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Depressive symptoms in women seeking surgery for pelvic organ prolapse

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Abstract

Introduction and hypothesis—To compare depressive symptoms in women with and without prolapse and evaluate impact on quality of life.

Methods—This is a secondary analysis of a case–control study assessing the effect of prolapse on body image. Cases had prolapse and sought surgery (Pelvic Organ Prolapse Quantification stage ≥2). Controls had stage ≤1. Subjects completed the Pelvic Floor Impact Questionnaire (PFIQ), Pelvic Floor Distress Inventory, and the Patient Health Questionnaire-9 (PHQ-9) at baseline. Cases completed measures 6 months post-operatively. We report: (1) the comparison of cases and controls at baseline and (2) comparison of baseline and post-operative scores in cases.

Results—Baseline questionnaires were completed by 75 cases and 65 controls; 57 cases completed post-operative measures. Cases were 5-fold more likely than controls to have depressive symptoms. Cases with depressive symptoms had higher PFIQ scores than cases without symptoms. PHQ-9 scores improved post-operatively.

Conclusions—Depressive symptoms are common in women with prolapse and a decrease following surgical treatment.

Keywords

Depressive symptoms; Quality of life; Pelvic organ prolapse; Surgery

Introduction

Pelvic organ prolapse refers to the descent of the pelvic organs into or outside of the vaginal canal. The majority of women with bulging 1 cm past the hymen report bother [1]. Prolapse affects half of women over the age of 50 and is a common indication for gynecologic surgery in these women [2]. Olsen found that women have an 11% risk of undergoing at least one surgery for prolapse or incontinence over their lifetime [3]. Direct costs of surgery for prolapse are over $1 billion per year [2]. As the population ages, it is estimated that the rate of women seeking treatment for prolapse will double [4].

Despite the prevalence of prolapse, we know very little about the emotional and social distress of women affected by it. While depression has been found to be highly prevalent in women with urinary incontinence [5-7] and is known to be the leading cause of disability in

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Conflicts of interest None.

women worldwide [8], nothing is known about the relationship between prolapse, major depression, anxiety disorders, and quality of life (QOL). The objective of our study was to compare depressive symptoms in women with and without prolapse and evaluate the impact of depressive symptoms on QOL before and after surgery for prolapse. We hypothesized that women seeking surgery for prolapse would have more depressive symptoms than women without prolapse. We also hypothesized that depressive symptoms impact QOL in women with prolapse before and after surgery and that symptoms are likely to lessen after surgical correction of prolapse.

Methods

This study was approved by the University of Pittsburgh institutional review board (IRB). This is a secondary analysis of an IRB-approved prospective cohort study of 75 women planning surgery with stage II prolapse or higher. Subjects were enrolled as part of a larger parent case–control and longitudinal cohort research study designed to assess the impact of prolapse on body image between February 2005 and December 2006. Sample size achieved the accrual goals of the parent study as determined by sample size calculation based on body image primary outcome. Likewise, the sample size for this secondary analysis was sufficiently robust for the analyses planned.

In the parent study, cases were enrolled from a urogynecology referral practice and completed self-administered measures at baseline and at 6 months after surgery. Controls were enrolled from a general gynecology university practice. Cases and controls were sexually active women ≥40 years of age. Cases were defined as women with symptomatic prolapse seeking surgical correction. Symptomatic prolapse was defined as Pelvic Organ Prolapse Quantification (POPQ) stage II or higher and answered “yes” to one or both of the following questions: (1) Do you usually have a sensation of bulging or protrusion from the vaginal area? (2) Do you usually have a bulge or something falling out that you can see or feel in the vaginal area? Women not desiring surgical reconstruction were excluded. Since obliterative procedures may have a unique relationship to body image, women seeking these procedures were excluded from the parent study. Controls were defined women without symptomatic prolapse. Controls had POPQ stage I or lower and answered “no” to both above questions. Controls did not undergo surgery. Women who were not sexually active and women who were unable to provide informed consent were excluded from participation.

At the initial study visit, subjects completed self-administered measures and were evaluated by standard urogynecologic clinical examination. Demographic, surgical history, and medications were obtained from the clinical chart. Self-administered measures included the Pelvic Floor Distress Inventory (PFDI) [9], Pelvic Floor Impact Questionnaire (PFIQ) [9], and Patient Health Questionnaire-9 (PHQ-9) [10]. The POPQ examination was performed at the time of baseline clinical examination [11]. Cases only proceeded to have surgery. The type and route of reconstructive surgery were chosen by the patient and physician. Subjects were given self-administered measures at the 6-month post-operative visit, and POPQ was performed at that time.

The PFDI and PFIQ were used to evaluate the impact of pelvic floor disorders on health-related QOL. The PFDI and PFIQ are validated, self-administered questionnaires that measure pelvic floor symptom bother and impact, respectively. Each questionnaire is composed of three subcategories. The PFDI assesses symptom distress and contains three subscales, the Urinary Distress Inventory (UDI), Pelvic Organ Prolapse Distress Inventory (POPDI), and Colorectal-anal Distress Inventory (CRADI) assessing urinary, pelvic, and colorectal symptoms. The PFIQ assesses the life impact of pelvic floor symptoms and contains three scales: Incontinence Impact Questionnaire, Pelvic Organ Prolapse Impact

Questionnaire (POPIQ), and Colorectal-anal Impact Questionnaire. The three PFIQ scales ask, “Do symptoms or conditions related to the following cause you to experience any of the following feelings?” Higher scores indicate worse symptoms.

The PHQ-9 is a validated measure of depression severity that correlates highly with the diagnosis of major depression by the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM). The PHQ-9 was chosen as a general depression measure to control for depression while assessing the impact of prolapse on body image in the parent study. The PHQ-9 was also validated in the ambulatory gynecologic population [12]. The measure can be scored in two ways: (1) continuous symptom score and (2) major depressive disorder diagnosis. Total scores of ≥10 correlate with moderate to severe depressive symptoms. Total scores of <10 correlate with none to minimal depression symptoms. A diagnosis of major depressive disorder is made if at least five questions, including question 1 or 2, are scored with answers greater than 1 and if symptoms have been present for more than 2 weeks.

The analysis presented consists of two main parts: (1) a comparison of cases and controls at baseline for dependent measures indicating depressive symptoms and (2) a longitudinal comparison of cases at baseline and 6 months post-operatively. Depressive symptoms were categorized into present if the PHQ-9 score was ≥10 or absent if scored <10.

The mean and 95% confidence interval (CI) were calculated for the PFDI subscales, PFIQ subscales, and their change scores. Non-parametric variables are usually described/ compressed using a median. Using a median value leaves a measurement for dispersion in question. Means and 95% CI are often robust enough to capture the measure of central tendency and dispersion rather than using the median without a measure of dispersion. We have chosen to use means and 95% CI depending upon their robustness for small to medium deviations from a parametric distribution. Continuous variables were compared using two independent sample *t* tests. Categorical variables were tested between cases and controls using a chi-squared statistic.

A logistic regression model was fitted with cases and controls as the dependent variable, and an adjusted estimate of the odds of depressive symptoms was created. The case–control study design is incompatible with examining exposure variables as dependent [13]. Variables associated with case–control status were chosen to evaluate for potential confounding. These variables were added to models by forward stepping and were left out of the final model if they were no longer associated with case–control status when other potential confounders were also in the model. These variables included age, race, smoking, PFDI, PFIQ, and urinary incontinence. Two logistic regression models were fitted only among cases. The first model among cases at baseline used depressive symptoms at baseline as the dependent variable, while the second model used post-operative depressive symptoms as the dependent variable. The adjusted odds of risk associated with various variables were estimated. For the first, we tested age, body mass index (BMI), baseline leading edge of prolapse, baseline PFDI and baseline PFIQ scores, and urinary and fecal incontinence. For the second, age, baseline PFIQ and PFDI scores, baseline depressive symptoms, post-operative PFIQ and PFDI scores, and post-operative leading edge (as proxy for success) were tested for their potential confounding effect.

Missing data for questionnaires in this study were handled per the methods described in the questionnaire validation manuscripts or by single regression imputation using STATA software (version 8.0; STATA Corporation, College Station, TX, USA) [14-16].

Results

Of 82 cases and 73 controls enrolled, 75 cases and 65 controls had completed baseline questionnaires. Six-month post-operative data were available for 57 cases. Demographic characteristics of the population are displayed in Table 1.

Cases had a mean leading edge of prolapse of +3.3±2.0 cm and controls had a leading edge of −2.3±0.6 cm ($P<0.001$) relative to the hymen, corresponding to a median stage of 3 in cases and a median stage of 1 in controls and consistent with what one would expect based upon case–control definitions. Baseline distribution of prolapse in cases by POPQ stage was as follows: stage II 6/57 (10%), stage III 47/57 (83%), and stage IV 4/57 (7%). Controls had POPQ stage 1 or lower and answered no to both questions regarding vaginal bulging.

Baseline depression scores in cases and controls are summarized in Table 2. Subjects with prolapse had significantly increased prevalence of depression. At baseline, 17/75 (22%) cases had moderate to severe depressive symptoms, while 58/75 (77%) had none to minimal symptoms. Surprisingly, cases with depressive symptoms and those with minimal symptoms listed similar use of antidepressant medication at baseline [4/17 (24%) versus 8/58 (14%), respectively; $P=0.5$]. Data regarding medication doses were inconsistent. In six of nine cases in which doses were reported, doses used were at or below lowest dose of recommended range. Doses were not recorded for controls.

Cases underwent the following surgeries: sacrocolpopexy 42/57 (57%), uterosacral ligament suspension 7/57 (12%), insertion of vaginal mesh 6/57 (11%), posterior colporrhaphy 2/57 (3%), and 35/57 (46%) had a concomitant urinary incontinence. Interestingly, depressive symptoms significantly decreased post-operatively. Six months after surgery, only five (9%) of cases had moderate to severe depressive symptoms representing a 12% decrease from baseline. All five subjects had moderate to severe depressive symptoms at baseline. At baseline, women with depressive symptoms had higher PFIQ scores compared to women without depressive symptoms. PFIQ scores in all subcategories were 2-fold higher (worse) in women with depressive symptoms compared to women without depressive symptoms.

PFDI, PFIQ, and PHQ-9 scores improved post-operatively in cases with and without depressive symptoms (see Table 3). Post-operative PFIQ scores, while not statistically different between women with and without depressive symptoms, were 2-fold higher in women with pre-operative depressive symptoms (see Table 4).

Several multivariable logistic regression models were developed. In the first model, the dependent variable was defined as the cases and controls with the control group serving as the reference. After controlling age, symptoms, and bother, cases were five times more likely to have depressive symptoms (odds ratio, OR=5.5; 95% CI 1.2–25.7, $P=0.03$). Independent variables included depressive symptoms (PHQ-9 ≥10), age, total PFDI score, and total PFIQ score. These independent variables were retained in the model because they were statistically significantly associated with group status (case or control).

Two additional models were created using only cases. In the first of these, variables predicting depression in cases were investigated. The dependent variable was defined as baseline depressive symptoms versus no baseline depressive symptoms, with no depressive symptoms serving as the reference. After accounting for symptoms, including urinary incontinence and fecal incontinence, BMI, and extent of prolapse, elevated total PFIQ score was independently associated with an increased risk of depressive symptoms (OR=1.005, 95% CI 1.002–1.008, $P=0.001$). The clinical interpretation of this finding is that a 100-point increase in PFIQ score yields a 50% increase in depressive symptoms.

In the second analyses using only cases, variables predicting post-operative depressive symptoms for cases were investigated. In these models, the dependent variable was defined as post-operative depressive symptoms versus no post-operative depressive symptoms, with no depressive symptoms serving as the reference. In separate models, higher pre-operative total PFIQ scores (OR=1.012, 95% CI 1.003–1.020, *P*=0.011) and post-operative total PFIQ scores (OR=1.013, 95% CI 1.004–1.021, *P*=0.003) were associated with post-operative depressive symptoms after controlling for baseline PFIQ scores, pre-operative PHQ-9 score, concomitant incontinence procedure, and post-operative leading edge. The clinical interpretation of these findings is that a 100-point increase in pre-operative PFIQ score yields a 120% increase in risk of post-operative depressive symptoms.

In an attempt to summarize these findings in a clinically significant way, we dichotomized total PFIQ scores to ≥200 and <200. At baseline, women with PFIQ scores ≥200 (comprising 51% of cases) were seven times more likely to have depressive symptoms (OR=7.5, 95% CI 1.5–36.3, *P*=0.01). Post-operatively, women with scores ≥200 (comprising 10% of cases) were 10 times more likely to have depressive symptoms. (OR=10.2, 95% CI 1.35–77, *P*=0.02).

Discussion

To our knowledge, this is one of the first studies investigating depressive symptoms in women with pelvic organ prolapse. We found that women seeking treatment for pelvic organ prolapse have a higher prevalence of depressive symptoms compared to controls without prolapse. Within the group of women with prolapse, women with baseline depressive symptoms reported a lower QOL with higher PFIQ scores than women without baseline depressive symptoms. PFIQ scores and depressive symptoms improve dramatically following surgery in cases.

In this study, women with pelvic organ prolapse had a higher prevalence of depressive symptoms compared to controls without prolapse. This finding likely only hints at the complex interactions between chronic burdens, risk factors, prolapse, its sequelae, and psychological variables. We hypothesize that prolapse has behavioral and psychological implications, which affect both health-related QOL and condition-specific QOL. Prolapse may increase symptoms of depression and anxiety, while symptoms of depression and anxiety may impact health behavior, symptom burden, QOL, and functional impairment pre- and post-operatively. Surgery aims to improve QOL by correcting the prolapse. We found that surgery leads to a dramatic improvement not only in condition-specific QOL but also in depressive symptoms.

Cases with baseline depressive symptoms reported a lower QOL with higher PFIQ scores than cases without baseline depressive symptoms. Since the PFIQ includes questions about nervousness/anxiety, fear, embarrassment, depression, frustration, and anger, one may question whether the measure itself is a confounder. Supplementary analyses were performed removing the “emotional” questions from the PFIQ. Even without these emotional questions, the adjusted PFIQ score remains significantly related to the risk of depressive symptoms among subjects with prolapse. This would suggest that the PFIQ measures other aspects of prolapse, which affect QOL and interrelate with symptoms of depression. Among cases, when total PFIQ scores were dichotomized to <200 and ≥200, the scores ≥200 were associated with a 7-fold risk of depressive symptoms pre-operatively and 10-fold risk post-operatively. For clinicians, this strongly suggests that PFIQ scores ≥200 may warrant further screening for depression.

Surgeons might question why depression screening is important. There is a growing body of literature suggesting that depressive symptoms impact surgical outcomes. Depressed patients having laparoscopic anti-reflux procedures had less symptom relief than the non-depressed [17]. Depression was also found to be an important risk factor for cardiac events after Coronary Artery Bypass Graft Surgery (CABG) [18]. Twelve months after CABG 27% of patients meeting pre-operative DSM-IV criteria for major depression experienced a cardiac event compared to 10% who were not depressed. Psychological well-being was shown to be predictive of long-term recovery and likelihood of improvement from knee arthroplasty [19]. Depression and cognitive impairment were also predictive of negative outcomes in elderly patients' rehabilitating from hip fracture [20]. It is hypothesized that depression and/or anxiety may impair positive health behaviors. As in other surgeries, depressive symptoms may have an impact on recovery from reconstructive pelvic floor surgery.

Because this was an ancillary analysis of a study designed to assess the impact of prolapse on body image, this study does not investigate possible confounders that could impact depressive symptoms scores and QOL such as other chronic medical problems, current or past history of depression, and social stressors. While symptoms of urinary incontinence were accounted for in the models, urge and stress urinary incontinence were not evaluated separately, and data regarding diabetes mellitus, hypertension, and other medical comorbidities were not collected. This study focused only on patients presenting for surgical management, and hence the findings of this study cannot be generalized to all women with prolapse. It is unknown whether women with depressive symptoms may be more bothered and present to surgery, or if perhaps women with depressive symptoms are less likely to seek care. In using a case–control design, it is also impossible to ascribe temporal relationships to the variables we included in the analysis. Thus, we cannot make conclusions in regards to whether depressive symptoms are a risk for or a consequence of prolapse.

Despite these limitations, this is one of the first studies reporting depressive symptoms in women with pelvic organ prolapse and the impact of surgery on depressive symptoms. With its prospective follow-up of 6 months, this study provides a longitudinal perspective of health-related QOL post-operatively. From the reported findings, we conclude that depressive symptoms are more common in women seeking care for pelvic organ prolapse compared to controls without prolapse. Pelvic floor disorders appear to have a greater impact on QOL in women with depressive symptoms as measured by PFIQ before and after surgery. Depressive symptoms appear to improve following reconstructive surgery. The relationship between depression, QOL, and pelvic floor symptoms needs further study to understand the true impact of prolapse and the effects of surgery on women.

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Table 1

Demographics

	Cases (*N*=75)	**Controls (*N*=65)**	***P*-value**
Mean age (years)	60.0±8.14	53.6±7.7	<0.01
BMI (kg/m^2)	28.4±5.4	28.9±10.2	0.7
Smoking	5 (6%)	6 (9%)	0.6
Prior hysterectomy	43 (56.6%)	16 (23.9%)	<0.01
Prior prolapse surgery	19 (25%)	–	–
Prior incontinence surgery	12 (15.8%)	2 (3%)	<0.01
Current antidepressive medication use	13(17.6%)	19 (28.8%)	0.4
Mean leading edge of prolapse (cm)	+3.3±2.0	−2.3±0.6	<0.01

Table 2

Baseline depressive symptoms

	Cases (*N*=75)	Controls (*N*=65)	*P*-value
Median total PHQ-9 (range)	3 (0–21)	1 (1–18)	<0.01
PHQ-9 >10	17 (22.4%)	4 (6%)	<0.01
Any depressive disorder	14 (18.4%)	4 (6%)	0.03

Table 3

Pre- and post-operative scores

	Baseline (*N*=75)[a]	6months post-operatively (*N*=58)	*P*-value	Change in score[b]
PFDI				
UDI[c]	61 (52–71)	15 (10–21)	<0.01	70 (55–83)
POPDI[c]	76 (64–88)	22 (14–30)	<0.01	94 (78–110)
CRADI[c]	71 (59–84)	26 (17–34)	<0.01	70 (48–75)
PFIQ			<0.01	
UIQ[c]	76 (61–90)	35 (21–48)	<0.01	60 (41–80)
POPIQ[c]	53 (40–63)	20 (10–29)	<0.01	59 (39–79)
CRAIQ[c]	45 (52–68)	23 (12–33)	<0.01	35 (16–54)
POPQ stage[d]	III (0–IV)	1 (0–IV)	<0.01	
Leading edge of prolapse (cm)[e]	+3.3±2.1	−2±1	<0.01	
PHQ-9[d]	3 (0–21)	2 (0–17)	<0.01	
PHQ-9 >10	17 (22.4%)	5 (9%)		
Any depressive disorder	14 (18.4%)	3 (5.4%)		
Major depressive disorder	11 (14.5%)	2 (3.6%)		

UIQ, Urinary Impact Questionnaire

[a] All baseline data are reported in this column. Change score and comparison of baseline to post-operative scores were calculated using only paired data

[b] Change in score: baseline score minus 6-month score

[c] Reported as mean scores with 95% CI. *P*-value from Wilcoxon's paired samples test

[d] Reported as median with range. *P*-value from Wilcoxon's paired samples test

[e] Reported as mean±SD. *P*-value from Student's paired samples *t* test

Table 4

Pre- and post-operative scores by depressive symptoms

	Baseline[a]			6months post-operatively			Change in score[b]		
	No baseline depressive symptoms (*N*=58)	Baseline depressive symptoms (*N*=17)	*P*-value[c]	No baseline depressive symptoms (*N*=41)	Baseline depressive symptoms (*N*=17)	*P*-value[c]	No baseline depressive symptoms (*N*=41)	Baseline depressive symptoms (*N*=17)	*P*-value
PFDI									
UDI	81 (68–95)	114 (74–154)	0.13	14 (7–20)	19 (6–32)	0.27	63 (49–76)	90 (46–134)	0.21
POPDI	113 (96–129)	148 (109–188)	0.07	19 (10–28)	40 (13–49)	0.1	89 (74–105)	112 (63–160)	0.37
CRADI	97 (77–117)	126 (79–173)	0.27	23 (14–33)	35 (15–54)	0.28	60 (40–80)	89 (39–139)	0.27
PFIQ									
UIQ	78 (61–95)	198 (139–257)	<0.01	24 (12–37)	63 (25–101)	0.07	40 (24–55)	126 (70–181)	<0.01
POPIQ	61 (45–78)	165 (103–226)	<0.01	13 (5–20)	39 (8–70)	0.1	41 (25–56)	114 (54–175)	0.02
CRAIQ	58 (38–77)	125 (62–188)	0.05	16 (6–26)	42 (8–76)	0.34	19.5 (3–36)	80 (23–136)	0.05

Results reported as mean (95% CI) unless otherwise noted.

UIQ, Urinary Impact Questionnaire

[a] All baseline data are reported in this column. Change score and comparison of baseline to post-operative scores were calculating using only paired data

[b] Change in score: baseline score minus 6-month score, independent *t* test

[c] *P*-value from Mann–Whitney test