**Impact of laparoscopic sacrocolpopexy (LSC) on sexual activity and function in women with advanced stages of pelvic organ prolapse (POP): A 5-year prospective study.**

**Bernard Najib1,2, Zdenek Rusavy2, Wael Abdallah1, Yara Abdel Khalek1,2, Nathalie Giraud2, Bruno Deval2.**

1 Department of Obstetrics and Gynecology. Hôtel-Dieu de France, University Hospital, St Joseph University, Beirut, Lebanon.

2Department of Functional Pelvic Surgery & Oncology, Geoffroy Saint-Hilaire, Ramsay Santé, Paris, France

**Corresponding author:**

Bernard Najib, MD.

Department of Functional Pelvic Surgery & Oncology, Geoffroy Saint-Hilaire, Ramsay Santé, Paris, France

Phone: +33658708897

Email : bernard.najib@gmail.com

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**Introduction:**

In addition to restitution of normal pelvic anatomy with associated improvement in the quality of life, improvement in sexual function is an acknowledged goal for women undergoing pelvic organ prolapse repair (1). Indeed, sexual function was ranked just below the vaginal bulge and physical health among important outcomes for women after POP surgery (2).

The impact of POP surgeries on sexual activity and function is controversial (3) ; some studies showing improvement , while others showed no differences or worsening in sexuality after the procedure (4). These different results may be explained by the diversity of surgical procedures and approaches used to treat pelvic organ prolapse and inconsistency in the use of validated instruments in order to measure women’s sexual functions.

Pelvic Impact Sexual Quantification – short form (PISQ-12) is the most common validated and reliable questionnaire that evaluates sexual function in women with pelvic organ prolapse (5).

Dyspareunia is a frequent complication of POP surgery in sexually active women. A systematic review found that dyspareunia was present in around 10% of patients after POP surgery (1). Therefore, clinicians frequently counsel women regarding the negative effect of prolapse surgery on their sexual health , especially on dyspareunia (6).

Previous studies reported changes in sexual function and quality of life in women undergoing POP repairs other than laparoscopic sacrolopopexy (7,8): a study conducted by L Handa et. al showed no improvement in PISQ-12 questionnaire and dyspareunia before and one year after surgery (9). Moreover, nonsignificant increases in sexual activity were noted after abdominal or robotic repair in Shatkin-Margolis et. al study (10). Other studies described sexual function after sacrocolpopexy: in fact, many sexually active women experienced improvements in sexual function following LSC, including a reduction in pelvic floor symptoms and pain during intercourse (11). However, Much of the sparse data about sexual function was limited to only a one year follow up (9,11).

The present study aims to compare patients undergoing laparoscopic sacrocolpopexy (LSC) for pelvic organ prolapse, in terms of sexual function and surgical anatomical outcomes over more than 5-years follow up period. The primary objective was to compare the PISQ-12 score pre and post operatively. The secondary objective was to assess decreasing dyspareunia related to anatomical and sexual improvement after surgery. To our knowledge, this is the largest study with the longest follow up concerning sexual function for LSC.

**Materials and methods:**

This is a cohort study of prospectively collected data that includes all women who underwent LSC between July 2005 and December 2021 at a tertiary care center (Geoffroy Saint-Hilaire, Ramsay Santé, Paris, France). 228 women were preoperatively evaluated, operated and followed up by a single surgeon specialized in minimally invasive and pelvic reconstruction surgery (BD). The indication for surgery was a symptomatic pelvic organ prolapse stage II and above.

The surgical technique for LSC was identical in all patients. Women were followed up from one month after surgery and then annually. The medical files and hospital records were used to extract the data. In addition, women that did not come to visit were interviewed over telephone. Variables analyzed included age, body mass index, obstetrical and gynecological history, urinary stress incontinence, overactive bladder, associated anal incontinence and constipation (table 1). In all visits, patients completed the validated quality of life questionnaires and were evaluated using the Pelvic Organ Prolapse Quantification system **(**POP-Q) score. The questionnaires used included the Pelvic Floor Distress Inventory Short Form (PFDI-20), Pelvic Floor Impact Questionnaire Short Form (PFIQ-7) and the Pelvic Impact Sexual Quantification – Short form (PISQ-12).

The mean scores of PFDI-20, PFIQ-7 and PISQ-12 scores preoperatively and after one year of the intervention were compared. Since the length of the follow up varied among the women, the last follow up was used for data collection.

Patients were divided preoperatively according to their sexual activity. Post operatively, women were divided in two groups, according to their answers to the question “Have you noticed any sexual improvement after pelvic organ prolapse surgery?”. To assess the change in sexuality, we compared the mean PISQ-12 scores preoperatively and one to five years (12 – 60 months) after the surgery and in more than 5-years follow up (60 – 174 months).

To note, every patient operated in our institution has a sexual psychologist consultant (NG) to help them with various sexual problems including lack of desire, difficulty having an orgasm and pain during sex.

Statistical analysis was performed with Statistical Package for the Social Sciences software SPSS 25. The normality of distribution of the variables was studied using Skewness-Kurtosis and Kolmogorov-Smirnov test. Student’s t-test was used if the continuous variables followed normal distribution, while non-parametric tests like Mann-Whitney U test, Wilcoxon test and Friedman test were performed in case of non-normal distribution. A probability value p < 0.05 was considered to be statistically significant.

All procedures performed in this study involving human participants were in accordance with the principles of the Helsinki Declaration. The study was approved by the institutional ethical committee (registration number IORG0009085). An informed consent was obtained from all the participants prior to enrollment in the study.

**Results:**

A total number of 228 patients were enrolled in this study. Table 1 shows the demographical characteristics and preoperative symptoms of our population. The mean age of the enrolled patients was 62.0 years, and the mean body mass index (BMI) was 24.1 kg/m2. The mean parity was 2 (range: 0-5). A history of prior surgery for urinary incontinence was noted in 11.8% of patients and prior hysterectomy in 17.1%.

43.9% of patients suffered from urinary stress incontinence and 41.2% were diagnosed with an overactive bladder. Posterior compartment symptoms were low (27.6% for anal incontinence and 28.9% for constipation). Table 2 summarizes the patient’s answers to some questions after the surgery: 51.3 % of patients describe some sexual improvement after the surgery with 78.1 % of patients having intercourse. On the other hand, 11% of patients described postoperative dyspareunia.

Sexual and anatomical follow-up is shown in table 3. We observed a statistically significant improvement over one year follow up in the PFDI, PFIQ and POPQ-score score (p-value < 0.01). However, there was no significant improvement in the PISQ-12 score with more than one year and also more than 5 years follow-up. The mean PISQ-12 score was 29.6 preoperatively, increases to 31 at 1 year and then decreases to 29.2 at 5-years follow-up with no significant difference.

To assess the global improvement of sexual activity, we focused on women who were sexually active postoperatively. In addition to those who maintained their sexual activity, 76.1% of patients (108 /148 patients) who were not sexually active preoperatively resumed their sexual activity after the surgery, making the total number of postoperative sexually active women to 178 patients (78.1 %). When it comes to postoperative sexually active patients, 25 (14%) described dyspareunia and 117 (65.7%) reported sexual improvement. To assess the determinants of sexual improvement after LSC, the patients were allocated into two groups according to their answers about sexual improvement post operatively. Patients who reported sexual improvement had significantly higher sexual PISQ-12 and PFIQ scores, with more sexual activity (Table 4). Surprisingly, 12.8% of patients with sexual improvement experienced dyspareunia whereas only 9% of patients who did not notice any sexual improvement had pain during intercourse.

**Discussion:**

The objective of the present study was to assess the impact of laparoscopic sacrocolpopexy for pelvic organ prolapse on sexual function. While laparoscopic sacrocolpopexy is a surgical technique that seems to be efficient in treating pelvic and rectal prolapse (12), we did not find significant difference between pre- and post-operative PISQ-12 scores; however, patients were more sexually active after surgery and 65.7% experienced amelioration in their sexual performance.

Several studies showed improvement in sexual function after POP surgeries (7,8,13) while others showed sexuality worsening (14). These studies were based especially on the vaginal approach techniques (7,14) or analyzed sexual outcome between different types of surgery (8).

PISQ-12 is the short version of the long form PISQ-31 which was developed to evaluate sexual functioning in women with urinary incontinence or pelvic organ prolapse (5,15) . It contains three domains: behavioral/emotive, physical and partner-related scores. Therefore, we should be cautious regarding the use of overall PISQ-12 score especially in a post-operative evaluation, as it may disregard some parameters (16). For example, women who have a partner-related or emotive problem will have a low PISQ-12 score which is independent from the surgical procedure. Our study showed a significant improvement in the PFIQ, PFDI and POP-Q scores after POP surgery. Patients who described a sexual improvement after the intervention had probably modifications in urinary incontinence symptoms and bulging, without affecting the other parameters of PISQ-12 score.

Sexual improvement postoperatively was significantly associated with improvement in post-operative PFIQ-7 score. The PFIQ-7 asks participants how symptoms or conditions in three separate categories (bladder or urine, bowel or rectum, and vagina or pelvis) affect them in seven quality of life domains (17). Although sexual improvement cannot be predicted pre-operatively, surgeons can counsel their patients that correcting anatomic pelvic floor disorders enhances sexual activity after POP surgery.

Total postoperative dyspareunia was seen in 11% of patients, which is in line with previously published outcomes of POP surgery(1,6). However, 12.8% of patients who described sexual improvement suffered from dyspareunia. Thus, the improvement of sexual activity is based mainly on pelvic anatomical and functional correction. However, a recent study comparing vaginal length and female sexuality before and after LSC found that although vaginal length is greater following LSC, it has no impact on female sexuality pre- and postoperatively (18). Other studies reported that sexual dysfunction in women suffering from POP is strongly related to women’s body image. Once we treat POP, improvement in sexual function after therapy may be secondary to improvement in body image perception(19). In fact, women suffering from POP generally had negative image of their vagina, describing it as “not normal”, and “ugly”. The presence of POP was also associated with negative emotions such as embarrassment, depressive feelings, and lower self-confidence(20).

The main strength of this study lies in the use of a consistent surgical technique for all the patients, performed by a single surgeon (BD). The data was collected prospectively and the follow up period is long. Other strengths of the present study are the use of validated pelvic floor disorders scores to assess not only sexual function but also sexual activity.

However, PISQ-12 has some limitations especially when used as a global score postoperatively. It provides little information about dyspareunia, sensation of bulge, vaginal distortion and partner-related sexual function (16). In our study, the score was directly calculated and recorded.

Other limitations of the study include missing information in the follow up, especially the validated questionnaire data as well as the lost to follow-up. Further studies are needed to assess the association between the different score domains and POP surgery.

**Conclusion:**

Most women described an improvement in their sexual activity and function one year after laparoscopic sacrocolpopexy. Despite the limitations of our study, our data showed that the anatomical correction of a pelvic organ prolapse and pelvic floor disorders by laparoscopic sacrocolpopexy may improve sexual function but did not change significantly the sexuality score. Sexuality is a very complex issue affected by multitude of factors among which prolapse seems to be less important. Future studies should focus on the different domains of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire and dyspareunia and reporting these measures pre and postoperatively.

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**Contribution to authorship:**

B.Najib: Project development, Data collection, Manuscript writing.

Z. Rusavy: Data collection, Manuscript editing.

W. Abdallah: Data analysis.

Y Abdelkhalek: Data collection, Data analysis, Manuscript editing.

N. Giraud (NG): Data collection, Manuscript editing.

B Deval (BD): Protocol development, Data collection, Manuscript editing.

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