Higher Symptom Score, Larger Residual Rectocele, and Lower Rectal Compliance Predict Failure of Improvement after Surgical Treatment of Rectocele

Sameh Hany Emile[1] Ahmed Hossam Elfallal[1] Mahmoud Abdelnaby[1] Mohamed Balata[1]

[1] Division of Colorectal Surgery, Department of General Surgery, Mansoura University Hospitals, Mansoura University, Mansoura, Egypt.

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Address for correspondence Sameh Emile, MD, FACS, Colorectal Surgery Unit, General Surgery Department, Mansoura University Hospitals, Mansoura University, Mansoura City 35516, Dakahlia, Egypt (e-mail: Sameh200@hotmail.com).

Abstract

Background Rectocele is a frequent finding in women and is usually asymptomatic. However, it is sometimes associated with symptoms of obstructed defecation syndrome (ODS). While most patients with ODS due to rectocele respond well to conservative treatment, some may require surgical treatment. The aim of the study was to determine the predictors of failure of symptom improvement after rectocele repair.

Methods The study included adult women with rectocele who underwent surgical treatment by transperineal repair (TPR) or transvaginal repair (TVR). The preoperative and postoperative assessment was done using the Wexner constipation score, anorectal manometry, and defecography.

Results A total of 93 female patients with a mean age of 43.7 years were included. Among them, 65.6% of patients underwent TPR and 34.4% underwent TVR; 22 (23.7%) patients reported failure of significant improvement in ODS symptoms after surgery. The independent predictors of failure of improvement were higher preoperative Wexner score (odds ratio, OR: 1.4, 95% confidence interval, CI: 1.09–1.84, $p = 0.009$), larger residual rectocele after repair (OR: 2.95, 95% CI: 1.43–6.08, $p = 0.003$), and lower postoperative maximum tolerable volume (OR: 0.949, 95% CI: 0.907–0.992, $p = 0.02$). The predictive cutoff point for the preoperative Wexner score was 15.

Conclusions Patients with a preoperative Wexner score higher than 15 and larger residual rectocele after surgery may experience little improvement in symptoms after rectocele repair. Although TPR was associated with a poorer relief of symptoms than did TVR; it was not an independent predictor of failure.

Keywords
- rectocele
- repair
- predictors
- outcome
- ventral mesh rectopexy

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Introduction

Rectocele represents one of the abnormalities of pelvic organ prolapse (POP),[1] which is a common condition and represents the indication for corrective surgery in more than 200,000 women in the United States every year.[2] It has been estimated that approximately 67% of parous women develop some form of POP.[3] Although anterior rectocele is a common finding in parous women; it can be also observed in women without a history of vaginal delivery.[4]

The relation between rectocele and obstructed defecation syndrome (ODS) is rather contentious. While some investigators proposed that rectocele is actually a secondary effect of chronic straining that results in weakening of pelvic floor muscles, other researchers suggest that rectocele causes ODS by shifting the vector force of defecation away from the normal physiologic direction.[5,6] It has been noted that the main etiology of rectocele is loss of integrity of the rectovaginal septum, which can be secondary to childbirth, aging, connective tissue disorders, and straining.[7] Although rectocele is asymptomatic in many women, some women complain of defecatory difficulty symptoms, namely ODS, and sexual concerns.[8]

Most patients with anterior rectocele would respond positively to conservative management, which includes a high fiber diet, the Kegel exercise, and pelvic physiotherapy.[9] However, when the symptoms fail to improve with conservative treatments, surgical intervention maybe indicated. Surgical correction of rectocele has been associated with varying outcomes in the literature. This observation can be explained by either inadequate repair of rectocele or failure to address other associated anatomic or functional problems, such as internal rectal prolapse and pelvic floor dyssynergia.[10]

Potential indications for surgical treatment of rectocele are a rectocele > 3 cm, significant barium entrapment on defecography, and frequent need for digital assistance of defecation.[11] Various techniques of rectocele repair exist, the rates of symptom improvement tend to vary according to the technique, and no consensus has been reached on the optimal surgical technique.[12]

A wide variation in the rates of symptom improvement after surgical treatment of rectocele has been observed. Improvement in ODS symptoms after transperineal repair has been noted, ranging between 53% and 91%.[13] Therefore, the present study aimed to identify the predictors of failure of improvement in defecatory symptoms after surgical treatment of rectocele to help counsel patients and tailor future treatment.

Patients and Methods

Study Design and Setting

This was a retrospective case-control study on female patients with anterior rectocele who were surgically treated in the Colorectal Surgery Unit of the Mansoura University Hospitals between February 2016 and January 2020. Ethical approval for the study was obtained from the Institutional Review Board of Mansoura Faculty of Medicine.

Eligibility Criteria

Adult female patients who were surgically treated for ODS associated with anterior rectocele after failure of conservative management with fibers, stool softeners, and biofeedback therapy were included. We excluded patients with associated anismus or slow-transit constipation, patients with coexisting internal rectal prolapse, those with less than 12 months of follow-up, and those with incomplete records missing vital data on the outcome of surgery.

Cases and Controls

The cases were defined as patients with anterior rectocele who did not report significant improvement in ODS symptoms after surgical treatment. The controls were patients with anterior rectocele who experienced significant symptom improvement after repair. The significant improvement in symptoms of ODS was defined as the reduction in the preoperative Wexner score by 25% or more after surgical repair, as reported in other studies.[14,15]

Assessments and Interventions

Patients were assessed as per our unit policy by a comprehensive approach that included detailed history taking and clinical examination, including digital rectal examination (DRE) and proctoscopy. Constipation was assessed with the Wexner constipation score.[16]

Patients were investigated with fluoroscopic defecography to depict the rectocele, measure its size, and exclude enterocele and internal rectal prolapse, as well as anal manometry to measure anal pressures and sensory thresholds, and colonic transit time using the Sitz marker study with films at day 3 and 5 to exclude slow-transit constipation. Anismus was excluded based on the findings of DRE, anal manometry, and surface EMG studies.

Surgery

Patients with rectocele who were admitted during the study period had bowel preparation before surgery and were treated with a transvaginal repair or transperineal repair. The procedures were performed by three expert colorectal surgeons. Some patients were part of a previous randomized trial that compared transvaginal and transperineal repair,[17] whereas the selection of procedure for the remaining patients was made based on patient-related factors, and surgeon's and patient's preferences. Transperineal and transvaginal repairs were performed under spinal anesthesia with patients placed in the lithotomy position. No synthetic material or mesh was used for either technique.

Transperineal Repair

The procedure was performed under spinal anesthesia with patients placed in the lithotomy position. A transverse incision was made in the perineum, and dissection of the plane between the external anal sphincter and the posterior vaginal wall was conducted by sharp and blunt dissection. The

dissection extended up to the vaginal apex to expose the rectocele, the perirectal fascia, and the levator arc. The upper limit of the rectocele was identified as divarication of the longitudinal muscle of the lower rectum. The repair started at this point and was completed in layers. As the first layer was plicated in the midline in a downward direction, the rectocele was obliterated, and the longitudinal muscle of the rectum was approximated. The second layer involved plication of the levator ani muscle. Finally, the skin was closed using polyglactin 3/0 sutures without drain.[18]

Transvaginal Repair

The procedure was performed under spinal anesthesia with patients placed in the lithotomy position. A transverse incision was made at the muco-cutaneous junction, and the posterior vaginal wall was incised at the midline and extended upwards to the level of the proximal border of the rectocele. Afterwards, the dissection extended laterally then the musculofascial components on both sides were approximated with intermittent polyglactin 2/0 sutures. The excess vaginal mucosa was excised, the remaining mucosa was approximated with polyglactin 2/0 sutures, and both sides of the lateral border were sutured without inserting drains.[19]

Follow-up

Patients were followed up in the outpatient clinic at 1 week, and at 1, 6, and 12 months after surgery. During follow-up, wound healing was evaluated by a surgical resident and a consultant of colorectal surgery, and any complications were recorded. The improvement in ODS symptoms was assessed using the Wexner constipation score. Follow-up anal manometry and defecography were performed at 12 months postoperatively. Recurrence of rectocele was detected clinically by DRE and was confirmed by fluoroscopic defecography.

Data Collection

The following data were collected from the medical archives:

- Baseline characteristics: Patients' age, gender, duration of symptoms, associated urinary symptoms, number of vaginal deliveries, preoperative Wexner constipation score, anal pressures, sensory thresholds, and rectocele size in defecography.
- Outcome data: Operation time, complications, Wexner constipation score at 12 months, anal pressures and sensory thresholds at 12 months, rectocele size in defecography at 12 months, recurrence of rectocele in defecography, and failure of improvement in symptoms.

Study Outcomes

The outcome of the study was the predictive factors of failure of symptom improvement at 12 months after rectocele repair.

Statistical Analysis

Data were analyzed by the Statistical Package Social Sciences version 23 (SPSS, IBM Corp., Armonk, NY, USA). Continuous data were expressed as mean ± standard deviation (SD) if they were normally distributed or, otherwise, as median and normal range. The Kolmogorov–Smirnov test was used for data normality. Categorical variables were expressed as numbers and proportions. The Student *t*-test and Mann-Whitney U test were used to process continuous data, and the Fisher exact test or Chi-square test was used for processing of categorical variables.

A multivariate binary logistic regression analysis was conducted to identify the predictors of outcome after rectocele repair. The failure of improvement in symptoms was modeled as the dependent variable, and the risk factors significantly associated with failure of symptom improvement in the initial univariate analysis were considered as the independent variables. The area under the curve (AUC) was calculated to assess the discriminatory ability of the test. The variance inflation factor (VIF) was used to assess for multicollinearity of the variables included in the analysis. A VIF = 1 indicated no correlation between the independent variable and the other variables, and a VIF > 5 indicated high multicollinearity between this independent variable and the others. Finally, p-values < 0.05 were considered significant.

Results

Patients' Characteristics

The present study included 93 female patients with anterior rectocele. The mean age of patients was 43.7 ± 10.7 years. The patients had symptoms of ODS for a median duration of 48 months (range 6–180). Among them, 84 (90.3%) patients had a history of one or more vaginal deliveries. The median number of vaginal deliveries was 2, ranging from 0 to 6. The mean preoperative Wexner constipation score was 16.9 ± 2.8 and the mean size of rectocele in preoperative defecography was 4.6 ± 0.81 cm. The mean preoperative resting and squeeze anal pressures were 61.7 ± 8.1 mm Hg and 130.9 ± 17.4 mm Hg, respectively. The mean preoperative volume required to elicit an urge to defecate was 130.9 ± 23.4 ml and the mean preoperative maximum tolerable volume (MTV) was 205.5 ± 44.7 ml.

This study's groups were divided into 61 (65.6%) patients who underwent transperineal repair and 32 (34.4%) who underwent transvaginal repair. A significant improvement in symptoms was noted in 71 (76.3%) patients, whereas 22 (23.7%) patients did not report significant improvement in symptoms. A statistically significant reduction in the mean Wexner score at 12 months postoperatively was noted (17.8 ± 3.1 to 9 ± 4.05; $p < 0.0001$). The mean size of rectocele in defecography showed a significant reduction postoperatively (4.6 ± 0.81 to 1.53 ± 0.9 cm; $p < 0.0001$). Complications were recorded in 20 (21.5%) patients and included wound dehiscence ($n = 15$), bleeding ($n = 2$), and SSI ($n = 3$). Recurrence of rectocele was recorded in 8 (8.6%) patients.

Comparing the Outcomes of Transperineal and Transvaginal Repair

The transvaginal and transperineal repair groups had similar baseline characteristics, except for a greater median number of vaginal deliveries in the former. Transvaginal repair had a

Table 1 Characteristics and outcomes of transperineal and transvaginal procedures

Factor		Transperineal ($n = 61$)	Transvaginal ($n = 32$)	p-value
Mean age (years)		44.7 ± 9.34	41.84 ± 12.9	0.223
Median number of vaginal deliveries (range)		2.0 (0–5)	3.0 (0–6)	**0.001**
Associated urinary symptoms (%)		5 (8.2)	2 (6.2)	1
Failure of improvement (%)		16 (26.2)	6 (18.8)	0.456
Complications (%)		16 (26.2)	4 (12.5)	0.184
Mean operative time in minutes		80.16 ± 27.83	55.16 ± 5.46	**<0.001**
Mean Wexner score	Preoperative	17 ± 2.51	16.75 ± 3.27	0.683
	Postoperative	9.87 ± 3.44	7.34 ± 4.64	**0.004**
Resting anal pressure (mmHg)	Preoperative	61.82 ± 9.31	61.62 ± 5.28	0.913
	Postoperative	64.64 ± 10.32	63.12 ± 6.93	0.458
Squeeze anal pressure (mmHg)	Preoperative	128.9 ± 18.43	134.78 ± 14.83	0.123
	Postoperative	131.8 ± 16.89	138.03 ± 16.54	0.092
Rectocele size (cm)	Preoperative	4.7 ± 0.81	4.56 ± 0.82	0.436
	Postoperative	1.77 (0.95)	1.06 (0.71)	**<0.001**
Median hospital stay, in days (range)		2 (1–4)	2 (2–3)	0.126

significantly shorter operative time (55.16 vs. 80.16 minutes, $p < 0.001$), and was followed by a significantly lower Wexner score (7.34 vs. 9.87, $p = 0.004$) and smaller postoperative residual rectocele (1.06 vs. 1.77 cm, $p < 0.001$). Symptom improvement and complications were comparable among both groups (►**Table 1**)

Univariate Analysis of Factors Associated with Non-improvement in Symptoms

As shown in ►**Table 2,** the factors that were significantly associated with failure of symptom improvement after surgery were the number of vaginal deliveries ($p = 0.03$), preoperative Wexner score ($p = 0.05$), postoperative rectocele size ($p < 0.001$), preoperative MTV ($p = 0.048$), postoperative MTV ($p = 0.002$), and operation time ($p = 0.0$).

Multivariate Analysis of Predictive Factors of Failure of Symptom Improvement

A higher preoperative Wexner score (odds ratio, OR: 1.4, 95% confidence interval, CI: 1.09–1.84, $p = 0.009$), larger residual rectocele after repair (OR: 2.95, 95% CI: 1.43–6.08, $p = 0.003$), and postoperative MTV (OR: 0.949, 95% CI: 0.907–0.992, $p = 0.02$) were the significant independent predictors of failure of symptom improvement (►**Table 3**). The predictive cutoff point for the preoperative Wexner score was 15 (sensitivity 95.4%, specificity 76%). The AUC of the model was 0.859 (95% CI: 0.767–0.951). There was no significant multicollinearity in the model used, as the VIF was lower than 5 for all factors.

Discussion

In the present study, we included 93 women, 90% of whom had a history of vaginal delivery, and 10% nulliparous, which concords with another study that reported a 12% incidence of rectocele in young nulliparous women.[20] To avoid the confounding effect of other associated conditions, a thorough comprehensive assessment of patients was done to assure the absence of anismus, since undiagnosed anismus may eventually lead to failure of symptom improvement.

About two-thirds of the patients underwent transperineal repair of rectocele, which is a popular technique among colorectal surgeons,[21] whereas the transvaginal repair was chosen for one-third of the patients. The transperineal repair was followed by a higher rate of failure of improvement, exceeding 25%. This reflects what has been documented in the literature on the disparate rates of improvement in ODS after transperineal repair, which range from 53% to 91%.[13] Failure of symptoms improvement after transperineal repair may be attributable to inadequate plication of the rectal wall or development of hypertensive anal canal postoperatively, as suggested in a recent study.[15] Although several technical modifications/additions to improve the outcome of TPR have been described, there is no consensus on the optimal indications for each modification.[22]

Although a significant improvement in the ODS symptoms was reported by the majority of patients, almost one-quarter of patients complained of persistent symptoms and lack of satisfactory improvement after surgery. To elucidate the causes of lack of improvement in symptoms after rectocele repair, we performed univariate and multivariate analyses to shed light on the predictors of poor outcome after rectocele repair.

Patients with a higher Wexner score before repair were more likely to experience failure of symptom improvement. This observation is quite reasonable, because patients with more severe ODS symptoms may be more likely to have partial rather than full resolution of symptoms after repair.

Table 2 Univariate analysis of the characteristics of patients with and without significant improvement in symptoms after surgery

Variable		No improvement in symptoms (cases = 22)	Improvement in symptoms (controls = 71)	*p*-value
Age (years)		41.6 ± 10.3	44.4 ± 10.8	0.29
Median number of vaginal deliveries (range)		2 (0–4)	2 (0–6)	**0.03**
Median duration of symptoms (months)		36 (12–72)	48 (6–180)	0.13
Associated cystocele (%)		3 (13.6)	5 (7)	0.5
Technique of repair (%)	Transperineal	16 (72.7)	45 (63.4)	0.58
	Transvaginal	6 (27.3)	26 (36.6)	
Preoperative Wexner score		17.91 ± 2.69	16.61 ± 2.75	**0.05**
% Reduction in Wexner score		21 ± 7	55 ± 18	<**0.001**
Rectocele size (cm)	Preoperative	4.68 ± 0.78	4.65 ± 0.83	0.88
	Postoperative	2.17 ± 0.85	1.33 ± 0.87	<**0.001**
Resting anal pressure (mmHg)	Preoperative	62.6 ± 7.3	61.5 ± 8.4	0.56
	Postoperative	65.4 ± 7.1	63.7 ± 9.9	0.44
Squeeze anal pressure (mmHg)	Preoperative	125.6 ± 20.2	132.58 ± 16.3	0.1
	Postoperative	130.7 ± 14.8	134.9 ± 17.5	0.3
Maximum tolerable volume (ml)	Preoperative	189.1 ± 41.4	210.5 ± 44.7	**0.048**
	Postoperative	161.4 ± 37.4	190 ± 37.3	**0.002**
Mean operation time in minutes		84.7 ± 28.4	67.5 ± 23.5	**0.005**
Complications (%)		7 (31.8)	13 (18.3)	0.29

Table 3 Multivariable logistic regression analysis of predictors of failure of improvement in symptoms

Variable	Odds ratio	95% confidence interval	*p*-value
Number of vaginal deliveries	0.744	0.456–1.21	0.237
Preoperative Wexner score	1.41	1.09–1.84	**0.009**
Postoperative rectocele size	2.95	1.43–6.08	**0.003**
Preoperative maximum tolerable volume	1.03	0.99–1.07	0.094
Postoperative maximum tolerable volume	0.949	0.907–0.992	**0.021**
Operation time	0.994	0.97–1.02	0.647

The analysis found that patients with a preoperative Wexner score greater than 15 were more likely to experience unsatisfactory improvement in symptoms after repair. Therefore, surgeons may counsel patients with a preoperative score >15 about the possibility of poor improvement in ODS symptoms, which may warrant further interventions postoperatively such as an adjuvant biofeedback therapy.

While the preoperative size of rectocele was not predictive of the outcome after repair, the postoperative rectocele size in the follow-up defecography was associated with a lack of significant symptom improvement. Larger residual rectocele as depicted in follow-up defecography may be the result of either inadequate plication of the rectovaginal septum or dehiscence of sutures used for repair as a result of continued postoperative straining; both can be associated with persistent or recurrent ODS symptoms. A previous study[23] used 3D/4D ultrasonography to determine how large a rectocele has to be to cause significant symptoms and concluded that a rectocele of ≥ 1.5 cm in depth is usually associated with significant symptoms.

Interestingly, the MTV in patients who did not experience improvement in symptoms was lower than that of the improved patients, both before and after surgical repair. It has been formerly reported that the MTV may be reduced in patients who have a non-compliant rectum, which may factor in the pathogenesis in constipation.[24] The reduced compliance of the rectum, as reflected by decreased MTV in our report, was originally present in non-improved patients before repair and seems to have increased after surgery, perhaps secondary to the effect of rectal wall plication that might have reduced compliance further.

Limitations of the present study include its retrospective nature that is associated with the risk of selection bias and the short-term follow-up of 1 year. Longer follow-up of the improvement in ODS after surgical intervention is essential, as long-term studies showed decreasing success and

improvement in symptoms with time after procedures for ODS such as stapled transanal rectal resection (STARR).[24,25] Therefore, prospective studies with longer follow-up are needed to ascertain the clinical utility of the predictors of failure reported in the present study.

Conclusions

Patients with a preoperative Wexner score higher than 15 and larger residual rectocele after surgery may experience little improvement of symptoms after rectocele repair. Although TPR was associated with poorer relief of symptoms than did TVR, it was not an independent predictor of failure.

Author Contributions

Sameh Emile designed the study, and contributed to data collection, analysis, and writing of the manuscript. Ahmed Elfallal contributed to data collection, analysis, and writing parts of the manuscript. Mahmud Abdelnaby and Mohamed Balata contributed to data collection, drafting, and critical revision of the manuscript.

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Conflict of Interests

The authors have no conflict of interests to declare.

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