ARTÍCULO ORIGINAL

Gac Méd Caracas 2023;131(4):789-798
DOI: 10.47307/GMC.2023.131.4.2

Outcomes of Lightweight Mesh Sacrocolpopexy for Pelvic Organ Prolapse Repair

Resultados de la Sacrocolpopexia con Malla Ligera para la Reparación del Prolapso de Órganos Pélvicos

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SUMMARY

Objective: *The research objective is to present and evaluate 3 years of experience in sacrospinal fixation using polypropylene mesh in the surgical treatment of genital prolapse in women.* **Methods:** *This retrospective study evaluated perioperative and mid-term outcomes in 68 women who underwent transvaginal sacroscopic cervicocolpopexy with lightweight polypropylene mesh for stage II-IV prolapse with apical involvement. Anatomical outcomes, complications, and symptoms were assessed using POP-Q staging and validated questionnaires preoperatively and at 12 and 36 months postoperatively.* **Results:** *No intraoperative complications were observed. In the long-term postoperative period, the following were observed: vaginal wall erosion in transvaginal Mesh-systems placement along the postoperative suture line at 2.9 % (2/68), and chronic pelvic pain at 2.9 % (2/68). The percentage of anatomical success in restoring the position of the apical vaginal segment was 98.5 % (67/68) 12 months after surgery and remained unchanged after 36 months of follow-up. There were symptoms of recurrence in the anterior segment of the vagina (cystocele) in 8.8 % (6/68) of patients in the form of cystocele of I-II degree, and an isolated recurrence of rectocele of II degrees was observed in 1.5 % (1/68) of 68 patients in the posterior segment of the vagina. A significant level of elimination of pathological symptoms in the functioning of the pelvic organs and improvement in quality of life, as assessed by questionnaires, was established: PFDI-20 (76.4±8.6-4.3±0.6; p<0.05), PFIQ-7 (41.0±5.8-8.3±1.1; p<0.05) before surgery and at the final stage of the study.* **Conclusion:** *Transvaginal sacroscopic cervicocolpopexy with lightweight mesh demonstrated favorable anatomical and functional outcomes at 3 years for apical prolapse repair, with low complication rates. Further comparative trials are warranted to establish long-term effectiveness versus other surgical techniques.*

Keywords: *Transvaginal sacrospinal cervicopexy, pelvic organ prolapse, vaginal surgery, lightweight polypropylene mesh, recurrence.*

DOI: https://doi.org/10.47307/GMC.2023.131.4.2

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Recibido: 21 de julio 2023
Aceptado: 13 de septiembre 2023

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RESUMEN

Objetivo: *El objetivo de la investigación es presentar y evaluar 3 años de experiencia en fijación sacroespinal mediante malla de polipropileno en el tratamiento quirúrgico del prolapso genital en la mujer.* **Métodos***: Este estudio retrospectivo evaluó los resultados perioperatorios y a mediano plazo en 68 mujeres que se sometieron a cervicocolpopexia sacroscópica transvaginal con malla liviana de polipropileno para prolapso en estadio II-IV con afectación apical. Los resultados anatómicos, las complicaciones y los síntomas se evaluaron mediante estadificación POP-Q y cuestionarios validados antes de la operación y a los 12 y 36 meses del postoperatorio.* **Resultados:** *No se observaron complicaciones intraoperatorias. En el período postoperatorio a largo plazo, se observó lo siguiente: erosión de la pared vaginal en la colocación de sistemas de malla transvaginal a lo largo de la línea de sutura postoperatoria en un 2,9 % (2/68) y dolor pélvico crónico en un 2,9 % (2/68). El porcentaje de éxito anatómico en la restauración de la posición del segmento vaginal apical fue del 98,5 % (67/68) a los 12 meses de la cirugía y se mantuvo sin cambios a los 36 meses de seguimiento. Hubo síntomas de recurrencia en el segmento anterior de la vagina (cistocele) en el 8,8 % (6/68) de las pacientes en forma de cistocele de grado I-II, y se observó una recurrencia aislada de rectocele de grado II en el 1,5 % (1/68) de 68 pacientes en el segmento posterior de la vagina. Se estableció un nivel significativo de eliminación de síntomas patológicos en el funcionamiento de los órganos pélvicos y mejora en la calidad de vida, evaluada mediante cuestionarios: PFDI-20 (76,4±8,6-4,3±0,6; p<0,05), PFIQ- 7 (41,0±5,8-8,3±1,1; p<0,05) antes de la cirugía y al final del estudio.* **Conclusión:** *La cervicocolpopexia sacroscópica transvaginal con malla liviana demostró resultados anatómicos y funcionales favorables a los 3 años para la reparación del prolapso apical, con bajas tasas de complicaciones. Se necesitan más ensayos comparativos para establecer la efectividad a largo plazo versus otras técnicas quirúrgicas.*

Palabras clave: *Cervicopexia sacroespinal transvaginal, prolapso de órganos pélvicos, cirugía vaginal, malla ligera de polipropileno, recidiva.*

INTRODUCTION

Genital prolapse (GP) continues to be an urgent problem in modern gynecology and occurs in one-third of all women regardless of age (1-3). Epidemiological studies show that up to 50 % of women in the United States have signs of genital prolapse at the age of over 40 and 11.1 % of them will be operated on, and some will even have more than one operation in their lifetime (4). The great interest in the problem of internal genital organ prolapses and prolapse is caused by the consistently large number of patients with GP and many recurrences after almost all types of surgical treatment. GP creates both gynecological and social problems, namely: disability (permanent or temporary), social maladjustment, and reduced quality of life (5). Following various authors, depending on the profile of the gynecological hospital and the specialization of the department's gynecologists, 6.1-38.9 % of women receive inpatient treatment of all patients with gynecological pathology requiring surgical treatment (2-5).

Over the past 30 years, the understanding of the etiology and pathogenesis of GP has significantly expanded, and several theories have been put forward. However, none of the many theories provides a complete explanation of all the causes of its development. The existence of the theory of systemic connective tissue dysplasia, under which GP is only one of the signs of multiorgan connective tissue insufficiency at the level of the reproductive system, partially answers most of the questions (4,5). As a result, the lack of a complete theoretical justification for the pathogenesis of all types of GP has led to the fact that hundreds of types of operations have been described to date aimed at surgical treatment of GP, correction of the position of the pelvic organs (PO) and supporting structures of the pelvic floor. However, most reputable experts note many recurrences in the treatment of GP and insufficient functional effect in restoring the normal position of the genitals and PO. Following the authors, the recurrence rate of GP ranges from 33 to 61.7 % (6). Of these, approximately 12.1 % of patients undergo reoperation for recurrence.

Transvaginal sacrospinal cervicopexy using the PROLIFT system has been an effective surgical method for the treatment of apical genital prolapse (7). Nevertheless, certain criticism regarding transvaginal access in the reconstructive treatment of GP using transvaginal Mesh-systems (TVM) exists (8,9) due to the relatively high incidence and severity of complications associated with the use of TVM.

It is extremely important to balance the positive effects with the potential complications when surgery is performed for a disease that affects a woman's quality of life. One of the most recent randomized clinical trials compared the results of surgical treatment of hernia using lightweight mesh (35 g/m^2, TiMesh®) and medium weight mesh (75 g/m^2, Parietex®) (9,10). There was a decrease in postoperative pain in patients, which contributed to a faster recovery of performance (routine activities) when using lightweight mesh, without any increase in the 2-year risk of hernia recurrence. However, very few clinical trials have been published on the results of using lightweight TVM for the treatment of GP using transvaginal access.

The research objectives are to analyze the frequency of intra- and postoperative complications; to assess anatomical results 12 and 36 months after surgery; to assess the level of elimination of pathological symptoms in the functioning of the pelvic organs and improvement of quality of life, using questionnaires in the application of lightweight polypropylene TVM (46 g/m^2), used in transvaginal access for surgical treatment of complete or incomplete uterine prolapse.

The purpose of this study is to analyze the frequency of intra- and postoperative complications, assess anatomical results, and evaluate the elimination of pathological symptoms and improvement in quality of life using lightweight polypropylene transvaginal mesh for surgical treatment of complete or incomplete uterine prolapse.

MATERIALS AND METHODS

This retrospective multicenter cohort study was conducted between January 2017 and December 2020 at two unspecified medical centers in Ukraine and included a 36-month follow-up period. The study enrolled 68 women with complete or incomplete uterine prolapse who underwent transvaginal sacrospinal cervicopexy. Informed consent was obtained from each participant regarding the retrospective design, data collection, and long-term follow-up. Comprehensive data was gathered preoperatively, intraoperatively, and postoperatively at 12 months and 36 months.

Before the research, it was established that all the involved surgeons had experience using polypropylene TVM for transvaginal access in the treatment of GP. The preoperative assessment consisted of an interview, urogynecological examination, and quantitative assessment of prolapse using the simplified pelvic organ prolapse quantification (POP-Q) stage assessment system (measuring the total vaginal length at rest TVL and Ba, C, C/D, and Bp at maximum, performing a Valsalva test, and GH size) (4). Patients underwent a standardized examination before the planned surgical intervention. Special urodynamic tests were performed only in patients with existing urodynamic disorders. Patients with decubitus ulcers received special treatment until complete epithelialization of the vaginal wall.

Between 2017 and 2020, 68 patients were enrolled in the research, all of whom gave consent. After 36 months, 68 patients completed the research. The average age of the patients was 57.1±7.2 years (range 47-79) years, the average body mass index (BMI) was 29.3±2.1 kg/m^2, and the average parity was 2.1±1.1. The number of patients with a history of supravaginal uterine amputation was 7.4 % (5/68), and 2.9 % (2/68) patients received SUI surgical treatment.

Inclusion criteria: signs of incomplete or complete uterine prolapse with a predominance of prolapse in the apical segment of the vagina, no contraindications for the use of TVM, and no signs of cervical, uterine, and ovarian pathology. Exclusion criteria: refusal to participate in the study, contraindications for TVM placement, need for uterine removal, refusal to use TVM, use of TVM in previous surgeries. To fix the cervix, a polypropylene implant (TVM) of the author's design was used, which contained a round-shaped base with a round cutout and a fixation part in the form of a sleeve 200 mm long and 15 mm wide. Other technical characteristics: macroporous mesh with a pore size of 2.0×2.4 mm (class 1), lightweight, non-absorbable, fiber thickness 0.34 mm, fiber diameter 0.1 mm, porosity 73.7 % (9,10).

The surgery was performed under regional (spinal) anesthesia or general anesthesia. The patient was placed in the lithotomy position. The bladder was not catheterized. The surgical field was treated with a 10 % antiseptic solution

of Povidone-Iodine. Hydropreparation was performed with 0.9 % NaCl solution up to 100 mL with the addition of Epinephrine (Adrenaline) hydrochloride 0.24 %-2.0 mL. A circular incision of the vaginal wall was made at the level of the fold indicating the position of the lower border of the bladder. The incision was made to the depth of the cervical stroma for easy access to the anterovaginal and retrocervical spaces. From the area of the posterior vaginal vault, the right parametrium was dissected laterally towards the place of departure of the right sacrospinal ligament from the spinous process of the ischial bone. The diameter of the tunnel was up to 30 mm. A pre-prepared mesh of the proposed shape was placed around the cervix. The implant sleeve was passed through the right sacrospinal ligament and placed freely. The main part of the mesh was fixed in three points to the cervical wall around the internal pharynx using non-absorbable sutures (Polyester with silicone coating 2-0). The vaginal wall was restored with sutures (Polyglycolide 1-0). The cervix was set at the level of the interspinal line by pulling the TVM sleeve.

Perioperative parameters and intraoperative complications were analyzed. The safety of TVM use and surgical outcomes were evaluated 12 and 36 months after surgery. The evaluation aimed at the safety of TVM use, which included the timing of pressure ulcer formation around TVM placement on the vaginal wall, pain in the area of TVM placement, or pain during physical activity. Signs of dyspareunia were not assessed. In addition, the anatomical results and the development of de novo pathology were evaluated. Anatomical outcomes after surgery were assessed using the POP-Q system for the anterior, apical, and posterior vaginal segments (C, TVL, Ba, C/D, Bp, GH). The outcome was considered anatomically successful at C -1 or less. Pelvic organ function was assessed by the MHU (urinary handicap measurement), PFDI-20 (Pelvic Floor Distress Inventory), and PFIQ-7 (Pelvic Floor Impact Questionnaire) questionnaires, which included an assessment of symptoms of stress urinary incontinence (SUI), and overactive bladder (OAB) (10). Satisfaction was assessed using a four-point system (++, +, +/-, -). Quantitative changes were statistically evaluated by frequency in the sample. Qualitative changes were evaluated as means and standard deviations. The nonparametric Wilcoxon test was used to compare POP-Q values and pelvic organ function (11).

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. A study was approved by the National Ethics Commission of the Ministry of Health of Ukraine on July 10, 2023, No 3113-C.

RESULTS

In the studied patients, most women had signs of a combination of cystocele (Ba+4.8±2.8 cm) with signs of complete or incomplete uterine prolapse (C+3.8±1.9 (+1 - +8)). Before the operation, more often, in 58.8 % of cases, the degree of prolapse was diagnosed as 3-4 according to POP-Q, which was indicated by the results of measuring the position of points C, Va, and Vr. Signs of rectocele were observed in every third patient (33.8 %) and were less clinically pronounced (Bp+0.6±2.4 (-3 to +10)). Measurement of the vaginal length showed almost the same value in all patients of the study group (TVL 8.0±2.0 (7 to 9)). The results of the preoperative anatomical assessment according to the POP-Q system and the postoperative assessment of the results of the operation are shown in Table 1.

No intraoperative complications were observed in the research group. The surgical interventions performed under regional anesthesia were 67/68 (98.5 %), general anesthesia – 1/68 (1.5 %), and the average operation time was 38.2±10.7 minutes (range (20-70 minutes). Additionally, pre-rectal plication was performed in 65/68 patients (95.6 %), and perineorrhaphy – in 63/68 (92.6 %). In 68/68 (100 %) cases, antibiotics (Cefazolin 2.0 g. IV) were prescribed immediately before surgery. No antibiotic therapy was prescribed after surgery. Minor bleeding from the area of pararectal dissection occurred in 3 out of 68 (4.4 %) cases. In these cases, prolonged antibiotic therapy was also not prescribed. So, surgery

Table 1

Results of Measuring the Vaginal Profile of Patients with Uterine Prolapse Before and After Surgical Treatment (N±N, cm)

POP-Q	Initial (N=68)	12 months (N=68)	Pa	36 months (N=68)	Pb
TVL	8.0±2.0 (7 - 9)	10.3±1.8 (7 - 11)	0.24	9.7±1.9 (7 - 11)	0.24
Ba	+4.8±2.8 (+1 - +6)	+4.5±1.9 (+2 - +5)	<0.01	+4.6±1.4 (+1 - +6)	<0.01
C/D	1.6±1.1 (1 - 10)	0.8±0.3 (1 - 2)	<0.01	0.9±0.1(1 - 2)	<0.01
C	+3.8±1.9 (+1 - +8)	- 6.6±0.1 (-7 - 1)	<0.01	-4.1±0.2 (-6 - -1)	<0.01
Bp	+0.6±2.4 (-3 - +5)	-2.7±1.1 (-3 - +1)	<0.01	-1.6±1.0 (-3 - +1)	<0.01
GH	6.1±1.1 (5 - 8)	3.6±0.4 (4 - 5)	<0.01	4.1±0.5 (2 - 5)	<0.01

Note: data are shown as standard deviations N±n; TVL – total vaginal length; a – comparison of initial and 12-month results; b – comparison of initial and 36-month results.

did not cause statistically significant changes in intraoperative hemodynamic and complete blood count.

After the operation, a tight vaginal tamponade was performed with a gauze tampon. The tampon was removed 18-24 hours after surgery. Complications in the form of hematomas in the pararectal spaces were not observed in patients. There were 46/68 (67.6 %) cases of subcutaneous hematomas in the ischeo-rectal area at the site of the prosthesis sleeve through the skin. Diffuse hematomas did not require additional treatment. A fixed urinary catheter was installed after surgery in 68/68 cases (100 %). The average duration of bladder catheterization was 0.9±0.1 days. In 5/68 (7.4 %) women, urinary retention of more than 1 day was observed, which required additional non-permanent bladder catheterization for 1.1±0.4 days in the range of (1-3) days. The average duration of pain in the postoperative period was 7.2±1.4 (5-14) days with a visual analogue scale (VAS) of 5.2±2.1 due to perineal pain. The average length of hospital stay was 1.9±0.5 days, a range of 1-4 days. The main reason for the delay in discharge from the hospital was the need for bladder catheterization in case of bladder hypotension. Postoperative perineal discomfort was assessed at 12 and 36 months. Women defined the outcome of the operation as satisfactory (+, +/-) or very satisfactory (++) in 66/68 (97.1 %) cases, and unsatisfactory (-) – in 2/68 (2.9 %) cases. Assessment of the level of discomfort after 36 months showed a statistically significant difference compared to the initial assessment before surgery ($p>0.05$).

The results of the POP-Q vaginal profile assessment after surgery at 12 and 36 months are shown in Table 1. A positive anatomical result, as assessed by point C, was obtained in all cases at 36 months of follow-up. The results of the POP-Q assessment were statistically significantly different at 36 months of follow-up from the initial assessment of anatomical parameters before surgery ($p>0.01$). A significant decrease in the size of the vaginal entrance after surgery from 6.1±0.4 cm to 4.1±0.5 cm, respectively, was determined ($p>0.01$). This is caused by most surgical interventions ending in standard perineoplasty. After 36 months, the study patients showed a tendency to increase the size of the vaginal entrance over time (from 3.6±0.4 cm to 4.1±0.5 cm) and did not differ significantly from the mean values 12 months after surgery ($p<0.05$), while the mean values of the Ba measurement results did not show any dynamics of changes 12 and 36 months after surgery. Functional disorders of the pelvic organs associated with genital prolapse and MHU, PFDI, and PFIQ were assessed before and after surgery. The results of the assessment of pathological symptoms are shown in Table 2.

The analysis of the pelvic function assessment results showed a significant reduction in the symptoms of urinary disorders and pathology of the act of defecation after surgery in 36 months. The results of the safety evaluation of TVM are

Table 2

Results of Measuring the Vaginal Profile of Patients with Uterine Prolapse Before and After Surgical Treatment (N±N, cm)

Average values	Initial (N=68)	12 months (N=68)	Pa	36 months (N=68)	Pb
PFDI					
UDI-6/100	30.4±3.1	7±2	<0.05	3±1.1	<0.05
CRADI-8/100	13.8±2	4.1±1.3	<0.05	5.5±1.8	<0.05
POPDI-6-100	31.5±1.7	3.8±1.1	<0.05	5.6±0.9	<0.05
PFDI-20/300	76.4±8.6	13.9±1.4	<0.05	4.4±0.6	<0.05
PFIQ					
UIQ-7/100	21±5.4	2.5±0.7	<0.05	4.4±1	<0.05
CRAIQ-7/100	6.8±1.4	1.5±0.6	<0.05	1.8±0.4	<0.05
POPIQ-7/100	11±2.3	1±0.2	<0.05	2±0.7	<0.05
PFIQ-7/300	41±5.8	4.9±0.8	<0.05	8.3±1.1	<0.05

Note: UDI – Urinary Distress Inventory; CRADI – Colorectal-Anal Distress Inventory; POPDI – Pelvic Organ Prolapse Distress Inventory; UIQ – Urinary Impact Questionnaire; CRAIQ – Colorectal-Anal Impact Questionnaire; POPIQ – Pelvic Organ Prolapse Impact Questionnaire; a – comparison of initial and 12-month results; b – comparison of initial and 36-month results; c – comparison of initial and 36-month results.

shown in 68 patients who were re-examined after 12 and 36 months, respectively. The formation of leakage around TVM placement on the vaginal wall was found in 2/68 (2.9 %) patients. No additional cavities or cysts were found around TVM plication during ultrasound examinations, and the TVM was completely integrated into the surrounding tissues. Twisting of the TVM with the formation of gross fibrosis did not cause additional discomfort to patients. There were no cases of pressure ulcers in the rectal wall in the long-term postoperative period.

Satisfaction with the surgery results after 36 months of surgery follow-up was expressed by 66/68 (97.1 %) patients. A negative result was observed in two patients, one of whom performed heavy physical work after surgery, which affected the outcome of the operation. Aseptic inflammation around the implant sleeve could have led to tunnel formation at the sleeve site, causing the apical segment to move toward the vaginal entrance. This resulted in loss of the primary outcome 12 months after surgery and at 36 months follow-up. The patient did not insist on reoperation. In another patient, the cause of the negative result could not be established. The probable cause was a violation of the sleeve insertion technique through the sacrospinal ligament, the so-called prespinal sleeve insertion. Regarding pain after surgery, the results of the survey are shown in Table 3, only 4/68 (5.8 %) patients reported persistent or spontaneous pain after 36 months, with a mean VAS score of 2.8/10. Induced pain during a physical examination at 36 months was observed in 6/68 (8.8 %) patients with a mean VAS score of 3.1/10. No patient required mesh dissection in the vaginal vault area.

Another surgery for cystocele was performed in 1/68 (1.5 %) patients before the end of the 36-month follow-up period. None of the patients underwent cervical amputation for cervical elongation (Galban's syndrome) during the 3 years of follow-up. Partial excision of the mesh along with granulation polyps was performed in 1/68 (1.5 %) patients after 12 months of follow-up. In two patients, 2/68 (2.9 %) were treated for stress urinary incontinence that formed de novo after surgery. In 8/68 (11.8 %) patients, symptoms of urge urinary incontinence were observed 36 months after surgery.

Table 3

Evaluation of the Results of Surgery in Patients with Genital Prolapse Using TVM for Sacrospinal Fixation (N, %)

Mark	Initial (N=68)		12 months N=68)		Pa	36 months (N=68)		Pb
	N	%	N	%		N	%	
SUI	6	8.8	6	8.8	>0.05	8	11.8	>0.05
OAB	19	27.9	7	10.3	<0.05	8	11.8	<0.05
Urinary retention	24	35.3	1	1.5	<0.05	0	0	<0.05
Defecation disorders	8	11.8	1	1.5	<0.05	1	1.5	<0.05
Pathological secretions	56	82.4	4	5.9	<0.05	2	2.9	<0.05
Vaginal wall erosion	-	-	1	1.5	<0.05	2	2.9	<0.05
Chronic pelvic pain	-	-	5	7.4	<0.05	4	5.9	<0.05
Pain during palpation	3	4.4	8	11.8	<0.05	6	8.8	<0.05
Result satisfaction	-	-	67	98.5	<0.05	67	98.5	<0.05

Note: a – comparison of initial and 12-month results; b – comparison of initial and 36-month results.

DISCUSSION

It has been convincingly demonstrated that TVM has better anatomical results than autoplasty in the surgical treatment of GP. A review of 58 studies in the Cochrane database confirmed that the risk of recurrence is higher with autoplastic repair than with TVM (risk ratio (RR) = 3.15, 95 %; confidence intervals (CI) = 2.50-3.96). However, these studies failed to demonstrate any significant difference in terms of the risk of reoperation or functional aspects, especially because TVM is associated with the risk of specific complications (wrinkling, exposure, pain, dyspareunia) (10,12,13).

In the research, 68 cases out of 68 treated patients were fully analyzed, which amounted to 100 % of the studied patients. The research results show that a positive anatomical result was achieved in 67/68 (98.5 %) cases after 36 months of follow-up, and 98.5 % (67/68) of patients were satisfied with the result of the surgical intervention at the end of the study. A significant level of elimination of pathological symptoms in the functioning of the pelvic organs and improvement in quality of life was found. These indicators were evaluated before surgery and at the final stage of the study, 36 months after surgery, using questionnaires: PFDI-20 (76.4±8.6-4.4±0.6; $p<0.05$), PFIQ-7 (41.0-8.4; $p<0.05$). Patients reported a slight improvement in the act of defecation, without changes in the state of the rectal continence.

The results indicate that the baseline level of assessment of the position of point C (n=68) by POP-Q was +3.8±1.9 cm (+1 – +8). The result of measuring point C (n=68) assessed after 12 months was: -6.6±0.1 (-7 – -1) and was statistically significantly different from the results of measurement before surgery ($p<0.01$). Subsequently, the result of the point C assessment by POP-Q after 36 months of follow-up did not change significantly: -4.1±0.2 (-6 – -1) ($p<0.01$), indicating a minimal risk of recurrence when using the proposed technique of fixing the apical segment of the vagina to the right sacrospinal ligament using TVM in long-term follow-up. In total, 2/68 (2.9 %) patients underwent surgery for recurrence in the anterior vaginal segment, and 2/68 (2.9 %) patients underwent surgical correction of stress urinary incontinence, which was established de novo by repeated examination 12 months after surgery. Partial excision of TVM along with granulation polyps was performed in 1/68 (1.5 %) patients.

In the Kulkarni et al. study, the rates of repeat surgery for recurrent apical prolapse (4 %) and mesh exposure (2 %) using lightweight mesh were low and comparable to the authors' study (2.9 % mesh exposure, 0 % recurrent prolapse) (14). This further supports the use of lightweight over heavier mesh to reduce complications requiring

reoperation. However, the mesh exposure rate remained substantial. Modifications like selective trimming of mesh arms may help reduce erosions while maintaining efficacy. Comparative data on authors' technique versus sacrocolpopexy would better delineate the risks and benefits of each approach.

In the Deng et al. study, the mesh exposure rate was 5.7 % with VALS (15). This is comparable to the 2.9 % erosion rate in this study using lightweight transvaginal mesh. The rates of postoperative fever (2.8 % *vs*. 0 %) and wound infection (0.9 % *vs*. 0 %) were slightly higher with VALS compared to the authors' technique, though the overall infectious complication rates were low. This suggests the transvaginal approach may reduce surgical site infections, though laparoscopic sacrocolpopexy also has low infection rates. Larger studies directly comparing the techniques are warranted to elucidate potential differences in complications.

A review by Schachar and Matthews found the rate of prolapse recurrence after sacrocolpopexy is consistently around 10 %, regardless of surgical approach (16). The 2.9 % recurrence rate in the authors' study using transvaginal mesh fixation is lower than this benchmark reported for sacrocolpopexy. This suggests the transvaginal approach may provide better apical support durability, though direct comparative data is lacking. Schachar and Matthews also noted ancillary factors like advanced preoperative prolapse stage adversely affect outcomes. The authors' technique achieved a high success rate despite including patients with stage III-IV prolapse, further supporting its efficacy for advanced prolapse. However, a longer follow-up in this study is needed to determine if the 0 % apical recurrence rate is maintained beyond 3 years and how it compares to sacrocolpopexy over the long term.

Following the research results, when applying the suggested technique, no signs of recurrence in the apical segment of the vagina were recorded. The anatomical and functional results of this research are consistent with recent literature (12,17). In addition, studies have shown that the use of lightweight mesh is safer and with fewer complications than the PROLIFT system and medium-weight and heavyweight propylene mesh (18,19-21). As for the anatomical results of this study concerning the Ba point following the POP-Q, they can be considered unsatisfactory in the medium and long term. This fact can be explained by the fact that the surgical technique excludes the additional use of TVM in the anterior vaginal segment in grade III cystocele (22,23). Based on this experience, using TVM in the anterior vaginal segment should be considered an additional operation. Its need should be discussed individually for each patient if signs of cystocele are seen at Va +2.0 on Valsalva testing. A potential disadvantage of this technique is the lack of effectiveness and the risk of recurrence of prolapse in the posterior segment of the vagina in case of hidden defects in the facial structures and the formation of de novo GP signs in this segment (24-27).

Considering the safety and advantages of using highly porous lightweight TVMs, a good integration of TVMs in the surrounding tissues without the formation of pathological cavities and postoperative infectious complications at the pleating site has been demonstrated. The research results are in line with the results of another study that analyzed the results of the treatment of 154 patients who were followed for at least 24 months, the success rate of the operation was 97.4 %, and the number of complications with TVM was 0.7 % (28,29). On the other hand, an evaluation of the results of using TVM based on the proposed method showed fewer complications compared to the results of using the PROLIFT system to restore the apical segment of the vagina (19,30,31).

The study by Korahanis et al. (32) compared the use of the PROLIFT system and laparoscopic sacrocolpopexy. This study showed that each technique has fundamental differences in the methodology of the operation and specific complications, which makes it impossible to fully compare these two techniques. In addition, the specific characteristics of the TVMs used, which include not only their weight but also their textile properties, make the results of such a comparison questionable. A study by Feola et al. (33) on the use of sacrocolpopexy in monkeys showed that the mechanical properties of the vagina were significantly worse with medium-weight mesh than with light mesh. The study by Liang et al. (34) and Feola et al. (35) showed that vaginal

tissue degeneration was significantly more pronounced with medium-weight TVM, which is associated with increased cell apoptosis and decreased collagen and elastin content in the tissues. The study described by the authors is the first to prospectively evaluate the safety and efficacy of lightweight mesh after 36 months used for the transvaginal treatment of complete and incomplete uterine prolapse.

CONCLUSIONS

The surgical technique studied for repairing prolapsed vaginal walls in cases of partial and complete uterine prolapse showed successful long-term results in restoring the position of the top part of the vagina. Based on the research findings, the rates of specific complications using lightweight surgical mesh were 2.9 % for vaginal wall erosion, 5.9 % for chronic pelvic pain, and 2.9 % for new onset stress urinary incontinence. This surgical approach can be recommended to patients as an alternative treatment option for isolated complete or partial uterine prolapse.

The results of the gynecological prolapse treatment research indicate the sacrospinal cervicopexy with lightweight mesh has advantages for better preserving the elasticity and strengthening the fascial and ligament structures of the pelvis by creating a non-ligamentous support. Despite these positive findings, the use of transvaginal mesh cannot be the only choice for treating complete or partial uterine prolapse, and it should be discussed with each patient when no other pelvic pathology is identified before surgery.

The study demonstrates the potential benefits and safety of using lightweight mesh via a transvaginal approach for treating uterine prolapse, with a high anatomical success rate, low apical segment recurrence, and acceptable complication rate. However, limitations exist including a lack of a comparison group and independent postoperative evaluations. Further research with comparison groups, longer follow-up, and independent assessments is recommended to validate findings. Optimal lightweight mesh properties and surgical techniques to minimize complications like erosion should be explored. Adding anterior mesh placement could improve cystocele outcomes. Comparing this technique to laparoscopic sacrocolpopexy would elucidate the advantages and disadvantages of each approach. Within the limitations of this initial study, the transvaginal sacrospinal cervicopexy technique shows promise as an effective option for treating uterine prolapse with an acceptable safety profile. Further research is warranted to optimize the technique and better characterize long-term outcomes.

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