Obliterative surgery for the treatment of pelvic organ prolapse: A patient survey on reasons for surgery selection and post-operative decision regret and satisfaction.

Michelle M. Takase-Sanchez, MD
Indiana University School of Medicine
Indiana University Health Hospital System
Methodist Hospital
Urogynecology Associates, PC
1633 N. Capitol Ave, MT 436
Indianapolis, IN 46202
(317) 962-6600
(317) 962-2049(Fax)
mmtsanchez88@gmail.com

Hannah M. Brooks, MD
Indiana University School of Medicine
502 E. 17th St. Apt# 104
Indianapolis, IN 46202
(317) 498-4845
hannah.michelle.brooks@gmail.com

Douglass S. Hale, MD
Indiana University School of Medicine
Indiana University Health Hospital System
Methodist Hospital
Urogynecology Associates, PC
1633 N. Capitol Ave, MT 436
Indianapolis, IN 46202
(317) 962-6600
(317) 962-2049(Fax)
dhale@iuhealth.org

Michael H. Heit, MD, PhD
Indiana University School of Medicine
Indiana University Health Hospital System
Methodist Hospital
Urogynecology Associates, PC
1633 N. Capitol Ave, MT 436
Indianapolis, IN 46202
(317) 962-6600
(317) 962-2049(Fax)
mheitmd@gmail.com

NO DISCLOSURES FOR THIS WORK FROM ANY OF THE AUTHORS

This is the author's manuscript of the article published in final edited form as:
Takase-Sanchez, M. M., Brooks, H. M., Hale, D. S., & Heit, M. H. (2015). Obliterative Surgery for the Treatment of Pelvic Organ Prolapse: A Patient Survey on Reasons for Surgery Selection and Postoperative Decision Regret and Satisfaction. Female Pelvic Medicine & Reconstructive Surgery, 21(6), 325–331. http://doi.org/10.1097/SPV.0000000000000198

Objectives: To identify patient-reported reasons for selecting obliterative surgery for the purpose of predicting decision regret and satisfaction.

Methods: We created a de-identified database of patients who underwent an obliterative procedure for prolapse from 2006 to 2013. Patients were excluded if they declined study participation, were deceased or had dementia. Participants completed a survey regarding reasons for selecting obliterative surgery and a modified version of validated questionnaires on decision regret (DRS-PFD) and satisfaction (SDS-PFD). Parsimonious multivariate linear regression models were constructed to determine if any of the reasons given for choosing obliterative surgery were independent predictors of decision regret and satisfaction after controlling for significant socio-demographic, clinical, and surgical outcome data identified by bivariate analysis.

Results: Seventy-seven women completed the surveys. “To follow my doctor’s recommendations” and “no longer sexually active and/or did not plan to be” as reasons for selecting obliterative surgery made the most difference; however, these reasons were not identified as independent predictors of decision regret or satisfaction after controlling for confounders. The regret linear regression models identified preoperative sexual activity rather than the patient-reported reason “no longer sexually active and/or did not plan to be,” as the only independent predictor of more decision regret after obliterative surgery (B coefficient 1.68, $p < 0.01$). The satisfaction linear regression models identified reoperation for any reason as an independent predictor of lower satisfaction (Beta -0.24, $p = 0.04$) and the patient-reported reason for choosing obliterative surgery “not interested in pessary” as a predictor of higher satisfaction (Beta 0.30, $p = 0.01$).

Conclusions: This study advances our knowledge about the obliterative surgical decision making process. Behavioral and educational interventions directed at improving patient and physician communications concerning the dynamics of sexual health issues in an aging population will likely decrease regret when obliterative surgery is chosen. Minimizing reoperation after obliterative surgery through increased experience, knowledge, and improved surgical skills and patient validation when pessary is declined will likely improve satisfaction when obliterative surgery is chosen.

Keywords: LeFort colpocleisis, vaginectomy, obliterative surgery, regret, satisfaction

Introduction

Le Fort colpocleisis and complete vaginectomy/colpectomy are obliterative surgeries for the treatment of advanced pelvic organ prolapse in appropriately selected women. Historically, obliterative surgery has been reserved for sexually inactive, aging women with significant co-morbidities that preclude consideration of a more extensive restorative procedure. However, such surgery can serve as a viable alternative treatment option for all women who no longer desire preservation of the vaginal vault for sexual intercourse. Notable advantages of the obliterative approach include factors such as decreased operative time and use of regional anesthesia which contribute to an overall reduction in perioperative morbidity with an associated low prolapse recurrence risk rate.[1] Studies demonstrate consistently high anatomic success rates approaching 100% with overall satisfaction rates greater than 90% in recent series.[1-9] Furthermore, data consistently support an overall improvement in health-related quality of life and symptom bother as measured by post-operative assessments.[1-9] Despite reduced perioperative morbidity, high anatomic success rates, improved quality of life, and reduced symptom bother, the regret rates range from 0 to 13.8%.[1-9] Only a few studies have looked at regret after an obliterative procedure.[4] The most notable reason for regret that has been identified is the loss of coital function with an up to 9% occurrence rate reported in one study.[9] This is not surprising as a significant correlation between sexual satisfaction and life satisfaction has been shown in aging women.[10] Therefore, a concerning disadvantage of an obliterative surgery is the possible psychological distress related to loss of coital function and its impact on overall life satisfaction and decision regret. Unfortunately, little is known

regarding the decision-making process and which factors contribute most to surgery decision regret and dissatisfaction.

We aimed to expand our understanding of this decision-making process and how it may contribute to regret and dissatisfaction in women who have undergone an obliterative surgery for pelvic organ prolapse. Our primary objective was to identify patient-reported reasons for selecting obliterative surgery. Our secondary objective was to determine which patient-reported reason for selecting obliterative surgery was a significant predictor of overall decision regret or satisfaction after controlling for socio-demographic, clinical, and surgical outcome data.

Material and Methods

Cross-sectional data collection and analysis of a postoperative surgical cohort from a single center private urogynecology practice was performed after Indiana University Institutional Review Board (IRB) approval was obtained. Study participants who underwent an obliterative surgery by a fellowship-trained urogynecologist at our center from January 2006 through June 2013 for pelvic organ prolapse were identified by Current Procedural Terminology (CPT) codes 57110 (complete vaginectomy/colpectomy), 57106 (partial vaginectomy/colpectomy/Le Fort), and 58280 (hysterectomy with vaginectomy). A written procedural consent that included the definition of Le Fort colpocleisis and complete vaginectomy/colpectomy as “a vaginal procedure that removes the vaginal skin and completely closes the vaginal opening to prevent prolapse from coming back. Once done, you will not be able to have intercourse

again" was obtained from all patients after counseling regarding alternative treatment options was completed.

The obliterative surgery was performed in a similar fashion to what has previously been described by our center in the medical literature.[9] The vaginal epithelium was excised above the hymenal ring, after which a series of absorbable sutures was used to invaginate the prolapse above the levator plate. The genital hiatus was closed by a series of vertical, midline levator plication ligatures. A concomitant mid-urethral sling was placed if the patient demonstrated urodynamic stress incontinence or intrinsic sphincter deficiency on pre-operative reduction stress testing. In cases of negative pre-operative reduction stress testing and/or presence of significant voiding dysfunction that precluded consideration of a sling procedure, a Kelly plication was performed at the discretion of the surgeon.

Preoperative baseline socio-demographic data including patient age at time of surgery, race, marital status, sexual activity, education level, and occupation were collected from all subjects. Sexual activity status was collected from all patients at baseline from a written question that asked "Are you sexually active? Yes/No" extracted from their new patient visit questionnaire. Clinical data collected included body mass index (BMI), vaginal parity, Charlson co-morbidity index at the time of surgery,[11] preoperative leading edge of prolapse by Pelvic Organ Prolapse Quantification (POP-Q), preoperative Pelvic Floor Distress Inventory (PFDI-20) and Pelvic Floor Impact Questionnaire (PFIQ-7) scores,[12-15] prior continence surgery, prior hysterectomy and prior prolapse treatment. Surgical outcome data collected included a composite surgical success or failure

determination based on the absence or presence of prolapse defined as Pelvic Organ Prolapse Quantification (POP-Q)[15] ≥ Stage 2 on exam or symptomatic bulge by report or response to question 3 on the PFDI-20 at the time of the last documented follow-up visit. Other surgical outcome data included the need and reason for reoperation, post-operative complication score as measured by the comprehensive complication index,[16,17] and postoperative PFDI-20 and PFIQ-7 scores at the time of the last documented follow-up visit for calculating change in symptom bother, and impact on activities of daily living (ADL's), respectively. We subtracted postoperative PFDI-20 and PFIQ-7 overall and sub-domain scores from preoperative values such that a negative change score indicated decreased symptom bother and impact on ADL's after surgery. Finally, duration in years from the date of obliterative procedure to the date of data collection was calculated.

Telephone contact of all women in this surgical cohort was attempted and when unsuccessful, phone number verification, alternate numbers and mortuary records were checked. Women who were successfully contacted were invited to participate in a phone survey after a preamble describing the study was read and verbal consent was obtained. Women were excluded if they declined, were deceased, or had dementia that precluded survey completion. Patients were excluded from study participation if dementia was documented in their past medical history. Participants were asked to complete a 6-item survey regarding reasons for selecting colpocleisis (Appendix A). They were asked to assign a score from 0 to 10 based on how much of a difference it made in their surgical decision-making process (0 = no difference, 1-3 = minimal difference, 4-6 some difference, 7-9 moderate difference, 10 = major difference). These six reasons included:

1) to minimize surgical risk, 2) to follow doctors' recommendations, 3) due to lack of sexual activity, 4) to avoid mesh, 5) due to pessary failure, and 6) due to declined pessary trial. Additionally, all participants completed modified versions of a validated pelvic floor disorders (PFD) questionnaires to measure surgical decision regret and satisfaction using the Decision Regret Scale (DRS-PFD) and Satisfaction with Decision Scale (SDS-PFD) respectively.[18] These questionnaires were modified from a 5-point response scale to a 6-point response scale by removing the neutral selection "Neither Agree or Disagree" and replacing it with "Somewhat disagree" and "Somewhat agree" in an attempt to minimize indecision and maximize response variability. Mean scores for decision regret and satisfaction were calculated from responses to the DRS and SDS questionnaires. High mean regret scores correlated with more decision regret and high mean satisfaction scores correlated with more decision satisfaction.

Frequency distributions were used to estimate the prevalence of patient-reported reasons for selecting obliterative surgery. Histograms of all continuous socio-demographic, clinical and surgical outcome data were examined to determine if they followed a normal distribution or necessitated recoding into categorical variables. Categorical socio-demographic, clinical, and surgical outcome data for women who participated in the survey were compared to similar data from women who declined participation using χ^2 test of association to minimize selection bias. Normal and non-normally distributed continuous socio-demographic, clinical, and surgical outcome data for women who participated in the survey were compared to similar data from women who declined participation using Student *t*-tests and Mann-Whitney *U* tests, respectively.

Bivariate analyses were performed to identify potential predictors of regret and satisfaction with a decision for obliterative surgery. Mean regret and satisfaction scores were compared across the six patient-reported reasons for selecting obliterative surgery using Spearman's rank correlation coefficients. Mean regret and satisfaction scores were compared across two and k category potential socio-demographic, clinical, and surgical outcome predictors using Student's *t* test and ANOVA, respectively. Pearson's or Spearman's correlation coefficients were calculated to identify any potential normal and non-normally distributed continuous socio-demographic, clinical, and surgical outcome predictors of regret and satisfaction with the decision for obliterative surgery during bivariate analysis.

Independent predictors of regret and satisfaction with the decision for obliterative surgery were identified with parsimonious multivariate linear regression based on theoretical modeling. Socio-demographic, clinical and surgical outcome data, including duration in years from surgery, that were identified during bivariate analysis with a predetermined significance level of $p < 0.10$ were entered in the first block of the multivariate analysis. We hypothesized that patient-reported reasons for selecting obliterative surgery would be the strongest predictors of decision regret or satisfaction and therefore entered reasons identified by bivariate analysis with a predetermined significance level of $p < 0.10$ into the second block of the multivariate analysis after controlling for significant socio-demographic, clinical and surgical outcome data in the first block. All independent predictors of regret and satisfaction with the decision for obliterative surgery were

identified at the $p < 0.05$ significance level. All statistical analyses were performed using the Statistical Package for the Social Sciences (IBM® SPSS® 21.0 version).

Results

A total of 150 women were identified as having undergone an obliterative surgery for pelvic organ prolapse from January 2006 to June 2013. Forty-three women were not eligible to participate (20 non-responders, 8 with dementia, 3 without working phone numbers or alternate numbers, and 12 deceased). One hundred seven women were contacted and 30 women declined to participate. The thirty women who declined did not report a particular reason for declining. The remaining 77 women completed the surveys and were included in the analysis.

The mean age of the study participants was 79 years, median parity was 3, and the mean Charlson co-morbidity index was 5. Seventy-four percent of study participants demonstrated Stage III/IV pelvic organ prolapse on examination with a mean preoperative leading edge of +5 cm. The majority of women were Caucasian (98%), widowed (49%), had a BMI of 28, and were not sexually active (95%). The majority underwent complete vaginectomy (91% vs 9% LeFort procedure). Follow-up ranged from 6 weeks post-op to 7 years post-op with a mean duration of 2.5 years from the index surgery. Seventy-eight percent had undergone previous prolapse treatment with pessary, physical floor muscle therapy (PFMT) and/or surgery. A concomitant mid-urethral sling procedure was performed in 35% of cases. Fifty-one percent of study participants underwent a Kelly plication at the time of their obliterative procedure after negative

preoperative urodynamic reduction stress testing. There were no cases of recurrent prolapse or surgeries for postoperative prolapse recurrence. However, there were 2 cases of reoperation; one for interval sling placement and the other for sling revision (Table 1). The overall rate of any regret was 3.9%. The mean regret and satisfaction scores with the decision for obliterative surgery was 1.75 ± 0.90 (range 1-6) and 5.19 ± 0.80 (range 1.83-6).

Of the 107 women contacted, the 30 women who declined to participate were older (mean age 83 years vs 79, $p = 0.02$), had slightly lower symptom bother as measured by the PFDI-20 (118 vs 126, $p = 0.02$) and were slightly farther out from their index surgery (3.3 years vs 2.5 years, $p < 0.05$).

The primary outcome of interest was patient-reported reasons for selecting obliterative surgery. A need "to follow my doctor's recommendations" made the most difference in selecting obliterative surgery as demonstrated by the highest mean score of 7.7 out of 10 (Table 2). Although "to follow my doctor's recommendations" made the most difference in a patient's decision for obliterative surgery, it was not predictive of decision regret or satisfaction. Patient-reported reasons that predicted less regret with the decision for obliterative surgery included "no longer sexually active and/or did not plan to be" (r = -0.220, p = 0.056) and "not interested in pessary" (-0.237, p = 0.041). Patient-reported reasons that predicted more satisfaction with the decision for obliterative surgery included "no longer sexually active and/or did not plan to be" (r = 0.235, p = 0.039) and "not interested in pessary" (r = 0.297, p = 0.009), as expected. "To avoid mesh" was also

predictive of more satisfaction with the decision for obliterative surgery during bivariate analysis ($r = 0.20$, $p = 0.080$).

Socio-demographic, clinical, and surgical outcome predictors of less regret with the decision for obliterative surgery included greater improvement in urinary incontinence impact on activities of daily living as measured by change in the IIQ sub-domain of the PFIQ ($r = -0.393$, $p = 0.047$). Longer duration in years from surgery ($r = 0.281$, $p = 0.016$) and preoperative sexual activity (2.55 ± 1.25 vs 1.77 ± 0.58, $p = 0.081$) was associated with more regret with the decision for obliterative surgery. Predictors of less satisfaction with the decision for obliterative surgery included increasing age ($r = -0.238$, $p = 0.039$) and longer duration from surgery ($r = -0.275$, $p = 0.018$). The highest mean regret and lowest satisfaction scores were seen in women requiring reoperation for sling revision/excision compared to no reoperation or interval sling operation (regret; 4.0 vs 1.67 vs 1.4, $p = 0.012$), satisfaction; 3.33 vs 5.25 vs 5.83, $p = 0.027$). Bivariate analyses of predictors of patient regret and satisfaction are presented in Tables 3A (continuous variables) and 3B (categorical variables).

The final multivariate linear regression models included pre-operative sexual activity as the only significant independent predictor of *more* regret with their decision for obliterative surgery (B coefficient = 1.679, $p < 0.001$). That is, women who reported being sexually active prior to surgery scored their decision regret 1.68 points higher on a 6-point Likert scale compared to women who were not sexually active. None of the patient-reported reasons for selecting obliterative surgery including “no longer sexually

active and/or did not plan to be" were retained in the final model after controlling for socio-demographic, clinical, and surgical outcome data. The final regression model explained 58% of the variance in regret with their decision for obliterative surgery. The final multivariate regression models included reoperation for any reason as a significant independent predictor of *lower* satisfaction (Beta -0.243, p = 0.043) and the patient reported reason "not interested in pessary" reason as a significant independent predictor of *higher* satisfaction (Beta 0.302, p = 0.011). "Not interested in pessary" had a more positive effect on satisfaction with their decision for obliterative surgery than reoperation when comparing standardized regression coefficients. The final regression model explained 24% of the variance in satisfaction with their decision for obliterative surgery. Multivariable analyses of independent predictors of patient satisfaction or regret with a decision for obliterative surgery are presented in Tables 4A (Regret) and 4B (Satisfaction).

Discussion

This study shows that although most patients reported a need "to follow doctors' recommendations" and "no longer sexually active and/or did not plan to be" as making the most difference in their decision-making process, these reasons did not significantly affect satisfaction or regret with their decision for obliterative surgery. We would like to explain why there appears to be a weak (small r coefficient value) but significant correlation between predictor variables and satisfaction and regret. These r values are results from the bivariate analyses and therefore, each r value represents the correlation of that one predictor variable taken alone and therefore represents only a fraction of the total

explanatory variance. Like many predictive models, when taken together, the explanatory variance of multiple predictors of regret (58%) and satisfaction (24%) perform better during multivariate modeling compared to bivariate analyses.

Not surprisingly, our study revealed that women who were preoperatively sexually active demonstrated a significantly higher level of regret with their decision for obliterative surgery. This highlights the importance of improving patient and physician communications concerning the dynamics of the sexual activity construct in an elderly population. Previously reported reasons for regret not only highlight the importance of preoperative discussions regarding loss of coital function but also emphasize a need to discuss unanticipated outcomes such as unchanged, de novo, or worsening urinary symptoms that may require reoperation. Crisp et al[2] identified new onset of urinary symptoms as the most common reason cited for regret after obliterative surgery. Our study also showed that suboptimal improvement in urinary symptom impact on ADL's was associated with more regret during bivariate analysis only. However, Vij et al[8] demonstrated an overall positive impact on quality of life, bladder and bowel function after colpocleisis at 2-5 years follow-up and a low mean regret rate of 4.3%.

Our study revealed that reoperation for any reason was an independent predictor of less satisfaction with a decision for obliterative surgery. Reoperation for de novo voiding dysfunction (sling revision) was associated with greater regret and less satisfaction than reoperation with interval sling placement for de novo stress urinary incontinence. In fact, women who underwent interval sling operation after obliterative surgery had the lowest

regret and highest satisfaction scores providing reassurance for both patient and physician when discussing interval surgery for urinary symptoms. Dissatisfaction is likely associated with varied perceptions of whether the underlying condition leading to reoperation is a result of a post-operative complication or a de novo symptom that is amenable to additional treatment. Conclusions about the additive effect of concurrent sling versus interval sling are only speculative because we did not collect data on recurrent UTI, prolonged catheterization or bothersome bladder symptoms beyond what could be ascertained from changes in disease-specific quality of life instruments. One study favored the staged approach to treating occult incontinence at the time of colpocleisis using a one-year overall utility decision analysis model.[19] However, the difference in postoperative continence rates comparing approaches was less than the accepted minimally important difference with only 22.5 % of women in the staged group ultimately undergoing mid-urethral sling. Therefore, both strategies, staged and concomitant mid-urethral slings as a surgical decision are clinically reasonable and should be tailored to individual patient preferences.

Strengths of this study are the use of questionnaires (SDS-PFD and DRS-PFD) to assess satisfaction and regret that have been validated for the evaluation of decision-making outcomes for female pelvic floor disorders. However, a notable limitation is that we opted to modify the delivery route from written surveys to phone questionnaires and expanded the response selections in order to maximize response and to minimize selection indecision which limits the validity of this tool. We also obtained detailed data on socio-demographic, clinical, and surgical outcome data from reliable single source

medical records. The observation period spanning 7 years from 2006 to 2013 allows for changes in secular trends that may have influenced surgery selection from the perspective of either the patient and/or surgeon. Additionally, follow-up ranged from short-term to several years from surgery allowing for assessment of regret and satisfaction from a longitudinal perspective. Our study identified longer duration in years from the index surgery date was significantly associated with more decision regret during bivariate analysis. Possible contributors include a change in overall functional status with time. A positive change in functional status may influence women to socialize more and subsequently reassess the significance of coital function in their overall sense of well being. That is, a new found desire for coital function may lead to decision regret over time. Alternatively, a negative change in functional status arising from advance aging and/or progression of co-existing or newly developing morbidities may have a negative impact on the patients' perception of long-term surgical outcomes. Lastly, our study provides a comprehensive evaluation of decision regret starting from the initial surgery decision-making process to long-term post-operative follow-up.

Limitations of our study include the cross-sectional study design that inherently restricts our ability to accurately collect patient reported reasons for selecting obliterative surgery at the time of decision-making. Unfortunately, information regarding patients' definition of sexual activity and values regarding preservation of coital function relative to other concerns at the time of decision-making are unavailable. Only about two-thirds (107/150) of the total cases were contacted due to limitations of long-term follow-up in an elderly cohort. Some of these limitations include inability to contact the patient due to relocation

or loss of contact information, loss of follow-up due to unmeasured dissatisfaction, transfer of care to another provider, and co-morbidities and mortality that limit overall participation. Differences between our 77 surveyed study participants and the 30 non-surveyed individuals who declined to participate may have introduced selection bias that favored more satisfaction and less regret with a decision for obliterative surgery based on their younger age at the time of surgery, shorter duration in years from surgery, and greater symptom bother.

"To follow my doctor's recommendations" and "no longer sexually active and/or did not plan to be" as reasons for surgery selection have less impact on overall decision regret and satisfaction than "not interested in pessary" which was independently associated with higher decision satisfaction. In light of the above information, the association between preoperative sexual activity and more decision regret highlights the importance of developing behavioral and educational interventions directed at improving patient and physician communications concerning the dynamics of sexual health issues in an aging population. Sexuality in all ages takes into consideration continued growth, development and adaptation of relationships.[10] Woloski-Wruble et al noted a positive significant correlation between sexual satisfaction and life satisfaction in aging women emphasizing the importance of discussions between health providers and patients regarding sexual health issues in this age group. Reoperation for perceived complication following obliterative surgery was associated with less decision satisfaction. Minimizing reoperation after obliterative surgery through increased experience, knowledge, and improved surgical skills and patient validation when pessary is declined will likely

improve satisfaction when obliterative surgery is chosen. Future directions to more accurately characterize the impact of surgery decision-making on overall surgery satisfaction and regret should seek prospective study designs with a focus on patient-centered goal attainment with an emphasis on psychometric parameters. A better understanding of the patient decision-making process can provide a guide to behavioral and educational interventions directed at predictor modification in order to influence decision regret or satisfaction in the desired direction.

References

1. Barber MD, Amundsen CL, Paraiso MFR, et al. Quality of life after surgery for genital prolapse in elderly women: obliterative and reconstructive surgery. Int Urogynecol J Pelvic Floor Dysfunct 2007 Jul;18(7):799-806.
2. Crisp CC, Book NM, Smith AL, et al. Body image, regret, and satisfaction following colpocleisis. Am J Obstet Gynecol 2013;209:473.e1-7.
3. Wheeler TL, Richter HE, Burgio KL, et al. Regret, satisfaction, and symptom improvement: Analysis of the impact of partial colpocleisis for the management of severe pelvic organ prolapse. Am J Obstet Gynecol 2005 Dec;193(6):2067-70.
4. FitzGerald, MP, Richter HE, Siddique S, et al for the Pelvic Floor Disorders Network. Colpocleisis: a review. Int Urogynecol J 2006;17:261-271.
5. Hullfish KL, Bovvbjerg VE, and Steers WD. Colpocleisis for pelvic organ prolapse: patient goals, quality of life, and satisfaction. Obstet Gynecol 2007 Aug;110(2Pt1):341-5.
6. Zebede S, Smith A, Plowright LN, et al. Obliterative LeFort Colpocleisis in a Large Group of Elderly Women. Obstet Gynecol 2012;121:279-84.
7. Gutman RE, Bradley CS, Ye W, et al for the Pelvic Floor Disorders Network. Effects of colpocleisis on bowel symptoms among women with severe pelvic organ prolapse. Int Urogynecol J 2010 Apr;21(4):461-6.
8. Vij M, Bombieri L, Dua A, et al. Long-term follow-up after colpocleisis: regret, bowel, and bladder function. Int Urogynecol J 2014;25:811-815.

9. Von Pechmann WS, Mutone M, Fyffe J, et al. Total colpocleisis with high levator plication for the treatment of advanced pelvic organ prolapse. Am J Obstet Gynecol 2003;189:121-6.
10. Woloski-Wruble AC, Oliel Y, Leefsma M, et al. Sexual activites, sexual and life satisfaction, and successful aging in women. J Sex Med 2010;7:2401-2410.
11. Frenkel WJ, Jongerius EJ, Mandjes-van Uitert MJ, et al. Validation of the Charlson Comorbidity Index in Acutely Hospitalized Elderly Adults: A Prospective Cohort Study. J Am Geriatr Soc 2014 Feb;62(2):342-6.
12. Barber MD, Kuchibhatla MN, Pieper CF, et al. Psychometric evaluation of 2 comprehensive condition-specific quality of life instruments for women with pelvic floor disorders. Am J Obstet Gynecol 2001;185:1388-95.
13. Barber MD, Walters MD, Bump RC. Short forms of two condition-specific quality-of-life questionnaires for women with pelvic floor disorders (PFDI-20 and PFIQ-7). Am J Obstet Gynecol 2005 Jul;193(1):103-13.
14. Barber MD, Walters MD, and Cundiff GW. Responsiveness of the Pelvic Floor Distress Inventory (PFDI) and Pelvic Floor Impact Questionnaire (PFIQ) in women undergoing vaginal surgery and pessary treatment for pelvic organ prolapse. Am J Obstet Gynecol 2006;194:1492-8.
15. Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol 1996;175:10-17.

16. Slankamenac K, Graf R, Barkun J, et al. The comprehensive complication index: a novel continuous scale to measure surgical morbidity. Ann Surg 2013;258(1):1-7.
17. Dindo D, Demartines N, and Clavien PA. Classification of Surgical Complications: A new proposal with evaluation in a cohort of 6336 patients and results of a survey. Annals of Surgery 2004;240:205-213.
18. Sung VW, Kauffman N, Raker CA, et al. Validation of decision-making outcomes for female pelvic floor disorders. Am J Obstet Gynecol 2008 May;198(5):575.e1-6.
19. Oliphant SS, Shepherd JP, and Lowder JL. Midurethral Sling for Treatment of Occult Stress Urinary Incontinence at the Time of Colpocleisis: A Decision Analysis. Female Pelvic Med Reconstr Surg 2012;18:216-220.

Appendix 1

Survey of reasons for selecting colpocleisis/colpectomy as a surgical option for treatment of pelvic organ prolapsed

Colpocleisis or Complete Colpectomy is a surgical option for pelvic organ or vaginal vault prolapse. This vaginal approach procedure, with or without hysterectomy (removal of the uterus and cervix), treats prolapse by removing the vaginal lining/skin and tucking the prolapse inside. This extensive vaginal skin removal results in an essentially closed vaginal opening. Patients who undergo this procedure will no longer be able to have traditional vaginal intercourse. This procedure can be done either under general or regional anesthesia. (See Patient Study Information Sheet for more details).

Women have multiple reasons for choosing a particular type of surgery. We are interested in determining how much of a difference the following reasons listed below influenced your decision to ultimately choose colpocleisis/colpectomy to treat your prolapse. Please take the time to fill out the following survey. Thank you.

Please select the best number on the scale from 0 to 10 with **0 meaning the statement made "No difference" in your decision up to 10 meaning that the statement made a "Major difference" in your decision.**

I selected colpocleisis/colpectomy procedure:	**No Difference**	**Minimal Difference**	**Some Difference**	**Moderate Difference**	**Major Difference**
1. I wanted to minimize surgical risks associated with major abdominal surgery or prolonged anesthesia time.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**
2. I wanted to follow the recommendations of my doctor.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**
3. I was no longer sexually active and/or did not plan to be.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**
4. I wanted to avoid synthetic mesh placement due to fear of reported mesh complications.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**
5. I tried the pessary but it did not work for me. Please explain why it did not work for you. E.g. too painful, fell out, just had enough of it.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**
6. I was not interested in the pessary and felt surgery was my only good option.	**0**	**1 2 3**	**4 5 6**	**7 8 9**	**10**

Table 1

Sociodemographic, clinical, and surgical outcome data from survey participants

Demographic	**Mean (SD)**
Age (n = 77)	79.32 (6.99)
Body Mass Index (n = 76)	28.19 (7.20)
Vaginal parity (n = 76)	3.26 (1.66)
Charlson Comorbidity Index (n = 76)	4.97 (1.66)
Preoperative leading edge of prolapse (n = 73)	4.94 (2.65)
Preoperative PFDI-20 (n = 58)	125.78 (55.16)
Preoperative PFIQ-7 (n = 59)	87.70 (75.64)
Comprehensive Complication Index (n = 47)	7.38 (11.10)
	n (%)
Smoking history	
Never	52 (68.4)
Former	23 (30.3)
Current	1 (1.3)
Marital status	
Single	7 (9.5)
Married	31 (41.9)
Widowed	36 (48.6)
Race	
Non-Hispanic White	52 (98.1)
Non-Hispanic Black	1 (1.9)
Education level completed	
No High school degree	2 (3.9)
High school degree	32 (62.7)
Associates	9 (17.6)
Bachelors	6 (11.8)
Graduate	2 (3.9)
Prior urinary continence surgery	
No	57 (77)
Yes	17 (23)
Prior hysterectomy	
No	27 (35.1)
Yes	50 (64.9)

Prior prolapse treatment	
None	17 (22.1)
Pelvic Floor Muscle Therapy (PFMT) + Pessary	1 (1.3)
Surgery + Pessary	13 (16.9)
Pessary	33 (42.9)
Surgery	13 (16.9)
Sexually active status	
No	71 (94.7)
Yes	4 (5.3)
Type of reconstructive surgery	
Colpectomy/Vaginectomy	70 (90.9)
LeFort colpocleisis	7 (9.1)
Concomitant hysterectomy	19 (24.7)
Concomitant Kelly plication	39 (50.6)
Concomitant mid-urethral sling	27 (35.1)
Concomitant levatorplasty	76 (98.7)
Re-operation (post-colpocleisis)	
None	69 (97.2)
Sling	1 (1.4)
Sling revision/excision	1 (1.4)
Repeat prolapse repair/vaginectomy	0 (0)
Pre-operative POP-Q Exam (Apical)	
Stage I	8 (10.4)
Stage II	12 (15.6)
Stage III	39 (50.6)
Stage IV	18 (23.4)

Table 2

Patient reported reasons for selecting obliterative surgery

Reasons for Surgery	Mean (SD)	Mode
To minimize surgical risks	3.56 (4.3)	0
To follow my doctor's recommendations	7.70 (3.6)	10
Not sexually active	5.96 (4.54)	10
To avoid mesh	4.53 (4.6)	0
Failed pessary	5.17 (4.8)	0
Declined pessary	3.21 (4.6)	0

Anchors, 0 = no difference, 10 = major difference

Table 3a

Bivariate analysis of continuous data

Variable	**Regret-DRS** (Correlation Coefficient)	**P value**	**Satisfaction-SDS** (Correlation Coefficient)	**P value**
Demographic and Clinical Outcomes				
Age	0.188	0.106	-0.238	0.039
BMI	0.098	0.408	-0.030	0.799
Vaginal Parity	-0.090	0.446	0.08	0.497
Charlson Co-morbidity index	0.074	0.533	-0.125	0.284
Comprehensive Complication Index	0.028	0.851*	0.009	0.953
Delta UDI	-0.156	0.437	-0.160	0.417
Delta POPDI	-0.266	0.180	-0.047	0.813
Delta CRADI	0.152	0.458	-0.275	0.165
Delta IIQ	-0.393	**0.047***	-0.048	0.812*
Delta POPIQ	-0.070	0.744*	-0.227	0.276*
Delta CRAIQ	-0.082	0.703*	-0.265	0.201*
Preop leading edge	-0.024	0.842	-0.036	0.764
Duration from surgery	0.281	0.016	-0.275	0.018
Patient-reported reasons for selecting obliterative surgery				
To minimize surgical risks	0.081	0.486*	-0.061	0.597*
To follow my doctor's recommendations	-0.145	0.213*	0.072	0.534*
Not sexually active	-0.220	0.056*	0.235	0.039*
To avoid mesh	-0.142	0.222*	0.200	0.080*
Failed pessary	0.061	0.602*	-0.149	0.197*
Declined pessary	-0.237	0.041*	0.297	0.009*

**Spearman's correlation coefficients. All other analyses used Pearson's correlation coefficients*

Delta = 6 months – preop.

TABLE 3b

Bivariate analysis of categorical data

Variable	DRS-PFD Score (mean, SD)	P value	SDS-PFD Score (mean, SD)	P value
6 month bulge symptoms				
No	1.67 (0.62)	0.296	5.35 (0.56)	0.267
Yes*	1.00		6.00	
Smoking				
Never	1.74 (0.96)		5.11 (0.88)	
Former	1.81 (0.83)	0.941	5.33 (0.72)	0.373
Current*	1.6		6.00	
Marital status				
Single	1.57 (0.42)		5.61 (0.45)	
Married	1.80 (0.95)	0.805	5.19 (0.87)	0.280
Widowed	1.82 (0.96)		5.06 (0.86)	
Race				
Non-Hispanic White	1.74 (0.85)		5.16 (0.83)	
Non-Hispanic Black	2.00	0.771	5.33	0.838
Hispanic*				
Other*				
Education level completed				
No High School	1.10 (0.14)		6.00	
High School	1.87 (1.00)		5.05 (0.98)	
Associates	1.53 (0.47)	0.586	5.37 (0.42)	0.481
Bachelors	1.72 (0.52)		5.40 (0.54)	
Graduate	1.30 (0.42)		5.50 (0.70)	
Prior prolapse treatment				
None	1.73 (0.55)		5.21 (0.55)	
PFMT	-		-	
Pessary	1.84 (1.15)	0.785	5.12 (0.98)	0.460
Surgery	1.55 (0.48)		5.48 (0.53)	
Surgery + Pessary	1.84 (0.89)		4.97 (0.96)	
Pessary + PFMT	1.00		6.00	
Prior UI surgery				
No	1.78 (0.97)	0.793	5.18 (0.87)	0.742
Yes	1.71 (0.75)		5.26 (0.70)	
Prior hysterectomy				
No	1.56 (0.55)	0.174	5.30 (0.58)	0.391
Yes	1.86 (1.03)		5.12 (0.94)	

Pre-op sexual activity				
No	1.72 (0.88)	0.081	5.23 (0.83)	0.113
Yes	2.55 (1.25)		4.54 (0.87)	
Type of surgery				
LeFort	1.77 (0.58)	0.985	5.04 (0.72)	0.638
Colpectomy/Vaginectomy	1.76 (0.93)		5.20 (0.85)	
Re-operation				
None	1.67 (0.75)	0.012	5.25 (0.72)	0.027
Sling	1.40		5.83	
Sling revision/excision	4.00		3.33	
Repeat vaginectomy	-		-	

Student's *t* test or ANOVA for 2 and k group comparisons, respectively
PFMT = Pelvic Floor Muscle Therapy.

Table 4a

Parsimonious decision regret linear regression model

Model	Unstandardized B coefficients (SE)	Standardized Beta coefficients	P value	95% CI for B
(Constant)	1.073 (0.187)		0.000	0.683, 1.463
Delta IIQ	-0.004 (0.003)	-0.238	0.132	-0.010, 0.001
Duration from surgery	0.124 (0.070)	0.264	0.091	-0.022, 0.271
Preop sexually active	1.679 (0.396)	0.635	<0.001	0.852, 2.506
Reoperation	-0.004 (0.399)	-0.002	0.992	-0.837, 0.829

F = 6.326, df = 4, p = 0.002 (ANOVA), R square = 0.559

Table 4b

Parsimonious decision satisfaction linear regression model

Model	Unstandardized B coefficients (SE)	Standardized Beta coefficients	P value	95% CI for B
(Constant)	6.449 (1.086)		0.000	4.277, 8.622
Duration from surgery	-0.016 (0.045)	-0.041	0.732	-0.107, 0.075
Reoperation	-0.684 (0.330)	-0.243	0.043	-1.344, -0.023
Age	-0.019 (0.014)	-0.168	0.172	-0.046, 0.008
Preop sexually active	0.031 (0.024)	0.190	0.207	-0.018, 0.080
Decline pessary	0.049 (0.019)	0.302	0.011	0.012, 0.086
Avoid mesh	-0.003 (0.024)	-0.016	0.914	-0.050, 0.045

F = 3.268, df = 6, p = 0.007 (ANOVA), R square = 0.243