Sexual Function Before and 1 Year After Laparoscopic Sacrocolpopexy

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Objective: This study aimed to compare sexual function before and 1 year after laparoscopic sacrocolpopexy using a porcine dermis or a polypropylene mesh material.

Methods: This was a secondary analysis of sexual function measured before and 1 year after laparoscopic sacrocolpopexy in a group of 81 sexually active women participating in a randomized controlled trial comparing porcine dermis and polypropylene mesh. Sexual function was assessed using the short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12). Responses to individual questions from the physical domain of the PISQ-12 were also analyzed. Additional information included the type of mesh material used and whether a concomitant suburethral sling or perineorrhaphy was performed.

Results: There was a significant postoperative improvement in total PISQ-12 scores for the entire cohort (33.2 vs 38.3, $P < 0.01$). Similarly, PISQ-12 scores were significantly improved in both groups (33.2 preoperative vs 37.4 one year postoperative in the porcine dermis, $P < 0.01$ and 33.2 vs 39.2 in the polypropylene mesh, $P < 0.01$). There were no differences between the 2 graft material groups. Preoperatively, 63.0% (48/76) of women reported avoiding sexual intercourse because of bulging in vagina (PISQ12-question #8), at 1 year postoperatively only 4% (3/76) had a positive response ($P < 0.01$). We observed a significant decrease in the number of women who reported pain during intercourse at 12 months as evidenced by the responses to the PISQ12-question #5, 47.4% (36/76) versus 26.3% (20/76) ($P < 0.01$). The addition of a suburethral sling or a perineorrhaphy did not negatively impact sexual function at 1 year.

Conclusions: Laparoscopic sacrocolpopexy had a positive impact on sexual function at 1 year regardless of whether a porcine dermis or a polypropylene mesh material was used.

Key Words: prolapse, female sexual function, laparoscopic sacrocolpopexy

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Sexual function is an integral part of normal adult life. Although female sexual function and dysfunction is multidimensional, the presence of symptomatic pelvic organ prolapse has been shown to negatively impact sexual function in women.[1] The surgical correction of prolapse can be performed with or without graft augmentation. The choice of graft material and route of implantation could have a significant impact on functional outcomes. Abdominal sacrocolpopexy is currently considered the "gold standard" operation for pelvic organ prolapse.[2–4] Handa et al[5] reported an improvement in sexual function after open abdominal sacrocolpopexy using a polypropylene mesh. Other reports are limited to the vaginal approach or by the use of nonvalidated outcome measures.[6–8]

This study was based on data from a randomized controlled trial of laparoscopic sacrocolpopexy using porcine dermis versus polypropylene mesh material.[9] The aim of this secondary analysis was to compare sexual function before and 1 year after laparoscopic sacrocolpopexy using a porcine dermis or a polypropylene mesh.

MATERIALS AND METHODS

This was a secondary analysis of sexual function measured before and 1 year after laparoscopic sacrocolpopexy in a group of 81 sexually active women participating in a randomized controlled trial comparing porcine dermis and polypropylene mesh. A total of 119 patients were enrolled in that study, which was approved by the by the institutional review board at Atlantic Health System (R05-11-004) and registered in clinical trials.gov (NCT00564083). The study design and outcomes were previously published.[9] Patients with pelvic organ prolapse who agreed to participate in the study were randomly assigned to undergo a laparoscopic sacrocolpopexy using a porcine dermis derived implant of cross-linked acellular collagen mesh (Pelvisoft; CR BARD, Inc, Murray Hill, NJ) or a type 1 polypropylene mesh (Pelvitex; CR BARD, Inc). Patients were blinded until the conclusion of the study at the 1-year postoperative visit. The research coordinator, who administered all the questionnaires, collected data, and performed all the postoperative POP-Q examinations, was also blinded to the material used until the 1-year postoperative visit with the patient.

The short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) was used to assess sexual function.[1] The PISQ-12 includes 12 questions about sexual desire, ability to be aroused and experience orgasm, satisfaction with sexual variety, pain, urinary incontinence and fear of urinary or fecal incontinence during sex, avoidance of intercourse because of prolapse, emotional response to sexual activity, partner sexual dysfunction, and intensity of orgasm. Each question has ordinal responses from 0 to 4 based on a Likert scale. Scores range from 0 to 48, with higher scores indicating better sexual function.[1] Responses to individual questions from the physical domain of the PISQ-12 were also analyzed and were considered negative for "seldom" or "never" and positive for "sometimes," "usually," or "always." The PISQ-12 correlates well with other sexual health questionnaires such as the Sexual History Form-12.[1] Sexually active patients completed the questionnaire at baseline and 1 year postoperatively.

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All cases were performed laparoscopically either with or without robotic assistance. Details of our robotic assisted surgical technique have been described in previous publications.[10,11] In brief, we perform the entire dissection and suturing laparoscopically. A supracervical hysterectomy is performed if a uterus is present. The bladder is sharply dissected off the vagina to within a centimeter from the bladder neck. The posterior vaginal wall is exposed to within a centimeter from the perineal body. This provides 4 to 6 cm of anterior coverage and 8 to 10 cm of posterior coverage. The mesh is sutured to the cervix and vagina using CV4 Gore-Tex suture on a TH-26 needle (W. L. Gore & associates, Inc, Medical Products Division, Flagstaff, Ariz) then configured into a Y mesh. The tail end is attached to the anterior longitudinal ligament at the level of the sacral promontory using 2 sutures of 0 Ethibond on an SH needle (Ethicon, San Antonio, Tex) (10). The peritoneum is reapproximated over the mesh using 0 Monocryl on a CT1 needle (Ethicon).

Baseline demographic and operative characteristics were collected including the type of graft material used and whether a concomitant suburethral sling or perineorrhaphy was performed. Data were analyzed using SAS 9.3 (SAS Institute Inc, Cary, NC). Baseline and group comparisons were made using χ^2, Fisher exact, and Student *t* tests. Preoperative and postoperative comparisons were made using paired Student *t* test and McNemar test. The α value was set at 0.05.

RESULTS

A total of 119 women participated in the study, 115 patients completed their 1-year follow-up (57 patients in the porcine dermis group and 58 patients in the polypropylene mesh group). Eighty-one (68%) were sexually active at the time of enrollment and 76 (64%) were sexually active at their 1-year postoperative visit. Four of the 5 women who ceased sexual intercourse after the procedure did so due to partner-related issues. None of the patients who were not sexually active before surgery became sexually active postoperatively. Table 1 summarizes the baseline data in both groups. Sexually active women were younger than their nonsexually active counterparts. There were no differences in menopausal status, body mass index, or the use of HRT. Additionally, there was no difference in regard to previous prolapse surgery, incontinence surgery, or preoperative POP-Q stage.

There was a significant improvement in total PISQ-12 scores in both groups (33.2 preoperative vs 37.4 one year postoperative in the porcine dermis, $P < 0.01$ and 33.2 vs 39.2 in the polypropylene mesh, $P < 0.01$). There were no differences between the 2 graft material groups at baseline or at 1 year after surgery, so we combined both groups for further comparisons. The total PISQ-12 scores were significantly improved for the entire group at 1 year after surgery (33.2 vs 38.3, $P < 0.01$). When we analyzed the individual questions responses, the improvement in the PISQ-12 score was gained from the physical domain. In other words, the responses to the emotional and couple-related questions did not change over the course of the study. The analysis of the dichotomized responses to individual questions in the physical domain shows some interesting trends, which in some cases reached statistical significance and others did not due to the small number of positive responses. Tables 2 and 3 have the numbers of positive responses to each question in the entire cohort (Table 2) and by graft material group (Table 3). Preoperatively, 63.0% (48/76) of women reported avoiding sexual intercourse because of bulging in vagina (PISQ12-question #8), at 1 year postoperatively only 4% (3/76) had a

TABLE 1. Baseline Information for the Porcine Dermis and Polypropylene Mesh Groups

	Porcine Dermis (n = 57)			Polypropylene Mesh (n = 62)		
Variable	Sexually Active (n = 38)	Not Sexually Active (n = 19)	*P**	Sexually Active (n = 43)	Not Sexually Active (n = 19)	*P**
Age, y	55.5 (8.1)	62.0 (7.1)	0.004	54.4 (7.7)	60.2 (9.1)	0.01
BMI	25.2 (3.8)	24.8 (2.7)	0.69	25.2 (3.6)	26.5 (3.6)	0.19
Vaginal parity (median-range)	2 (1–5)	2 (1–7)	0.19	2 (0–6)	2 (1–5)	0.75
Postmenopausal, %	76.3 (29/38)	94.7 (18/19)	0.08	74.4 (32/43)	89.5 (17/19)	0.19
Using HRT, %	21.1 (8/38)	10.5 (2/19)	0.32	13.9 (6/43)	5.3 (1/19)	0.32
White race, %	97.4 (37/38)	89.5 (17/19)	0.21	93.0 (40/43)	89.5 (17/19)	0.31
Smoker, %	7.9 (3/38)	5.3 (1/19)	0.71	4.7 (2/43)	5.3 (1/19)	0.92
Incontinence severity index	3.2 (3.6)	3.4 (4.4)	0.87	2.8 (2.6)	4.2 (4.2)	0.20
Previous hysterectomy, %	26.3 (10/38)	31.6 (6/19)	0.68	23.3 (10/43)	26.3 (5/19)	0.80
Previous incontinence surgery, %	13.2 (5/38)	5.3 (1/19)	0.36	7.0 (3/43)	10.5 (2/19)	0.63
Previous prolapse surgery, %	23.7 (9/38)	15.8 (3/19)	0.49	25.6 (11/43)	31.6 (6/19)	0.63
Preoperative GH, cm	3.8 (1.5)	3.8 (1.3)	0.86	3.9 (1.4)	4.0 (1.8)	0.74
Preoperative PB, cm	2.3 (0.5)	2.6 (0.9)	0.16	2.6 (0.8)	2.4 (0.6)	0.32
Preoperative TVL, cm	9.38 (1.0)	9.2 (1.1)	0.49	9.2 (0.8)	8.9 (0.9)	0.31
Preoperative prolapse stage, %						
Stage II	44.7 (17/38)	31.6 (6/19)	0.34	53.5 (23/43)	31.6 (6/19)	0.11
Stage III	50.0 (19/38)	57.9 (11/19)	0.58	44.2 (19/43)	63.2 (12/19)	0.17
Stage IV	5.3 (2/38)	10.5 (2/19)	0.47	2.3 (1/43)	5.3 (1/19)	0.54
PISQ-12 total score	37.4 (5.2)	—	—	39.2 (4.9)	—	—

Data are expressed as mean (SD) except where otherwise indicated.

**P* values were obtained using χ^2, Fisher exact, and Student *t* tests.

BMI indicates body mass index; GH, genital hiatus; PB, perineal body; TVL, total vaginal length.

TABLE 2. Sexual Function Before and 1 Year After Laparoscopic Sacrocolpopexy Among Sexually Active Women

	Total (n = 76)		
	Before SC (n = 76)	1 y After SC (n = 76)	*P*
PISQ-12 total score	33.2 (6.2)	38.3 (5.1)	<0.01*
Pain during intercourse-PISQ12-question #5	47.4% (36/76)	26.3% (20/76)	<0.01†
Urine incontinence during sex PISQ12-question #6	21.1% (16/76)	2.6% (2/76)	<0.01†
Fear of incontinence restrict sexual activity PISQ12-question #7	19.7% (15/76)	7.9% (6/76)	0.02†
Avoids sex because of bulging in vagina PISQ12-question #8	63.2% (48/76)	4.0% (3/76)	<0.01†

PISQ responses were considered negative for "seldom" or "never." Only positive responses are in the table.

*Paired Student *t* test.

†McNemar test.

positive response ($P < 0.01$). We observed a significant decrease in the number of women who reported pain during intercourse at 12 months as evidenced by the responses to the PISQ12-question #5, 47.4% (36/76) versus 26.3% (20/76) ($P < 0.01$). Five (5.2%) patients developed new onset dyspareunia (3 in the polypropylene mesh group and 2 in the porcine mesh group, $P = 0.49$), they responded well to conservative measures, such as topical estrogen, pelvic floor physical therapy, or, in the case of 1 patient, trigger point injection. Concomitant procedures were limited to either a suburethral sling in 70/119 (59%) patients or a perineorrhaphy in 26/119 (21.8%). There was no significant difference in the de novo dyspareunia rates at 1 year among women who received a perineorrhaphy and those who did not 13.3% versus 2.3% ($P = 0.19$). Similarly, the addition of a suburethral sling did not have a negative impact on dyspareunia rates at 1 year (5.9% vs 4.3%, $P = 0.71$). There was no difference in total PISQ-12 scores at 12 months among women who received a suburethral sling and those who did not (39.02 vs 38.15, $P = 0.47$); furthermore, there was no difference in the PISQ-12 score improvement among women who received a suburethral sling and those who did not (5.51 vs 3.42, $P = 0.12$).

DISCUSSION

Sexual function significantly improved 1 year after laparoscopic sacrocolpopexy. Our findings are similar to that of open abdominal sacrocolpopexy.[5] To our knowledge, there is no other sexual function study comparing biologic and polypropylene mesh materials for laparoscopic sacrocolpopexy. This trial presented a unique opportunity to compare the 2 materials about sexual function and pain during intercourse. Although we did not find any difference in sexual function between the 2 materials, the trial was never powered to specifically look at this issue. The power analysis of the original trial was based on prolapse success and not sexual function. Hence, many of the comparisons did not reach statistical significance.

Laparoscopic sacrocolpopexy had a positive effect on the prolapse-related complaints such as avoidance of sex because of vaginal bulge, incontinence during sexual activity, and fear of incontinence. The significant decrease in the number of women who reported pain during intercourse is another interesting finding. Although prolapse is not typically linked to pain, the discomfort during intercourse could be perceived as pain by some women, which could explain the postoperative improvement.

We typically do not perform posterior repairs because the posterior compartment is addressed laparoscopically with a deep dissection aiming to reach the level of the perineal body. The use of perineorrhaphy was reserved for patients with a gaping introitus, and bringing the bulbocavernosus and transverse perinei muscles together did not produce persistent dyspareunia at 1 year.

The strength of the study is based on its prospective nature and the double-blinding of patients and examiner to the type of material used. As mentioned previously, the trial was powered to capture the prolapse outcomes difference between the 2 graft materials and not powered to detect a difference in sexual

TABLE 3. Sexual Function Before and 1 Year After Laparoscopic Sacrocolpopexy by Material Among Sexually Active Women

	Porcine Dermis (n = 39)			Polypropylene Mesh (n = 43)		
	Before SC (n = 37)	1 y After SC (n = 37)	*P*	Before SC (n = 39)	1 y After SC (n = 39)	*P*
PISQ-12 total score	33.2 (6.2)	37.4 (5.2)	<0.01*	33.2 (6.3)	39.2 (4.9)	<0.01*
Pain during intercourse PISQ12-question #5	43.2% (16/37)	32.4% (12/37)	0.25†	51.3% (20/39)	20.1% (8/39)	<0.01†
Urine incontinence during sex PISQ12-question #6	27.0% (10/37)	2.7% (1/37)	<0.01†	15.4% (6/39)	2.6% (1/39)	0.03†
Fear of incontinence restrict sexual activity PISQ12-question #7	16.2% (6/37)	8.1% (3/37)	0.32†	23.1% (9/39)	7.7% (3/39)	0.01†
Avoids sex because of bulging in vagina PISQ12-question #8	62.2% (23/37)	0.0% (0/37)	<0.01†	64.1% (25/39)	7.7% (3/39)	<0.01†

PISQ responses were considered negative for "seldom" or "never." Only positive responses are in the table.

*Paired Student *t* test.

†McNemar test.

function. Nevertheless, the use of a validated questionnaire and the randomization limited bias. The clinician should use caution when applying these results to patients with concomitant colporrhaphy or total hysterectomy at the time of sacrocolpopexy, given that neither procedure was performed in the study population. Although the correction of prolapse using any method could result in similar improvement in sexual function, our conclusions only apply to the procedures performed as part of the study.

Sexually active women planning to undergo laparoscopic sacrocolpopexy can expect to continue to be sexually active at 1 year after surgery. Furthermore, laparoscopic sacrocolpopexy had a significant positive impact on sexual function at 1 year after surgery regardless of whether a porcine dermis or a polypropylene mesh material was used.

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