Assessment of defecation disorders using high-resolution MRI-defecography

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Aims. The aim of this retrospective study was to try to find correlations between different diagnoses established by clinical examination, anorectal manometry and MRI-defecography and, the association with psychiatric disorders.
Methods. 44 patients (median age 53.81 years) presenting with intestinal motility disorders and who underwent clinical, biological and psychiatric examination, dynamic defecographic-MRI (resting, squeezing, straining, defecation and evacuation phases), anorectal manometry, colonoscopy. MRI was performed using the 1,5 T.
Results. MRI-defecography revealed the following changes: anismus (16), rectocele (12), pelvic floor dysfunction (6), peritoneocele (2), cervical-cystic-ptosis (1), rectal prolapse (6), and in 1 case the examination was normal. Hypertonic anal sphincter (16) and lack of defecation reflex (12) at anorectal manometry correlated with anismus in all patients at MRI-defecography. Lack of inhibitor anal reflex (6) was associated with rectocele (4), cervix-cysto-ptosis (1) and peritoneocele (2). Anxiety (11), depression (6) and anxiety-depressive disorders (10) were found in 27/44, somatization disorders in 9/44 and no psychiatric changes in 8/44 cases.
Conclusion. As multiparous women are at risk for outlet obstruction constipation, MRI-defecography is suggested in this category. There is good correlation between diagnosis using anorectal manometry and MRI-defecography in patients with terminal constipation and anismus. Lower defecation dysfunction is often associated with psychiatric disorders.

Key words: MRI-defecography, outlet obstruction constipation, defecation dysfunction, anismus

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INTRODUCTION

Pelvic floor prolapse (PFP), representing the herniation of the pelvic organs through the perineum, can be classified as: anterior (cystocele-urinary bladder), middle (uterus, vagina) and posterior (small bowel-enterocele and rectum-rectocele); all these have at magnetic resonance imaging (MRI)-defecography a prolapsing pattern[1]. Dyssynergic defecation and PFP often coexist in functional defecation disorders in females, clinical examination being inadequate[2]. Mild cases with involvement of a single compartment are poorly evaluated by imaging methods, but complex cases with multiple organic involvement are best evaluated by translabial ultrasound and dynamic pelvic MRI-defecography[3].

Among the advantages of MRI-defecography are: lack of ionizing radiation, good soft tissue resolution, ability to display the entire pelvic floor, guiding the pre/postoperatory management.

The aim of this study was to try to find correlations between different diagnosis established by clinical examination, anorectal manometry and MRI-defecography and also the degree of association with psychiatric disorders.

MATERIALS AND METHODS

A retrospective study was conducted among patients with symptomatic pelvic floor dysfunction (PFD), subjects that presented at our unit between 01.01.2019–31.12.2020.

All 44 patients (22-72 years old) admitted to the 2nd Medical Clinic for intestinal motility disorders underwent clinical, biological and psychiatric examination, dynamic defecographic MRI (during defecation), anorectal manometry, colonoscopy.

Static images of the pelvis were obtained using TSE-T2W1/FSE-T2W1 (repetition time (ms)/echo time(ms), 7030/105; field of view (FOV) 240-280 mm; slice thickness 3 mm, number of signals acquired 3).

MRI was performed using the 1,5 T (MAGNETOM Avanto, Siemens, Germany) with 18 channel phase array body coils. Defecographic algorithm consists in views in sagittal and coronal planes, and images were obtained during the resting, squeezing and straining (Valsalva maneuver), defecation and evacuation phases. Defecation phase is demonstrating best the anterior/middle organic descent in dyssynergic defecation. MRI images were analyzed by 2 experienced radiologists independently. Patients were positioned in the supine position within the MRI scanner, initial T2 weighted images were acquired through the pelvis in sagittal, coronal and axial directions.

During dynamic MRI-defecography, the anal-rectal angle (ARA) was measured between the pubococcygeal line and anorectal junction. Dyssynergic defecation was defined if abnormal ARA-change was found. The dynamic phases of squeezing and straining required breath holding for maximum of 20 seconds each. Prior to MRI, the patient's rectum was filled with a synthetic stool of potato starch and Gadolinium (Gd) based contrast liquor (2–3 mL/potato starch box) named Gadovist 1 mmol/mL. 50–60 mL of the enema with potato and Gd was administrated via a rectal tube with the patient on the MRI table in the lateral position. Patients were asked to produce Valsalva maneuver with contracted sphincter for 10 seconds and then to eliminate the rectal content; the limitation was impossible or possible after one or several attempts, depending on the underlying pathology.

Diagnostic MRI-defecography criteria was considered for: anismus- the lack of normal puborectal muscle relaxation during defecation, rectocele- bulge of anterior rectal wall >2 cm during straining, cystocele- bladder descent below pubic symphysis, vaginal prolapse- descent of cervix below pubococcigeal line during straining, enterocele- herniation of pelvic peritoneal sac into rectogenital space, intussusception circular invagination of proximal rectum (mucosa and muscular layer) during defecation.

Assessments included also a validated constipation questionnaire, and psychiatric disorders were evaluated by Hospital Anxiety and Depression scale (HADS), GAD-7 (Generalized Anxiety Disorder-7).

All patients included signed the informed consent and also the approval for participating in medical teaching, in accordance with the Declaration of Helsinki.

Statistical analyses were performed using descriptive statistics. All categorical variables are expressed as proportions (%).

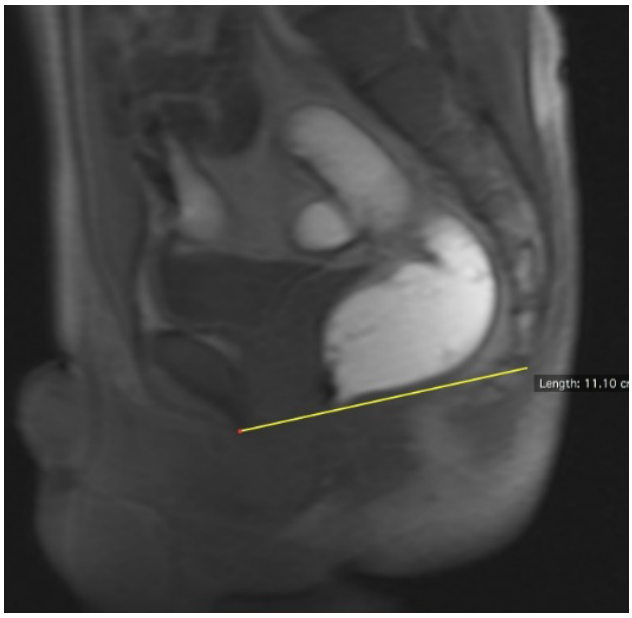

Fig. 1. Anismus (absence of rectal evacuation) with minimal descent of the anorectal junction during the defecation effort (<2 cm) descent of the post pelvic floor grade I in a 30-year-old patient with irritable bowel syndrome- form with constipation and undifferentiated somatoform disorder.

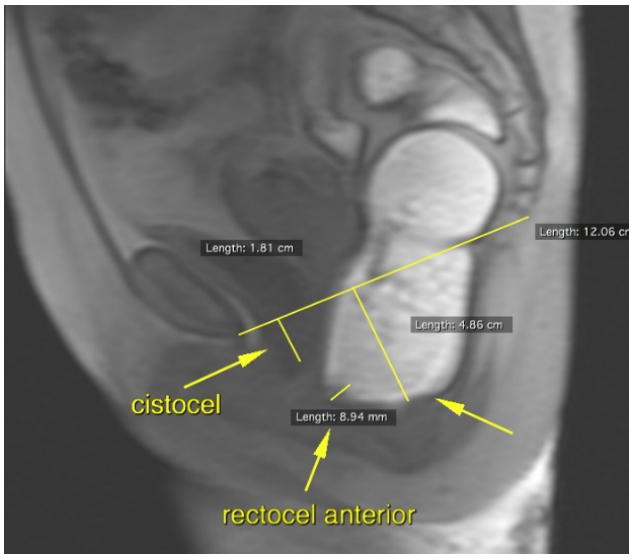

Fig. 2. Dysfunction of the pelvic floor during the defecation effort, with the lowering of the anterior (grade I) and posterior (grade II) compartment with small anterior rectocele in a 60-year-old patient with irritable bowel syndrome-form of alternating diarrhea with constipation.

RESULTS

44 patients (30 females, 14 males, with median age 53.81 years (range 22-72) underwent clinical, biological, psychiatric, colonoscopy, MRI-defecographic and anorectal manometric examination.

The patients' symptoms consisted in: chronic constipation (all patients), diffuse abdominal pain (20/44), rectal tenesmus (8/44), incomplete defecation (20/44).

Of the total 44 outlet obstruction constipation patients, MRI-defecography revealed the following changes: anismus (16) (Fig. 1), rectocele (12), dysfunction of the pelvic floor (6) (Fig. 2), peritoneocele (2), cervical-cystic-ptosis (1), rectal prolapse (6), and in one case the examination was normal. Among anismus patients 23.5% (n=8) were with combined cystocele, and 17% (n=6) with combined vaginal prolapse.

The following risk factors were found in our study-group: female gender (30/44), obesity (18/44), previous pelvic surgery (10/44), COPD (4/44), smoking (12/44); among female subjects, other risk factors were detected: prepartum- frequent urinary infections (12/30), low socioeconomic status (18/30), depression (8/30), and postpartum- frequent urinary infections (8/30), preexisting symptoms (8/30), forceps delivery (2/30), perineal tear (3/30) and menopause (20/30).

Colonoscopy detected internal hemorrhoids in 26 patients, without other lesions. Hypertonic anal sphincter (16) and lack of defecation reflex (12) at anorectal manometry correlated with anismus in all patients at MRI-defecography. Lack of inhibitor anal reflex (6) was associated with rectocele (4), cervix-cysto-ptosis (1) and

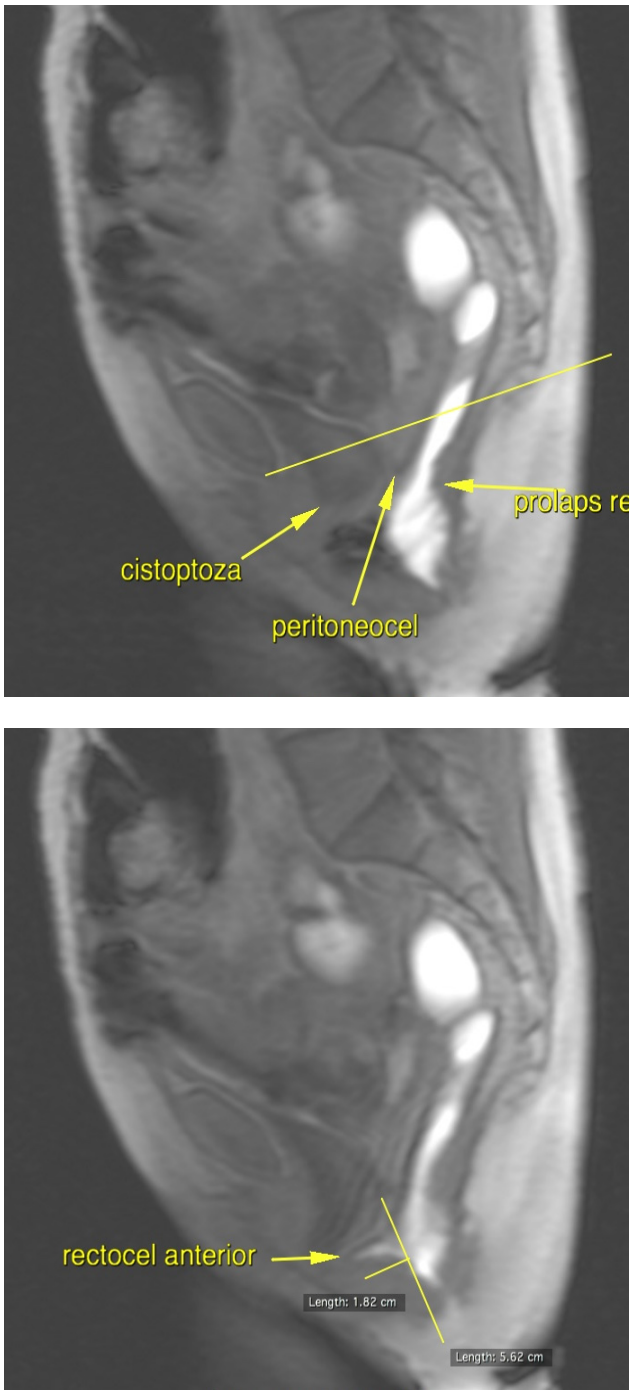

Fig. 3. Cervical-cysto-ptosis grade II, anterior rectocele grade II, discrete peritoneocele and invagination grade I rectal mucosa in a 60-year-old patient with hysterectomy and irritable bowel syndrome- form with constipation.

peritoneocele (2). Anxious-depressive disorders (anxiety in 11, depression in 6 and combined anxious-depressive disorder in 10 patients) were found in 27/44, somatization disorders in 9/44 and no psychiatric changes in 8/44cases. Evaluation by means of Hospital Anxiety and Depression scale (HADS) greater than 8 and GAD-7 (Generalized Anxiety Disorder-7) over 7 was found in 28/36, respectively in 30/36 patients.

The final diagnosis of dyssynergic defecation was established by an interdisciplinary group, including a gastroenterologist, an internist and a radiologist after reviewing the medical history, anorectal manometry and MRI-defecography.

DISCUSSION

Functional PFD can be present, clinically and radiologically, independent from pelvic organ prolapse[4]. The most frequent finding for the spastic pelvic floor syndrome is the prolonged and incomplete evacuation[5]. Mean evacuation time was considered longer (mean time 60 seconds) compared to the results of Halligan et al.[6] possible due to the bigger volume of enema. Paradoxical sphincter contraction is a useful indicator for anismus.

PFP is frequent found in multiparous women over 50 years, our study-group (66.6%, representing 20/30 of our female patients) having a higher percentage compared to literature (15%) (ref.[7]); complaints include fecal/urinary incontinence, uterine prolapse, constipation, incomplete urinary voiding, dyspareunia and pelvic pain[8], mucous discharge, rectal bleeding, prolonged toilet time, incomplete defecation with/without digitation[1].

Risk factors for PFD were evaluated in our group in different percentage: female gender (68.18%), obesity (40.9%), pelvic surgery (22.72%), smoking (27.27%) and condition that increases intraabdominal pressure (COPD-9.09%); but no connective tissue diseases were found compared to data in literature[5]; specific female risk factors before pregnancy were detected similar to literature data[9]: preexisting depression (26.66%), reccurent urinary infections (33.33%), low educational status (60%) and the ones postpartum: pre-pregnancy presence of symptoms (26.66%), reccurent urinary infections (26.66%), forceps delivery (6.66%), important perineal tear (1%), menopause (66.66%). Chronic constipated patients develop more often cystocele, enterocele, recocele, rectal prolapse[10].

Hard and small volume feces, excessive strain at stool, tenesmus and fecaloma are the most frequent symptoms described by anismus patients with dyskinetic pattern at MRI-defecography[1]. The anorectal group had anismus as the most common clinical feature (16/24, 66.66%), while rectocele (12/20, 60%) and rectal prolapse (6/20, 30%) were predominant in the multi-compartment pelvic group. Rectocele occured in most of the patients with outlet obstructive constipation with anorectal and pelvic floor dysfunction[11]. Reiner et al.[12] found in 100% patients with dyssynergic defecation (anismus/PFD) an impaired evacuation, the most frequent finding here being rectal descent (78%); his results suggest that impaired evacuation can be also found in other causes of functional constipation due to pelvic floor abnormalities (other than anismus). 95% of the patients with PFD have abnormalities in all 3 pelvic compartments[13].

Regarding the contrast agent used for the rectal enema at MRI-defecography in literature, ultrasound gel mixed with Gd proved to underestimate the size and degree of anterior rectocele and intussusception size, compared to potato starch mixed with gadolinium[14].

Poncelet et al.[15] revealed no significant difference between dynamic MRI-defecography and X-ray defecography while investigating abnormalities of the posterior compartment of the pelvic floor, while Van Iersel[16] found an inferior accuracy in diagnosing rectocele and enterocele, but a superior value for intussusception. Salvador et al.[6] found the superiority of MRI-defecography for evaluating the posterior compartment disorders, and similar to fluoroscopy in pelvic organ prolapses[17-19]. In older times, colpocystodefecography was even considered the gold standard method among the imaging investigation methods, and MRI-defecography was considered unreliable for the anterior and middle compartment[20].

Recent studies involving women with pelvic organ prolapse showed no significant association with depression and anxiety symptoms both in preoperative and postoperative patients[21]. Other studies, like Ai et al.[22] revealed generalized anxiety disorders in 20.6% of women with pelvic organ prolapse, being present in almost 1/5 of postmenopausal women, and associated with higher scores in those with bowel and urinary dysfunction (22). Vrijens et al.[23] showed a prevalence of 20.3% depression among females with pelvic organ prolapse and Mazi et al.[24] even higher, of 43% among patients with pelvic floor dysfunction. Our group showed even a higher rate of anxiety alone or in combination with depression (21/44, 47.72%) compared to the literature; even if general recommendations[25] show higher values of the scales of assessing anxiety and depression, 77.7% of our patients had the HADS score above 8 and 83.33% GAD-7 above 7. On the other hand, strong correlation between the severity of these psychiatric symptoms and the severity of the pelvic floor dysfunction was shown by Khan et al.[26]. Merkel et al.[27] demonstrated a higher incidence of depression, somatization and anxiety in chronic constipated patients. Limer et al.[28] described a higher rate of anxiety in patients with mixed urinary incontinence.

Management of obstructive defecation syndrome implies a multidisciplinary approach, ranging from conservative (fiber diet, laxatives, rectal irrigation, biofeedback, transanal electrostimulation, yoga, psychodynamic psychotherapy, cognitive behaviour therapy, anti-depressants) to surgery[29,30].

CONCLUSION

As multiparous women, especially those ones with vaginal delivery, are at risk for outlet obstruction constipation, MRI-defecography is suggested in this category. There is a good correlation between diagnosis using anorectal manometry and MRI-defecography in patients with terminal constipation and anismus. Lower functional digestive disorders generating defecation dysfunction is often associated with psychiatric disorders.

Author contribution: All authors contributed equally to preparing the manuscript.
Conflicts of interest statement: None declared.

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