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DOI: 10.17235/reed.2020.6921/2020

Link: [PubMed \(Epub ahead of print\)](#)

Please cite this article as:

Ciriza de los Ríos Constanza, Aparicio Cabezudo Marta , Zatarain Vallés Ana, Rey Díaz-Rubio Enrique. Obstructed defecation syndrome: a diagnostic and therapeutic challenge. Rev Esp Enferm Dig 2020. doi: 10.17235/reed.2020.6921/2020.



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OR 6921 inglés

Obstructed defecation syndrome: a diagnostic and therapeutic challenge

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Received: 05/02/2020

Accepted: 10/02/2020

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ABSTRACT

Obstructed defecation syndrome produces constipation with anal blockage and a feeling of incomplete evacuation, due to either anatomic and functional causes. This is a complex and multifactorial entity due to diverse etiological factors that may coexist in many patients. Therefore, a diagnostic approach requires structural and functional assessment. The concordance between findings of diagnostic tests is suboptimal, thus an individualized analysis is mandatory in each patient. Therapeutic strategies require the best understanding of anatomic and functional aspects. Consequently, this entity is a diagnostic and therapeutic challenge.

Keywords: Obstructed defecation. Dyssynergic defecation. High-resolution anorectal manometry.

INTRODUCTION

Obstructed defecation syndrome (ODS) is present in up to 7 % of the adult population and is more prevalent among females (1). It is characterized by constipation with

defecatory straining, incomplete evacuation (even though when the stools are soft), tenesmus, the need for digital support and pelvic discomfort (2). It can be secondary to either anatomic and functional causes, due to an incoordination between abdominal contraction and anal relaxation (3).

Pescatori et al. (4) described it as an “iceberg syndrome”, which includes rectocele and mucosal prolapse in up to 90 % of patients with ODS. This is easily detected and thus comprises the visible area of the iceberg. However, concomitant and occult anatomic or functional abnormalities could be underdiagnosed if an adequate clinical suspicion is not well established (1). Different diagnostic tests are often indicated due to the presence of several factors that are able to produce constipation in ODS. The therapeutic approach is also complex as “to restore anatomy does not mean to restore function” (5). This issue may explain the high long-term failure rates after surgical procedures (6).

ANATOMY AND PHYSIOLOGY OF NORMAL DEFECATION

Anal sphincter structures include the internal anal sphincter (IAS), the external anal sphincter (EAS) and the puborectalis muscle (PR). The IAS is involved in 2/3 of the anal tone and consists of smooth muscle fibers that act under involuntary mechanisms from the autonomous nervous system. Both EAS and PR comprise striated muscle fibers and contribute to the rest of the anal tone. The structure of PR has an acute angulation and plays a role in the maintenance of continence. When the stools reach the rectum, the rectal distention stimulates sensorial receptors that produces a feeling of defecation and subsequently, a relaxation of the IAS. At this point, the rectal pressure should exceed the anal pressure, which depends on EAS relaxation, PR relaxation and intra-abdominal pressure.

ETIOLOGY OF OBSTRUCTED DEFECATION

Possible causes of ODS are shown in table 1. After excluding organic lesions that could provoke a mechanic obstruction, concomitant anatomic and functional disorders should be considered. A recent study of patients with rectal intussusception found irritable bowel syndrome (IBS) criteria in 1/3 of patients and dyssynergic defecation

(DD) in 2/3. Moreover, the presence of these disorders was the main factor associated with the severity of constipation (7).

Anatomic causes

Prolapses affecting the posterior wall of the vagina include rectocele (defect in the rectovaginal septum), enterocele (defect in the pouch of Douglas) and descending perineum syndrome (8). The most frequent lesions associated with ODS are rectocele and rectal prolapse.

Rectocele

This is an outpouching of the anterior wall of the rectum through the posterior wall of the vagina, which extends externally. Causes include defects or weakness in the rectovaginal septum, or its disinsertion from the perineal structures, leading to a difficult evacuation. Symptoms are typically those related to ODS and the use of manual maneuvers to expel the stools, a feeling of occupation or bulge in the vagina, urinary/fecal incontinence and pelvic pain are the most frequent (9). However, the role of rectocele in the development of these symptoms is controversial, as other concomitant pelvic floor disorders often accompany this lesion. On the other hand, up to 80 % of asymptomatic females have small rectocele (size less than 2 cm) (5).

Rectal prolapse

This is a partial or complete protrusion of the rectal wall through the anus. It starts as an internal invagination of the bowel that could become a prolapse of the external mucosa (intussusception) and finally, a complete or full-thickness prolapse. Although both complete prolapse and internal intussusception can develop separately, they are often associated with dysfunction of the pelvic structures such as rectocele, uterine prolapse, cystocele and enterocele. The prevalence of external prolapse is low (less than 0.5 % in general population) and it is more frequent in advanced age and among females. Complete prolapse appears as a rectal mass that may be self-reduced spontaneously after defecation. However, it could become incarcerated or strangled. Non-complete prolapse produces a variety of unspecific complaints, such as rectal plenitude or bulge, symptoms of obstructed defecation, fecal incontinence, bloody or

mucous discharge. The etiology of prolapse is variable since it depends on the complexity of the pelvic floor. Anatomic factors more frequently associated with the condition include redundant sigmoid colon, diastasis of levator ani complex, lack of vertical course of the rectum and sacrum fixation or a deep pouch of Douglas (9).

Functional causes

Dyssynergic defecation

It is the most prevalent functional cause of chronic constipation with a difficult evacuation. It is caused by the inability to coordinate the abdominal and pelvic floor muscles to evacuate stools, which results in inadequate propulsive forces, paradoxical contraction or the absence of relaxation of the anal sphincter. According to the Rome IV criteria, DD belongs to the anorectal functional disorders and its diagnosis is determined by the fulfilment with the criteria of functional constipation or constipation-predominant IBS plus altered defecation, as demonstrated by two diagnostic tests (3,10) (Table 2). Mechanisms of DD can be divided into two main groups: a) the presence of adequate propulsive forces, with or without altered contraction of the anal and pelvic floor muscles; and b) the failure of propulsive forces. Although DD is regarded as a functional disorder, current data support a possible involvement of abnormalities in the enteric nervous system. Moreover, it could be accompanied with slow-transit constipation (25 %), rectal hyposensitivity (66 %) and delayed gastric emptying (32 %) (11,12). The prevalence of DD ranges between 11-18 % and it is more frequent in females (3). The causes involved in the development of DD are unknown. A prospective survey of 118 patients with DD reported the onset of symptoms during childhood in 31 % of cases, after a specific event such as pregnancy or trauma in 29 % and without a recognized cause in 40 % of cases (7). On the other hand, nearly 60 % of patients with DD complained about hard stools, suggesting that excessive defecatory straining over time could influence these behavioral problems. Anxiety and chronic stressors often accompanied this entity and these psychological factors could negatively affect symptoms by excessively increasing the pelvic floor muscles tone. From a pathophysiological point of view, a chronic excessive defecatory

effort could provoke weakness of pelvic floor muscles, descent of pelvis organs and a lack of PR relaxation. Furthermore, stretching of the pudendal nerve that leads to neuropathy has been involved in abnormalities of rectal perception. Consequently, stools become hard and small and unable to provoke the inhibitory anorectal reflex by IAE relaxation, which makes the passage of stools difficult (13). Symptoms of DD are similar to those observed in ODS, as well as in certain structural anorectal abnormalities.

DIAGNOSTIC ASSESSMENT

The ODS is a complex and multifactorial entity and therefore, we need an extensive diagnostic approach, including structural and functional assessment. The concordance between findings of different diagnostic tests is often unsatisfactory. Moreover, diagnostic criteria are not well standardized, thus an individualized analysis in each patient is mandatory (1,14).

Clinical history

This should include detailed information about the clinical onset and circumstances, duration and severity of symptoms. Alarm symptoms such as bleeding, anemia, loss of weight, pain or rectal mass, should also be ruled out. Other relevant data include surgical and medical history, drugs and dietary habits. It is important to assess the defecatory pattern and stool consistency using the Bristol scale, specific diaries and questionnaires.

Physical examination

A complete abdominal and perineal examination includes an inspection of anal and perianal lesions. Vaginal examination allows the assessment of pelvic muscles, as well as the detection of a prolapse from three compartments. An abnormal anocutaneous reflex (contraction of EAE following the stimulus of perianal skin) is suggestive of pudendal damage. A digital rectal examination could detect organic causes (rectal mass, fecal retention), anatomic lesions (rectocele) and functional causes. A dynamic examination evaluates anal tone and relaxation by asking patients to squeeze and to

mimic the defecatory maneuver. The absence of relaxation or a paradoxical contraction is suspicious of DD (15).

Functional tests

These tests are indicated in complex cases of ODS and to study the possibility of DD. Neither diagnostic test alone is conclusive, so a diagnosis of DD requires the demonstration of an altered defecatory pattern in at least two diagnostic tests (3,10) (Table 2).

Balloon expulsion test (BET)

This is a simple test consisting of a balloon tied to a catheter that is placed into the rectum, then the patient is asked to expel it in physiologic and private conditions. Although different protocols have been reported, a current consensus recommends the use of a 16-Fr catheter with a balloon filled with a fixed volume of 50 ml of water. The balloon should be expelled in less than 2 minutes (16).

Anorectal manometry

This allows the study of the anorectal motor activity by registering intraluminal pressure changes, both at resting and during physiological situations (contraction, anorectal inhibitory reflex, defecatory maneuver, cough reflex). Furthermore, this procedure is able to assess the rectal sensitivity by distention of an intrarectal balloon. (17). Constipated patients who do not respond to habitual treatment with hygienic and dietary measures and laxatives could benefit from a manometric study, as well as BET. High-resolution anorectal manometry (HR-ARM) provides an advance with respect to the conventional procedure. The recent London classification improves the standardization of this technique, it also includes the findings of BET and a rectal sensitivity study (16). From a manometric point of view, dyssynergia is differentiated into four groups. Whereas propulsive forces are not altered in subtypes I and III, they fail in subtypes II and IV (3) (Fig. 1). Nevertheless, isolated manometry is insufficient to establish a diagnosis of DD. Thus, concerns arise about the use of HR-ARM to discriminate between healthy subjects and patients affected by DD. Novel metrics

have been proposed at this point, such as the integrated pressurized volume, which shows a better correlation with BET and improves the definition of patients with DD (18). On the other hand, there is increasing evidence about the use of HR-ARM in the diagnosis of structural abnormalities of the pelvic floor. These include descending perineum syndrome, rectal prolapse or intussusception, when comparing to fluoroscopy defecography or dynamic MRI defecography (19,20).

Radiological studies

The available tests to characterize structural causes of ODS include: video-defecography with barium, dynamic MRI defecography and ultrasound techniques (endoanal/transvaginal and transperineal ultrasound). Bowel-cleansing and radiological contrast are needed for video-defecography and dynamic MRI defecography. Moreover, barium defecography uses radiation emission. Defecography to investigate the presence of DD may be considered when the results from BET and HR-ARM are disappointing.

Other diagnostic tests: colonic transit time (CTT)

This study can identify a delayed colonic transit, which could be useful as up to 20 % of constipation overlap DD and slow colonic transit ⁽¹⁾. There are different procedures to evaluate CTT such as radio-opaque markers, gamma-graphic studies or wireless motility capsule. The CTT with radio-opaque markers is the most widely used study. It allows to distinguish between a delayed CTT secondary to colonic inertia and obstructed defecation (Fig. 1).

THERAPY

Conservative treatment

This aims to improve the defecatory frequency, the consistence of stools and the function of the pelvic floor muscles. It is very important to encourage defecatory habits and life style to reach these objectives. Relaxation and breathing exercises are useful to relax the pelvic floor muscles. Fiber intake is recommended to increase the fecal volume and bowel movements, although its benefit in slow transit constipation and/or

pelvic floor dysfunction have not been demonstrated.

Osmotic and stimulant laxatives, as well as secretory and prokinetic agents (prucalopride), are useful to improve constipation, especially in cases with slow transit constipation. Enemas and suppositories are appropriate in complicated constipation with fecal retention, as well certain cases of obstructed defecation (21).

Biofeedback therapy (BF)

This aims to achieve a normalization of the defecatory behavior using visual and sensitive feedback procedures during the simulated evacuation, by manometry or electromyography. This strengthens the pelvic floor muscles, trains the rectal sensitivity and improves the muscular coordination of the pelvic floor during the evacuation. BF is the technique of choice for patients suffering constipation due to DD (21). Available data from randomized assays show that 70-80 % of these patients respond to this therapy, with efficacy maintenance over 5 years (22). On the other hand, small rectoceles and rectal intussusception can also benefit from pelvic floor rehabilitation (13).

Botulinum toxin

Botulinum toxin type A (50 U injected at the PR muscle) is a therapeutic option for DD, with a success rate of 50 %, although its effect is transient. Adverse effects are mild and infrequent, especially mild and transitory incontinence, and hypotension (23).

Psychological treatment

Patients with ODS may often suffer anxiety or depression. A novel therapeutic approach has been proposed for DD patients with psychological disorders, consisting of a combination of relaxation techniques guided by ultrasound (psycho-echo-biofeedback) These have a preliminary success rate of one and a half to two years (24).

Surgery

This is rarely the first option in patients with ODS. Initial short-term outcomes after surgery are often satisfactory, but frequently worsen over time unless other factors that could contribute to ODS have been considered. Surgical options are divided into

four groups: a) ostomy for antegrade irrigation; b) either resection or plication or pexy, in cases of internal mucosal prolapse; c) reinforcement of the rectovaginal septum or resection of the redundant mucosa, in cases of big rectocele; and d) myotomy in ODS secondary to muscular disorders, which do not respond to other measures (13).

The transperineal bilateral partial myotomy of the PR has been proposed in DD, aimed to enhance the relaxation of the defecatory straining. This procedure seems to be more effective than BF therapy and botulinum toxin injections (25). Other surgical procedures are mentioned in table 3.

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DOI: 10.1007/s11605-010-1229-4

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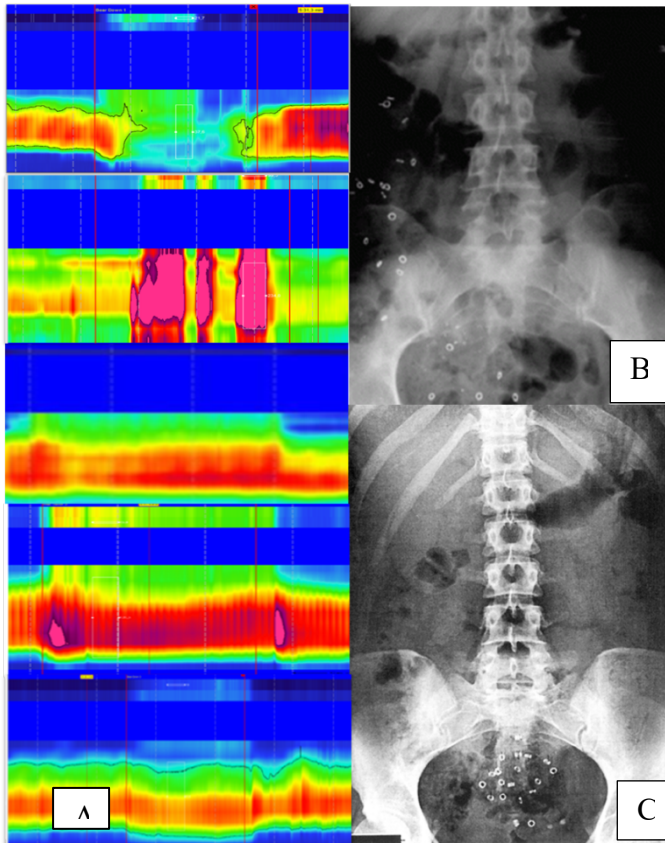


Fig. 1. Classification of defecatory dyssynergia (DD) sub-types, according to the manometric pattern by high-resolution anorectal manometry (HR-ARM) and colonic transit time with radio-opaque markers. Part A shows two colored bands, a thin one above (rectal) and a thick one below (anal), where brighter colors represent higher pressures and paler colors represent lower pressures. A normal defecatory maneuver shows an adequate rectal propulsive force with complete anal relaxation. Sub-types I and III show paradoxical contraction or the absence of anal sphincter relaxation with adequate rectal propulsive forces, whereas sub-types II and IV are characterized by inadequate or an absence of rectal propulsive forces, with or without paradoxical contraction, respectively. Parts B and C shows two colonic transit studies with radio-opaque markers. The image above (B) shows retention of markers in the right colon (colonic inertia), whereas below (C), the markers are retained in the rectal area (DD).

Table 1. Causes of obstructed defecation syndrome

Systemic causes	Endocrine Diabetes mellitus Hypothyroidism Hyperparathyroidism Panhypopituitarism Hipokalemia Hypermagnesemia Hypercalcemia	Neurological Dementia Parkinson disease Multiple sclerosis Hirschsprung Cerebrovascular disease Spinal cord injury Pudendal neuropathy	Psychological Anxiety Depression Posttraumatic stress Sexual abuse
Drugs	Anticholinergic agents Opioids Calcium channel blockers Antidepressants Iron supplements		
Motor and sensorial alterations	Functional constipation Slow-transit constipation IBS-constipation Rectal hyposensitivity		
Mechanic causes	Structural (posterior compartment) Rectal prolapse Descendent perineum Sigmoidocele Enterocele Rectal Intussusception Rectal solitary ulcer syndrome	Functional Defecatory dyssynergy Normal propulsive force Inadequate propulsive force	Organic Colorectal Cancer Hemorrhoids Anal fissure Fecaloma

Table 2. Rome IV diagnostic criteria for functional constipation, irritable bowel syndrome (IBS)-constipation and functional defecation disorders

<p>Rome IV diagnostic criteria for functional constipation</p> <p>1. Must include 2 or more of the following:</p> <ul style="list-style-type: none"> • Straining during more than one-fourth (25 %) of defecations • Lumpy or hard stools (BSFS 1-2) more than one-fourth (25 %) of defecations • Sensation of incomplete evacuation more than one-fourth (25 %) of defecations • Sensation of anorectal obstruction/blockage more than one-fourth (25 %) of defecations • Manual maneuvers to facilitate more than one-fourth (25 %) of defecations (e.g., digital evacuation, support of the pelvic floor) • Fewer than 3 spontaneous bowel movements per week <p>2. Loose stools are rarely present without the use of laxatives</p> <p>3. Insufficient criteria for irritable bowel syndrome</p>
<p>Rome IV diagnostic criteria for IBS-constipation</p> <p>Recurrent abdominal pain, on average, at least 1 day per week in the last 3 months, associated with 2 or more of the following criteria:</p> <ul style="list-style-type: none"> – Related to defecation – Associated with a change in the frequency of the stool – Associated with a change in form (appearance) of the stool <p>Diagnostic criteria for IBS subtypes</p> <p>Predominant bowel habits are based on stool form on days with at least one abnormal bowel movement*.</p> <p>IBS with predominant constipation: More than one fourth (25 %) of bowel movements with Bristol stool form types 1 or 2 and less than one-fourth (25 %) of bowel movements with Bristol stool form types 6 or 7.</p> <p><i>Alternative for epidemiology or clinical practice:</i> Patient reports that abnormal bowel movements are usually constipation (like type 1 or 2 in the picture of Bristol Stool Form Scale [BSFS]).</p> <p>*IBS subtypes related to bowel habit abnormalities (in this case, IBS-C) can only be confidently established when the patient is evaluated when off the medications used to treat the bowel habit abnormalities.</p>
<p>Rome IV diagnostic criteria for functional defecation disorders</p> <ol style="list-style-type: none"> 1. The patient must satisfy diagnostic criteria for functional constipation and/or irritable bowel syndrome with constipation 2. During repeated attempts to defecate, there must be features of impaired evacuation, as demonstrated by 2 of the following 3 tests: <ul style="list-style-type: none"> • Abnormal balloon expulsion test • Abnormal anorectal evacuation pattern with manometry or anal surface EMG • Impaired rectal evacuation by imaging 3. Subcategories F3a and F3b apply to patients who satisfy criteria for FDD <p>F3a. Diagnostic criteria for inadequate defecatory propulsion</p> <p>Inadequate propulsive forces as measured with manometry with or without inappropriate contraction of the anal sphincter and/or pelvic floor muscles</p> <p>F3b. Diagnostic criteria for dyssynergic defecation</p> <p>Inappropriate contraction of the pelvic floor as measured with anal surface EMG or manometry with adequate propulsive forces during attempted defecation</p>
<p>Criteria fulfilled for the last 3 months with symptom onset at least 6 months before diagnosis</p>

Table 3. Surgical procedures in ODS

Transvaginal approach	Transanal approach	Transabdominal approach
<p>Indication</p> <p>Posterior compartment prolapses (rectocele).</p>	<p>Indication</p> <p>Posterior compartment prolapse (rectocele), rectal prolapse and rectal intussusception.</p>	<p>Indication</p> <p>Multi-compartment prolapses (anterior, medium and /or posterior), rectal prolapse or rectal intussusception.</p>
<p>Procedures</p> <p>Posterior colporrhaphy with native tissue with/without:</p> <ul style="list-style-type: none"> • “site specific” facial repair • Plication of puborectalis (it can cause dyspareunia) <p>Posterior colporrhaphy with graft augmentation.</p>	<p>Procedures</p> <p>Delorme procedure (rectal mucosectomy with plication of rectal muscle in rectal prolapse)</p> <p>Stapled transanal rectal resection (STARR)</p> <p>Perineal proctosigmoidectomy (Altemeier)</p>	<p>Procedures</p> <p>Sacrocolpopexy</p> <p>Ventral rectopexy with/without sigmoidectomy.</p>

Accepted