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Recurrence of Rectal Prolapse After Surgical Repair in Women With Pelvic Organ Prolapse

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Abstract

BACKGROUND—Pelvic organ prolapse is prevalent among women with rectal prolapse.

OBJECTIVE—This study aimed to determine whether clinically significant pelvic organ prolapse impacts rectal prolapse recurrence after surgical repair.

DESIGN—A retrospective cohort.

SETTING—This study was performed at a single managed-care institution.

PATIENTS—Consecutive women undergoing rectal prolapse repair between 2008 and 2016 were included.

INTERVENTIONS—There were no interventions.

MAIN OUTCOME MEASURES—Full-thickness rectal prolapse recurrence was compared between 4 groups: abdominal repair without pelvic organ prolapse (AR–POP); abdominal repair with pelvic organ prolapse (AR+POP); perineal repair without pelvic organ prolapse PR–POP; and perineal repair with pelvic organ prolapse (PR+POP). Recurrence-free period and hazard of recurrence were compared using Kaplan-Meier and Cox proportional hazards methods. To identify potential confounding risk factors for rectal prolapse recurrence, the characteristics of subjects with/without recurrence were compared with univariable and multivariable analyses.

RESULTS—Overall, pelvic organ prolapse was present in 33% of 112 women and was more prevalent among subjects with rectal prolapse recurrence (52.4% vs 28.6%, $p = 0.04$). Median follow-up was 42.5 months; rectal prolapse recurrence occurred in 18.8% at a median of 9 months. The rate of recurrence and the recurrence-free period differed significantly between groups: AR–POP 3.8%, 95.7 months; AR+POP 13.0%, 86.9 months; PR–POP 34.8%, 42.1 months; PR+POP

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57.1%, 23.7 months ($p < 0.001$). Compared with AR–POP the HR (95% CI) of rectal prolapse recurrence was 3.1 (0.5–18.5) for AR+POP; 14.7 (3.0–72.9) for PR–POP and 31.1 (6.2–154.5) for PR+POP. Compared with AR+POP, PR+POP had a shorter recurrence-free period ($p < 0.001$) and a higher hazard of recurrence (HR, 10.2; 95% CI, 2.1–49.3).

LIMITATIONS—The retrospective design was a limitation of this study.

CONCLUSIONS—Pelvic organ prolapse was associated with a higher rectal prolapse recurrence rate and earlier recurrence in women undergoing perineal, but not abdominal, repairs. Multidisciplinary evaluation can facilitate individualized management of women with rectal prolapse. Abdominal repair should be considered in women with concomitant rectal and pelvic organ prolapse. See **Video Abstract**, at <http://links.lww.com/DCR/A513>.

Keywords

Pelvic floor disorders; Pelvic organ prolapse; Rectal prolapse; Surgical outcomes

Rectal prolapse (RP) is a morbid condition that mainly affects women, especially those over 50 years of age.^{1–3} Epidemiologic studies demonstrate that pelvic floor disorders, particularly pelvic organ prolapse (POP), are common among women with RP, with reported prevalence between 21% and 34%.^{4,5} These rates are substantially higher than the 3% to 6% POP rate in the general female population over age 50,^{6,7} making awareness and proper diagnosis of concomitant POP essential for comprehensive treatment of women with RP.^{8–14} Published studies advocate that women with RP should be managed by a multidisciplinary team, including colorectal and pelvic reconstructive surgeons.⁵ To date, a unifying cause responsible for the pathogenesis of these conditions has not been elucidated, but high prevalence of POP among women with RP raises the possibility of a common etiologic pathway.

Rectal prolapse repairs are associated with high failure rates, often necessitating reoperations, which increase morbidity and healthcare costs.³ The best surgical approach for treatment of RP remains to be determined, with the most recent Cochrane review unable to establish the superiority of abdominal vs perineal repairs based on existing randomized trials.¹⁵ Despite this, current clinical guidelines recommend abdominal RP repair in appropriate patients, because of the increased failure rates of perineal approaches reported in existing studies.³

Although it has been well established that POP and RP often coexist, to our knowledge, the relationship between POP and RP recurrence (RPR) after surgical repair has not been previously explored. Therefore, the primary objective of this study was to test the hypothesis that RPR rates are higher in women with clinically significant POP relative to women without POP. Given the notion that RPR might be greater after perineal vs abdominal repairs, as suggested by existing literature,^{2,16–20} we also aimed to assess the combined effect of POP and surgical route on outcomes of RP repair.

MATERIALS AND METHODS

This retrospective cohort study of consecutive women who underwent RP repair by 3 board-certified colorectal surgeons at our institution between 2008 and 2016 was approved by the Southern California Kaiser Permanente Institutional Review Board. With the use of electronic medical records, subjects were identified by a combination of *International Classification of Diseases, Ninth Revision* and *Tenth Revision* codes for RP (569.1, K62.3) and *Current Procedural Terminology* codes for Delorme (45505), Altemeier (45130), abdominal resection rectopexy (45402), or abdominal nonresection suture or mesh rectopexy (45400). Procedures were verified by the review of medical records. Subjects undergoing emergent procedures were excluded.

The primary outcome of interest was RPR, defined as full-thickness RP after initial surgical repair. Subjects with RPR were identified through the review of medical records. The primary exposure of interest was clinically significant POP, defined as at least one of the following: POP symptoms, POP at/beyond the hymen, or history of POP repair.

Demographic and clinical characteristics thought to potentially impact the rate of RPR were abstracted from medical records (Table 1). We assessed the Charlson Co-morbidity Index,²¹ instead of the ASA classification, given the narrow range of ASA classes within our cohort.

To determine the combined effect of POP and repair route on RPR, subjects were categorized into groups based on POP and the type of surgical approach (POP/surgery type). Abdominal repairs (ARs) included resection and nonresection rectopexies, and perineal repairs (PRs) included Delorme and Altemeier procedures. The following 4 groups were compared: 1) AR without POP (AR–POP); 2) AR with POP (AR+POP); 3) PR without POP (PR–POP); and 4) PR with POP (PR+POP). Univariable analysis of potential confounders for RPR was conducted using χ^2 and Student *t* tests for categorical and continuous variables. Significant variables ($\alpha < 0.1$) were included in stepwise backward binomial logistic regression analysis to identify independent association with RPR. Age and connective tissue disorder (CTD)/myopathy were included in the regression analysis a priori, because of the high biological plausibility of their effect on both the outcome and the exposure of interest.^{4,22–24} Given the heterogeneity of the POP group and potential that women undergoing combined POP and RP repairs may behave differently with respect to recurrence, sensitivity analysis was performed after excluding women undergoing combined repairs. Comparisons were repeated with the statistical tests noted above. Given differences in follow-up time, recurrence-free period (months) and the risk of RPR were compared between groups by using Kaplan-Meier and Cox proportional hazards methods. The Breslow test was chosen for statistical interpretation of survival analyses, because log-rank test assumptions were not satisfied. Results for univariable comparisons are presented as mean $\pm$ SD, and those for survival analyses are presented in mean $\pm$ SEM. All analyses were performed using Statistical Package for the Social Sciences (SPSS, Chicago, IL), version 24.

RESULTS

Among the 112 women who constituted the study cohort, 67% underwent RP repair via the abdominal route (75/112), including 43 of 75 (57.3%) resection rectopexies and 32 of 75

(42.7%) nonresection rectopexies. The majority of ARs were performed using minimally invasive conventional laparoscopic or robotic-assisted approaches, including 30 of 32 (93.8%) nonresection and 35 of 43 (81.4%) resection rectopexies. Perineal repairs were performed in 33% (37/112), including 20 of 37 (54.1%) Delorme and 17 of 37 (45.9%) Altemeier procedures. Median time to death or last follow-up was 42.5 months (range, 1–100). Eleven subjects (9.8%) died during the follow-up period. The overall complication rate was 31.8%, with an average Clavien-Dindo score of 1.94. The rate of minor complications was 11.8%, and the rate of major complications, defined as Clavien-Dindo classification 2, was 20%. Comparisons between ARs and PRs did not reveal a significant difference in the rate of overall complications (AR 35.6% vs PR 24.3%, $p = 0.3$), minor complications (AR 15.1% vs PR 5.4%, $p = 0.2$), or major complications (AR 20.5% vs PR 18.9%, $p = 0.8$).

The overall rate of RPR, diagnosed at a median of 9 months (1–79), was 18.8% (21/112). Women with and without RPR did not differ with respect to most demographic and clinical characteristics examined (Table 1). However, subjects with RPR were more likely to have undergone PR (76.2% vs 23.8%, $p < 0.001$) and to smoke at the time of RP surgery (23.8% vs 4.4%, $p = 0.01$). The rate of RPR after abdominal resection rectopexies (4.7%) was similar to nonresection (9.4%) rectopexies ($p = 0.6$), as well as after Delorme (45.0%) compared with Altemeier (41.2%) procedures ($p = 0.8$).

Thirty-three percent (37/112) of women met criteria for POP. In the vast majority (33/37, 89.2%), POP was diagnosed based on objective Pelvic Organ Prolapse Quantification (POP-Q) examination. Among subjects for whom POP-Q examination was available, anterior and posterior compartments constituted the leading edge of POP in 15 of 33 (45.5%) and 11 of 33 (33.3%). The remaining 7 of 33 (17.7%) subjects with POP had predominantly apical prolapse. All women with subjective POP symptoms were among these 33 subjects. In the remaining 4 of 37 (10.8%) women, POP was diagnosed based on history of POP surgery before RP repair, with 2 subjects having undergone posterior colporrhaphy: 1, anterior colporrhaphy; and 1, vaginal hysterectomy for apical prolapse.

There was a significantly higher rate of POP among subjects who developed RPR (52.4%) than among those who did not (28.6%), $p = 0.04$. Importantly, women with and without POP did not differ with respect to either the surgical approach for RP repair ($p = 0.4$) or smoking status ($p = 0.3$). The rates of RPR, which increased with both concomitant POP and perineal route of surgery, were as follows: 3.8% for AR–POP, 13.0% for AR+POP, 34.8% for PR–POP, and 57.1% for PR+POP. Four subjects underwent concomitant POP repairs, performed by board-certified Female Pelvic Medicine and Reconstructive Surgery specialists at the time of RP repair. Two underwent sacrocolpopexy concomitantly with nonresection rectopexy, one underwent extraperitoneal colpopexy and posterior colporrhaphy at the time of a Delorme procedure, and one underwent posterior colporrhaphy concomitantly with resection rectopexy. None of these 4 patients experienced RPR.

The only factor independently associated with RPR on multivariable regression analysis was POP/surgery type (Table 2). It is notable that POP did not confer a higher risk of RPR in women who had AR (OR, 4.8; 95% CI, 0.6–42.7 for AR+POP vs AR–POP). Even though PR was associated with a higher RPR rate for all women, the risk of RPR was further

dramatically increased in women with POP who underwent PR, relative to women without POP. Compared with the AR–POP group, designated as a reference group, the OR for RPR was 136.5 (95% CI, 8.1–2295.3) in PR+POP, substantially exceeding that of PR–POP group (OR, 55.9; 95% CI, 3.3–940.1). After backward stepwise elimination, the only variable remaining in the final model was POP/surgery type. In the final model, using AR–POP as the reference group, the ORs for RPR for each group were as follows: AR+POP 3.8 (95% CI, 0.6–24.2), PR–POP 13.3 (95% CI, 2.6–69.7), and PR+POP 33.3 (95% CI, 5.7–194.9).

Sensitivity analysis was performed excluding subjects ($n = 4$) who underwent concomitant POP and RP repair. The relationship between POP and RPR persisted (13.3% for no POP vs 33.3% for POP, $p = 0.02$). Results were also similar on multivariable regression analysis, in which, compared with AR–POP, AR+POP conferred OR 2.7 (95% CI, 0.4–19.0), PR–POP OR 12.4 (95% CI, 2.3–68.1), and PR+POP OR 38.4 (95% CI, 6.0–245.3). Interestingly, in this analysis, current smoking conferred an independent risk of RPR (OR, 7.9; 95% CI, 1.3–48.5).

Average time to recurrence differed significantly between groups, with the longest recurrence-free period in AR–POP (95.7 ± 3.0 months), compared with AR+POP (86.9 ± 6.7 months), PR–POP (42.1 ± 7.1 months), and PR+POP (23.7 ± 6.3 mo.), $p < 0.001$ (Fig. 1). Interestingly, pairwise comparisons revealed a similar time to recurrence between AR–POP and AR+POP (95.7 vs 86.9 months, $p = 0.5$), but nearly double the length of recurrence-free period in PR–POP, compared with PR+POP (42.1 vs 23.7 months, $p < 0.018$). Among subjects with POP, the recurrence-free period was 4 times longer in AR+POP, compared with the PR+POP group (86.9 vs 23.7 months, $p < 0.001$). Relative to AR–POP, Cox proportional hazards ratios (HR (95% CI)) for RPR were as follows: AR+POP: 3.1 (0.5–18.5), PR–POP: 14.7 (3.0–72.9) and PR+POP: 31.1 (6.2–154.5). Hazard of recurrence was also higher for PR+POP relative to AR+POP (HR, 10.2; 95% CI, 2.1–49.3).

DISCUSSION

To our knowledge, this is the first study to demonstrate a relationship between clinically significant POP and recurrence after primary RP repair. In our cohort of 112 female subjects, the prevalence of clinically significant POP was 33%, consistent with reported POP rates in women with RP,^{3–5} and substantially greater than the 3% to 6% rate in the age-comparable general female population.^{6,7} Among subjects who underwent perineal RP repair, the rate of RPR was significantly higher in women with POP (57.1%), compared with women without POP (34.8%). In subjects without POP, hazard of RPR was significantly higher after perineal RP repair (HR, 14.7), compared with the outcomes observed in the abdominal rectopexy group. Importantly, the risk of RPR after PR was further dramatically increased in women with POP (HR, 31.1). In contrast, the presence of POP did not significantly alter the risk of RPR after AR (Table 2). Both POP and perineal surgical routes were associated with earlier recurrence of RP, with the shortest recurrence-free period in subjects with POP undergoing PR (Fig. 1).

It is important to note that, despite the overall high rate of POP in this cohort, POP was substantially more prevalent in subjects with RPR relative to women who had successful RP

repair. These results support our hypothesis that POP is not only associated with primary RP, but it also serves as a risk factor for RPR after surgical repair. Another important finding of our study is that the coexistence of POP and RP is associated with substantially higher recurrence rates and earlier time to RPR in women undergoing primary PR of RP. In contrast, abdominal approaches for RP repair appear to mitigate this risk, with comparable patterns of RPR in women with and without concomitant POP. Interestingly, the significantly higher failure rate of perineal but not abdominal RP repairs in women with POP, identified in this study, resonate with the data in the field of female pelvic medicine. Published studies comparing outcomes of various surgical modalities for POP correction favor abdominal sacrocolpopexies over vaginal native tissue repairs. The most recent Cochrane review on this topic reports a 41% rate of POP recurrence after vaginal repairs, compared with 23% after abdominal sacrocolpopexy, as well as higher rates of reoperation for prolapse (RR, 2.3) and recurrent bothersome prolapse symptoms (RR, 2.1) after vaginal procedures. It would, therefore, prove fruitful to explore possible common etiologic pathways that account for the increased success of abdominal surgical approaches for POP and RP repair in the future. Our findings provide a compelling argument for surgeons to strongly consider ARs in women with concomitant POP and RP. To take POP into account during preoperative planning and to facilitate individualized counseling, it is essential that female patients with RP be assessed for the presence of POP. Integrated care of women with rectal prolapse by female pelvic medicine and colorectal surgery specialists would enable standardized assessment of pelvic organ support via a validated POP-Q examination.^{25,26} In line with previously proposed recommendations,^{3,5} our study provides further evidence in support of multidisciplinary management of women with RP and routine screening for POP.

It has been previously suggested that connective tissue aberrations constitute a common etiologic pathway underlying both RP and POP.^{4,24} This notion is strengthened by the observations of higher rates of RP and POP among women with hereditary CTDs, such as Marfan and Ehlers-Danlos syndrome,^{23,27} and alterations in elastin composition and metabolism.^{28,29} Although CTD/myopathy was not significantly associated with RPR in our study, likely because of the small numbers, it is possible that some women had undiagnosed or subclinical connective tissue abnormalities that predisposed them to RP, POP, and RPR. Consistent with previously published findings,²² we did not identify aging as an independent risk factor for RPR. We also explored whether smoking is a risk factor for RP repair failure, given a well-known detrimental impact of smoking on tissue regeneration.³⁰ Smoking, however, was not an independent risk factor for RPR in our overall cohort, although an independent association was found after excluding those patients undergoing concomitant POP and RP repair.

Strengths of our study include the uniform operative technique by 3 surgeons at a single institution and a stable managed-care population, enabling long-term follow-up. Limitations of this study are inherent to its retrospective design and the small number of subjects in some of the groups. Consistent with practice patterns across other institutions in the United States, our patients are not scheduled for routine surveillance examinations by colorectal surgeons after RP repair outside the immediate postoperative period, which could potentially result in the underestimation of RPR. However, the rate of RPR identified in the current study is consistent with the published literature. Furthermore, to address the above, we

capitalized on the advantages offered by our closed managed-care organization. We used time to last encounter as a surrogate for time to last follow-up, based on the assumption that patients with RPR who continue to receive primary and other specialty care within our organization would present to our group for reevaluation. Future studies with standardized follow-up intervals will be useful. Also, not all women included in the cohort had undergone a standardized POP-Q examination. Even though routine screening for POP has not been instituted at the time of this study, POP at/ distal to the hymen, a well-established metric of clinically relevant POP and surgical failure, would be apparent during the examination of RP conducted in all subjects. Importantly, POP at/distal to the hymen strongly correlates with POP symptoms. Thus, we defined clinically significant POP as history of POP surgery, subjective report of vaginal bulge, and POP at or beyond the hymen, because these are well-established metrics of clinically relevant POP and surgical failure of POP repairs.^{31–33} Importantly, the majority of women categorized as having POP in our cohort (33/37, 89.2%) had undergone POP-Q examination, with the remaining subjects categorized as having POP based on a history of POP surgery. We conducted sensitivity analysis after excluding women who underwent combined RP and POP procedures to confirm that the inclusion of these women was not skewing our results; the significant positive association between RP and POP persisted on both univariate and logistic regression analysis.

Given that only 4 subjects in our cohort underwent concomitant RP and POP repairs, the numbers were too small for meaningful analysis to be conducted in this subgroup. To date, there are no published randomized control trials evaluating the role of POP correction on the outcomes of RP repairs. A recent retrospective study of 59 women who underwent ventral rectopexy with concurrent sacrocolpopexy or hysteropexy demonstrated a 57.4% composite success rate, defined as the absence of subjective and objective recurrent pelvic organ or RP at a median follow-up of 17 months.³⁴ Prospective trials investigating the impact of concomitant RP and POP repairs on surgical outcomes are an important area for future research. Despite these limitations, our study contributes important novel information regarding the impact of POP on recurrence patterns after surgically treated primary RP.

CONCLUSION

The overall rate of RPR is higher in women with pelvic organ prolapse than in those without. Perineal RP repairs are associated with substantially higher risk of RPR and shorter time to recurrence in women with both rectal and pelvic organ prolapse, compared with women who do not have pelvic organ prolapse. Abdominal approaches for treatment of RP appear to mitigate the additional risk of procedure failure in women with pelvic organ prolapse. Surgeons should strongly consider abdominal RP repair in women with concomitant rectal and pelvic organ prolapse. We recommend that women with RP undergo a multidisciplinary evaluation and routine screening for pelvic organ prolapse to facilitate individualized preoperative counseling. Future prospective studies are needed to further evaluate the impact of pelvic organ prolapse on RPR patterns following surgical repair and to evaluate potential common etiologic pathways accountable for these morbid conditions.

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FIGURE 1.

Comparison of recurrence-free period, in months, after surgical rectal prolapse repair between the following groups: 1) abdominal repair without pelvic organ prolapse (AR-POP); 2) abdominal repair with pelvic organ prolapse (AR+POP); 3) perineal repair without pelvic organ prolapse (PR-POP), and 4) perineal repair with pelvic organ prolapse (PR+POP).

TABLE 1

Demographic and clinical characteristics of women with and without rectal prolapse recurrence (RPR) following primary surgical repair

Characteristic	No RPR proportion, % (n) n = 91	RPR proportion, % (n) n = 21	p value ^a
Age, y ^b			0.13
20–59	26.4 (24)	19.0 (4)	
60–79	51.6 (47)	38.1 (8)	
80	22.0 (20)	42.9 (9)	
Race/ethnicity			0.86
White	79.6 (74)	90.5 (19)	
Black	1.1 (1)	0	
Asian	4.4 (4)	4.8 (1)	
Hawaiian/Pacific Islander	1.1 (1)	0	
Hispanic	11.1 (10)	4.8 (1)	
BMI, kg/m ² ^c	23.8 ± 4.2	23.5 ± 4.1	0.79
Parity ^c	2.2 ± 1.9	2.8 ± 1.6	0.27
Hysterectomy Smoking	47.3 (43)	52.4 (11)	0.81
Current	4.4 (5)	23.8 (5)	
Former	34.1 (31)	28.6 (6)	
Never	61.5 (56)	47.6 (10)	
Connective tissue disorder/myopathy	8.8 (8)	4.8 (1)	1
Charlson Comorbidity Index ^c	1.1 ± 1.5	1.6 ± 1.8	0.16
Constipation	37.4 (34)	33.3 (7)	0.73
Fecal incontinence	51.6 (47)	66.7 (14)	0.21
Pelvic organ prolapse (POP)	28.6 (26)	52.4 (11)	0.04
Type of surgery			<0.001
Abdominal resection rectopexy	45.1 (41)	9.5 (2)	
Abdominal nonresection rectopexy	31.9 (29)	14.3 (3)	
Perineal Delorme repair	12.1 (11)	42.9 (9)	
Perineal Altemeier repair	11 (10)	33.3 (7)	
POP/type of surgery			<0.001
Abdominal repair/no POP	96.2 (50)	3.8 (2)	
Abdominal repair + POP	87.0 (20)	13.0 (3)	
Perineal repair/no POP	65.2 (15)	34.8 (8)	
Perineal repair + POP	42.9 (6)	57.1 (8)	

^a p values derived from analyses of continuous variables using unpaired Student *t* tests and of categorical variables using χ^2 or Fisher exact tests.

^b Age categories determined by quartiles within cohort.

^c Results presented as mean ± SD.

TABLE 2

Categorized dependent binomial analysis with RPR as primary outcome

Characteristic	No RPR proportion, % (n) n = 91	RPR proportion, % (n) n = 21	OR	95% CI
POP and surgical route				
AR–POP	96.2 (50)	3.8 (2)	Ref	Ref
AR+POP	87.0 (20)	13.0 (3)	4.8	0.6–42.7
PR–POP	65.2 (15)	34.8 (8)	55.9	3.3–940.1
PR+POP	42.9 (6)	57.1 (8)	136.5	8.1–2295.3
Smoking				
Never smoker	4.4 (5)	23.8 (5)	Ref	Ref
Current smoker	34.1 (31)	28.6 (6)	5.3	0.8–33.2
Former smoker	61.5 (56)	47.6 (10)	1	0.3–3.7
Age, y ^a				
20–59	26.4 (24)	19.0 (4)	Ref	Ref
60–79	51.6 (47)	38.1 (8)	0.12	0.01–1.4
80	22.0 (20)	42.9 (9)	0.14	0.01–2.1
Connective tissue disorder/myopathy	8.8 (8)	4.8 (1)	1.7	0.1–22.1

The odds ratios were obtained from the multivariable logistic regression model.

POP = pelvic organ prolapse; AR–POP = abdominal repair without pelvic organ prolapse; AR+POP = abdominal repair with POP; PR–POP = perineal repair without POP; PR+POP = perineal repair with POP; RPR = rectal prolapse recurrence.

^aAge categories determined by quartiles within cohort.