BEST: Barbed-suture Efficiency Study for Sacrocolpopexy: A Randomized Clinical Trial

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Importance Unidirectional barbed suture may decrease suture time for vaginal mesh attachment in robotic sacrocolpopexy.

Objective The objective of this study was to evaluate if absorbable unidirectional barbed suture decreases vaginal mesh attachment time compared with nonbarbed suture.

Study Design This single-blind, randomized trial of women undergoing robotic sacrocolpopexy for ≥stage 2 symptomatic pelvic organ prolapse assessed if absorbable unidirectional barbed suture resulted in a 50% faster vaginal mesh attachment compared with interrupted nonbarbed suture. Surgeon-reported ease of mesh attachment, appearance of mesh, and global satisfaction with each suture type was assessed with a 10-point Likert scale (1 worst, 10 best). Six-month patient-centered outcomes were assessed.

Results In total, 52 participants were randomized, with 25 in the barbed suture group and 27 in the nonbarbed suture group. Vaginal mesh attachment was faster for barbed suture (13.2 vs. 19.7 min, $P<0.01$). However, this did not reach the primary outcome of a 50% decrease in suture time. When stratified by level of training, barbed suture remained significantly faster for resident and fellow surgeons but not for attending surgeons. Surgeons rated barbed suture higher than nonbarbed suture for ease of suture use and global satisfaction, with similar mesh appearance ratings. Total operative time was similar between groups (186.1 vs. 180.9 min, $P=0.62$). Six-month patient-centered outcomes were similar between groups.

Conclusions Unidirectional barbed suture decreased mesh attachment time compared with nonbarbed suture, especially for novice surgeons. Surgeon satisfaction was higher for barbed suture, and there was a similar improvement in all patient-centered outcomes at 6 months.

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WHY THIS MATTERS

Abdominal sacrocolpopexy is the most durable reconstructive surgical method for the management of apical pelvic organ prolapse; however, there is increased operative time when it is performed robotically. With current incentives to decrease operative times and costs, surgical efficiency is an important consideration for both surgeons and patients. This study investigated the use of absorbable unidirectional barbed suture compared with nonbarbed suture on total mesh attachment time, with the hypothesis that barbed suture would lead to a 50% decrease in total mesh attachment time. Our study found that barbed suture resulted in a decreased total mesh attachment time compared with nonbarbed suture in novice surgeons; however, there was not a 50% decrease in total mesh

Abdominal sacrocolpopexy with the use of type 1, lightweight polypropylene mesh is the most durable standard for surgical management of apical pelvic organ prolapse, demonstrating lower risk of recurrence at the expense of longer operating times compared with vaginal native tissue repair.[1,2] When comparing robot-assisted sacrocolpopexy to laparoscopic sacrocolpopexy, robotic operative times were on average 59 minutes longer than the laparoscopic approach.[3] Longer operative times are associated with increased 30-day perioperative

attachment time. This randomized trial contributes to evidence in support of absorbable, barbed suture for faster vaginal mesh attachment, particularly for less experienced surgeons.

complications and cost.[4,5] With current incentives to decrease operative times and cost, surgical efficiency is an important consideration for both surgeons and patients.

Attachment of mesh to the vagina can be the most time-consuming aspect of minimally invasive sacrocolpopexy.[6–8] Prior studies have looked at the utility of anchors or bidirectional barbed suture for mesh attachment; however, they reported low surgeon satisfaction due to a steep learning curve.[7,9] Conversely, a unidirectional barbed suture has a looped end, which eliminates the need to tie knots, making it less difficult to manage. Since repetitive knot tying can be time consuming, using unidirectional barbed suture could decrease mesh attachment time without compromising surgeon satisfaction with its use.

Our hypothesis was that vaginal mesh attachment using barbed suture would be 50% faster than nonbarbed suture in robot-assisted sacrocolpopexy. Our secondary aim was to compare total operative time, mesh attachment time by surgeon factors, surgeon satisfaction with suture type, and 6-month patient-centered outcomes based on questionnaire responses.

STUDY DESIGN

This randomized, single-blind trial took place at a tertiary care hospital with 3 operative locations in the United States between July 2023 and October 2024. The trial involved the patients of the 3 attending surgeons who perform robotic sacrocolpopexy; all cases involved a fellow, and the majority also involved a urology or obstetrics/gynecology resident. Approval from the Atrium Health Wake Forest Baptist Hospital Institutional Review Board (IRB00093867) was obtained before enrollment and adhered to the Consolidated Standards of Reporting Trials guidelines.[10] Date of Clinicaltrials.gov registration was March 8, 2023, and initial participant enrollment was June 21, 2023 (NCT05760794, site: https://clinicaltrials.gov/study/NCT05760794). This study was funded by Coloplast; however, they had no input on study design, data collection or interpretation, manuscript writing, or decision to submit for publication.

Participants aged 21 years or older with symptomatic Pelvic Organ Prolapse Quantification (POP-Q) ≥ stage 2 pelvic organ prolapse undergoing robot-assisted sacrocolpopexy with or without hysterectomy were screened for participation. Eligible patients had a score of 2 or higher on question 3 of the Pelvic Floor Distress Inventory-20 (PFDI-20) questionnaire, "Do you usually have a bulge or something falling out that you can see or feel in your vaginal area?" Patients were excluded if they had a prior history of prolapse repair with mesh, history of pelvic organ cancer or pelvic irradiation, or history of chronic pelvic pain.

Eligible patients provided consent at their preoperative clinic visit. Randomization was performed by the lead research coordinator using Research Electronic Data Capture (REDCap) computer-generated number sequence in a block size of 4 with 1:1 treatment allocation.[11,12] Randomization was performed in the operating room immediately before mesh graft attachment to the vagina to minimize postrandomization withdrawal. Participants were randomized to delayed absorbable unidirectional barbed suture (2-0 V-Loc Wound Closure Device, 9 inch, 90 d, GS 22 needle [Covidien, Mansfield, MA]) or nonbarbed polydioxanone suture (2-0 PDS, cut to 8–10 inches, CT 2 needle [Ethicon, Somerville, NJ]). For the barbed suture group, a spiral shape was followed (Fig. 1). For the nonbarbed suture group, mesh attachment required a minimum of 4 attachment points each on the anterior and posterior vagina, with 5 knots per stitch. PDS was chosen as the comparator to V-loc because both are absorbable sutures. In addition, a prior trial demonstrated that suture time between PDS and the traditional polytetrafluoroethylene (PTFE) was similar.[13] PTFE was primarily used for vaginal mesh attachment in our institution before this study. So for this study, attending and trainee surgeons transitioned to the use of V-Loc and PDS rather than PTFE. The surgeon performing the mesh attachment was required to perform the procedure on a minimum of 3 cases using each type of suture before participating as a

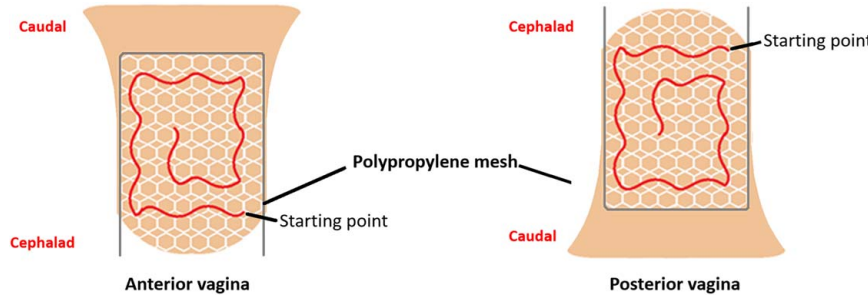

FIGURE 1. Path of barbed suture used for the barbed-suture efficiency study for sacrocolpopexy (BEST) trial. Anteriorly, suturing was started in the right cephalad corner and continued in a clockwise manner. Posteriorly, suturing was started in the right cephalad corner and continued in a counter-clockwise manner.

surgeon in this study. Based on prior intermittent use of these sutures, we estimated that performing the procedure on 3 cases with each suture would allow the surgeon to feel comfortable handling the needle and produce a consistent suturing technique to minimize the effect of a learning curve.

If the patient was undergoing a hysterectomy, either a total vaginal hysterectomy or a total laparoscopic hysterectomy was performed per the surgeon's preference. If a vaginal hysterectomy was performed, the anterior and posterior vaginal dissection was performed through a vaginal approach, followed by robotic attachment of the mesh. The sacrocolpopexy Y-mesh used was either the ultra-lightweight polypropylene mesh (Restorelle, Coloplast, Minneapolis, MN) or the lightweight polypropylene mesh (Upsylon, Boston Scientific, Boston, MA) based on surgeon preference. The anterior and posterior mesh grafts were at least 4 cm long. The sacral arm of the mesh was attached to the anterior longitudinal ligament using permanent 2-0 PTFE suture, and the peritoneum was closed over the mesh using absorbable suture. All surgeons used only 8 mm robotic trocars, including the assistant port used to introduce the needles. Robotic instrument choice and additional procedures were at the discretion of the surgeon. Patients participated in an enhanced recovery after surgery (ERAS) protocol with a plan for same-day discharge. Participants had a 6-week in-person visit and a 6-month phone visit. At the 6-week visit, a pelvic examination with POP-Q assessment was performed. At baseline and 6 months, participants completed 3 validated questionnaires: the PFDI-20, Pelvic Organ Prolapse/Incontinence Sexual Questionnaire, short form (PISQ-sf), and Pelvic Floor Impact Questionnaire, short form-7 (PFIQ-sf7). Patients were masked to their allocation, and postoperative providers were masked at the 6-week and 6-month visits.

The primary aim of this study was to evaluate if vaginal mesh attachment using barbed suture would be 50% faster than nonbarbed suture in robot-assisted sacrocolpopexy. Time was measured on a stopwatch and was defined as the total time of anterior mesh attachment plus posterior mesh attachment. Anterior and posterior mesh attachment times started when the needle first contacted the tissue and ended when the last suture was cut. The secondary aim was to compare total operative time, mesh attachment time by surgeon level of training and number of prior cases, surgeon satisfaction with suture type, and patient-centered outcomes. Total operative time was defined as the time from the first incision to the closure of the last incision. The level of training was divided into resident, fellow, and attending surgeon. The number of prior cases was stratified as ≤ 20 cases and > 20 cases. Surgeon satisfaction with suture type was assessed on a 10-point Likert scale for ease of placement, appearance of mesh, and global satisfaction (1 worst, 10 best). Finally, patient-centered outcomes were assessed using the mean difference in score on the PFDI-20, PISQ-sf, and PFIQ-sf7 at 6 months compared with preoperatively.

Demographic and medical history were collected from the patient's report. Surgical data, intraoperative complications, and postoperative outcomes were obtained with electronic medical record abstraction. Reportable intraoperative complications included major vascular injury, urinary system injury, vaginotomy, bowel injury, and a dislodged needle. Adverse events within 8 weeks of surgery were graded based on the Clavien-Dindo scale.[14] Race and ethnicity data

were collected to allow assessment of study generalizability.

Based on prior data, mesh attachment with interrupted delayed absorbable suture takes 38 minutes (±23 min).[8] To determine if barbed delayed-absorbable suture would decrease mesh attachment time by 50%, a total of 23 participants per group (46 total) was needed, assuming a 5% significance level and 80% power. A 50% improvement was chosen because it would be a clinically significant decrease in suture time that could decrease total operative time. Assuming 15% attrition for a 6-month follow-up, we planned to enroll 54 participants with the intention to treat 27 in each group. All participants enrolled who were randomized and underwent the procedure were considered part of the per-protocol analysis. The Welch *t* test was used for comparing mean suture times for the overall difference and by number of prior cases, and the Wilcoxon rank-sum test was used for comparing mean suture times by surgeon level of training. Multiple linear regression was used to assess the effect of surgeon and patient factors on suture time. A 2-sample permutation test was used for comparing satisfaction ratings. Mean change in PFDI-20, PFIQ-sf7, and PISQ-sf from baseline to 6 months was analyzed with the Welch *t* test. Surgical and postoperative outcomes were compared using the χ^2 test or the Fisher exact test for categorical variables and the Student *t* test for continuous variables as applicable. Analyses were performed using R Statistical Software.[15]

RESULTS

From June 2023 through October 2024, a total of 54 participants were enrolled. Two participants were withdrawn due to sacrocolpopexy not being performed—one due to intolerance of the Trendelenburg position and one due to failure of the CO_2 insufflation system. In total, 25 had barbed suture and 27 had nonbarbed suture used for vaginal mesh attachment (Fig. 2).

Baseline demographic data were similar between groups—mean age was 63 years and mean body mass index was 27 (calculated as weight in kilograms divided by height in meters squared) (Table 1). The median preoperative prolapse was stage 3. Eleven participants in each group underwent concomitant

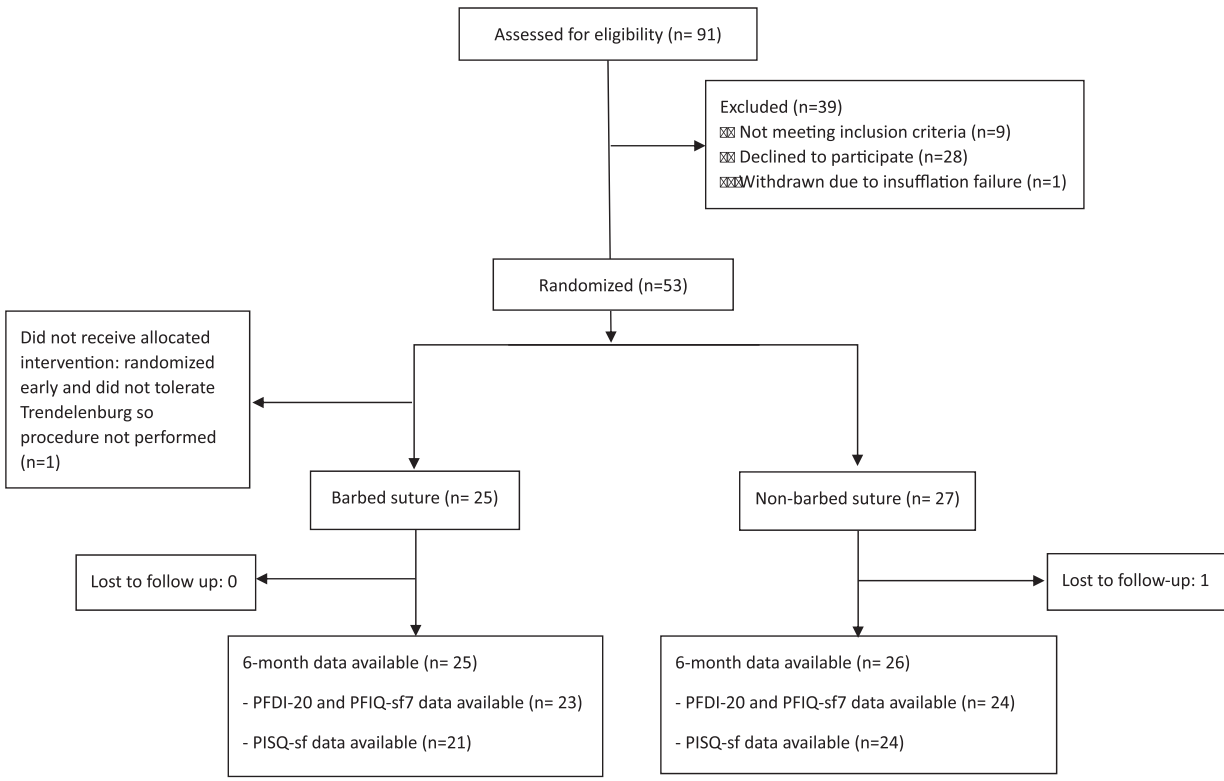

FIGURE 2. CONSORT (Consolidated Standards of Reporting Trials) flow diagram of all participants. PFDI-20, Pelvic Floor Distress Inventory-20; PFIQ-sf7, Pelvic Floor Impact Questionnaire, short form-7; PISQ-sf, Pelvic Organ Prolapse/Incontinence Sexual Questionnaire, short form.

total hysterectomy. The majority of surgeons performing the mesh attachment were fellows (65%); the remaining surgeons were residents (17%) or attendings (17%) (Table 2). Sixty-five percent of surgeons had performed the procedure on >20 prior cases. The average length of the mesh used for anterior vaginal attachment was 5 cm, and the average length for the posterior vaginal attachment was 6.7 cm. One surgeon performed the entirety of the mesh attachment for each procedure, except 1 case in the PDS group, where a fellow took over for a resident suturing due to prolonged suture time.

TABLE 1. Demographics and Baseline Characteristics

Characteristic	Barbed Suture (n = 25)	Nonbarbed Suture (n = 27)
Age (y)	63.2 ± 11.7	63 ± 7.8
BMI	27.6 ± 6.5	27.0 ± 8.5
Parity (median, IQR)	2 (2, 3)	2 (1, 3)
Charleston comorbidity index (median, IQR)	2 (1, 3)	2 (1, 2)
Menopausal status		
Premenopausal or perimenopausal	3 (12)	2 (7.4)
Postmenopausal, no hormone therapy	17 (68)	11 (40.7)
Postmenopausal, vaginal estrogen	4 (16)	12 (44.4)
Postmenopausal, systemic hormone therapy	1 (4)	2 (7.4)
Hispanic or Latino ethnicity	1 (4)	0
Race		
Black or African American	1 (4)	2 (7.4)
White	23 (92)	25 (92.6)
Not reported	1 (4)	0
Insurance status		
Private/HMO	13 (52)	16 (59.2)
Medicaid/Medicare	14 (56)	10 (37.0)
No insurance	0	1 (3.7)
Smoking status		
Never	22 (88)	20 (74.1)
Previous	3 (12)	6 (22.2)
Current	0	1 (3.7)
Previous pelvic surgery		
Hysterectomy	14 (56)	16 (59.2)
Vaginal prolapse repair without mesh	2 (8)	0
Midurethral sling	1 (4)	1 (3.7)
None	22 (88)	26 (96.3)
Preoperative POP-Q stage		
Stage 2	6 (24)	12 (44.4)
Stage 3	16 (64)	15 (55.6)
Stage 4	3 (12)	0

Data are presented as mean ± SD, median (IQR), or n (%).

BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); HMO, health maintenance organization; IQR, interquartile range; POP-Q, Pelvic Organ Prolapse Quantification.

For our primary outcome, the mean time for robotic vaginal mesh attachment was 13.2 minutes (±3.6 min) for barbed suture and 19.7 minutes (±6.2 min) for nonbarbed suture ($P < 0.01$) (Table 3). A multiple linear regression of total suture time on suture type, body mass index, prolapse stage, level of training, and number of prior cases showed that suture type remained statistically significant. While barbed suture led to a significantly shortened suture time, this did not reach the primary outcome of a 50% decrease in suture time. When assessing suture time by level of training, the difference in suture time remained statistically significant for resident and fellow surgeons, but was no longer statistically significant for attending surgeons. Surgeons rated barbed suture more favorably for ease of suture use and global satisfaction with suture (Fig. 3). Appearance of the mesh was rated similarly between groups.

There was no difference in total operative time (186.1 vs. 180.9 min, $P = 0.62$), estimated blood loss, or intraoperative complications between groups (Table 2). Four vaginotomies occurred in the barbed suture group during the vaginal dissection—3 were in patients who were posthysterectomy and 1 was in a patient undergoing concomitant total vaginal hysterectomy. One vaginotomy occurred in the nonbarbed suture group during the vaginal dissection; this patient was undergoing a concomitant total vaginal hysterectomy. None of the patients who experienced a vaginotomy was using vaginal estrogen preoperatively; however, 1 patient was taking systemic hormone therapy. All vaginotomies were repaired by oversewing the defect with absorbable suture. There was 1 needle dislodged in the abdomen in the nonbarbed group during needle exchange, which required straightening the needle to remove it safely from the trocar. One patient in the barbed group had apical granulation tissue that was treated with silver nitrate. There were 2 Grade II or higher Clavien-Dindo postoperative complications—1 patient in the nonbarbed suture group experienced

TABLE 2. Surgical Data and Postoperative Complications

Characteristic	Barbed Suture (n = 25)	Nonbarbed Suture (n = 27)	P
Surgeon level of training			
Resident	2 (8)	7 (25.9)	0.14
Fellow	18 (72)	16 (59.2)	0.39
Attending	5 (20)	4 (14.8)	0.72
No. prior cases			
3–5 cases	1 (4)	2 (7.4)	> 0.99
5–20 cases	6 (24)	10 (37)	0.38
> 20 cases	18 (72)	16 (59.3)	0.39
Total operative time (min)	186.1 (± 38)	180.9 (± 36.5)	0.62
Total anesthesia time (min)	220 (201, 255)	228 (201, 256.5)	0.72
Type of mesh used for sacral colpopexy			
Restorelle (Coloplast)	5 (20)	6 (22.2)	> 0.99
Upsylon (Boston Scientific)	20 (80)	21 (77.8)	> 0.99
EBL (mL)	74 (± 49.2)	76.9 (± 64.2)	0.86
Concomitant procedure			
TVH	9 (36)	6 (24)	0.36
Robotic TLH	2 (8)	5 (20)	0.42
Salpingectomy	10 (40)	14 (56)	0.42
Oophorectomy	4 (16)	10 (40)	0.12
Retropubic mid-urethral sling	5 (20)	7 (28)	0.75
Single incision sling	5 (20)	8 (32)	0.52
Burch colposuspension	3 (12)	0 (0)	0.10
Posterior repair	7 (28)	4 (16)	0.32
Lysis of adhesions > 30 min	2 (8)	7 (28)	0.14
None	6 (24)	4 (16)	0.49
Intraoperative complications			
Vaginotomy	4 (16)	1 (3.7)	0.13
Needle pop off	0	1 (3.7)	> 0.99
Postoperative complications (Dindo grade)			
UTI (I)	3 (12)	6 (22.2)	0.47
Urinary retention (I)	1 (4)	3 (11.1)	0.61
SBO (IIIB)	1 (4)	0 (0)	0.48
Rhabdomyolysis (II)	0 (0)	1 (3.7)	> 0.99

Data are presented as n (%), mean (SD), or median (IQR).

EBL, estimated blood loss; TLH, total laparoscopic hysterectomy; SBO, small bowel obstruction; TVH, total vaginal hysterectomy; UTI, urinary tract infection.

lower leg rhabdomyolysis that resolved with medical management, and 1 patient in the barbed suture group experienced a small bowel obstruction from a port site incarceration that required laparoscopic reduction and oversewing of the affected bowel segment.

Fifty-two participants (98%) completed 6-month follow-up. There was 1 mesh exposure in each group. The barbed suture group had an anterior sacrocolpopexy mesh exposure in a patient who also underwent a concomitant total vaginal hysterectomy; of note this patient had a vaginotomy at the time of their sacrocolpopexy. The nonbarbed suture group had a mesh exposure from a midurethral sling. Both mesh-exposed patients were treated with vaginal estrogen, but due to nonresolution, both underwent partial mesh excision.

Two patients in the nonbarbed suture group had new pelvic pain, and one had new dyspareunia. In the

TABLE 3. Mean Suture Times

Characteristic	Barbed Suture (n = 25)	Nonbarbed Suture (n = 27)	P
Total suture time (min)	13.2 ± 3.6	19.7 ± 6.2	< 0.01
Anterior vaginal suture time	6.36 ± 1.8	10.11 ± 3.9	< 0.01
Posterior vaginal suture time	6.78 ± 2.5	9.5 ± 3.7	< 0.01
Suture time by number of cases (min)			
≤ 20 cases	17.3	24.9	< 0.01
> 20 cases	11.6	15.5	< 0.01
Suture time by level of training (min)			
Resident	16.98	24.7	0.03
Fellow	13.8	19.5	< 0.01
Attending	9.3	11.6	0.09

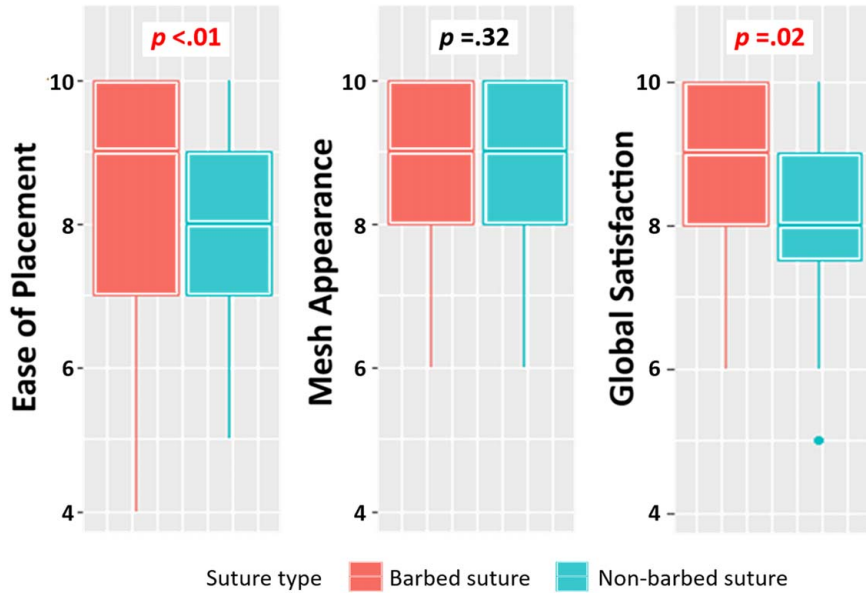

FIGURE 3. Surgeon satisfaction with suture type.

barbed suture group, there were no new reports of pelvic pain, and 1 patient had new dyspareunia. No patients reported sensation of barbs in the vagina, and no patient reported that their sexual partner could feel suture material in the vagina. There were no reoperations for recurrent prolapse at 6 months. Improvement in mean PFDI-20, PFIQ-sf7, and PISQ-sf scores from baseline to 6 months was similar between groups (Table 4).

DISCUSSION

Use of unidirectional barbed suture resulted in decreased mesh attachment time for robot-assisted sacrocolpopexy compared with nonbarbed suture; however, there was not a 50% difference in mesh attachment time between groups. When stratified by surgeon level of training and number of prior cases, the difference in suture time between barbed and nonbarbed suture only existed for novice surgeons. In addition, surgeons rated unidirectional barbed suture more favorably for ease of use compared with nonbarbed suture, but with similar mesh appearance scores. Thus, while the 6.5-minute difference in suture time is not likely clinically significant, surgeons expressed greater satisfaction using unidirectional barbed suture. Of note, our suture time in both groups was significantly shorter than that reported by Matthews et al.[8] Our study primarily involved fellow surgeons performing the vaginal mesh attachment, while the Matthews et al study may have involved a larger proportion of resident surgeons performing the vaginal mesh attachment, which would require more instruction time.

Surgical efficiency cannot compromise outcomes and, therefore, assessment of patient-centered outcomes on prolapse symptoms, pain, and sexual function was an important consideration in this study. At 6 months postoperatively, the use of unidirectional barbed suture achieved the same improvement in vaginal bulge symptoms as nonbarbed sutures and was not associated with higher rates of mesh exposure, dyspareunia, or pelvic pain.

There have been several trials evaluating different suture types and methods of vaginal mesh attachment to reduce operative time. Matthews et al reported that an interrupted 2-0 polydioxanone suture had

TABLE 4. **Patient Centered Outcomes After 6 Months (Mean Change From Baseline)**

	Barbed Suture (n = 25)*	Nonbarbed Suture (n = 27)†	Mean Difference	P
PFDI-20	−100.1 ± 55.6	−95.79 ± 48.1	−4.3	0.77
PFIQ-sf7	−65.01 ± 57.9	−54.76 ± 50.0	−10.3	0.52
PISQ-sf	−5.16 ± 6.6	−6.89 ± 7.2	1.7	0.44

Data presented as mean change ± SD.

*PFDI-20 and PFIQ-sf7 data are missing for 2 participants. PISQ-sf data missing for 4 participants.

†PFDI-20, PFIQ-sf7, and PISQ-sf data are missing for 3 participants.

PFDI-20, Pelvic Floor Distress Inventory-20; PFIQ-sf7, Pelvic Floor Impact Questionnaire short form-7; PISQ-sf, Pelvic Organ Prolapse/Incontinence Sexual Questionnaire, short form.

similar mesh attachment times and did not adversely affect short- and long-term outcomes compared with PTFE.[8,13] Berger et al[9] studied the use of absorbable anchors compared with interrupted delayed absorbable suture in robotic sacrocolpopexy and found a 42% shorter mesh attachment time in the anchor cohort. However, there is a steep learning curve with the use of anchors that required the authors to place delayed absorbable interrupted sutures to stabilize the mesh before anchor deployment. In another study, bi-directional barbed delayed-absorbable suture (Quill, Corza Medical, Westwood, MA) was compared with nonbarbed delayed absorbable suture at the time of minimally invasive sacrocolpopexy and the bidirectional barbed suture group was found to be more efficient in attachment of vaginal mesh; however, there was a low surgeon score for ease of use.[7] The authors also report using an absorbable suture to stabilize the mesh before the bidirectional barbed suture due to difficulty managing the suture.

This study demonstrates that unidirectional barbed suture increased surgical efficiency of mesh attachment and surgeon satisfaction without compromising patient-centered outcomes at 6 months postoperatively. In addition, the use of barbed suture avoids the need for multiple needle exchanges to complete mesh attachment, decreasing the risk of a needle being dislodged. In our study, 1 needle in the nonbarbed group was dislodged, which had to be straightened to be removed through a port. Locating a dislodged needle with a docked robot can present great challenges for the surgical team, potentially requiring undocking and use of X-ray or C-arm to localize the needle.[16,17]

The strength of this study is that it was a randomized, single-blinded study. We ensured that all surgeons participating in the study had performed at least 3 mesh attachments using each type of suture to minimize the effect of a learning curve on outcomes. We did not define a required training level for the surgeon operating, which increases our generalizability to academic institutions with trainees. However, the majority of surgeons performing the mesh attachments were second- or third-year fellows.

One of the limitations of this study is that we do not currently have long-term follow-up data to determine if barbed suture adversely affects recurrence risk or mesh exposure; however, 1-year data are being actively collected. Prior retrospective studies have shown a similar rate of recurrence with barbed and nonbarbed suture.[18] We also did not track how many passes of the barbed suture was required for mesh attachment. We did not require a certain length of the nonbarbed suture, which could have increased suture time, because this affects how many suture exchanges were required to complete mesh attachment. In addition, the length of the anterior and posterior vaginal dissection was not recorded, which affects the number of suture passes needed to secure the mesh. However, the length of the vaginal mesh was recorded, and that correlates with the vaginal dissection length. While we blinded examiners at the 6-week and 6-month visits, the data regarding the suture used were available in the operative note if an examiner chose to look. Finally, this study did not measure attending surgeon satisfaction with trainee performance to understand their perception of these efficiency improvements.

In conclusion, the use of unidirectional barbed suture for vaginal mesh attachment during robot-assisted sacrocolpopexy decreased total mesh attachment time compared with nonbarbed suture, especially in novice surgeons, without compromising surgeon satisfaction and with similar improvement in patient-centered outcomes postoperatively.

ARTICLE INFORMATION

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