To cite this article: Harmanci O. Primary chronic constipation and obstructed (dyssynergic) defecation. Guven Med Health Sci 2024; 1(2): 53-58.

Derleme/Review

Primary chronic constipation and obstructed (dyssynergic) defecation

Birincil kronik kabızlık ve tıkalı (dissinerjik) dışkılama

Ozgur Harmanci*

Department of Gastroenterology, Ankara Güven Hospital, Ankara, Turkey

Öz

Kabızlık, sosyo-ekonomik üretkenliği, yaşam kalitesini ve artan sağlık bakım masraflarını büyük ölçüde etkileyen kronik bir tıbbi durumdur. Kabızlığın tıbbi tedavisi, tıbbi bakım maliyetlerini azaltan ve tanıya ulaşan aşamalı bir yaklaşımla gerçekleştirilmelidir. Tanı yöntemlerinin seçimi ve uygulanması bir uzmana danışılmalıdır. Gastroenterologlar, rektoanal cerrahlar, fizyoterapistler ve jinekologlardan oluşan bir uzman ekip dissinerjik dışkılamayı teşhis etmeli ve yönetmelidir. Çoğu hastada aynı anda birden fazla patolojik durum bulunduğundan bunların bir sırayla ele alınması gerekir. Bu derleme dissinerjik dışkılamayı tanımlamayı, teşhis etmeyi ve yönetmeyi amaçlamaktadır.

Anahtar Kelimeler: kabızlık, dissinerjik defekasyon, pelvik taban bozuklukları, biofeedback tedavisi

Abstract

Constipation is a chronic medical condition that greatly impacts socio-economic productivity, quality of life, and increased healthcare costs. Medical management of constipation should be performed by a step-wise approach, reducing the costs of medical care and achieving a diagnosis. The choice and performance of the diagnostic modalities should be consulted by a specialist. A team of specialists should diagnose and manage the dyssynergic defecation, including gastroenterologists, rectoanal surgeons, physical therapists, and gynecologists. Since most patients have multiple pathologic conditions simultaneously, these should be handled in an order. This review aims to define, diagnose, and manage dyssynergic defecation.

Keywords: constipation, dyssynergic defecation, pelvic floor disorder, rectocele, biofeedback treatment

Corresponding author*: Ozgur Harmanci, Gastroenteroloji Bölümü, Ankara Güven Hastanesi, Ankara, Türkiye.
E-mail: ozgurharmanci@gmail.com
Orcid: 0000-0002-0643-4980
Recevied: 12.03.2024 accepted: 03.05.2024
Doi: 10.62351/gmhs.2024.009

Introduction

Constipation is a subjective symptom but cannot be defined only by rare toilet visits. Defecation can occur every seven to ten days without causing discomfort, pain, or bloating sensation. But thousands of people have a diagnosis of constipation even if they defecate daily because of other significant accompanying findings. In young adults, constipation is defined by excessive straining (52%), hard stools (44%), and inability to have a bowel movement (34%) (Sleisenger). In adults older than 60, straining and hard bowel movements were the most common symptoms in patients diagnosed with constipation. Due to its subjective nature, the Rome-4 consensus is a widely accepted and verified tool that has made it possible to define constipation objectively. It must include two or more of the following:

1. Straining during more than ¼ (25%) of defecations

2. Lumpy or hard stools (Bristol Stool Form Scale 1-2) of more than ¼ (25%) of defecations

3. Sensation of incomplete evacuation of more than ¼ (25%) of defecations

4. Sensation of anorectal obstruction/blockage of more than ¼ (25%) of defecations

5. Manual maneuvers to facilitate more than ¼ (25%) of defecations (e.g., digital evacuation, support of the pelvic floor)

6. Fewer than three spontaneous bowel movements per week

7. Loose stools are rarely present without the use of laxatives

8. Insufficient criteria for irritable bowel syndrome

Constipation is an underestimated clinical problem that affects nearly 15%-20% of the general population worldwide (1). Due to previous surgical operations, the underlying cause can be classified as primary or secondary depending on the presence or absence of secondary causes like tumors, stricture, or brids. Primary constipation without any secondary cause can present as a complex scenario related to multiple mechanisms that work together in a given patient (2). The complexity of this pathophysiology mandates a step-by-step approach to diagnosing each of the mechanisms involved. Otherwise, this chronic clinical condition may lead clinicians and patients down the wrong management pathway.

Social and Economic Burden of Constipation

Constipation causes 20% more expenses during outpatient diagnosis plus management and 2.5% more loss of productivity when combined with abdominal symptoms like bloating, pain, and discomfort (3). According to another report in 2004, constipation directly costs 1.6 billion USD, with an additional 140 million USD due to indirect expenses (4). Therefore, it is prudent to take cost-effective steps during the evaluation and management of chronic constipation patients.

Investigations for Primary Chronic Constipation

Defecation is the final stage of the digestive function, which requires a functioning colon with an intact and effectively functional anorectal defecation reflex that results in routine toilet visits. Therefore, constipation should be thoroughly evaluated by testing these two essential components of the defecation reflex mechanism together. Most of the cases have idiopathic constipation, but some patients have either obstructed (dyssynergic) defecation or both. Therefore, the crucial classification of the patients should be based on four essential tests: 1- Colon transit time, 2- Colonoscopy, 3- Anorectal manometry (ARM), and 4- MR Defecography (MRD).

Colon Transit Time

The colon transit time (CTT) is performed by getting serial abdominal x-rays at days 1, 3, and 5 after ingesting radiopaque markers contained in one self-dissolving medicine degree capsule on day zero. The patients on medication for constipation should be asked to stop taking medications a couple of days before the examination. Although most define normal CTT as fewer than 20% of the initial markers on the fifth day as standard, an alternative schedule can also be used. According to this, if a capsule is used with 20 markers, then the average number of markers should be on day 1: ≤16 rings, day 2: ≤8 rings day, ≤4 rings, day 4: ≤2 rings, and on day 5: ≤1 ring. Upon performing CTT, the patients are divided into two groups: slow vs normal transit constipation. Patients with slow transit constipation should be investigated further for underlying causes like hypothyroidism, complicated diabetes, neuromuscular disorders, drug use (anti-cholinergic), and others. Normal transit constipation patients should be investigated with colonoscopy to rule out causes like distal bowel obstructions and obstructed defecation.

Colonoscopy

The advantage of a direct visual examination combined with the ability to receive a biopsy upon requirement makes

colonoscopy a gold-standard technique for investigating constipation. Obstructing benign lesions, inflammatory bowel disease complicating with strictures, malignant tumors, complicated diverticulosis, and other lesions are easily diagnosed and managed accordingly. A routine colonoscopy also directs the physician to further tests to study the defecation reflex motor by MRD and ARM.

A colonoscopy is performed by cleansing the large bowel with oral colonoscopy preparation solutions and enemas if required. A low-residue diet (1 to 5 days, depending on the institution) is almost always necessary to increase the effectiveness of oral solution to achieve an acceptable degree of bowel cleansing. Since patients are chronically constipated, laxative supplementation during the diet phase is also helpful for optimum cleansing. The procedure should be performed under deep sedation utilizing sedative hypnotics like midazolam, fentanyl, and propofol alone or in combination. An anesthesiologist should continuously monitor the patient during the process.

MR-Defecography (MRD)

Anatomical evaluation of pelvic structures at rest and during dynamic defecation are the main advantages of MRD. For MRD preparation, the patient should fast for 8 hours, the bladder should be emptied before 2 hours of examination, and the bowel should be cleaned by enema before the examination. Resting images are obtained first when the patient is lying supine. After completion of this phase, the patient turns to a lateral decubitus position, and the rectum is filled with ultrasound gel via a large bore catheter installed inside the rectum. The instilled gel volume is usually around 120-250 ml or until the patient reports the first sensation of rectal fullness, but not to the level of urgency to defecate. Although not mandatory, mixing the gel with 1-2 ml of gadolinium-based contrast medium has been helpful and preferred by some institutions (5). At this gel-contrast phase, the patient is set to a supine position with the knees bent over with the help of a pillow underneath the knees. The obtained serial images evaluate four stages: 1-Rest, 2-Squeeze, 3-Strain (Valsalva), and 4-Defecation/Evacuation phase. The radiologist evaluates the pelvic structures, urinary bladder, uterus, endopelvic fascia, pubococcygeal line, anorectal angle, bladder-vaginal vault-uterus descent, and presence of any rectocele, rectal intussusception and the percent volume of post-defecation residual gel retention. The position of the patient during the defecation process is usually supine, and it is shown that there is no difference between sitting and supine positions during MRD (6). The normal limit of the defecation/evacuation phase is expulsion of at least 2/3 of rectal gel volume in at least 30 seconds.

Anorectal Manometry (ARM)

Primary constipation can be due to one or a combination of multiple etiologies. Anorectal manometry is a gold standard test to evaluate pelvic floor dysfunction, rectoanal inhibitory reflex, abdominal-rectal push pressure, anal canal pressurization patterns, and anorectal motor/sensory dysfunction.

In the ARM study of our gastroenterology unit, after cleansing the anorectal area with an enema, a high-resolution solid-state probe that contains 144 sensors arranged in a 12 channel-12 sensors/channel construction (ManoScan© HR-AM catheter, Medtronic Company) (Figure 1) is inserted into the rectum. After insertion, several steps are completed to complete ARM. These measurement steps include: Resting anal pressure (including sphincteric length and resting pressure), cough reflex test, squeeze pressure, squeeze duration, push, RAIR (rectoanal inhibitory reflex), rectal compliance, and rectal volume tolerability (first sensation, the urge to defecate and discomfort volume).

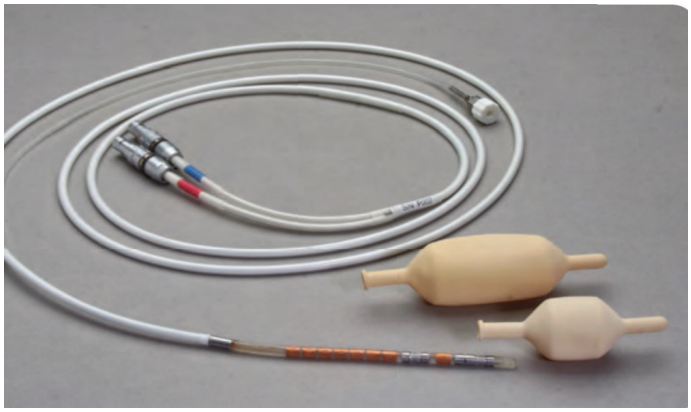

Figure 1. ManoScan HR-AM catheter©, Medtronic Company

Balloon Expulsion Test (BET)

This method tests the time required to expulse a balloon filled with 50 ml air or water. The test has some disadvantages. The balloon cannot fully imitate the patient's regular feces in terms of stool structure and elasticity. Also, there are no population-based gold-standard averages, so the results may differ in a given population. The normal BET is the ability to expulse the 50-ml balloon in 1-2 minutes. Another disadvantage is the presence of a rectocele and intussusception, which may directly affect balloon expulsion in favor of a longer BET time.

Therefore, BET remains a minor test and should always be assessed with other parameters.

Criteria of Obstructed (Dyssynergic) Defecation

A newly proposed criterion for diagnosis of Dyssynergic Defecation is as follows (7):

• Patients must satisfy the diagnostic criteria for functional constipation or constipation-predominant IBS.

• Patients must demonstrate a dyssynergic pattern during repeated attempts to defecate. A dyssynergic pattern of defecation (composed of subtypes I-IV) is defined as a paradoxical increase in anal sphincter pressure (anal contraction), or less than 20% relaxation of the resting anal sphincter pressure, or inadequate propulsive forces observed with manometry, imaging or electromyography recordings

• Patients must satisfy one or more of the following criteria:

• Inability to expel an artificial stool (50 mL water-filled balloon) within 1-2 minutes.

• Inability to evacuate or ≥ 50% retention of barium during defecography. Some laboratories use a prolonged colonic transit time, i.e., greater than five markers (≥ 20% marker retention) on plain abdominal radiography taken 120 hours after ingesting one radiopaque marker capsule containing 24 radiopaque markers.

The Causes of Dyssynergic Defecation

The lack of coordination between pelvic musculature, rectal compliance-contraction, anal sphincter relaxation, recto-anal inhibitory reflex, and abdominal muscle contraction can result in DD. Based on ARM findings, DD can be grouped into four subtypes (8) (Table 1).

Table 1. Subgroups of dyssynergic defecation based on ARM.

Subtype	Push force generated by abdominal vasculature and rectum.	Anal sphincter relaxation
Normal	Adequate (40 mmHg or more)	Present
Type-1	Adequate (40 mmHg or more)	Paradoxical increase
Type-2	Inadequate	Paradoxical increase
Type-3	Adequate (40 mmHg or more)	Absent or inadequate (less than 20% normal)
Type-4	Inadequate	Absent or inadequate (less than 20% normal)

• Type-1: Adequate abdominal pressure with rectal contraction is present, but due to paradoxical contraction in the anal canal, anal pressure overwhelms push force and inhibits defecation.
• Type-2: This is a variant of Type-1. However, the push force measured in the rectum is also lower than normal.
• Type-3: Enough push force is generated, but anal sphincter relaxation is either absent or lower than normal (less than <%20 of expected relaxation).
• Type-4: Lack of or ineffective anal relaxation is combined with lack of push force.

Balloon Distension, Rectal Sensation and Rectoanal Inhibitor Reflex

During ARM, a specific balloon is inserted and inflated gradually by 10 cc of air in short periods. The patient is asked to report the first sensation of fullness inside the rectum. Rectoanal inhibitory reflex is a physiological reflex that involves the relaxation of the anal canal by distention of the rectum. In normal subjects, it can be observed at 15 ml air inflation, but ARM requires gradual inflation up to 50 ml since personal variabilities occur. The third step is the measurement of urgency-maximum tolerance volume. To achieve this, the balloon should be inflated by 20 ml increments every thirty seconds up to 400 ml, recording the patient's response as the "first sensation of urgency" and "most bearable point" (maximum fullness or sensation to sudden defecation). Therefore, rectal sensory functions, as well as rectal compliance, are tested and recorded accordingly.

High-resolution ARM gives important results and physiological findings of pelvic floor anatomy, defecation dynamics, and anal pressurization. Since it is impossible to make a certain diagnosis in a given patient by only ARM, it is prudent to evaluate medical history and drug use, MRD findings, ARM, and other laboratory results to achieve a final diagnosis and decide the best management strategy.

Management by Biofeedback Treatment

The management of OD can involve pharmacologic and non-pharmacologic modalities. Pharmacologic modalities include prokinetic agents, laxatives, fiber supplements, and other medications. The pharmacological management can be found elsewhere in detail (4) and will not be discussed further in this manuscript.

Biofeedback treatment (BFT) and pelvic floor rehabilitation (PFR) are the gold standard non-pharmacologic management

strategies. BFT and PFR are behavioral therapies that incorporate the correction of abdominal-rectal push force in combination with the relaxation of the pelvic floor to facilitate optimum defecation by using visual and auditory feedback. BFT-PFR is best achieved by a holistic approach, managing each patient as a whole by taking social and mental factors into account, and should always combined with both dietary and pharmacological treatment plans tailored individually. Therefore, achieving a management plan requires a teamwork approach composed of a dietitian, gastroenterologist, gynecologist, urologist, rectal-pelvic floor surgeon, physical treatment, and physiotherapist (9). Currently, the American Neurogastroenterology and Motility Society and the European Society of Neurogastroenterology and Motility have recommended that BFT as the primary option of treatment for both long and short-term management of constipation with dyssynergic defecation based on level I, grade A evidence (10, 11). There are a few contraindications to biofeedback therapy which include; pregnancy, presence of infection, anal fissure, cognitively impaired patients, dementia, or acute post-operative patients (9).

There are four types of biofeedback treatment modalities. The system should give input and receive output by providing visual and auditory feedback to guide the patient to achieve the desired goal. The types of biofeedback systems are explained in Table 2. The BFT has several therapeutic targets, modulation of rectal sensing, resting anal sphincter tone, increasing voluntary contraction of the anal sphincter and puborectalis muscle, and modulating abdominopelvic coordination during defecation (12). The BFT requires specialized and trained personnel. It consumes many work hours and requires a specifically conditioned environment to decrease stimuli for the patient to focus only on BFT (10).

In a 2020 study by Moore et al. (13), only eleven well-designed studies fulfilled scientific and statistical criteria for eligibility for meta-analysis in terms of the effectiveness of BFT in DD. Since BFT has two major end-points, including relaxation and push force improvement, only three studies utilized both (EMG or manometry) and balloon BFT modalities for every patient (14-16). Eight other studies only used a single modality. The patients' follow-up and adherence to the BFT was 91%. The response rates and clinical improvements were reported in only 60% of studies, which indicated a significant success rate. Only four studies reported improvement with a mean 72% response rate of dyssynergic defecation by post-BFT manometric examination. Other non-BFT treatment options like botulinum toxin or surgical division of puborectalis muscle are invasive and prone to severe complications and, therefore, should be applied only in selected patients. A portable and self-applied home-based BFT strategy is another option with growing interest and effectiveness (13, 17). The highest success rates are achieved with patients who have a greater willingness to participate, higher resting anal sphincter pressure, and a prolonged balloon expulsion time (11).

Table 2. The four types of biofeedback modalities (Adapted from Narayanan et al) (12).

	Strength and Coordination Training		Rectal Sensitivity Training	
	Anorectal manometry guided BFT	Surface EMG-guided BFT	Simulated defecation training	Sensory training
Description	Catheter with anal and rectal sensors + display monitor	Intra-anal surface electromyography probe ± a second probe over rectus abdominis, connected to a display monitor	Catheter with a balloon and perfusion port	Catheter with a balloon and perfusion port
Purpose	Patients receive visual feedback on anal and rectal pressures.	Measures electrical activity of anal striated muscles and abdominal muscles—visual and auditory feedback	Patients try to expel a rectal balloon (50 mL) while gentle downward traction is applied to the balloon.	The rectal balloon is intermittently inflated with progressively lower rectal volumes in patients with reduced rectal sensation and with progressively higher volumes in patients with increased perception.

Declaration of conflicting interests

The author declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The author received no financial support for the research and/or authorship of this article.

Authors' contribution

OH; design, review, editing and writing the paper

References

1. 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: 1582-91; quiz 1, 92.
2. Serra J, Mascort-Roca J, Marzo-Castillejo M et al. Clinical practice guidelines for the management of constipation in adults. Part 1: Definition, aetiology and clinical manifestations. Gastroenterol Hepatol 2017; 40: 132-41.
3. Sharma A, Rao SSC, Kearns K, Orleck KD, Waldman SA. Review article: diagnosis, management and patient perspectives of the spectrum of constipation disorders. Aliment Pharmacol Ther 2021; 53: 1250-67.
4. Mark Feldman LSFMHS. Sleisenger & Fordtran's gastrointestinal and liver disease : pathophysiology, diagnosis, management: Eleventh edition. Philadelphia : Saunders, [2020].
5. Haliloglu N, Erden A. Magnetic resonance defecography findings of dyssynergic defecation. Pol J Radiol 2022; 87: e181-e5.
6. Bertschinger KM, Hetzer FH, Roos JE, Treiber K, Marincek B, Hilfiker PR. Dynamic MR imaging of the pelvic floor performed with patient sitting in an open-magnet unit versus with patient supine in a closed-magnet unit. Radiology 2002; 223: 501-8.
7. Rao SS, Patcharatrakul T. Diagnosis and Treatment of Dyssynergic Defecation. J Neurogastroenterol Motil 2016; 22: 423-35.
8. Sadeghi A, Akbarpour E, Majidirad F et al. Dyssynergic Defecation: A Comprehensive Review on Diagnosis and Management. Turk J Gastroenterol 2023; 34: 182-95.
9. Skardoon GR, Khera AJ, Emmanuel AV, Burgell RE. Review article: dyssynergic defaecation and biofeedback therapy in the pathophysiology and management of functional constipation. Aliment Pharmacol Ther 2017; 46: 410-23.
10. Hite M, Curran T. Biofeedback for Pelvic Floor Disorders. Clin Colon Rectal Surg 2021; 34: 56-61.
11. Rao SS, Benninga MA, Bharucha AE, Chiarioni G, Di Lorenzo C, Whitehead WE. ANMS-ESNM position paper and consensus guidelines on biofeedback therapy for anorectal disorders. Neurogastroenterol Motil 2015; 27: 594-609.
12. Narayanan SP, Bharucha AE. A Practical Guide to Biofeedback Therapy for Pelvic Floor Disorders. Curr Gastroenterol Rep 2019; 21: 21.
13. Moore D, Young CJ. A systematic review and meta-analysis of biofeedback therapy for dyssynergic defaecation in adults. Tech Coloproctol 2020; 24: 909-18.
14. Farid M, El Monem HA, Omar W et al. Comparative study between biofeedback retraining and botulinum neurotoxin in the treatment of anismus patients. Int J Colorectal Dis 2009; 24: 115-20.
15. Faried M, El Nakeeb A, Youssef M, Omar W, El Monem HA. Comparative study between surgical and non-surgical treatment of anismus in patients with symptoms of obstructed defecation: a prospective randomized study. J Gastrointest Surg 2010; 14: 1235-43.
16. Gong BY, Ma HM, Zang XY et al. Efficacy of Cranial Electrotherapy Stimulation Combined with Biofeedback Therapy in Patients with Functional Constipation. J Neurogastroenterol Motil 2016; 22: 497-508.
17. Rao SSC, Valestin JA, Xiang X, Hamdy S, Bradley CS, Zimmerman MB. Home-based versus office-based biofeedback therapy for constipation with dyssynergic defecation: a randomised controlled trial. Lancet Gastroenterol Hepatol 2018; 3: 768-77.

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/ by/4.0/).