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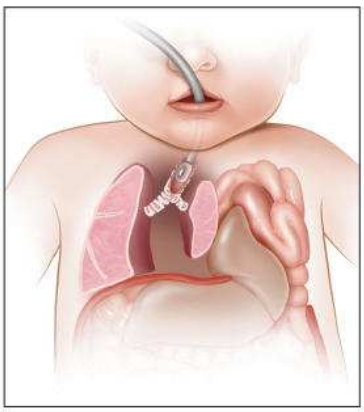

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Anal Sphincters Evaluation by Endoanal Ultrasound in Obstructed Defecation

Andreia Albuquerque, MD, Guilherme Macedo, MD, PhD

Objectives—To evaluate anal sphincter abnormalities detected by endoanal ultrasound in obstructed defecation due to rectocele and rectal intussusception.

Methods—The retrospective analysis includes 45 patients with obstructed defecation syndrome due to rectocele and/or rectal intussusception with or without fecal incontinence, and submitted to endoanal ultrasound.

Results—Ninety-three percent (n = 42) were women (mean age of 63 ± 12 years), and 47% (n = 21) of the patients had fecal incontinence. In total, 29% (n = 13) had a previous anorectal surgery, and 93% (n = 39) of the women had a previous vaginal delivery. An isolated rectal intussusception was diagnosed in 20% (n = 9) of the patients, an isolated rectocele in 24% (n = 11), and rectal intussusception and rectocele in 56% (n = 25). Thirty-six percent of patients had anal sphincter lacerations (n = 16): 12% (n = 2) had only internal laceration, 69% (n = 11) had only external laceration, and 19% (n = 3) had both. Two patients had a thinner internal anal sphincter with 0.9 and 1.2 mm, respectively. In total, 25% of the patients without fecal incontinence had an occult anal sphincter laceration, and all were women with an external sphincter laceration in the anterior quadrant and a previous vaginal delivery. In patients with obstructed defecation and fecal incontinence, 48% had sphincter lacerations. Previous anorectal surgery was a predictor of anal sphincter laceration (odds ratio [OR] 4.8; 95% confidence interval [CI] = 1.214–18.971; $P = .025$), but fecal incontinence (OR 2.7; 95% CI = 0.774–9.613; $P = .119$) and previous vaginal delivery (OR 1.250; 95% CI = 0.104–15.011; $P = .860$) were not.

Conclusions—Endoanal ultrasound should be considered in obstructed defecation with or without fecal incontinence, especially if surgical correction is planned.

Key Words—endoanal ultrasound; fecal incontinence; obstructed defecation syndrome; rectal intussusception; rectocele

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Address correspondence to Andreia Albuquerque, MD, Gastroenterology Department, Centro Hospitalar São João, 4200-319 Porto, Portugal.

E-mail: a.albuquerque.dias@gmail.com

Abbreviations

CI, confidence interval; DTPUS, dynamic transperineal ultrasound; EAS, external anal sphincter; EAUS, endoanal ultrasound; FI, fecal incontinence; IAS, internal anal sphincter; ODS, obstructed defecation syndrome; OR, odds ratio; RI, rectal intussusception; SD, standard deviation

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Chronic constipation affects between 2 and 27% of the population in Western countries.[1] Obstructed defecation syndrome (ODS) occurs in approximately 7% of adults, and in half of the constipated patients, more commonly in women.[2] Structural diseases like rectal intussusception (RI), rectocele, sigmoidocele, enterocele, and excessive perineal descent are normally present and are causes of defecatory disorders. Rectocele and rectal internal mucosal prolapse are the most common causes present in more than 90% of patients.[3]

Rectocele is defined as a herniation of the anterior rectal wall into the posterior vagina.[4–6] Rectal intussusception is an invagination of the rectal wall into the rectal lumen[6] and can be classified as intrarectal, intra-anal, or external (rectal prolapse).[6] Ten to 30% of the patients with a rectocele have fecal incontinence (FI),[4] and some studies have percentages higher than 60% of FI in RI and rectal prolapse.[7] Several mechanisms may be implicated in this FI:

synchronous defect of the anal sphincters, traction pudendal neuropathy, an overflow-type mechanism resulting from the filling of a large rectocele,[4] or distension of the lower rectum by the intussusception that activates the rectoanal inhibitory and relaxes the internal anal sphincter (IAS).[4]

Occult anal sphincter defects may be present in patients with ODS and can be the cause of FI. The two previous studies[8,9] using endoanal ultrasound (EAUS) in patients with ODS found that 19 to 20% of the patients had occult and asymptomatic laceration of the IAS and/or external anal sphincter (EAS).[8,9] The presence of an anal sphincter defect can change the clinical and surgical management of patients with ODS.[10] An associated anal sphincter repair can be done and the trauma to anal sphincters should be minimized, limiting the use of anal retractor.[9] More information on the importance of EAUS in ODS, namely, before a surgical correction is planned, is lacking.

Our aim was to evaluate anal sphincter alterations detected by EAUS in patients with ODS due to rectocele and RI.

Methods

Patients and Study Design

This was a retrospective study conducted in our department, and included 45 patients with ODS due to rectocele and RI submitted to EAUS for anal sphincter evaluation from October 2014 to September 2016. In our department, patients with ODS with or without FI are submitted to EAUS to rule out the presence of concomitant anal sphincter lacerations/alterations. Patients were included if they had symptoms of ODS, with a confirmed rectocele and/or RI diagnosed by clinical examination and dynamic transperineal ultrasound (DTPUS) of the posterior compartment. Obstructed defecation syndrome was diagnosed if the patient had prolonged and unsuccessful straining at stool, feelings of incomplete evacuation, self-digitation for defecation, sense of incomplete evacuation or sensation of anorectal obstruction/blockage, and a stool frequency of less than three times per week. Dynamic transperineal ultrasound and EAUS are normally performed in the same session.

Clinical Assessment

Medical history regarding ODS duration, need for self-digitation, FI, previous anorectal surgery, and vaginal delivery was always obtained before examination and was recorded. Clinical severity of FI was evaluated by the Cleveland Clinic (Wexner) Incontinence Score. This score has five parameters: incontinence for solid stools, liquid stools, incontinence for gas, wearing pads and lifestyle changes, each scoring from 0 to 4 according to the frequency. The total score ranges from 0 (perfect continence) to 20 (complete incontinence). A detailed physical examination of the anal region was always performed previously to DTPUS and EAUS.

Endoanal Ultrasound

All procedures were performed with a Hitachi-Aloka ultrasound scanner (Hitachi-Aloka Medical Ltd, Tokyo, Japan) with a 360° radial endoanal probe, with the patient in a left lateral position, and performed by the same operator (A.A.) with almost 4 years of experience with this technique and 200 examinations/year. A probe with a condom filled with gel was introduced into the anal canal, and the upper, middle, and lower anal canal were systematically accessed. A laceration was defined as a discontinuity in the IAS (hypoechoic ring) or EAS (hyperechoic ring). Descriptions were made in a radial clockwise (in degrees) direction in the four quadrants (anterior, posterior, left, right) and longitudinally (upper, middle, and/or lower anal canal). The IAS thickness was measured in millimeters as an average of the measurements taken in the left and right quadrants, and a thickness between 2 and 3 mm was considered normal.

Dynamic Transperineal Ultrasound

All procedures were performed with a Hitachi-Aloka ultrasound scanner with a curved array recovered by nonpowdered glove. The patients were in the left lateral position and procedures were performed by the same operator (A.A.). No bowel preparation was made and the patient's rectum was filled with 50 mL of ultrasonographic coupling gel before examination of the posterior compartment. The first evaluation was made in the resting position, and then the patient was asked to strain. Rectoceles were measured as the maximal depth of the protrusion beyond the expected margin of the normal anterior rectal wall, as described by others,[6] and diagnosed if a depth of more than or equal to 20 mm was present. Rectal intussusception was diagnosed if an invagination of the rectal mucosa to the rectum or anal canal was seen.

Statistical Analyses

Continuous variables were described as mean (± standard deviation [SD]) if normal distribution, and median (p25–p75) if nonnormal distribution. Categorical variables were described as frequencies.

Association among categorical variables was made using the chi-square test or Fischer's exact test. For this analysis, the Wexner score was stratified in equal to or fewer than 10 points or more than 10 points, and IAS hypertrophy was considered for a diameter greater than 3 mm. Predictive factors for anal sphincter laceration were estimated by logistic regression.

Statistical analysis was performed using SPSS statistical software version 21 (IBM Corp, Armonk, NY). A P value of less than .05 was considered significant.

Table 1. Features of 45 Patients With Obstructed Defecation Syndrome

Feature	Value
Age (years), mean ± standard devition	63 ± 12
Female, n (%)	42 (93)
ODS duration (months), median (p25–p75)	24 (12–60)
Anal digitation, n (%)	19 (42)
Fecal incontinence, n (%)	21 (47)
Wexner score (points), mean ± SD	8 ± 3
Vaginal delivery, n (%)	39 (93)
Histerectomy, n (%)	8 (19)
Previous anorectal surgery, n (%)	13 (29)
Hemorroidectomy, n (%)	5 (39)
Retocele, n (%)	3 (23)
Fissure, n (%)	2 (15)
Fistula, n (%)	2 (15)
Rectal intussusception, n (%)	1 (8)
Rectal intussusception, n (%)	9 (20)
Rectocele, n (%)	11 (24)
Retocele and rectal intussusception, n (%)	25 (56)
Anal sphincter laceration, n (%)	16 (36)
IAS laceration, n (%)	2 (12)
IAS and EAS laceration, n (%)	3 (19)
EAS laceration, n (%)	11 (69)
IAS thickness (mm) mean ± SD	3.2 ± 1.0
IAS thickness < 2.0 mm, n (%)	2 (4)
IAS thickness > 3.0 mm, n (%)	24 (53)
IAS Laceration Characteristics (N = 5)	
Middle anal canal, n (%)	5 (100)
Anterior quadrant, n (%)	1 (20)
Left quadrant, n (%)	1 (20)
Posterior quadrant, n (%)	3 (60)
Discontinuity (°) mean ± SD	78 ± 34
EAS Characteristics (N = 14)	
Middle anal canal, n (%)	14 (100)
Right quadrant, n (%)	1 (7)
Anterior quadrant, n (%)	13 (93)
Discontinuity (°) mean ± SD	53 ± 11

Results

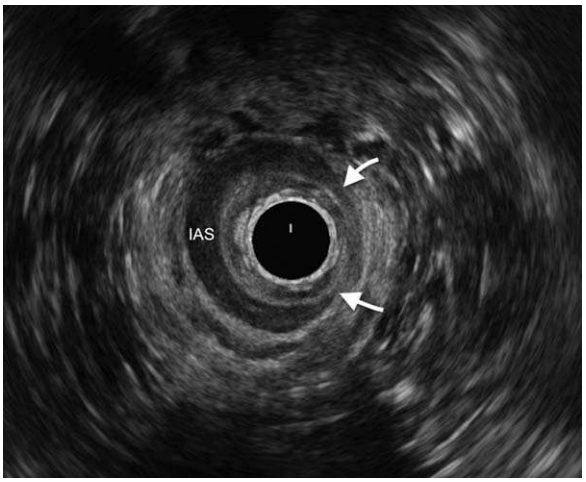
The population was 93% (n = 42) female with a mean age of 63 ± 12 years (Table 1). Patients had ODS symptoms with a median duration of 24 (p25–p75: 12–60) months, and 47% (n = 21) had fecal incontinence with a mean Wexner score of 8 ± 3 points. In total, 29% (n = 13) of the patients had previous anorectal surgery, and 93% (n = 39) of the women had a previous vaginal delivery. Dynamic transperineal ultrasound diagnosed an isolated RI in 20% (n = 9) of the patients, an isolated rectocele was diagnosed in 24% (n = 11), and RI and rectocele was present in 56% (n = 25).

In total, 36% (n = 16) of the patients had anal sphincters lacerations: 12% (n = 2) had only IAS laceration, 69% patients (n = 11) had only EAS laceration, and 19% (n = 3) had both. There were also two patients with ODS that, although they did not have an anal sphincter laceration, did have a thinner IAS, with 0.9 mm (patient with both RI and rectocele) and 1.2 mm (patient with RI).

The IAS mean diameter was 3.2 ± 1.0 mm, and 53% of the patients (n = 24) had an IAS diameter greater than 3 mm. The IAS hypertrophy was not associated with RI (P = .194) or rectocele (P = .143).

All IAS lacerations (Figure 1) were in the middle anal canal, with a mean discontinuity of 78 ± 34°, and were more frequently in the posterior quadrant (60%).

Figure 1. Endoanal ultrasound of a female patient showing an IAS laceration between 2 and 5 o'clock (between arrows) in the middle portion of the anal canal. This patient had been submitted to a previous anorectal surgery.



All EAS lacerations (Figure 2) were in the middle anal canal, with a mean discontinuity of $53 \pm 11°$, and were more common in the anterior quadrant (93%).

The FI ($P = .114$) and the Wexner score ($P = 1.0$) were not associated with anal sphincter laceration.

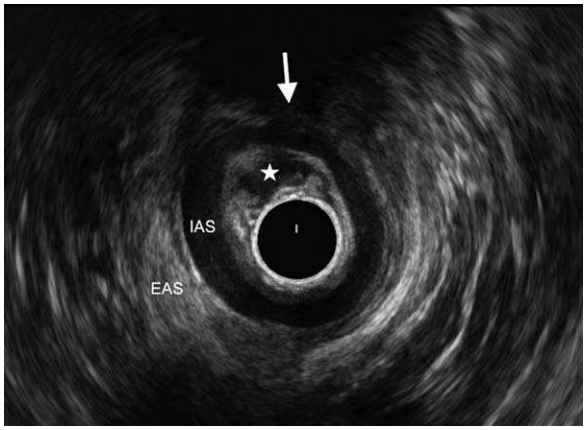
There were 24 ODS patients without FI, six of whom had occult anal sphincter lacerations (25%). All of these six patients were women, with EAS laceration in the anterior quadrant and with a previous vaginal delivery. Of the 21 ODS patients with FI, 10 patients had anal sphincter lacerations (48%).

Previous anorectal surgery was a predictor of anal sphincter laceration on EAUS (odds ratio [OR] 4.8, 95% CI = 1.214–18.971, $P = .025$), but FI (OR 2.7, 95% CI = 0.774–9.613, $P = .119$) and previous vaginal delivery (OR 1.250, 95% CI = 0.104–15.011, $P = .860$) were not.

Discussion

Endoanal ultrasound is the gold standard for morphological assessment of the anal sphincters.[6] This procedure is not routinely performed in ODS patients. In our study, 40% of the patients (16 patients with sphincter lacerations and two patients with a IAS diameter ≤ 2.0 mm) had previously undiagnosed sphincter lacerations and atrophy. Our data showed that 25% of ODS patients without FI had anal sphincter lacerations that would remain unrecognized without this examination. In a study by Nielsen et al,[8] aiming to describe the anal ultrasonography findings in 16 patients with obstructed defecation, three patients (19%) had anal sphincters lacerations due to previous anal dilatation or hemorrhoidectomy. Similar results were obtained in another study[9] of EAUS in 92 patients with ODS, which found that 20% of the patients had occult and asymptomatic laceration of the IAS and/or EAS sphincter. All of them were female with a history of vaginal delivery, and none had symptoms of FI. In addition, in our study, all of these patients were women, with EAS laceration in the anterior portion and with a previous vaginal delivery, which makes obstetric injury the most probable etiology. An important study by Sultan, published in 1993,[11] showed that 35% of women had an occult anal sphincter laceration after their first vaginal delivery.

Figure 2. Endoanal ultrasound of a female patient showing an EAS laceration in the anterior quadrant (arrow) in the middle portion of the anal canal. An IAS hypertrophy and hemorrhoids (star) can also been seen. This patient had three vaginal deliveries.



Rectocele and RI can be associated with FI by several mechanisms. In our study, 48% of ODS patients with FI had an undiagnosed anal sphincter laceration that could be the cause or at least one of these contributing factors. The recognition of the possible etiology of FI is fundamental for the selection of appropriate treatment.

Transvaginal/transanal rectocele repair is possible in patients with ODS, but caution is mandatory in patients at risk for developing FI. In a study by Van Dam et al,[12] 89 women were submitted to a combined transvaginal/transanal rectocele repair with 8% experiencing deterioration in FI. Others reported a continence impairment in up to 38% of patients.[13] Anal stretching during rectocele repair may lead to impaired continence.[12] Patients with damaged anal sphincters can be more susceptible to these complications. For the Stapled Transanal Rectal Resection, FI is considered a contraindication.[14]

There were some limitations in this study. Ninety-three percent of the patients were women and 93% of them had a previous vaginal delivery, so we could not really assess the role of this as a predictive factor of anal sphincter laceration. Some studies show a poor agreement between defecation proctography and DTPUS in the measurement of quantitative parameters. We only performed DTPUS to diagnose rectocele and RI, and no measurements were used for this study except for defining rectocele. Patients were diagnosed with rectocele and/or RI based on the presence of symptoms of ODS, clinical examination, and DTPUS of the posterior

compartment. No other exam was used for diagnoses, although because of the high predictive value of a positive DTPUS, confirmation of a positive result with another technique is not normally necessary. Ultrasonography is an operator-dependent technique, and adequate training and expertise are necessary. The fact that our examinations were done by an experienced operator in a tertiary center could explain the high rate of sphincter lesion detection. These results could be different in other clinical settings and with a less-experienced examiner.

Although this is a retrospective study, all of the procedures were done by the same operator, following the same diagnostic criteria, with DTPUS and EAUS performed in the same session. Dynamic transperineal ultrasound is a simple, inexpensive, and noninvasive first-line evaluation in obstructed defecation.[15] It can be performed as an initial examination in patients with ODS. When RI or rectocele are diagnosed on ultrasound, these results were highly predictive of findings on defecation proctography.[16] Different studies considered different cutoffs for rectoceles, namely, 10 mm,[17] 15 mm,[18] and 20 mm.[6,19–21] A rectocele larger than 20 mm is a frequent cause of ODS, but those less than 1 cm normally do not cause symptoms.[5] In our department, the cutoff is 20 mm for DTPUS diagnosis. Different techniques can be performed, but filling the rectum with ultrasound gel also improves visualization, as described by others.[22] We always performed EAUS in ODS, independent of FI presence, so there was no bias of patients with more severe symptoms being referred more frequently for EAUS assessment, and consequently more abnormalities diagnosed by this method.

In conclusion, EAUS should be considered in patients with ODS with or without FI, especially if a surgical correction is considered, although further studies are necessary to make this a formal recommendation. Fecal incontinence in ODS can be caused by anal sphincter injuries that need to be recognized for better treatment. Patients with ODS may have anal sphincter abnormalities without suggestive symptoms.

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