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Results of the laparoscopic lateral suspension and laparoscopic sacrocolpopexy techniques done for uterine prolapse

Canan Satır Özel [1], Mehmet Küçükbaş [1], Oğuz Devrim Yardımcı [1], Vildan Nalbant [1], Ateş Karateke [2]

[1] Göztepe Prof. Dr. Süleyman Yalçın City Hospital, Department of Obstetrics and Gynecology, Istanbul, Turkey
[2] Istanbul Medeniyet University, Faculty of Medicine, Department of Obstetrics and Gynecology, Istanbul, Turkey

ORCID of the author(s)

CSÖ: https://orcid.org/0000-0001-5287-5114
MK: https://orcid.org/0000-0001-6697-8990
ODY: https://orcid.org/0000-0003-0838-8241
VN: https://orcid.org/0000-0002-1766-7501
AK: https://orcid.org/0000-0002-0199-6474

Corresponding Author
Canan Satır Özel
Department of Obstetrics and Gynecology, Göztepe Prof Dr Süleyman Yalçin City Hospital, Eğitim Mahallesi Fahrettin Kerim Gökay Caddesi 34722, Kadıköy, Istanbul, Turkey
E-mail: drcanansatirozel@gmail.com

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The study was approved by the Clinical Ethics Committee of Göztepe Prof. Dr. Süleyman Yalçin City Hospital with the registry number 2020/0421 on July 1, 2020.
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest
No conflict of interest was declared by the authors.

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Abstract

Background/Aim: Sacrocolpopexy is considered the gold-standard surgical treatment for patients with symptomatic uterine prolapse. This technique can be performed using a laparoscopic approach. Laparoscopic lateral suspension has emerged as a new alternative pelvic organ prolapse surgery method. This study aims to compare the postoperative anatomical improvement and sexual function outcomes in patients who underwent laparoscopic sacrocolpopexy (Group 1) versus laparoscopic lateral suspension (Group 2) for pelvic organ prolapse at our institution.

Methods: Group 1 consisted of 14 patients, while Group 2 comprised seven patients. Relevant data were collected using the Turkish-validated Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12), A Simple Questionnaire to Screen for Sexual Dysfunction, and the Pelvic Organ Prolapse Quantification System (POP-Q) questionnaires.

Results: There was no statistically significant difference between Group 1 and Group 2 in terms of the preoperative stage of uterine prolapse (2.6 (0.8) vs. 2.7 (0.7) [P=0.534]). The postoperative period was significantly longer in Group 1 compared to Group 2 (1,014.7 (348.8) days vs. 598.4 (276.5) days [P=0.013]). In the POP-Q evaluation, point C was measured as -6.6 (1.1) cm in Group 1 and -5.2 (1.5) cm in Group 2, indicating a statistically more proximal location (P=0.037). The total vaginal length was greater in Group 1 than in Group 2, but this difference was not statistically significant (8.7 (1.2) cm vs. 8.1 (1.3) cm, [P=0.343]). There was no statistical difference between the groups in terms of uterine prolapse stages and sexual function during the follow-up period.

Conclusion: Laparoscopic lateral suspension is an alternative method for patients with uterine prolapse, offering comparable anatomical and sexual outcomes to laparoscopic sacrocolpopexy.

Keywords: anatomical improvement, laparoscopic lateral mesh suspension, laparoscopic sacrocolpopexy, pelvic organ prolapse, sexual function

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Introduction

Pelvic organ prolapse is characterized by the displacement of pelvic organs from their normal anatomical position. The uterosacral and cardinal ligaments, endopelvic fascia, and levator ani muscles provide essential anatomical support for the vaginal apex [1]. Pelvic organ prolapse can manifest as either asymptomatic or with symptoms such as pelvic pressure, a sensation of vaginal fullness, urinary retention, difficulties with defecation, or symptoms of sexual dysfunction. Surgical reconstruction is the recommended treatment for symptomatic patients, involving the repeated suspension of the vaginal apex as well as repair of the anterior or posterior vaginal walls.

Abdominal sacrocolpopexy has been widely recognized as the gold standard for surgical treatment of uterine prolapse [2]. In 1995, Wattiez et al. [3] introduced laparoscopic sacrocolpopexy as an alternative method based on the abdominal promontofixation technique. Subsequently, numerous studies have compared laparoscopic sacrocolpopexy with the abdominal approach [4–6].

Laparoscopic lateral suspension was initially described by Dubuisson et al. [7] in 1998 and has since been recognized as a viable alternative to sacrocolpopexy [7–9]. This technique involves placing a T-shaped polypropylene mesh, which is threaded through a subperitoneal tunnel created parallel to the ovarian vessels, connecting the lateral vaginal fornix to the lateral abdominal wall using a laparoscopic approach. Consequently, the prolapsed pelvic organs are effectively suspended [10].

We hypothesize that laparoscopic lateral suspension could be an alternative approach for treating pelvic organ prolapse. This study, conducted at a tertiary center, aimed to compare the levels of anatomic correction and sexual function outcomes between patients who underwent laparoscopic lateral suspension and those treated with laparoscopic sacrocolpopexy.

Materials and methods

We obtained approval from the Ethics Committee at Göztepe Prof. Dr. Süleyman Yalçin City Hospital Clinical Ethic Committee (registry number: 2020/0421, approval date: July 1, 2020). Patient data were extracted from the hospital's automated registry system. Between January 1, 2016 and December 31, 2019, we identified 21 patients who underwent laparoscopic (L/S) sacrocolpopexy and 14 patients who underwent L/S lateral suspension at our clinic. Patients who declined to participate in the study, those whose contact information could not be obtained, non-Turkish speakers, individuals who had undergone urogynecologic repeat surgery, those with diabetic neuropathy, and patients with advanced gynecologic cancer were excluded from the study.

We provided clear and understandable information to the patients who agreed to participate in the study and obtained their written consent. All procedures were conducted following ethical guidelines and the principles outlined in the Declaration of Helsinki.

L/S sacrocolpopexy was designated as Group 1, with 21 patients initially included. However, only 14 patients from Group 1 were ultimately included in the study. The exclusion of seven patients occurred due to incorrect phone numbers for three patients, one patient residing outside the city, and three patients declining to participate. Similarly, L/S lateral suspension was classified as Group 2, comprising 14 patients. However, only seven patients from Group 2 participated in the study. This reduction was attributed to one patient with an incorrect phone number, three patients residing outside the city, and three patients declining to participate.

After collecting the general demographic data of the patients, we administered a questionnaire designed to enable participants to provide accurate and comfortable responses. The patients completed the "Turkish-validated PISQ-12 Questionnaire" and the "Simple questionnaire to screen sexual dysfunction" forms. In the case of an illiterate patient among the participants, the clinician read the questionnaire items aloud clearly and understandably.

The Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire-12 (PISQ-12) is a validated, self-administered questionnaire designed to assess sexual function in women with pelvic prolapse and/or urinary incontinence [11]. It consists of 12 questions, covering emotional factors in items 1–4, physical factors in items 5–9, and partner-related issues in items 10–12. For inclusion in the study, questionnaires required a minimum of ten answered questions; otherwise, they were excluded. The questionnaire allows for comparing total scores and scores in specific sections [11]. For our study, we utilized the validated Turkish version of this questionnaire [12].

Questions 1–4 in the questionnaire employ a reverse Likert scale, where a score of 4 is assigned to 'always' and 0 points to 'never.' Questions 5-12 use a regular Likert scale, with 0 points for 'always' and 4 points for 'never'. In this questionnaire, higher scores indicate better sexual activity, with a maximum possible score of 48 [12].

The "Simple questionnaire to screen sexual dysfunction" is a concise questionnaire consisting of three items, designed to be quickly administered by any physician to assess sexual dysfunction in individuals. The original questions were translated into Turkish while maintaining contextual integrity. Participants were asked the following questions: "1. Are you sexually active? 2. Do you experience any problems during sexual activity? 3. Do you feel pain during sexual activity?" [13]. Each item in the questionnaire offers a choice between 'yes' or 'no' responses.

After completing the questionnaire, a POP-Q evaluation was conducted with the participant in the dorsolithotomy position following voluntary bladder emptying. Measurements were taken using ring forceps scaled in centimeters and uni-valve speculums. Initially, measurements of the genital hiatus (gh), perineal body (pb), and total vaginal length (Tvl) were obtained in a neutral position, ensuring participants were comfortable without straining [1]. Subsequently, anterior and posterior measurements were taken by placing uni-valve speculums on the opposite vaginal wall. Measurements including Aa, Ba, C, Ap, Bp, and D adhered to the original definitions [1]. The distal side of the hymen was assigned a "+" value, while the proximal side was assigned a "-" value. Quantitative results were recorded in a 3-by-3 grid format.

Patients without any prolapse (Aa, Ba, Ap, and Bp points measured as -3 cm, C and D points between Tvl and 2 cm less than Tvl) were classified as stage 0. Those with the most distal part of the prolapse, more than 1 cm proximal to the hymen, were categorized as stage 1. Stage 2 encompassed patients with the most distal part between 1 cm proximal and 1 cm distal to the hymen. Patients with a distal part measuring more than 1 cm but 2 cm less than Tvl were classified as stage 3, while those with total prolapse were assigned stage 4 [1]. In our study, any prolapse classified as stage 2 or higher was considered a recurrent prolapse.

Data pertaining to surgical indications, additional surgical procedures, and perioperative complications were extracted from both the hospital records and surgical records.

Statistical analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences 21.0 for Windows (SPSS Inc., Chicago, IL, USA). The normality of the data was assessed using the Shapiro-Wilk test. Continuous data are presented as mean (standard deviation), while categorical data are presented as percentages. Differences in categorical variables between groups were evaluated using the Chi-square test or Fisher's exact test. Unpaired samples were compared using Student's t-test or the Mann-Whitney U test, as appropriate. Statistical significance was set at a two-sided *P*-value of <0.05.

Results

Age, smoking habits, body mass index (BMI), and history of chronic diseases are summarized in Table 1. There was no statistically significant difference between Group 1 and Group 2 in terms of the preoperative stage of uterine prolapse (2.6 (0.8) vs. 2.8 (0.7), [*P*=0.534]). The mean length of follow-up was longer in Group 1 than in Group 2, indicating statistical significance (1,014.7 (348.8) days vs. 598.4 (276.5) days, [*P*=0.013]). There was no need for repeat urogynecologic surgery for any patient. While de novo incontinence did not develop in any patient in Group 1, it was observed in two patients in Group 2 without statistical significance (*P*=0.100).

Table 1: General features and conditions.

Variables	Group 1 (n=14)	Group 2 (n=7)	*P*-value
Age, mean (SD)	42.5 (7.0)	40.1 (6.2)	0.463
Stage of uterine prolapse (Presurgical), mean (SD)	2.6 (0.8)	2.8 (0.7)	0.534
Additional surgery, n (%)	8 (57%)	3 (43%)	0.659
Mean length of follow-up (Day), mean (SD)	1,014.7 (348.8)	598.4 (276.5)	0.013
Perioperative complication, n (%)	0 (0%)	0 (0%)	-
Gravidity	3.5 (2.0-6.0)	2.0 (1.0-3.0)	0.075
Parity	2.0 (2.0-3.0)	2.0 (1.0-2.0)	0.104
Abortion	1.0 (0.0-2.2)	0.0 (0.0-0.0)	0.051
Vaginal birth number, mean (SD)	2.1 (1.0)	1.7 (0.7)	0.368
Preoperative BMI, mean (SD)	25.1 (3.6)	26.5 (4.2)	0.435
Postoperative BMI, mean (SD)	25.8 (3.8)	27.0 (4.6)	0.528
Postmenopausal woman, n (%)	4 (28%)	2 (28%)	0.701
Smoking habits, n (%)	6 (43%)	3 (43%)	0.681
Chronic diseases, n (%)	9 (64%)	2 (28%)	0.183
Need for repeat urogynecologic surgery, n (%)	0(0)	0(0)	-
De novo incontinence , n (%)	0 (0%)	2 (28%)	0.100
Presence of postoperative symptoms, n (%)	8 (57%)	4 (57%)	0.676
Profession (active workpeople), n (%)	6 (43%)	3 (43%)	0.676

In Group 1, complaints of postcoital penile bleeding in the partner of one participant, a feeling of vaginal fullness in two patients, prolapse in two patients, and ongoing urinary incontinence continuing from the preoperative period in four patients were detected. In Group 2, complaints of pain in two patients, de novo incontinence in two patients (one with pain, together), a feeling of vaginal fullness, and prolapse in one patient were observed. There were no statistically significant differences between the groups regarding symptoms (*P*=0.676).

The comparison of anatomical assessment was performed using POP-Q and recurrence rates in the groups (Table 2). In the POP-Q evaluation, point C was measured as -6.6 (1.1) cm in Group 1 and -5.2 (1.5) cm in Group 2, indicating a statistically more proximal location (*P*=0.037). The Tvl in Group 1 was measured longer than that in Group 2 but without statistical significance (8.7 (1.2) cm vs. 8.1 (1.3) cm, [*P*=0.343]).

Table 2: Comparison of POP-Q examination results and recurrence of pelvic organ prolapse.

Variables	Group 1 (n=14)	Group 2 (n=7)	*P*-value
Aa (cm), mean (SD)	-1.7 (1.0)	-2.3 (0.7)	0.227
Ba (cm), mean (SD)	-1.7 (1.7)	-2.6 (0.4)	0.331
C (cm), mean (SD)	-6.6 (1.1)	-5.2 (1.5)	0.037
Gh (cm), mean (SD)	3.8 (0.8)	4.3 (0.7)	0.235
Pb (cm), mean (SD)	4.0 (1.1)	3.3 (0.4)	0.140
Tvl (cm), mean (SD)	8.7 (1.2)	8.1 (1.3)	0.343
Ap (cm), mean (SD)	-2.1 (1.1)	-1.7 (2.0)	0.813
Bp (cm), mean (SD)	-2.7 (0.5)	-1.6 (2.5)	0.147
D (cm), mean (SD)	-7.3 (1.3)	-6.8 (0.8)	0.328
Anterior wall recurrence, n (%)	4 (29%)	1 (14%)	0.624
Posterior wall recurrence, n (%)	4 (29%)	1 (14%)	0.624
Apical recurrence, n (%)	0 (0%)	0 (0%)	-
Recurrence (on a patient basis), n (%)	5 (36%)	2 (28%)	0.572

While there was no apical recurrence in any patient, anterior wall recurrence was detected in four patients in Group 1 and one patient in Group 2. Similarly, posterior wall recurrence was detected in four patients in Group 1 and one in Group 2. On a patient basis, recurrence was detected in five patients in Group 1 and two patients in Group 2 without statistical significance (*P*=0.572).

In the anterior wall evaluation, ten patients in Group 1 presented with stage 0–1 prolapse, and four presented with stage 2 prolapse. In Group 2, six patients presented with stage 0–1 prolapse, and one presented with stage 2 prolapse. No patients in either group had a more severe prolapse detected.

In the posterior wall evaluation, ten patients in Group 1 presented with stage 0–1 prolapse, and four presented with stage 2 prolapse. In Group 2, six patients presented with stage 0–1 prolapse, and one presented with stage 3 prolapse. There were no patients in either group with other stages of prolapse.

In the apical region evaluation, all 14 patients in Group 1 and 2 patients in Group 2 fell into stage 0–1. Although there was no statistically significant difference between the groups in any compartment, the highest stage of prolapse detected in the study was stage 3 in a patient from Group 2. The relevant findings are summarized in Table 3.

When comparing the groups in terms of sexual functions, no statistically significant difference was found (Table 4). One patient who was not sexually active was excluded from the statistical evaluation. The total PISQ-12 score was 30.7 (6.3) in Group 1 and 33.1 (7.8) in Group 2 (*P*=0.481). In both groups, the highest scores were obtained in the physical variables, with scores of 13.2 (3.9) for Group 1 and 16.3 (3.2) for Group 2 (*P*=0.105). In Group 1, 11 patients reported experiencing pain during sexual activity, while in Group 2, four patients reported the same.

Table 3: Pelvic organ prolapse stages according to vaginal compartments.

	Group 1 (n=14)	Group 2 (n=7)	*P*-value
Anterior Wall			0.710
Stage 0	4 (28%)	3 (42%)	
Stage 1	6 (42%)	3 (42%)	
Stage 2	4 (28%)	1 (14%)	
Stage 3	0	0	
Stage 4	0	0	
Apex			0.638
Stage 0	10 (71%)	4 (57%)	
Stage 1	4 (28%)	3 (42%)	
Stage 2	0	0	
Stage 3	0	0	
Stage 4	0	0	
Posterior Wall			0.187
Stage 0	7 (50%)	3 (42%)	
Stage 1	3 (21%)	3 (42%)	
Stage 2	4 (28%)	0	
Stage 3	0	1 (14%)	
Stage 4	0	0	

Table 4: Comparisons for PISQ-12 and Simple Questionnaire.

	Group 1 (n=14)	Group 2 (n=7)	*P*-value
PISQ-12 Questionnaire Score			
Behavioral, mean (SD)	9.0 (2.7)	8.5 (4.3)	0.769
Physical, mean (SD)	13.2 (3.9)	16.3 (3.2)	0.105
Partner related, mean (SD)	8.5 (3.3)	8.3 (2.5)	0.878
Total PISQ score, mean (SD)	30.7 (6.3)	33.1 (7.8)	0.481
Simple Questionnaire			
Sexually active, n (%)	14 (100%)	6 (85%)	0.147
Problem in sexual activity, n (%)	4 (28%)	0 (0%)	0.267
Pain in sexual activity, n (%)	11 (78%)	4 (66%)	0.613

Discussion

The primary symptoms associated with pelvic organ prolapse include feeling fullness and pressure. However, in addition to these, pelvic organ prolapse may also manifest with symptoms such as incontinence and sexual dysfunction. The treatment options for pelvic organ prolapse range from conservative measures like lifestyle modifications, Pesser use, and physical therapy to surgical procedures employing natural tissues or meshes [1]. L/S sacrocolpopexy and L/S lateral suspension are surgical procedures that involve using mesh to treat uterine prolapse.

Two prospective studies assessed the PISQ-12 scores and sexual functions of patients who underwent laparoscopic sacrocolpopexy. In both studies, the postoperative scores were higher than the preoperative scores [14,15]. In our study, the laparoscopic sacrocolpopexy group had a mean follow-up time of 1,014 days, and the average PISQ-12 score was 30.7. These findings indicate lower values compared to the studies mentioned above.

In a study that assessed preoperative and postoperative sexual functions using the Female Sexual Function Index, patients who underwent laparoscopic lateral suspension scored higher in both settings [10]. In our study, the mean follow-up time for the lateral suspension group was 598 days, and the average PISQ-12 score was 33.1. We did not find any studies directly comparing PISQ-12 scores and sexual functions between patients who underwent laparoscopic sacrocolpopexy and those who underwent laparoscopic lateral suspension. Despite using different questionnaires, both methods demonstrated improved scores regarding sexual functions during the postoperative period.

In a systematic review involving 1,066 patients who underwent lateral suspension surgery, the reported rates of surgery-related postoperative complications were as follows: 33 (3.1%), 42 (3.9%), two (0.2%), and eight (0.8%) for Clavien Dindo grades 1, 2, 3a, and 3b, respectively. During the perioperative period, 9 patients experienced bladder injuries, and three patients had bowel injuries. In the postoperative period, 16 patients developed urinary tract infections, 11 patients experienced urinary retention, one patient had pyelonephritis, one patient had a hemorrhage, 16 patients reported pain, one patient had ablation of the lateral suture fixing mesh, ten patients developed vaginal granulation tissue, one patient had a uterovaginal fistula, and one patient required excision of the mesh due to erosion through the vaginal route within the first 30 days [16]. A total of 32 patients (3.1%) experienced mesh erosions, and the erosion rates for the relevant mesh types were as follows: titanium-coated polypropylene, 1.8%; polypropylene, 2.3%; polyethylene, 5.8% [16]. We did not observe any cases of mesh erosion in any of the groups.

Various anatomical success criteria have been used to define the effectiveness of laparoscopic lateral suspension. The success rates for the anterior vaginal wall ranged from 76.2% to 100%, for the apical region from 84.4% to 100%, for the posterior vaginal wall from 75% to 85%, and the overall success rate ranged from 82.7% to 100%. The recurrence rates for the anterior wall ranged from 0% to 9.4%, for the apical region from 0% to 7.4%, for the posterior wall from 1.6% to 20%, and the overall recurrence rates were reported as 5.7% to 20%. The re-operation rate ranged from 0% to 13% [16]. In our study, no secondary urogynecological operations were required, and we did not observe any cases of apical recurrence in either group. The recurrence rates for the anterior and posterior vaginal walls were 29% and 14% for Group 1 and Group 2, respectively.

In the sacrocolpopexy technique, the vaginal wall is anchored to a mesh using the anterior longitudinal ligament. This procedure requires retroperitoneal dissection through the right pelvic wall and presacral dissection, which involves close contact with structures such as the ovarian artery, common iliac artery, sigmoid colon, and presacral venous plexus. A meta-analysis comparing L/S sacrocolpopexy with robotic sacrocolpopexy in 18 studies revealed that after L/S sacrocolpopexy, the mean blood loss was 100.58 ml, the mean operation time was 50.24 min, and the mean rates of intraoperative bladder, bowel, vascular, and ureteral injuries were 3.1%, 1.1%, 0.8%, and 0%, respectively. Additionally, the rates of postoperative mesh erosion, anorectal dysfunction, and sexual dysfunction were reported as 2.7%, 3.2%, and 13%, respectively, following laparoscopic methods [17]. In a study by Baines et al. [18] on L/S sacrocolpopexy using mesh, complications included five cases of vaginal mesh exposure, four cases of suture erosion, six cases of bladder injury, five cases of vaginal buttonholing, one case of intraabdominal hemorrhage, one case of repeat laparoscopy for suspected bleeding without significant findings, one case of bowel injury, three cases of hematomas (one in the vaginal vault and two in the abdominal incision), nine cases of local infection, and one case of incisional hernia. The mean operation time was reported as 90 min (ranging from 27 to 251 min), and the mean hospital stay was 2 days (ranging from 0 to 85 days). Preoperative Point C had a mean value of 1.18 cm, while postoperative Point C had a mean value of -7.3 cm, representing an approximate difference of 8.5 cm [14]. Our study measured the mean values for Point C as -6.6

(1.1) cm and -5.2 (1.5) cm for the L/S sacrocolpopexy and L/S lateral suspension groups, respectively. Vascular injuries, hypogastric plexus lesions, right hypogastric nerve lesions, spondylodiscitis, and lumbar pain were reported in various studies following sacrocolpopexy [8,19–22].

The mean surgery times reported for L/S lateral suspension were 108.8 (29.8), 78.4 (29.7), and 245 (45) min in three different studies [7,10,23]. In studies on sacrocolpopexy, the mean surgery times ranged from 50.24 to 90 min [17,18]. Another study found a statistically significant difference in mean surgery times between experienced operators and trainees, with 178 min versus 251 min, respectively. However, there were no significant differences in perioperative complications and short-term anatomical results between the two groups [24].

Limitations

This study has several limitations, including the retrospective collection of patient data, a small sample size, variations in the length of follow-up, differences between the groups, operations performed by different surgeons, and a focus on comparing short-term results. However, this study may still hold advantages due to the scarcity of research on comparing postoperative improvements in prolapse and sexual functions between patients undergoing L/S sacrocolpopexy and L/S lateral suspension. Nevertheless, there is a need for randomized prospective studies and meta-analyses to compare both short-term and long-term outcomes.

Conclusions

Abdominal sacrocolpopexy is widely accepted as the gold standard surgical treatment for uterine prolapse and can be safely performed using a laparoscopic approach. L/S lateral suspension has emerged as a newer alternative method for treating uterine prolapse. In the present study, we found that laparoscopic lateral suspension surgery demonstrated comparable anatomical improvement, sexual function outcomes, rates of de novo incontinence development, and postoperative symptom profiles in patients within the same age groups and with similar preoperative levels of uterine prolapse. There were no significant differences between the groups regarding PISQ-12 scores, dyspareunia, or recurrence. Except for point C, there were no statistically significant differences between the groups regarding POP-Q reference points. Point C was measured more proximally in L/S sacrocolpopexy than in L/S lateral suspension. In conclusion, both L/S lateral suspension and L/S sacrocolpopexy yielded similar short-term anatomical and sexual outcomes. However, considering that L/S lateral suspension is an easier technique to learn and involves a safer intraoperative dissection plan, it may be preferred over L/S sacrocolpopexy.

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