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Obstructed Defecation Syndrome: A Treatise on Its Functional Variant

Arshad Rashid[1]* and Suhail Khuroo[2]

[1]Assistant Professor, Department of General Surgery, MMIMSR, Mullana - 133207, India
[2]Clinical Fellow, Surgical Gastroenetrology, KEM Hospital, Mumbai - 400012, India

Abstract

Obstructed defecation occurs in a major portion of patients suffering from chronic constipation. Constipation caused by obstructed defecation is of two basic types: functional and mechanical. Repeated stretching of pelvic floor musculature and nerves due to childbirth, problems with rectal sensory perception and psychological factors has been implicated in the pathogenesis of obstructed defecation syndrome. Biofeedback is the backbone of therapy of obstructed defecation. In this review, we attempt to discuss the epidemiology, pathophysiology and management of the functional variant of obstructed defecation syndrome.

Keywords: Obstructed defecation syndrome; Functional; Anismus; Pelvic dys-synergy; STARR; Biofeedback; Megarectum; Descending perineum syndrome

Introduction

Chronic constipation is a common problem that affects 2-30% of people in the Western World. A significant proportion of these patients i.e. about 30-50% suffer from obstructed defecation syndrome [1,2]. In obstructed defecation feces do reach the rectum, but rectal emptying is extremely difficult. These patients have a feeling that defecation is blocked. Despite repetitive attempts, complete evacuation of rectal contents is not possible. The patients may also complain of prolonged and unsuccessful straining at stools, feelings of incomplete evacuation, digital removal of feces, and laxative abuse [3].

Constipation caused by obstructed defecation is of two basic types: functional and mechanical. The functional type includes idiopathic megarectum, anismus (pelvic floor dys-synergy), and descending perineal syndrome, whereas the mechanical type includes rectocele, enterocele, internal intussusception and overt rectal prolapse [3,4]. All of these conditions represent either a defect of pelvic support or abnormal function of the pelvic floor musculature. In this review, we attempt to discuss the epidemiology, pathophysiology and management of the functional variant of obstructed defecation syndrome (ODS).

Pathophysiology

The etiology of ODS is controversial. It is presumed that in childbearing women damage to the innervation and soft tissues of the pelvis may occur as a direct consequence of vaginal childbirth [5,6]. Trauma to the pelvic soft tissues can result in endopelvic fascial and pelvic support defects [7,8]. Cumulative nerve damage from stretching of pelvic floor due to childbirth and activities that cause chronic and repetitive increases in the intra-abdominal pressure such as obesity and chronic cough may also predispose to the development of symptomatic defects [9].

Decreased rectal sensory perception has been suggested as a putative cause of obstructed defecation. Akervall et al. demonstrated that in patients with constipation, the outcome of subtotal colectomy with ileorectal anastomosis was successful in those patients with a normal rectal sensory perception, whereas in patients with blunted rectal sensation however, the operation was ineffective [10]. Loening-Baucke reported that a group of children with constipation who did not recover from constipation despite successful relaxation of their pelvic floor showed significantly decreased rectal sensory perception as compared to the recovered children [11].

Impaired sensorimotor function in patients with obstructed defecation might be caused by a deficit of parasympathetic sacral nerves (Nervi Erigentes). It is a well-known fact that in some patients, obstructed defecation starts following pelvic surgery. Patients who have undergone rectopexy frequently experience diminished rectal sensory perception that has been attributed to the division of the "lateral ligaments", which contain branches of the parasympathetic sacral nerves [12-14]. Varma and Smith reported significantly decreased rectal sensory perception women with intractable constipation following hysterectomy [15]. Patients with the cauda equina syndrome report suffering from obstructed defecation [16].

It has been suggested that defecation, like micturition, is coordinated by a center in the pons [17,18]. The neurons located in the putative pontine defecation center start to exhibit a stimulating firing pattern during perineal stimulation [18]. It has also been reported that the pons is also involved in the perineo-rectal reflex [18]. Thus a digital pressure, applied upon the perineum, results in an increase in rectal tone. This observation explains why women with obstructed defecation frequently apply perineal pressure in order to facilitate their defecation.

There is growing interest in the influence of psychological distress on bowel dysfunction. Devroude et al. reported that constipated women demonstrated a conversion pattern, which indicated the presence of a somatization defense mechanism [19]. Drossman et al. demonstrated that a history of sexual abuse is a frequent finding in women with functional gastrointestinal disorders [20]. Leroi et al. reported that 40% of patients with a functional disorder of the lower digestive tract had a history of sexual abuse, which was in contrast to 10% in patients with an organic disease, and to approximately 20% in the general population [21]. The most frequently reported symptoms of these sexual maltreated patients were of constipation and obstructed defecation [19-21].

Anismus, also known as spastic pelvic floor and pelvic floor dys-synergia, is a malfunction of the external anal sphincter and puborectalis

***Corresponding author:** Dr. Arshad Rashid, 1/E - Umar Abad Colony, Amargrah, Sopore, Kashmir - 193201, India, Tel: +917838194782/+918059931539; E-mail: arsh002@gmail.com

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sling during defecation [22]. During defecation, the muscles of rectal wall contract whereas the puborectalis sling and the external anal sphincter relax to permit defecation. The concept of pelvic floor dys-synergy encompasses many diagnoses including anismus, spastic pelvic floor syndrome, and paradoxical puborectalis contraction [23-25]. It is reported that 25 to 50% of patients with obstructed defecation have a component of pelvic floor dys-synergy [24]. It is also seen in patients of rectocele, rectal prolapse and other pelvic floor disorders. Hyperactive puborectalis is also seen in patients of solitary rectal ulcer syndrome [23-26].

Mega-rectum is defined as an enlarged rectal diameter of >6 cm at the level of the pelvic brim, or total rectal capacity of over 450 ml of air on manometry [22]. Descending perineum syndrome is characterized by a descent of more than 3 cm of the perineal body during straining at stools. Excessive straining and weakened perineal muscles (possible stretching damage to the pudendal nerves) are responsible for it [3].

A vicious cycle of straining and perineal descent develops in the patients of ODS that eventually culminates with the development of prolapse. An important thing to note here is that though functional and mechanical variants of ODS have been described, but in reality, they belong to the same spectrum. Deterioration of functional variant eventually leads to morphological anomalies causing mechanical blockage to the passage of feces and accentuating the ODS.

Diagnosis

As per the Rome III guidelines [3], for a patient to be labeled as suffering from functional constipation, which also includes obstructed defecation, following criteria should be present for at least 3 months:

1. Must include two or more of the following:

(a) Straining during at least 25% of defecations,

(b) Lumpy or hard stools in at least 25% of defecations,

(c) Sensation of incomplete evacuation for at least 25% of defecations,

(d) Sensation of ano-rectal obstruction/ blockage for at least 25% of defecations,

(e) Manual maneuvers to facilitate at least 25% of defecations (e.g., digital evacuation, support of the pelvic floor),

(f) Fewer than three defecations per week.

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

3. Insufficient criteria for irritable bowel syndrome.

The same criteria define dys-synergic defecation as inappropriate contraction of the pelvic floor or less than 20% relaxation of basal resting sphincter pressure with adequate propulsive forces during attempted defecation [3].

On physical examination, the paradoxical contraction of the pelvic floor can be assessed by palpation of the puborectalis muscle while the patient is straining [27]. Perineal descent >3 cm, mucous discharge or mucosal prolapse may also be seen when the patient is asked to strain for stools [28]. However, most clinicians do not rely on palpation and advocate the use of specific tests to diagnose ODS [28-32]. Electromyography (EMG) of the pelvic floor, the balloon expulsion test (BET), and defecography are the most frequently used tests [30-33]. Other radiologic methods for the dynamic evaluation of the ODS include magnetic resonance imaging and ultrasonography, each of which has its advantages and limitations [28-34].

In EMG, the activity of the pelvic floor is measured with a needle or wire electrode, inserted in the puborectalis muscle, with the patient in left lateral position. In pelvic dys-synergy, EMG shows a paradoxical increase in activity of the puborectalis muscle during straining [28-31]. In BET, the patient is asked to expel is a balloon filled with air or water is installed in the rectum, after positioning him in the left lateral or sitting position. Inability to expel this balloon supports the diagnosis of ODS [31-33].

Asking the patient to evacuate thickened barium sulfate, which has been introduced in the rectum, under radiological control, performs defecography. On defecography, ODS is characterized by a lack of widening of the anorectal angle during attempted evacuation of contrast [31-34]. In a normal individual, during straining, the anorectal angle becomes more obtuse because of relaxation of the puborectalis muscle. Anal EMG and BET are the best modalities for the diagnosis of pelvic dys-synergy [35]. Defecography is reported to be too sensitive and can lead to a false-positive diagnosis, but does have the advantage of evaluating any coexistent pelvic pathology [36].

The development of fast Magnetic Resonance Imaging sequences provides a new alternative to study all pelvic visceral movements in a dynamic fashion. MR defecography has several important advantages over conventional defecography [37-39]. Its non-ionic nature, multiplanar capacity, dynamic evaluation and good temporal resolution along with its high-resolution soft-tissue contrast makes it an ideal modality in the assessment of ODS patients. Imaging in the mid-sagittal plane allows evaluation of the anal canal, anorectal angle, levator muscle and hiatus and the vaginal disposition as well as their relationship to a consistent electronically designated pubo-coccygeal Line (PCL). Diagnostic parameters for pelvic dys-synergy include an indented impression of the pubococcygeus muscle on the rectum with excessive obtuse anorectal angulation accompanied by very prolonged rectal emptying on T2-weighted MR images [38].

Dynamic trans-perineal ultrasound (DTP-US) is a recently developed, simple means of dynamic assessment of the pelvic floor assessing in real-time the components of the anterior, middle and posterior compartments [40]. It has a significant learning curve and dedication but because of its widespread availability and low cost, it is recommended as a first step analysis for patients presenting with ODS and as a marker for the more selected use of dynamic MR imaging [41]. Its other advantages include the lack of radiation exposure, its repeatability and its ability to define the presence of intrinsic internal and external anal sphincter anomalies. It is also useful in the assessment of patients presenting with ODS who have extra-rectal disorders such as recurrent pelvic tumor and pelvic endometriosis [42].

Anal manometry is another frequent investigation ordered as part of a diagnostic work-up protocol. A thin plastic catheter is placed in the anus and rectum to measure sphincter muscle pressures. Four patterns of anal and rectal pressure changes have been recognized during attempted defecation [43]. A normal pattern is characterized by increased intra-rectal pressure associated with relaxation of the anal sphincter (mainly puborectalis). The type I pattern is characterized by both adequate propulsive forces (intra-rectal pressure > 45 mm Hg) and increased anal pressure. The type II pattern is characterized by inadequate propulsion (intra-rectal pressure < 45 mm Hg) and insufficient relaxation or contraction of the anal sphincter. The type III pattern is characterized by increased intra-rectal pressure (>45 mmHg) with absent or insufficient (20%) relaxation of anal sphincter pressure. Both types III and I are classified as dys-synergic defecation.

A Colonic Transit Study may be additionally done in patients who are suspected of having poor colon muscle or nerve function (colonic dysmotility). Patients with slow transit constipation have markers evenly distributed throughout the colon even after a week, and those patients with ODS have markers retained in the distal colon and rectum [4].

Treatment

ODS involves complex anatomic and functional changes that may be difficult to manage. Many forms of treatment have been proposed with varying results, including dietary modification, laxatives & enemas, biofeedback therapy, electro-stimulation, sacral nerve stimulation and surgical intervention [44-47].

Biofeedback is the first-line therapy to manage pelvic floor dys-synergy [48,49]. However, there is no consensus regarding the technique for conducting biofeedback, the number of sessions needed, or which components of treatment are most effective. There is strong evidence coming from four randomized controlled studies supporting the use of biofeedback therapy in the treatment of dys-synergic defecation [49-52]. At our place, we have noticed that the most important thing in biofeedback is to make patient aware of his defecation process. Asking the patient not to forcefully strain at defecation after initial motion has passed; despite feeling of incomplete evacuation arrests the progression of functional ODS to overt prolapse.

Biofeedback training for constipation resulting from pelvic dys-synergy attempts to coordinate pelvic floor muscle relaxation with active contraction of abdominal wall musculature generating a downward propulsive force. Depending on whether EMG or an intra-rectal pressure monitor is used to assess pelvic floor muscle relaxation, techniques of biofeedback fall into two categories [51-53]. Although EMG is more commonly used, a recent meta-analysis found that intra-rectal pressure monitored biofeedback was superior to EMG monitored biofeedback [54]. There was no difference in the outcomes of biofeedback when intraanal and perianal EMG monitoring were compared [54].

Patients who do not respond well to a course of dietary management and biofeedback should be considered for injection of botulinum toxin into the puborectalis muscle and external anal sphincter. In a recent study it was reported that 75% of patients improve, although the benefit is short term, ranging from 1 to 3 months in most patients [55]. The most significant side effect is transient fecal incontinence, which occurs in 25% of patients. The major disadvantages with the use of botulinum toxin are its cost and the short duration on benefit.

Surgical division of puborectalis muscle in the posterior midline is reserved for patients with intractable pelvic dys-synergy who are debilitated by their symptoms. However, the results of this procedure are not encouraging [56]. The current opinion is that there is little, if any role for this procedure. If ODS is associated with any other structural anomaly like prolapse, rectocele, etc., it merits a surgical intervention. STARR (Stapled Transanal Rectal Resection) is a new surgical procedure that was introduced for such morphological anomaly. Longo proposed the use of two circular staplers: the first to reduce the intussusception and the bulging rectocele anteriorly, correcting the anterior wall muscle defect, the second to correct the intussusception posteriorly [57]. The data from European STARR Registry (2006-2008) reveal a significant reduction in ODS scores coupled with improved quality of life [58].

Modified Longo score (Table 1) is the most commonly used scoring system to decide treatment strategy for ODS patients as well as to see percent and total change in ODS symptom score from baseline after intervention in short term and long term follow up trials at various intervals. Some authors have taken 9 as cut off score for surgical intervention i.e. STARR in ODS patients while others have taken 7 as cut off point. There is no consensus till date on cut off score [29,59].

S. No.	QUESTIONS	SCORES†			
1	Medication to evacuate (enemas or suppositories)	0	1	2	3
2	Difficulties to evacuate	0	1	2	3
3	Digitation to evacuate	0	1	2	3
4	Return to toilet to evacuate	0	1	2	3
5	Feeling of incomplete evacuation	0	1	2	3
6	Straining to evacuate	0	1	2	3
7	Time needed to evacuate	0	1	2	3
8	Lifestyle Alteration	0	1	2	3

†Each point is scored according to frequency of the symptom. Questions 1-6: 0 = never, 1 = less than once weekly, 2 = 1–6 times weekly, 3 = every day; question 7: 0 = less than 5 min, 1 = 6 – 10 min, 2 = 11–20 min, 3 = more than 20 min; question 8: 0 = no alteration of lifestyle, 1 = mild alteration, 2 = moderate alteration, and 3 = significant alteration of lifestyle. The total score is in the range of 0 (best) to 24.

Table 1: Modified Longo Score for Obstructed Defecation Syndrome.

Conclusion

ODS is a problem that is frequently encountered in the elderly females, and the management should be tailor-made to each clinical scenario.

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