



The effect of vaginal cuff suspension to uterosacral ligaments in vaginal hysterectomy on improvement of lower urinary tract symptoms and pelvic organ prolapse

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ABSTRACT

Objectives: To evaluate the effects of suturing the cuff to the uterosacral ligaments (USL) during vaginal hysterectomy on healing with regards to anatomy and lower urinary tract symptoms (LUTS).

Materials and Methods: This study was carried out on patients, who applied to the Urogynecology Outpatient Clinics of Muğla Research and Training Hospital between the dates of March 2021 and March 2022 and were diagnosed as having uterine prolapse. All of the patients were operated on by the same experienced surgeon (Prof. AAS) and the newly created vaginal cuff was sutured to the USL. In the preoperative period, all patients underwent pelvic organ prolapse quantification (POP-Q) system measurement, and were questioned about LUTS, including stress urinary incontinence, urgency, urge incontinence, frequency, hesitancy, abnormal micturition, nocturia, dysuria, pelvic pain, fecal incontinence, incomplete evacuation of stool, constipation, and vaginal wind. The patients, who were operated on, were reevaluated with respect to POP-Q and LUTS in the follow-up period at the 3rd, 6th and 12th months.

Results: A total of 80 patients were included in this study. POP-Q points; Aa, Ba, C, Ap and Bp measurements were significantly deeper and genital hiatus measurements were significantly narrower after surgery than during the preoperative period. No statistically significant difference was observed in the perineal body and with respect to total vaginal length measurements. Moreover, statistically significant improvements were found in the symptoms of urgency, urge incontinence, stress urinary incontinence, frequency, abnormal micturition, nocturia, pelvic pain, fecal incontinence, incomplete evacuation of stool and constipation. In the POP-Q scoring performed in the postoperative follow-up of the cases, the C value was taken as a reference for *de novo* vaginal vault prolapse. There were 8 cases of recurrence. The mean C value was +3.6 in these cases. Recurrent cases were treated with LeFort colpocleisis, iliococcygeal fixation and posterior intravaginal sling (PIVS) operations. No recurrence was observed in the follow-ups.

Conclusion: The suturing of the newly created vaginal cuff during vaginal hysterectomy to the USLs is a very simple, easily applicable, highly effective surgical technique with low morbidity and low risk of vaginal vault prolapse. This technique should be included in the armamentarium of all surgeons dealing with urogynecology due to the positive effect it provides in LUTS as well as anatomical healing.

Keywords: Apical suspension; pelvic organ prolapse; uterosacral ligaments; vaginal hysterectomy

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INTRODUCTION

Hysterectomy is the surgical removal of the uterus. It is one of the most commonly performed gynecologic procedures in Türkiye, ranking second in the world after cesarean section.^{1,2} The number of women who have hysterectomies each year is significant, and the majority of them are performed for benign reasons such as leiomyoma, adenomyosis, severe abnormal uterine bleeding that does not respond to medical treatment, and uterine prolapse.³ Today, many urogynecologists prefer vaginal hysterectomy for apical compartment defect and uterine prolapse. The likelihood of a woman having prolapse surgery during her lifetime is 11-19%, and this rate rises as the elderly population grows. The vast majority (80-90%) of pelvic organ prolapse (POP) is treated vaginally, with abdominal surgery being less common. Vaginal hysterectomy plays an important role in the treatment of prolapse worldwide.^{4,5} In recent years, surgical techniques have advanced rapidly to improve outcomes in female pelvic functional reconstructive surgery and to reduce prolapse recurrence rates.^{6,7} Because of postoperative apical recurrences, it is now accepted that apical support for a permanent repair during vaginal hysterectomy is required. Uterosacral ligament (USL) plication is a popular procedure for this type of apical support.⁵⁻⁸

In this thesis study, we aim to look at anatomical and lower urinary tract symptoms (LUTS) and effects of suturing the vaginal cuff to the USLs, which we did to prevent recurrent prolapse in vaginal hysterectomies.

MATERIALS AND METHODS

This prospective cohort study was conducted in the Department of Obstetrics and Gynecology of the Faculty of Medicine of Muğla Sıtkı Koçman University, Muğla, Türkiye. Ethical approval was obtained from the Faculty's Ethics Committee (no. 4/III; 17 February 2021). The study was conducted according to the recommendations of the Helsinki Declaration. Written informed consent was obtained from all patients before undergoing surgery. This study was conducted with 80 patients at the Urogynecology Polyclinic of Muğla Sıtkı Koçman University Training and Research Hospital Gynecology and Obstetrics Clinic between March 2021-March 2022. Preoperative evaluation, surgery and postoperative follow-up of the patients were performed by the same surgical team. The necessary information was obtained from the hospital database and patient files.

1. Inclusion Criteria: Completed fertile period or “not pregnant/no risk of pregnancy” status, uterine prolapse (C point ≥ 0), the patient accepting to be treated with vaginal hysterectomy for uterine prolapse, patients able to communicate well and adapt

to the diagnosis-treatment and follow-up process, and patients able to 3rd, 6th and 12th-month controls.

2. Exclusion Criteria: a history of previous pelvic floor surgery, known adverse reactions to non-absorbable suture material such as erosion, fistula, and abscess development, and the need for ovarian removal (adnexal mass, BRCA 1/2 positivity, family history of ovarian cancer)

3. Preoperative Patient Evaluation: Anamnesis, Physical Examination, and Pelvic Examination:

Patients were evaluated at the urogynecology outpatient clinic. A detailed anamnesis was taken, followed by a physical and pelvic examination. The urogynecologic patient evaluation form included information about the patient's age, parity, body mass index, menopausal status, POP-quantification (POP-Q) scoring, and upper urinary tract stone (UUTS). POP-Q scoring included Aa, Ba, C, D, D, Ap, and Bp points, as well as genital hiatus (Gh), perineal body (Pb), and total vaginal length (TVL). The patients were given a detailed explanation of vaginal hysterectomy and cuff suspension surgery for USL. A signed consent form was obtained from each patient at least 48 hours before surgery and kept in the files. Before surgery, bowel cleansing was not performed.

4. Surgical Procedure:

After regional anesthesia was applied to the patient, the patient was placed in a high dorsal lithotomy position. The uterosacral ligaments, exposed when the uterus was pulled forward and upward, were shown being held with Allis clamps (Picture 1a). The border of the bladder could be identified from the reflection in the vaginal epithelium covering it. The bladder was removed from the incision line with the help of an assistant. A circular incision was made in the upper part of the cervix, at the level where the bladder reflex is observed. At the same time, the level

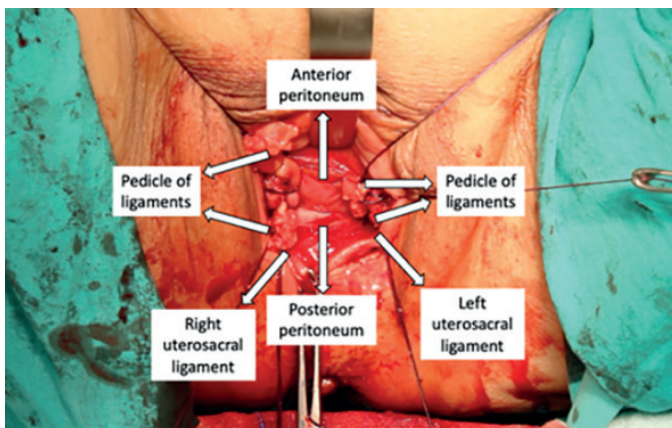


Picture 1a. Demonstration of uterosacral ligaments held with Allis clamps

of this incision also determined the postoperative total vaginal length. Thin laces called “plica uterovesicalis” were held with small pean clamps. Then it was cut and tied. The bladder was removed from the cervix via sharp and blunt dissection. The cardinal ligaments extending to the pelvic wall on the right and left sides of the cervix were held with a Heaney clamp, cut and tied with no. 0 late absorbable sutures. Bilateral uterine arteries were held with curved Heaney clamps, cut and tied. The USLs, which were exposed by traction of the uterus, first in a forward position and then upward, are held, cut and sutured. The sutures belonging to the USLs were left uncut and kept. The posterior peritoneum was cut and opened. The anterior peritoneum was curved from below with a finger and cut open with scissors. The ligament pedicles were held in place by opposing Heaney clamps. These pedicles included the round ligament, ligamentum ovary proprium, ligamentum latum and tuba uterina. Each pedicle was tied with two stabilizing sutures placed first medially and then distally. Picture 1b shows the appearance of the retained sutures after the uterus is removed and which structures these sutures belong to. Three sutures held on the right belong to two ligament pedicles and the right uterosacral ligament. The three sutures held on the left belong to the two ligament pedicles and the left USL.

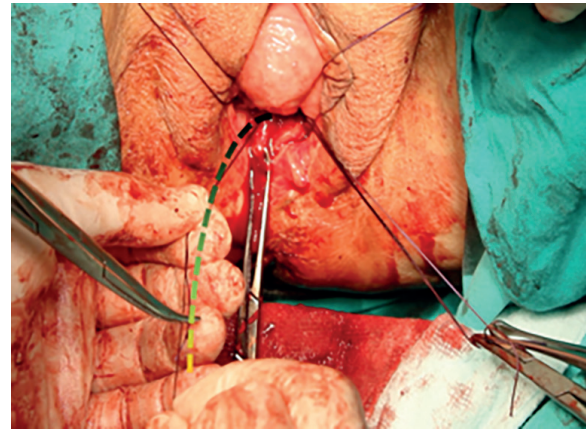
Hemostasis was evaluated at this stage with the retained pedicles. After peritonization, the tied suture was not cut but instead secured, serving as a reference point for the next steps (Picture 1c). The sutures of the right and left ligament pedicles were connected to each other in a reciprocal manner. Simultaneously, the right and left USLs were also mutually connected.

At the end of this stage, the sutures of the USLs and pedicles were cut (Picture 2). One end of the peritonised suture and fix were passed through the upper leaf of the cuff, and the other end passed through the lower leaf. If double needle suture material is not used, free needles can also be used.

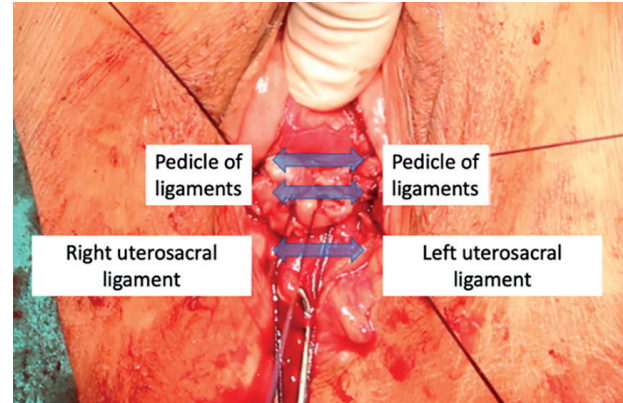


Picture 1b. The appearance of the retained sutures after the uterus was removed, showing the structures to which these sutures belong

The cuff was closed by individually suturing it using size 0 late-absorbable suture material. After the vaginal cuff was pushed in with the help of an assistant, the sutures extending from the upper and lower leaves of the cuff-continuing from the suture used in peritonization-were placed in the deep plane. This ensured the connection between the cuff and the USL, providing apical support simultaneously with the vaginal hysterectomy. Picture 3 shows the post-operative view.



Picture 1c. After peritonization, the tied suture was not cut but fixed at key points for the next steps



Picture 2. The sutures of the USLs and pedicles were cut
USLs: Uterosacral ligaments



Picture 3. Post-operative appearance

5. Postoperative Patient Evaluation: UUTS and Pelvic Examination:

The bladder catheter was removed at the 8th postoperative hour and the patients were mobilized. In routine practice, the patient was discharged 48 hours postoperatively and scheduled for a follow-up visit on the 10th postoperative day. At the 3rd, 6th, and 12th postoperative months, symptoms were assessed and re-evaluated through pelvic examination. Current symptoms and POP-Q values were recorded on urogynecologic follow-up forms. A postoperative POP-Q C value of >0 was considered indicative of *de novo* vaginal cuff prolapse.

Statistical Analysis

Skewness/Kurtosis values were used to test normality in the obtained data. Values were expressed as mean \pm standard deviation, median (minimum-maximum), or frequency (%). The Independent Samples t-test and Mann-Whitney U test were used to compare continuous variables between two groups. The non-parametric test was analyzed using One-Way ANOVA with the Kruskal-Wallis test when comparing variables between more than two groups. Relationships between continuous variables were analyzed using Spearman or Pearson correlation analysis. The chi-square test was employed to compare categorical data, including both counts and percentages, between groups. All analyses were conducted using the SPSS 20 software, with a significance level set at 0.05. Statistical results were assessed for their consistency with the literature and any observed differences.

RESULTS

As a result of the examination of demographic characteristics, it was seen that the mean age and body mass index (kg/m²) were 63.33 \pm 8.42 and 28.75 \pm 3.20, respectively. The number of patients who were not in menopause was 5 (6.2%), and the

number of patients in menopause was 75 (93.8%). When the parity was evaluated, it was seen that 1 (1.2%) patient was nulliparous, 8 (10%) patients were primiparous, and 71 (88.8%) patients were multiparous (Table 1).

The women in the study had their preoperative and postoperative POP-Q measurements compared at the 3rd, 6th, and 12th months. As a result, there were statistically significant differences between the groups in terms of Aa, Ba, C, Ap, Bp, Gh.

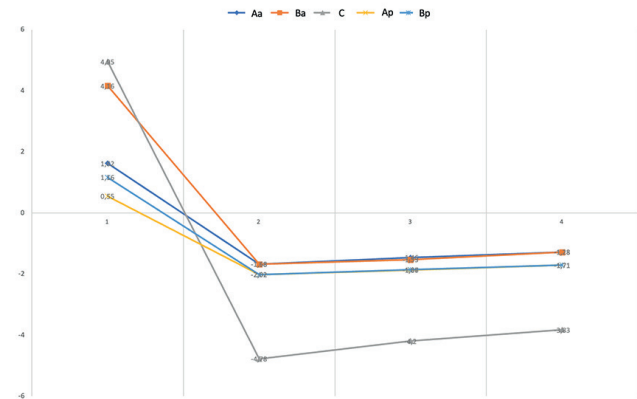


Figure 1. Variation of Aa, Ba, C, Ap, and Bp values over time

Table 1. Demographic data of the patients included in the study

Demographic data	(n=80)
Age (years)	63.33 \pm 8.42
BMI (kg/m ²)	28.75 \pm 3.20
Menopausal status	
No	5 (6.2%)
Yes	75 (93.8%)
Parity	
Nulliparous	1 (1.2%)
Primiparous	8 (10%)
Multiparous	71 (88.8%)
Mean \pm SD, (%), BMI: Body mass index; SD: Standard deviation	

Table 2. Vaginal measurements of patients according to POP-Q (cm)

	Preoperative (Mean \pm SD)	Postoperative 3 rd month (Mean \pm SD)	Postoperative 6 th month (Mean \pm SD)	Postoperative 12 th month (Mean \pm SD)	p
Aa (cm)	1.62 \pm 2.42	-1.68 \pm 1.37	-1.46 \pm 1.57	-1.28 \pm 1.56	0.00*
Ba (cm)	4.16 \pm 2.33	-1.68 \pm 1.94	-1.53 \pm 2.01	-1.28 \pm 2.03	0.00*
C (cm)	4.95 \pm 2.91	-4.78 \pm 2.57	-4.20 \pm 2.87	-3.83 \pm 3.04	0.00*
Ap (cm)	0.55 \pm 3.14	-2.02 \pm 1.04	-1.87 \pm 1.31	-1.71 \pm 1.33	0.00*
Bp (cm)	1.16 \pm 3.58	-2.02 \pm 1.04	-1.86 \pm 1.33	-1.71 \pm 1.36	0.00*
Gh (cm)	4.62 \pm 0.96	3.83 \pm 0.76	3.82 \pm 0.76	3.82 \pm 0.76	0.00*
Pb (cm)	2.21 \pm 0.59	2.23 \pm 0.57	2.23 \pm 0.57	2.23 \pm 0.57	0.98*
Tvl (cm)	8.10 \pm 1.31	8.12 \pm 1.31	8.12 \pm 1.31	8.12 \pm 1.31	0.99*

Aa: Aa point; Ba: Ba point; C: C point; Ap: Ap point; Bp: Bp point; Gh: Genital hiatus; Pb: Perinal body; Tvl: Total vaginal length; *Kruskal-Wallis test; **One-Way ANOVA test

No statistically significant difference was observed in terms of Pb and TVL (Table 2, Figure 1).

During the 3rd, 6th, and 12th months after surgery, there was a significant decrease in symptoms such as a sudden urge to urinate, stress urinary incontinence, frequent urination,

abnormal emptying, nocturia, pelvic pain, fecal incontinence, difficult defecation, and constipation ($p < 0.05$). There was no statistically significant change in complaints about difficulty starting urination or dysuria ($p > 0.05$). Table 3 shows the clinical findings of the women, who participated in the study (Table 3).

Table 3. Results of clinical findings of the patients included in the study

	Preoperative	Postoperative 3 rd month	Postoperative 6 th month	Postoperative 12 th month	p
SUU					0.000*
Yes	43 (46.3%)	3 (3.7%)	3 (3.7%)	4 (5%)	
No	37 (53.7%)	77 (96.3%)	77 (96.3%)	76 (95%)	
SUSI					0.002*
Yes	5 (6.3%)	-	-	-	
No	75 (93.7%)				
SUI					0.000*
Yes	23 (28.8%)	1 (1.3%)	1 (1.3%)	-	
No	57 (71.2%)	79 (98.7%)	79 (98.7%)		
Frequent urination					0.000*
Yes	36 (45%)	1 (1.3%)	3 (3.9%)	8 (10%)	
No	54 (55%)	79 (98.7%)	77 (96.1%)	72 (90%)	
Difficulty in urination					0.11*
Yes	2 (2.5%)	-	-	-	
No	78 (97.5%)				
Abnormal excretion					0.000*
Yes	32 (40%)	-	-	-	
No	48 (60%)				
Nocturia					0.000*
Yes	48 (60%)	4 (5%)	1 (1.3%)	2 (2.5%)	
No	32 (40%)	76 (95%)	79 (98.7%)	78 (97.5%)	
Dysuria					0.39*
Yes	1 (1.3%)	-	-	-	
No	79 (98.7%)				
Pelvic pain					0.000*
Yes	37 (46.3%)	-	2 (2.5%)	4 (5%)	
No	43 (53.7%)		78 (97.5%)	76 (95%)	
Fecal incontinence					0.007*
Yes	4 (5%)	-	-	-	
No	76 (95%)				
Difficult defecation					0.007*
Yes	4 (5%)	-	-	-	
No	76 (95%)				
Constipation					0.000*
Yes	13 (45%)	2 (2.5%)	-	1 (1.3%)	
No	67 (55%)	78 (97.5%)		79 (98.7%)	
Sound from vagina					
Yes	-	-	-	-	
No					

* Pearson χ^2 test. (%); *AHI: sudden urge to; AHI: sudden urinary sensory incontinence; SUI: Stress urinary incontinence

The C value was used as a reference for *de novo* vaginal cuff prolapse in the POP-Q evaluation during the cases' postoperative follow-up. Accordingly, *de novo* vaginal cuff prolapse was found in 8 cases (mean C value +3.6). The C value was greater than zero in two cases at three months, three cases at six months, and three cases at twelve months. Two of the three patients with a C value >0 at the sixth month were asymptomatic until the 12th month of postoperative follow-up. These patients underwent recurrence surgeries in the 12th month after becoming symptomatic. In the study cohort, the rate of *de novo* vaginal prolapse was 10%. LeFort colpocleisis, iliococcygeal fixation, and PIVS procedures were performed in four, three, and one of these cases, respectively. No recurrence was observed in the 1-year follow-up of these cases.

Based on the findings of our study, we observed statistically significant anatomical improvements in Aa, Ba, C, Ap, and Bp values, as well as a narrowing of Gh. There was no effect of surgery on Pb or TVL. When the results were analyzed for symptomatic improvement, it was found that symptoms such as sudden urge to urinate, urge incontinence, stress urinary incontinence, frequent urination, abnormal emptying, nocturia, pelvic pain, fecal incontinence, difficulty with defecation, and constipation showed statistically significant improvement.

DISCUSSION

One of the most important steps in vaginal hysterectomy for a patient with apical prolapse is to return the vaginal cuff to its anatomically normal position and provide apical support, i.e., the De-Lancey 1 support point. Several techniques have been developed to accomplish this. Although several different apical suspension procedures are available for women with pelvic organ prolapse, there is limited data on their long-term efficacy and safety profiles, and there is no universal definition of "success" for these techniques in prolapse surgery. Essentially, anatomical and symptomatic improvement is considered successful surgery.⁸ In this surgical technique, the strongest ligaments of the pelvic floor are used to suspend the cuff. A cadaveric study demonstrated that the middle part of the USL can weigh up to 17 kg.⁹ The use of a strong ligament, such as the USL, for apical prolapse prevention is beneficial. The recurrence rates reported in studies on high USL suspension in the literature were investigated. According to Pedersen et al.¹⁰, 19% of women had cuff prolapse in the sixth postoperative month, and 35% underwent re-prolapse surgery after an average follow-up of 7.2 years. Another study of 302 women found a recurrence rate of 13%, and a systematic review published in 2010 discovered a recurrence rate of 9.4%.^{11,12} A retrospective cohort analysis of 219 patients revealed a recurrence rate of 24.7%.¹³ All of these rates show that cuff prolapse, which occurs in 43% of patients after

hysterectomy, is reduced with apical USL support.¹⁴ According to our findings, recurrence occurred in 8 (10%) of the 80 patients, who underwent vaginal hysterectomy and cuff application with USL. This recurrence rate outperforms the studies discussed above. We believe this is due to our surgical technique and the non-absorbable sutures we used. The same surgeon performed recurrence surgeries on 8 patients (mean C value +3.6), including four with colpocleisis, one with posterior intravaginal sling (PIVS), and three with bilateral iliococcygeal fixation. Patients experienced symptomatic and anatomical improvement during the postoperative period following recurrence surgery. In addition to reducing the rates of prolapse recurrence, the surgical technique we employed allows for repairs using natural tissue, thereby avoiding complications associated with mesh. Vaginal mesh and related kits for prolapse surgery were introduced in the United States in 2005 to improve natural tissue repair in vaginal prolapse. Many transvaginal mesh products have been developed to help prevent vaginal cuff prolapse. The Food and Drug Administration (FDA) issued public warnings about the safety of mesh products due to an increase in reports of mesh-related complications such as vaginal erosions, infections, granulomas, dyspareunia, vesicovaginal fistulas, and chronic pain, as well as a lack of superior functional outcomes.¹⁵ As a result, these synthetic mesh products have not been shown to consistently improve problems associated with apical compartment defects. Although data is limited, recurrence rates and subjective measures of improvement do not outperform natural tissue repair, and different types of vaginal mesh kits have not been shown to be superior to one another. In terms of mesh-specific complications, it has been determined that it is more logical to use mesh surgery for specific cases or patient-specific risk factors such as recurrence after natural tissue repair than as a routine technique.¹⁶ The PIVS is a popular surgical technique for apical prolapse. However, the FDA issued a public health statement in 2008 and provided an update in 2011 regarding the increased complication rates associated with the use of mesh in vaginal surgery.¹⁷ Although the PIVS procedure has a similar success rate to many other apical prolapse surgical techniques, mesh-related complications are a disadvantage. The most commonly reported morbidities are mesh erosion, pelvic infection, dyspareunia, pelvic pain, and sexual dysfunction.^{18,19}

Abdominal sacrocolpopexy, while superior in some objective outcomes, is comparable to vaginal ligament suspensions in terms of subjective outcomes in the short to medium term and, like PIVS, has a higher risk of mesh exposure in the long term. Although hysteropexy is a surgical option for the treatment of symptomatic vaginal apical prolapse, the available data are of low quality. More comparative research is required before

this procedure can be widely implemented in routine clinical practice.²⁰ When comparing sacrocolpopexy to sacrospinous fixation, surgeons prefer sacrospinous fixation in terms of surgical time and patient postoperative recovery, despite the fact that sacrocolpopexy is more successful in the long run.¹³

Sacrospinous ligament fixation is another surgical option for treating apical prolapse. In a retrospective study of 10,210 eligible patients, 7,127 underwent USL, while 3,083 underwent sacrospinous ligament fixation. When complications from the two surgical techniques were compared, USL was associated with a lower risk of complications with the exception of urinary tract infection.²¹

Ureteral injuries are a feared complication of USL suspension. According to one study, the incidence rate of this complication was 1.2%, while another found an average rate of 1.8%.^{11,22} Furthermore, diagnostic cystoscopy with contrast media enables early diagnosis and intraoperative management, reducing long-term complications. Recently, intraoperative strong Doppler ultrasound has been proposed as a non-invasive method for determining ureteral patency during pelvic surgery.²³ Only 0.6% of ureteral injuries require ureteral implantation, as most ureteral obstructions can be resolved by removing the offending uterosacral sling sutures.¹¹ It is also recognized that the addition of an anterior compartment repair increases the risk of ureteral kinking.²⁴ In a cadaveric study, the distance between the middle of the USL and the ureter was found to be 2.3 cm.⁹ Suturing the ligament without shifting laterally may help to avoid ureteral complications. There were no ureteral complications in the 80 patients in our study. Neurosensory injury and uterine artery injury are two additional rare complications of USL plication. To avoid complications, it is important to avoid using sutures that are too deep or deviated.

One of the significant findings from our study was the narrowing of Gh. In a study by Vaughan et al.,²⁵ surgical success rates were compared retrospectively by categorizing patients into three groups. These three groups included women with persistently wide Gh after surgical repair, women with improved Gh after surgery, and women with stable Gh before and after surgery. In this study, women with persistently enlarged Gh had a higher risk of anatomic failure after surgery than that in the other two groups.²⁵ In another study, both posterior and non-posterior repair groups were present, and it was discovered that a lower preoperative Gh was associated with surgical success, regardless of posterior repair performance.²⁶ DeLancey and Hurd²⁷ also discovered that patients, who experienced two or more recurrent prolapses after surgery had a larger urogenital cavity.

Today, the choice of surgical approaches is largely determined

by the surgeon's preferences and experience. When discussing surgical options with patients, data comparing efficacy and potential risks is critical.²⁸ The technique discussed in our study is feasible, simple, low-cost, and systematizable when compared to existing surgical methods. Additionally, it is a safe procedure performed with natural tissue, thereby avoiding some complications associated with other techniques.

Our findings revealed statistically significant improvements in Aa, Ba, C, Ap, and Bp values, as well as a significant narrowing of Gh. At the same time, there was a significant improvement in symptoms such as a sudden urge to urinate, urge incontinence with sudden urge to urinate, stress urinary incontinence, frequent urination, abnormal emptying, nocturia, pelvic pain, fecal incontinence, difficult defecation, and constipation at one year follow-up compared to preoperative symptoms. There were no intraoperative complications among our patients. The data from our study revealed that both symptomatic and anatomical success was achieved. The most important criterion for successful treatment of pelvic organ prolapse in patients is the absence of prolapse-related symptoms and anatomical improvement of the prolapse.²⁹ In order for the data to be generalized, large-scale studies involving more patients and conducted in different centers are needed.

Study Limitations

The mean age of the patients in our study was 63.33 ± 8.42 and the follow-up period was 12 months. Conducting this study with a patient group with a lower mean age or utilizing a follow-up period of longer than 12 months might change the surgical recurrence rates and long-term results of the surgery. At the same time, the surgeries in the study were performed by a surgeon, who was specifically specialized and experienced in urogynecological surgery. This may reduce the generalizability of the study and could alter the surgical results when performed by different teams.

CONCLUSION

Suturing the vaginal cuff to the USLs simultaneously with vaginal hysterectomy is a simple and feasible surgical technique. According to the results of this study, this technique is seen as an effective surgical intervention that provides symptomatic relief as well as anatomical recovery.

ETHICS

Ethics Committee Approval: Ethical approval was obtained from the Faculty of Medicine of Muğla Sıtkı Koçman University's Ethics Committee (no. 4/III; 17 February 2021).

Informed Consent: Prospective study.

FOOTNOTES

Contributions

Surgical and Medical Practices: A.A.S.; Concept: A.A.S., D.A.G., İ.G.; Design: A.A.S., D.A.G., İ.G.; Data Collection and/or Processing: D.A.G.; Statistical Analysis: D.A.G., İ.G., R.E.P.; Project Development: A.A.S., D.A.G.; Writing: D.A.G.

DISCLOSURES

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

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