



*Comparison of pelvic organ prolapse recurrence between abdominal sacrocolpopexy and vaginal uterosacral ligament suspension/sacrospinous fixation*

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### **Abstract**

**Introduction and Hypothesis:** Pelvic organ prolapse usually involves the descent of one or more of the vaginal walls and/or the uterus. Pregnancy and age are the most common causes. Although it is often asymptomatic, it has a high prevalence. Several approaches are used to fix pelvic organ prolapse, but the best procedure remains undetermined. In this study, we evaluated the primary surgical outcomes to compare the efficacy between abdominal sacrocolpopexy and vaginal uterosacral ligament suspension/sacrospinous fixation in fixing and preventing recurrence of utero-vaginal or vault prolapse.

**Methods:** This retrospective cohort study included 110 patients who underwent either sacrocolpopexy, uterosacral ligament suspension, or sacrospinous fixation between 2016 and 2019 at King Abdulaziz Medical City and who were followed up for >1 year using pelvic organ prolapse quantification (POP-Q). Primary outcome was Recurrence rate, and secondary outcome sexual and overall satisfaction using Likert scale. All patients who met the inclusion and exclusion criteria were included. The required data were collected from medical charts, then analyzed using the chi-square test and t-test. Results were reported as frequency, percentage, mean, and standard deviation.

**Results:** The most affected women were those aged 40-49 years with 7-9 previous deliveries; 4<sup>th</sup> degree prolapse was the most common. The most frequent procedure was sacrocolpopexy, and the most common postoperative complication was dyspareunia.

**Conclusions:** There were no differences in recurrence rates among the approaches. Uterosacral ligament suspension or sacrospinous fixation is more suitable for multiparous women with 2<sup>nd</sup>-degree prolapse as they resulted in fewer postsurgical complications (especially dyspareunia). Sacrocolpopexy may be preferred for patients with advanced pelvic organ prolapse, especially those aged 50-59 years.

**Key words:** dyspareunia, pelvic organ prolapse, postoperative complications, uterine prolapse, vaginal prolapse

**Brief Summary:** Abdominal sacrocolpopexy and vaginal uterosacral ligament suspension/sacrospinous fixation did not differ in recurrence rates. Larger studies should be performed to validate our findings.



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**Introduction**

*The uterus is a muscular organ that consists of the fundus, body, and cervix. The cervix protrudes into the vaginal vault, where it opens. It is the most fixed part of the uterus, as it is attached to the back of the bladder, vaginal fornix, and other structures that directly or indirectly help to maintain the normal position (pelvic diaphragm, condensation of visceral pelvic fascia, and ligaments) [1].*

There are many ligaments that support the uterus, but the most important ligaments include the round ligament for forward stability, transverse cervical ligament for lateral stability, and uterosacral ligaments for backward stability [1].

Pelvic support is provided mostly by the levator ani muscles and connective tissue attaching the vagina to the sidewalls and pelvis. With normal pelvic support, the vagina lies horizontal to the levator ani muscles. When the levator ani muscles are damaged, its position becomes more vertical and the vaginal opening widens, shifting support to the connective tissue attachments. Biomechanical studies have revealed that, during the second stage of labor, the levator ani muscles are stretched by >200%, beyond the threshold for stretch injuries [2].

*Pelvic organ prolapse (POP) in gynecology is defined as herniation of the anterior vaginal wall, posterior vaginal wall, uterus, or vaginal apex into the vagina; descent may involve one or more structures (Figure 1) [2]. POP symptoms typically include vaginal bulge, pelvic pressure or heaviness, abnormal voiding or defecation, and sexual dysfunction [3].*

Although POP can affect women of all ages, it is more common in older women [2]. Other risk factors for POP are categorized as obstetrical factors (parity and vaginal delivery), lifestyle



factors (higher body mass index), unmodifiable risk factors (ethnicity), and other risk factors associated with increased intra-abdominal pressure (constipation, difficult labor, and chronic obstructive pulmonary disease) [4].

Despite the high prevalence of POP, our knowledge of its pathophysiology is limited. Prolapse may result from defective supportive structures with normal levels of intraabdominal pressure or from normal pelvic support structures with chronically high levels of intra-abdominal pressure [3]. More than two-thirds of parous women have objective evidence of POP upon clinical examination. Most of these defects are asymptomatic, and few require surgical intervention [5].

*In cases that do require intervention, the following apical suspension procedures may be used: sacrocolpopexy (SCP), uterosacral ligament suspension (USLS), or sacrospinous fixation (SSF) [6]. POP surgeries may be reconstructive or obliterative; reconstructive surgery corrects the prolapse while restoring normal vaginal anatomy, while obliterative surgery corrects the prolapse by closing off the vaginal canal either partly or completely. Therefore, reconstructive surgery is the appropriate choice for women who are or intend to be sexually active. Obliterative surgery should be considered as a first-line surgical procedure for fragile, older women with advanced POP who no longer desire vaginal intercourse.*

*The choice of apical suspension procedure should be individualized for each patient. SCP, which is the fixation of the uterus or vault to sacral promontory by using synthetic mesh and laparoscopy, is the preferred approach. It is appropriate for women at risk for prolapse recurrence [6]. USLS involves fixing the vault to the uterosacral ligament that attaches to the uterus anteriorly and the sacrum posteriorly. SSF, on the other hand, is always vaginal. It involves fixing the vault to the right sacrospinous ligament, which is a triangular area attached to the sacrum, coccyx, and ischial spine. For the purpose of this study, we grouped cases that had undergone USLS and SSF procedures together, as both were performed using vaginal approaches, and both had similar preparations, intraoperative durations, and postoperative care interventions, and many postoperative complications. Lastly, grouping them together ensured a good sample size.*

*Few studies have been conducted on this topic, especially in Middle Eastern countries. One study reported that the recurrence rate for stage III prolapse was lower after SCP than after USLS. However, there was no difference in the rates of recurrence of preoperative 2<sup>nd</sup>-degree prolapse between the two procedures, and mesh augmentation may not be necessary for these patients [7].*

*Another study reported a lower rate of recurrent vault prolapse and less dyspareunia with abdominal SCP than with vaginal SSF. These benefits must be balanced against the longer procedure time, longer time to return to daily activities, and increased cost associated with SCP [8]. Abdominal SCP is more effective in correcting advanced stages of uterovaginal or vault prolapse, but it is associated with more intra- and postoperative morbidity compared to vaginal sacrospinous ligament fixation [9]. Vaginal sacrospinous ligament fixation is the procedure of choice for patients with other medical disorders [9], as it required shorter operative time.*



*Some studies showed no differences in the complication and/or cure rates but did find slightly better long-term anatomical outcomes after SCP [10]. In all SCP and USLS/SSF, the patients achieved the same success rates and levels of function [11]. There is no strong evidence supporting one procedure over the other, and it remains unclear which operations lead to the best results and patient satisfaction [12].*

*In this study, we compared the efficacies of abdominal SCP and vaginal USLS/SSF procedures for fixing uterovaginal or vault prolapse in preventing POP recurrence by examining primary surgical outcomes. We also examined the secondary outcome of patient satisfaction, taking into consideration age, type of prolapse, and the patient's medical condition prior to the procedure.*

## **Materials and Methods**

### **Study setting**

*The study was conducted at King Abdul-Aziz Medical City, a tertiary teaching hospital in Riyadh, Saudi Arabia. The hospital provides care in subspecialties, such as general obstetrics and gynecology, maternal-fetal medicine, in vitro fertilization, and urogynecology.*

*The obstetrics and gynecology department has 110 beds; the outpatient clinic receives almost 2,000 patients per week and delivers almost 10,000 babies per year.*

*In the urogynecology department, all procedures are performed by expert urogynecology surgeons assisted by senior residents in their 4th or 5th years.*

### **Patients**

*All patients from 2016 to 2019 who met the following inclusion criteria were included: middle-aged women (aged 30-75 years); patients with POP (stages II-IV or vault prolapse); and patients who underwent either abdominal laparoscopic SCP or vaginal USLS or vaginal SSF. Patients who have undergone previous POP surgery were excluded.*

### **Study design**

*This retrospective cohort study included all patients (n = 110) from 2016 to 2019 who underwent procedures utilizing one of the two approaches, abdominal SCP or vaginal*

*USLS/SSF, and who were followed up for at least 1 year after the surgery using (POP-Q). We used non-probability consecutive sampling, where all patients who met the inclusion and exclusion criteria were included in the study.*



### **Data collection, instruments, and measurements**

*Data were collected from patients' medical charts, retrieved from operative schedules.*

*Patients were grouped according to the type of operation, either abdominal SCP or vaginal USLS/SSF. All patients were followed up for at least 1 year to assess the outcome; operation length, complications, and length of admission were also evaluated.*

### **Statistical analysis**

*Data were analyzed using SPSS statistical software for Windows version 20 (Riyadh, Saudi Arabia). Categorical data were expressed as frequency and percentage, and numerical data were measured using the standard deviation (SD). The chi-squared test was used to assess associations between outcomes and group variables. A p-value <0.05 was considered significant.*

### **Ethical considerations**

*Our study was approved by the King Abdullah International Medical Research Center at Riyadh (IRP No. H-01-R-005), and the work undertaken conforms to the provisions of the Declaration of Helsinki. The study does not violate the policies or/and procedures established by the journal. The ethics committee waived the requirement for informed consent due to the retrospective study design. All data were collected through chart review. Only the research team was authorized to access patient information. No medical record number or names are mentioned in the study.*

### **Results**

*This study was designed to compare the efficacy of abdominal SCP with that of vaginal*

*USLS/SSF in preventing POP recurrence and to examine differences in patient satisfaction. We targeted and electively enrolled 110 women into the study; all were treated and attended follow-up appointments at King Abdul-Aziz Medical City in Riyadh, Saudi Arabia.*

*Table 1 shows the patients' socio-demographic characteristics. The mean age was 53.99 years (SD=11.3; range, 29-73 years). The most affected group was those aged 40-49 years, which accounted for approximately 33.6% of the recruited women.*

*Table 2 shows the surgical and medical outcome characteristics. All women were diagnosed with uterine prolapse before surgery, and the degree of uterine prolapse as documented in their pre-*



*surgical notes was analyzed (Figure 2a). Our review of the medical records of these women revealed that 20% developed one or more post-surgical complications (Figure 2b).*

*To examine differences in socio-demographics and surgical and past medical outcomes between the two groups, we compared them using bivariate analytical methods; the results are displayed in Tables 3 and 4. Starting with primary hypothesis, the analysis showed that the POP recurrence rate was not significantly different between the two approaches. Which 2<sup>nd</sup> degree and more POP considered recurrence. However, the chi-square test of association showed that women who underwent USLS or SSF were significantly less likely to develop post-surgical complications of any type ( $p = 0.017$ ) (Figure 2c). Women who underwent USLS or SSF were significantly less likely to have had dyspareunia than those who underwent SCP ( $p = 0.031$ ), but the other types of postoperative complications did not differ between the two groups.*

*The age distribution (years) of the women undergoing the two approaches of surgical apical uterine repair procedures (abdominal SCP vs. vaginal USLS, SSF) did not differ significantly ( $p = 0.216$ ) according to the independent groups *t*-test, but the chi-square test comparing the age groups of women who underwent each surgical type showed that women aged 50-59 years were slightly less inclined to undergo a USLS or SSF surgical repair for their uterine prolapse ( $p = 0.085$ ).*

*Moreover, comorbidity was not significantly correlated with the received uterine prolapse surgical interventions ( $p = 0.372$ ) according to the chi-square test; the types of complications developed was also not significantly correlated with the type of surgical intervention ( $p > 0.050$ ).*

*The women's mean number of previous pregnancies was not significantly correlated with their choice of uterine prolapse repair surgical intervention ( $p = 0.131$ ) according to the independent *t*-test, but the chi-square test of the association showed that the parity number was slightly correlated with the received uterine prolapse surgical intervention ( $p = 0.074$ ). In general, women with 7-9 previous pregnancies were slightly more inclined to undergo USLS and SSF than SCP.*

*A medical history of cesarean section was not significantly correlated with the type of uterine prolapse repair. Table 4 shows the results of the bivariate analysis of the associations between surgical intervention types and their disease characteristics and surgical outcomes. The analysis results suggest that women with 2<sup>nd</sup>-degree uterine prolapse were significantly more likely to have undergone USLS or SSF than SCP for uterine prolapse problems ( $p < 0.001$ ).*

*On average, the women who underwent SCP required a longer intraoperative time*

*(mean rank duration = 70.15 min) than those who underwent USLS/SSF (mean rank duration = 28.83 min;  $p < 0.001$ ), indicating that SCP may require significantly longer intraoperative surgical time than USLS/SSF according to the Mann-Whitney *U* test.*

*Nonetheless, the length of hospital stays post-surgery did not differ significantly between the two groups ( $p = 0.556$ ), nor did the elapsed time since the surgery ( $p = 0.328$ ) according to the Mann-Whitney *U* test. The sexual satisfaction self-rating did not differ significantly between the groups according to an independent *t*-test; however, women who had received USLS or SSF may*



have experienced slightly greater sexual satisfaction than those who received SCP ( $p = 0.189$ ). In addition, the overall surgical satisfaction did not differ between the two groups.

### **Discussion**

*This retrospective cohort study compared the efficacy between abdominal SCP and vaginal USLS/SSF for the treatment of uterovaginal prolapse in preventing POP recurrence as Primary outcome and in terms of the sexual and overall patient satisfaction as secondary outcome.*

*Our study showed different results when using different statistical tests (t-test, chisquare test, Mann-Whitney U test). No difference in our primary hypothesis POP recurrence between two approaches in follow up using POP-Q, which 2<sup>nd</sup> degree POP considered recurrence. Women aged between 50 and 59 years were less likely to undergo USLS or SSF. This may be because, at this age, women are still sexually active [6]. Another study reported that SCP resulted in slightly better long-term anatomical outcomes; hence, it is a preferable treatment option for young or sexually-active women [10].*

*Frail women may prefer to undergo USLS or SSF rather than SCP, because SCP requires more intraoperative time and because they may have other medical problems [6, 9].*

*In this study, women with 7-9 previous pregnancies were slightly more inclined to undergo USLS or SSF than SCP for the same reasons.*

*In this study, women with 2<sup>nd</sup>-degree prolapse were significantly more likely to undergo USLS or SSF than SCP, but this prolapse severity may be associated with slightly younger ages.*

*USLS or SSF showed significant results, as their intraoperative time was short and the women were less likely to develop post-surgical complications, especially dyspareunia. In contrast, other studies have shown SCP to be a minimally invasive approach associated with lesser blood loss, shorter hospital stay, longer operative time, and lower prolapse recurrence rate than USLS or SSF for patients with 3<sup>rd</sup>-degree uterine prolapse [6, 7]. SCP may be preferable for patients with advanced POP, particularly those aged 50-59 years.*

*With regard to POP recurrence, a Danish cohort study reported that the reoperation rate was lowest for the apical compartment but highest in all three compartments during the first year after primary surgery. In all three compartments, the reoperation rate peaked in the group of women who underwent primary surgery before menopause [13].*

*In contrast, no significant differences were found in comorbidities, history of cesarean section, length of hospital stay after surgery, or time elapsed since surgery. In addition, differences in postoperative sexual satisfaction and overall satisfaction were not significant ( $P$*

*> 0.05).*



*This study had several strengths. It provides a strong level of evidence, and the bivariate analysis we used decreased the risk of confounding variables. The patients in this study were followed for >1 year, which increased the likelihood that, if a patient was going to experience recurrence, it would appear during the study period. Regarding the limitations, the sample size (n=110) was smaller than the required sample size calculated before the study was conducted using Piface (n=219). Furthermore, the use of a chart review may have weakened the results due to response bias. Since there are no similar studies in Arab countries and few globally, this study will serve as a reference for future studies. Further research and larger samples are needed to confirm our findings and determine the best procedure for POP correction and prevention of POP recurrence.*

*In conclusion, this retrospective cohort study revealed no differences in recurrence rates between the two approaches. Further research on long-term outcomes and with larger sample sizes should be carried out to validate our findings, this study will serve as a reference for future studies.*

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