients have a lack of urge to defecate and may go days or even weeks between bowel movements, sometimes despite use of multiple laxatives.

In May 2006, the Rome Coordinating Committee released the updated Rome III criteria for constipation.⁸ According to this report, symptoms need to be present 3 or more days per month for the last 3 months of constipation for at least 6 months prior to the

diagnosis. Constipation may be defined by difficult evacuation or infrequent bowel movements, or both. Difficult evacuation is defined by two or more of the following symptoms at least 25% of the time: straining, lumpy or hard stools, sensation of incomplete evacuation, sensation of anorectal obstruction or blockage, and manual maneuvers to promote defecation. Infrequent bowel movements are defined as three or less defecations per week. In addition, patients may have loose stools that are rarely present without the use of laxatives and cannot meet the criteria for irritable bowel syndrome.

EVALUATION OF CONSTIPATION

A detailed history is essential when managing patients with constipation. Patients frequently present with a history of abdominal discomfort associated with altered bowel habits. Patients may note that the stool consistency is hard, small, and pellet-like. Many patients also strain to initiate or complete defecation, experience incomplete evacuation, or require digital maneuvers to aid with defecation.

A detailed medical history to include both prescription and over-the-counter medication can often identify common causes of constipation. Patients should be queried about diet and intake of fluids and fibers. Laboratory evaluation should include thyroid function test, chemistry panel, calcium, and blood glucose to evaluate for associated diseases such as diabetes, hypothyroidism, and metabolic deficiencies.

Most patients should undergo a colonoscopy to rule out an associated malignancy. Digital rectal examination can detect the presence of attenuated sphincter tone and masses as well as assess for rectoceles or pelvic floor prolapse. The patient should be asked to tighten the anal sphincter as well as “bear down” as a simulation of defecation to assess proper contraction and relaxation of the pelvic floor muscles. The perineum is assessed for increased perineal descent or bulge indicative of pelvic floor laxity that is often seen with increasing age, multiparity, or prior pelvic floor surgery.

The dynamics of rectal evacuation can be studied with defecography. At this examination the rectum is filled with contrast material. Use of vaginal contrast enhances the possibility to visualize some abnormalities such as enterocele and rectocele. A contrast medium gel or a tampon soaked with contrast medium is used. The use of a gel is preferable, as a tampon might obscure important diagnostic information. Use of intraperitoneal contrast can enhance visualization of some findings.⁹ There are no standard definitions of radiographic findings at defecography, but the following possible findings can be studied at the examination: abnormal rectal emptying, nonrelaxing pelvic floor, internal rectal prolapse, external rectal prolapse, enterocele, and rectocele.^{10,11}

Patients with outlet obstruction usually also undergo anorectal manometry to complete the work-up. Anorectal manometry is used as an adjunct to test for the rectoanal inhibitory reflex. This is present in idiopathic constipation and, when absent, may be consistent with short-segment Hirschsprung's disease and may require an examination under anesthesia with biopsies.¹² Furthermore, anorectal manometry can be used to measure resting and squeeze pressures, determine the high-pressure zone, and is useful to rule out hypertonia and anismus.

Electromyography (EMG) can also be used to document nonrelaxing or paradoxical puborectalis contraction. The striated muscles in the external anal sphincter are continuously active at rest, and the activity normally increases during voluntary contraction and decreases during straining.¹³ The EMG activity in the external anal sphincter is different from that in other muscles, as there is continuous and spontaneous EMG activity even at rest.¹⁴ Because of discomfort when using needle or wire EMG, several centers prefer to use surface electrodes, either with surface electrodes placed on the perianal skin adjacent to the anal verge¹⁵ or with an anal plug that is placed in the anal canal.¹⁶ EMG is the most used method to identify patients with inappropriate puborectalis contraction, which is registered as a failure to relax the puborectalis muscle at attempted defecation and maintained or increased activity is registered at EMG.

A nonrelaxing or paradoxical puborectalis contraction can also be diagnosed clinically with digital rectal examination, at defecography, or with a balloon expulsion test. On defecography, this is demonstrated by a persistent acute anorectal angle (lack of straightening) and indentation of the puborectalis on the rectal lumen in addition to failure to empty the contrast material. The balloon expulsion test is a simple office procedure that can quickly estimate overall pelvic floor function. In a study of 130 patients, those with pelvic floor dysfunction had a pathologic balloon expulsion test in 21 of 24 versus only 12 of 106 patients without dysfunction.¹⁷

A transit study may objectively document gastrointestinal motility. The most used transit study is quite simple. The patient is asked to stop all laxatives and stimulants prior to the test. The patient is then asked to ingest radiopaque markers, usually 24 plastic rings in a capsule. Radiographs are taken on postingestion days 1 and 5. The day 1 film demonstrates the presence of markers and the transit analysis is made on the day 5 film. Both the number of retained markers and the distribution are useful in the analysis. The presence of more than 20% of the markers on day 5 is consistent with a positive test. Slow-transit patients typically have an even distribution of markers throughout the colon. In obstructed defecation, transit studies may be normal or

an increased amount of markers may be retained, usually in distal colon or rectum.

NONSURGICAL MANAGEMENT OF CONSTIPATION

Initial medical management for all patients with constipation includes ensuring adequate fluid and fiber intake. Current recommendations include adding a fiber supplement to total 25 to 30 g per day and water or fluid intake to 1 to 2 L per day. Other saline and stimulant laxatives, such as senna and polyethylene glycol solutions, are frequently used with some improvement in symptoms. The effect may deteriorate with time, possibly through damage to the myenteric plexus, and long-term usage is controversial.¹⁸

In patients with normal-transit or mild slow-transit constipation, simple dietary modification is often sufficient to normalize bowel habits. Patients should be counseled that this is probably a lifelong requirement and that they may need to take an occasional laxative or enema. Most patients can be effectively managed with this regimen. Finally, the clinician should treat any identified metabolic deficiencies such as hypokalemia, hypomagnesemia, or hypocalcemia and control blood sugar when abnormal.

Patients with nonrelaxing or paradoxical puborectalis have an inability to relax the pelvic floor appropriately at straining or Valsalva. Pelvic floor exercises and biofeedback have become an integral part of the treatment of these patients. Patients are taught how to relax their pelvic floor through a series of Kegel-type exercises, using perianal or transanal EMG, ultrasonography, or manometric monitoring. Although there is some debate in the literature about the degree of effectiveness of biofeedback, almost all agree that it has minimal risk and biofeedback is associated with higher rates of success with completion of therapy. Success rates in the literature range between 30 and 90%.^{19,20} Park and colleagues²¹ found that paradoxical contraction on manometry and a poor pretreatment defecation index were associated with a poor response to therapy. The duration of a successful response is also debated. Chiarioni and colleagues²² reported a lasting benefit out to at least 2 years following five weekly biofeedback sessions.

For patients who do not respond to biofeedback, other second-line methods of therapy include tegaserod,²³ electrogalvanic stimulation,²⁴ and antegrade enemas.^{25,26}

SURGICAL TREATMENT OF CONSTIPATION

Surgical treatment of constipation is considered only after nonsurgical options have failed and following a

thorough work-up. Patients with slow-transit constipation documented by sitz marker studies and failure to improve with dietary and medical means may be considered candidates for a subtotal colectomy with ileorectal anastomosis. It is important to exclude concomitant pelvic floor dysfunction in these patients, as failure to address that component may lead to persisting symptoms.

In patients with slow-transit constipation, subtotal colectomy can lead to improved symptoms in over 90% of carefully selected patients.²⁷ In addition to resolution of the abdominal pain and constipation, patients may regain their sensation and urge to defecate.²⁸ There has also been anecdotal success with combined subtotal colectomy with rectopexy for patients with slow-transit constipation combined with outlet obstruction secondary to rectal prolapse.²⁹

Approximately one third of patients experience complications following subtotal colectomy, including small bowel obstruction; persisting abdominal pain, frequent bowel movements, and sometimes even fecal incontinence. In a study of 50 patients, with a mean follow-up of 106 months, Pikarsky and associates³⁰ found fecal incontinence symptoms in 6% of patients after subtotal colectomy for constipation. It should be noted that a small percentage of patients have persistent or recurring constipation after subtotal colectomy. This may be associated with a generalized gastrointestinal dysmotility syndrome or concomitant pelvic floor dysfunction. Although colchicine,³¹ biofeedback,³² and ileostomy³³ have all been reported as successful therapies for this problem, patients should be counseled preoperatively about this unwelcome outcome.

RECTOCELE REPAIR

Rectoceles exist when the endopelvic fascial support in the rectovaginal septum breaks down, resulting in a bulge of the anterior rectal wall into the posterior vagina. Patients present classically with difficulty with evacuation and a posterior vaginal bulge and often give a history of requiring manual pressure on the posterior vaginal wall to aid in evacuation. Rectoceles are a common finding on physical examination and defecography.^{34,35} The majority are small, less than 1 cm in size, and normally not a source of symptoms.^{36,37} However, rectoceles larger than 2 cm can be a significant source of outlet obstruction.^{34,38}

Initial treatment for rectoceles, like that for all sources of obstructed defecation, includes addition of bulk to the diet with fiber supplementation along with occasional use of enemas or suppositories. When these fail, surgical therapy of the rectocele can be performed by a transvaginal, transperineal, or transanal approach. The goal of all these approaches is to repair and support the

rectovaginal septum. Traditionally, gynecologists usually have preferred the transvaginal approach and colorectal surgeons have used transanal or transperineal approaches.

Traditional transvaginal repair, posterior colporrhaphy, includes plication of the levator muscles in the midline and redundant vaginal wall resection. After this procedure, symptomatic relief is often quite satisfactory and improvement in defecation symptoms has been reported in up to 90% of patients.^{34,39,40} Posterior colporrhaphy achieves a stable and durable repair, but high rates of dyspareunia have been reported.³⁴

To reduce the risk for dyspareunia, some authors advocate repair of discrete fascial defects in the rectovaginal septum instead of plicating the levator muscles in the midline.^{41,42} Defects in the rectovaginal fascia cause rectoceles, and the repair is concentrated to repair these defects. Discrete fascia repair is probably associated with a higher recurrence rate.⁴¹

Instead of incising the posterior vaginal wall, access to the rectovaginal septum may be obtained with a transverse incision in the perineum and dissection in the plane between the external anal sphincter and vaginal epithelium.

Mesh can be used to reduce the risk of recurrence and postoperative dyspareunia. Both transvaginal and transperineal techniques can be used, and both absorbable mesh and nonabsorbable mesh have been used. Use of mesh carries a risk for mesh erosion and infectious complication. No mesh materials have been reported to have a lower risk for mesh complications. Use of biological mesh is associated with a low risk for complications, but its durability still needs to be established.⁴³

The transanal approach is preferred by many colorectal surgeons, as they are experienced operating in this area. The procedure is straightforward, but the access to high rectoceles may be limited with this approach. Patients are usually operated in the prone jackknife position. Reported symptomatic outcomes are in general quite good, with an improvement in symptoms between 30 and 100% in different series.⁴⁴⁻⁴⁶

Endorectal stapling techniques have also been described with both linear⁴⁷ and circular stapling⁴⁸ techniques, although with small case series and limited follow-up. Laparoscopy has also been used for repair of rectoceles, although in general with poor outcomes. In a study comparing 40 patients undergoing laparoscopic pelvic floor repair case-matched with 40 patients undergoing transanal repair, patients undergoing transanal repair had higher rates of alleviation of bowel symptoms (63% versus 28%) and higher satisfaction.⁴⁹ Stapled transanal rectal resection (STARR) is a new transanal stapling technique for the treatment of patients with obstructed defecation, including patients with rectoceles, and this new technique has shown early promising results in a limited number of studies (see later).^{50,51}

To maximize the chance of a successful outcome, regardless of the technique, the surgeon must be selective in accepting patients.^{40,52-54} Preoperative symptoms of a vaginal bulge and need to support the posterior vaginal wall digitally at defecation may be predictors of success, independent of constipation or anorectal function.⁵⁵ Still, with longer follow-up, recurrence rates remain widely variable at 0 to 50%.⁵⁶⁻⁵⁸

TREATMENT OF INTERNAL RECTAL PROLAPSE

Internal rectal prolapse, referred to as hidden or occult intussusception, occurs when the rectum telescopes on itself during rectal evacuation. The extent of prolapse ranges from a small mucosal prolapse to full-thickness external rectal prolapse; however, an internal rectal prolapse contains the full thickness of the rectal wall and the intussusception does not extend beyond the anal verge. Internal rectal prolapse can be demonstrated in up to 40% of asymptomatic women undergoing defecography.⁵⁹

Internal rectal prolapse may have a myriad of symptoms and range from being an asymptomatic incidental finding on defecography to playing a role in problems with evacuation. Most commonly, patients present with symptoms of obstructed defecation, lower abdominal pain, and sometimes rectal bleeding. Physical examination is in general normal, although a small percentage of patients have decreased anal sphincter tone. Concomitant pelvic floor pathology such as enteroceles or rectoceles can also be present in up to 50%.⁶⁰ Work-up should include anorectal physiology studies and endoscopy. Flexible sigmoidoscopy may be completely normal or demonstrate inflammation or ulceration. Ulcers should be biopsied to rule out malignancy and to diagnose possible solitary rectal ulcer syndrome (SRUS). The latter is diagnosed as colitis cystica profunda at pathological examination, with normal glands deep to the muscularis mucosa.⁶¹

Defecography is invaluable in the diagnosis of internal rectal prolapse and may identify concomitant pathology such as non-relaxing puborectalis, increased perineal descent, rectocele, enterocele, or sigmoidocele.⁶² Although not always indicated, anorectal manometry studies have demonstrated that patients with internal prolapse have higher resting and squeeze pressures and higher rates of nonrelaxing puborectalis syndrome than normal patients or those with overt rectal prolapse (15% versus 9%).⁶³

The proper treatment for hidden prolapse continues to be a matter of debate. The risk for internal rectal prolapse to progress to external prolapse is low.⁶⁴ All patients should be initially be treated medically with emphasis on proper bowel habits, avoidance of straining, and the addition of a stool-bulking agent.

Occasionally enemas or suppositories may be useful as a second-line agent. Biofeedback has been shown to be helpful in patients with internal prolapse and pelvic floor dysfunction or SRUS in a small study.⁶⁵ Similarly, Rao and colleagues found biofeedback to improve evacuation symptoms, stop bleeding, and allow discontinuation of digitalization during bowel movements in another small group of 11 patients with internal rectal prolapse and SRUS.⁶⁶ Hwang and colleagues found that long-standing constipation (more than 9 years) was associated with a worse response rate to biofeedback (13% versus 78% success rate, $p < 0.05$).⁶⁷

Surgical treatment for internal rectal prolapse remains controversial.⁶⁸⁻⁷⁰ Some authors have advocated rectopexy for patients with both internal rectal prolapse and SRUS.⁷¹ Resection has been associated with improved radiological studies but no improvement in symptoms. In patients with SRUS and internal rectal prolapse, anterior or transrectal resection has been plagued by poor wound healing and high recurrence rates.⁷² Newer procedures such as STARR and the external pelvic rectal suspension procedure (Express procedure) have been reported to be less invasive and to be successful for patients with internal rectal prolapse.^{73,74}

The Express procedure involves a perineal curvilinear incision with rectal mobilization. Collagen t-shaped strips are then attached to the rectal wall, passed through the space of Retzius, and secured to pubic bone, similar to the tension-free vaginal tape sling for urinary incontinence. Williams and colleagues⁷⁴ have reported significant symptomatic improvement in 15 patients who underwent the Express procedure. However, follow-up was short at only 6 months, and two patients had to undergo reexploration secondary to sepsis. Thus, further data need to be accumulated to determine outcomes.

STARR is another new transanal stapling technique for the treatment of patients with obstructed defecation, including patients with internal rectal prolapse, and this new technique has shown early promising results in a limited number of studies.^{50,51}

STAPLED TRANSANAL RECTAL RESECTION

The STARR procedure is used in patients with obstructed defecation symptoms combined with a rectocele or an internal rectal prolapse. The STARR procedure uses two circular staplers to produce a circumferential transanal full-thickness resection of the lower rectum.^{50,51}

Six studies have looked at the short-term efficacy of the STARR procedure, with a follow-up ranging between 2 and 20 months.^{50,51,75-78} Boccasanta and

associates reported on 25 patients operated with the STARR procedure. All patients experienced an improvement in constipation symptoms at a mean follow-up of 24 months.⁵⁰ Defecograms of all 25 patients similarly showed correction of the prior rectocele or internal intussusception. Still, the issue of long-term durability and potentially increased postoperative complications remains.^{75,79} In a larger study of 90 patients, complications included urinary retention (6%), bleeding (4%), and pneumonia (1%).⁵¹ Urgency was still present in 16 patients (18%) at 1 month along with 9% incidence of incontinence to flatus and two cases (2%) of rectal stenosis. At 1 year, the urgency and incontinence to flatus had improved with only 1% experiencing symptoms of each, and one additional patient had developed rectal stenosis (3%). Rectovaginal fistula formation and other significant complications have been reported⁸⁰ as a complication of STARR and highlight the need for further evaluation of this technique's complication risks and long-term results.^{50,51,75,77,78}

SACRAL NERVE STIMULATION

Although it is primarily used for urinary and fecal incontinence, there are some data regarding the use of sacral nerve stimulation in the setting of constipation. Kenefick⁸¹ reported 75% symptomatic improvement with increased bowel movements in women at a follow-up of 8 months. Similar symptomatic improvement has been shown in several small case series, all of which reported increased evacuation frequency.^{82–85} Although short-term results look promising, long-term outcome data with increased numbers of patients in this setting are still needed prior to full evaluation.

SUMMARY

Obstructed defecation is a common medical condition with limited good surgical options. Initial management should include nonsurgical treatment including counseling about the need for lifelong dietary modification with increased fiber and fluid intake. Biofeedback is successful in some patients but necessitates a motivated patient to achieve satisfactory results. Surgery is sometimes indicated in patients with slow-transit constipation and large rectoceles and potentially internal intussusception. Promising newer therapies, such as the STARR procedure and sacral nerve stimulation, may offer improved treatment options in the future.

DISCLOSURE

Dr. Steele has no conflicts of interest to report. Dr. Mellgren is a consultant for American Medical Systems, Ethicon Endosurgery, and Q-Med.

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