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Original

Surgical outcomes of a low-cost adapted sacrospinous fixation for apical prolapse repair

Resultados cirúrgicos de uma fixação sacroespinhosa adaptada de baixo custo para reparo de prolapso apical

Resultados quirúrgicos de una fijación sacroespinosa adaptada de bajo costo para la reparación del prolapso apical

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Abstract

Objective: To assess surgical outcomes of women submitted to the adapted sacrospinous fixation (SSF) at a school hospital in northeastern Brazil for apical prolapse repair. **Methods**: Retrospective study with medical records of women submitted to the adapted SSF at a reference center in Brazil (2015 to 2019). All women submitted to this SSF were included, and those with pelvic organ prolapse (POP) recurrence, repair using other techniques, or unavailable medical records were excluded. The anatomical result, surgical characteristics, and associated complications and recurrence were evaluated. The chi-square and Fisher's exact test were used for statistical analysis, using a significance level of 5%. **Results:** A total of 198 medical records were included. The mean age was 65.1 ± 8.2 years; most had less than eight years of education, were menopausal, multiparous, and with urinary incontinence. The postoperative POP stage significantly improved at all compartments. The complication rate was 15.7%, especially due to de novo urinary incontinence (n = 12; 6%). Five cases of mesh-related complications (5%) were observed. The median follow-up was nine months, with 8.4% of POP recurrence and reoperation. POP recurrence or mesh-related complications were not associated with sociodemographic, clinical, or surgical characteristics. **Conclusion:** The adapted SSF significantly improved the postoperative POP stage and reduced its recurrence and mesh-related complications.

Descriptors: Pelvic Organ Prolapse; Uterine Prolapse; Surgical Mesh; Operative Surgical Procedures.

Whats is already known on this?
Pelvic organ prolapse is a prevalent disease impacting quality of life. It often requires surgical repair, but treatment costs and complications limit its use.

What this study adds?
A modification of the technique and materials used for sacrospinous fixation that allows the surgical treatment of apical prolapse in an effective way, with few complications.

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Resumo

Objetivo: *Avaliar os resultados cirúrgicos de mulheres submetidas à fixação sacroespinhosa adaptada (FSS) em um hospital-escola no nordeste do Brasil para correção de prolapso apical.* ***Métodos:*** *Estudo retrospectivo com prontuários de mulheres submetidas à FSS adaptada em um centro de referência no Brasil (2015 a 2019). Foram incluídas todas as mulheres submetidas a essa FSS, sendo excluídas aquelas com recorrência de prolapso de órgãos pélvicos (POP), reparo com outras técnicas ou prontuários indisponíveis. O resultado anatômico, as características cirúrgicas, as complicações associadas e a recorrência foram avaliados. Para a análise estatística, foram usados o teste do qui-quadrado e o teste exato de Fisher, com um nível de significância de 5%.* ***Resultados:*** *Foram incluídos 198 prontuários. A idade média foi de 65,1 ± 8,2 anos; a maioria tinha menos de oito anos de estudo, estava na menopausa, era multípara e apresentava incontinência urinária. O estágio pós-operatório do POP melhorou significativamente em todos os compartimentos. A taxa de complicações foi de 15,7%, especialmente por apresentar incontinência urinaria novamente (n = 12; 6%). Foram observados cinco casos de complicações relacionadas à tela (5%). O acompanhamento médio foi de nove meses, com 8,4% de recorrência de POP e reoperação. A recorrência do POP ou as complicações relacionadas à tela não foram associadas a características sociodemográficas, clínicas ou cirúrgicas.* ***Conclusão:*** *O FSS adaptado melhorou significativamente o estágio pós-operatório do POP e reduziu sua recorrência e as complicações relacionadas à tela.*

Descritores: *Prolapso de Órgão Pélvico; Prolapso Uterino; Telas Cirúrgicas; Procedimentos Cirúrgicos Operatórios.*

Resumén

Objetivo: *Evaluar los resultados quirúrgicos de mujeres sometidas a fijación sacroespinosa (FSS) adaptada en un hospital universitario del noreste de Brasil para corregir el prolapso apical.* ***Métodos:*** *Estudio retrospectivo con historias clínicas de mujeres sometidas a FSS adaptada en un centro de referencia en Brasil (2015 a 2019). Se incluyeron todas las mujeres sometidas a esta FSS, excluidas aquellas con recurrencia del prolapso de órganos pélvicos (POP), reparación con otras técnicas o registros médicos no disponibles. Se evaluó el resultado anatómico, las características quirúrgicas, las complicaciones asociadas y la recurrencia. Para el análisis estadístico se utilizó la prueba de chi cuadrado y la prueba exacta de Fisher, con un nivel de significancia del 5%.* ***Resultados:*** *Se incluyeron 198 historias clínicas. La edad promedio fue de 65,1 ± 8,2 años; la mayoría tenía menos de ocho años de escolaridad, se encontraba en menopausia, era multípara y presentaba incontinencia urinaria. La etapa postoperatoria del POP mejoró significativamente en todos los compartimentos. La tasa de complicaciones fue del 15,7%, especialmente por nueva incontinencia urinaria (n = 12; 6%). Se observaron cinco casos de complicaciones relacionadas con la malla (5%). El seguimiento medio fue de nueve meses, con un 8,4% de recurrencia y reintervención del POP. La recurrencia del POP o las complicaciones relacionadas con la malla no se asociaron con características sociodemográficas, clínicas o quirúrgicas.* ***Conclusión:*** *La FSS adaptada mejoró significativamente el estadio postoperatorio del POP y redujo su recurrencia y las complicaciones relacionadas con la malla.*

Descriptores*: Prolapso de Órgano Pélvico; Prolapso Uterino; Mallas Quirúrgicas; Procedimientos Quirúrgicos Operativos.*

INTRODUCTION

Pelvic organ prolapse (POP) is the descent of pelvic structures (e.g., vaginal walls and apex) from their anatomical location,[1] which may impair the emotional health, delaying the search for care.[2] Usually, ≥ stage 2 in the POP Quantification (POP-Q) system or impaired quality of life are indicated for surgery, some of them using a biologic graft or synthetic mesh.[3]

Although Brazil has no restrictions on using synthetic meshes for POP repair, their use is controversial, because these meshes were banned for POP repair in the United States, and other countries, such as the United Kingdom, Japan, Canada, Australia, and New Zealand restricted them for recurrence or complex cases.[4-6]

The controversy on synthetic meshes for POP repair is mainly due to the possibility of mesh-related complications (about 12% of cases), which may vary and be related to several outcomes, types of meshes, and lack of long-term follow-up.[7,8] Furthermore, it increases the reoperation due to mesh erosion (3 to 11%).[9]

The sacrospinous fixation (SSF) technique through the transgluteal route using a synthetic mesh has been significantly reduced due to the worldwide restriction of synthetic meshes. Also, the high cost of these commercial kits hampers POP repair, especially in the public health system of resource-poor countries and regions, such as northeastern Brazil. [4,5,6]

Although anterior and posterior vaginal prolapse repair had good results using native tissue, apical prolapse repair presented promising and safe results with small synthetic meshes through the transgluteal route (i.e., apical sling).[10-13] Thus, the SSF technique was adapted to use the available clinical expertise and materials and develop a safe and low-cost alternative for apical prolapse repair.[14]

The adaptations in SSF included a reduced mesh size (compared to Uphold©, Elevate©) to decrease mesh-related complications, a deep location of the mesh to avoid mesh erosion, and a needle that could be sterilized and reused to reduce costs (aiming at the socioeconomic reality of developing countries). In this sense, the aim of the study was to assess surgical outcomes of women submitted to

the adapted sacrospinous fixation (SSF) at a school hospital in northeastern Brazil for apical prolapse repair.

METHODS

This is a retrospective study that used medical records of women submitted to the adapted SSF between 2015 and 2019 at a tertiary center in northeast Brazil. All medical records of women submitted to POP-Q and stage ≥ 2 in the apical compartment (both vaginal vault and uterus) or smaller stages with symptoms, accompanied by prolapses in other compartments or not) were included and those with POP recurrence, repair using other techniques or unavailable medical records were excluded.

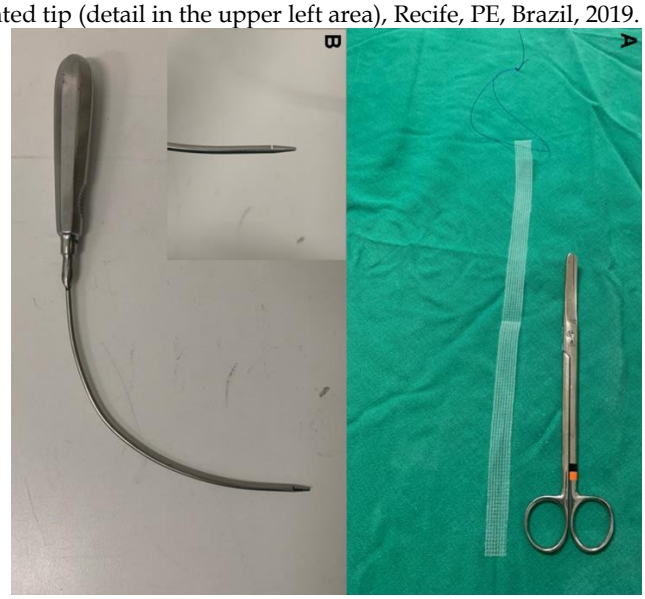
The OpenEpi software version 3.0 (Atlanta, Georgia, USA) calculated the sample size. A sample of 163 women was initially estimated, considering 12% of mesh erosion for transvaginal mesh surgeries with non-absorbable type 1 monofilament macroporous polypropylene mesh, 95% confidence interval (CI), and 5% precision. After a 20% increase in sample size due to possible losses, a total of 196 women was estimated.[7]

To characterize the sample, the variables age, skin color, marital status, educational level, number of pregnancies and deliveries, type of previous birth, history of fetal macrosomia (≥4000 grams), postmenopausal status, previous hysterectomy, comorbidities (hypertension, diabetes, chronic obstructive pulmonary disease, smoking and constipation), presence of stress urinary incontinence (SUI) or urge urinary incontinence (UUI) and POP-Q stage were used. To evaluate surgical characteristics, the type of repair performed (anterior, posterior, and apical), performance of hysterectomy or correction of simultaneous urinary incontinence, surgical complications, and recurrence of POP were evaluated. In bivariate analysis, mesh-related complications and POP recurrence were considered as dependent variables and independent variables were age (<60 years or ≥ 60 years), educational level (<12 years or ≥ 12 years), vaginal births (<3 or ≥ 3), presence of macrosomia fetal, postmenopausal, hysterectomy or hysteropexy, comorbidities, POP-Q stage in any compartment (<2 or ≥2) and association with urinary incontinence.

The presence of mesh fragments in the vagina or hollow organs (e.g., urethra, bladder, and intestinal loops) was considered a mesh-related complication. Also, POP recurrence was characterized by POP-Q ≥ stage 2 at the assessed period and symptoms impairing the quality of life with the need for reoperation.

The adapted SSF technique consisted of a longitudinal incision with sharp and digital dissection of the vaginal mucosa and paravaginal space until accessing ischial spines and sacrospinous ligaments bilaterally. Two small gluteal incisions were performed bilaterally, and two polypropylene mesh sheets were transfixed in the sacrospinous ligaments using reusable, fenestrated, and self-made curved needles (Figure 1).

Figure 1: (A) Mesh with a loop for sacrospinous fixation. (B) Sacrospinous fixation needle with fenestrated tip (detail in the upper left area), Recife, PE, Brazil, 2019.



Two pieces of transvaginal mesh (30x1.5cm) were made from non-absorbable, synthetic, monofilament polypropylene mesh (Venkuri, São Paulo, Brasil). The mesh was then pulled to suspend the vaginal apex, using a small loop of non-absorbable suture (2-0 prolene) through the existing fenestra in the needle. The excess mesh was sectioned, the vaginal and gluteal incisions were closed.

All surgeries were performed by urogynecology staff with junior fellowships. The same technique was used regardless of the presence or absence of a uterus.

Anterior or posterior vaginal prolapses were repaired using colporrhaphy with native tissues when POP-Q ≥ stage 2. Women with preoperative complaints of urinary incontinence were submitted to a urodynamic study before surgery, and clinical or urodynamic diagnosis of SUI were referred for a simultaneous sling. It was decided to perform ahysterectomy with POP repair only in cases of endometrial hyperplasia or injuries that could lead to cervical cancer.

Data from medical records were analyzed using the EpiInfo software version 7.2.5 (Centers for Disease Control and Prevention, Atlanta, USA). Categorical variables were presented as frequency, and quantitative variables as mean and standard deviation or median and interquartile range. The chi-squared and Fisher's exact tests analyzed the association between categorical variables. The multivariate logistic regression should analyze variables with ≤ 0.20 significance in the bivariate analysis, which was not found and therefore not carried out. Statistical significance was set at 5% with 95% confidence interval.

This study followed Resolution 446/12 of the National Health Council and was approved by the local research and ethics committee (CAAE 39891720.8.0000.5201, opinion no. 4.420.603).

RESULTS

A total of 198 medical records were included for analysis. The mean age of women was 65.1 ± 8.2 years, and 37.9% were married. Most women had less than eight years of education (n = 120; 73.2%). Also, 94.5% (n = 187) of women had previous deliveries; of these, 94.5% (n = 187) had at least one vaginal, 26.3% (n = 52) had at least one cesarean, and 7.1% (n = 14) had at least one forceps delivery. A history of fetal macrosomia was observed in 19.7% (n = 39) of women. Moreover, 90.1% (n = 180) of women were menopausal at the time of surgery, 27.5% (n = 51) reported previous hysterectomy, 25.2% (n = 50) had diabetes mellitus, 36.3% (n = 72) had symptoms of SUI, and 41.4% (n = 82) had urge urinary incontinence (UUI) (Table 1).

Table 1. Demographic characteristics of women submitted to the adapted sacrospinous fixation for apical prolapse repair, Recife, PE, Brazil, 2019.

Characteristics	
Age (years) - mean (SD)	**65.1 (8.2)**
Marital status - n (%)	177 (100)
Single	41 (23.2)
Married	67 (37.9)
Divorced	16 (9)
Widowed	44 (24.9)
Stable union	9 (5.1)
Education level (completed years) - n (%)	164 (100)
0 to 8	120 (73.2)
9 to 11	33 (20.1)
12 or more	11 (6.7)
Number of pregnancies - median (IQR)	**4 (3 – 6)**
Three or more pregnancies - n (%)	158 (79.8)
Number of deliveries - median (IQR)	**3 (2 – 5)**
Three or more deliveries - n (%)	131 (66.1)
Type of deliveries - n (%) *	
Vaginal	187 (94.4)
Cesarean	52 (26.3)
Forceps	14 (7.1)
History of fetal macrosomia - n (%)	39 (19.7)
Menopausal status (yes) - n (%)	180 (90.1)
Previous hysterectomy - n (%)	51 (27.5)
Comorbidities - n (%) *	117 (59.1)

DM	50 (25.2)
COPD	4 (2.0)
Smoking	17 (8.6)
Chronic constipation	46 (23.2)
Presence of SUI - n (%)	72 (36.3)
Presence of UUI - n (%)	82 (41.4)

SD: standard deviation; IQR: interquartile range; DM: diabetes mellitus; COPD: chronic obstructive pulmonary disease; SUI: stress urinary incontinence; UUI: urge urinary incontinence. * Women may have one or more responses.
Source: authors (2023).

Anterior and apical vaginal walls showed the greatest prolapses. According to the POP-Q, the median for points Ba and C was + 4 cm with an interquartile range (IQR) of 3 and 6 cm (respectively), and the median of the posterior wall was 0 cm (IQR = 6 cm). The POP-Q ≥ stage 2 (n = 184; 95.4%) was mainly observed in the anterior wall, followed by the apical (n = 166; 86%) and posterior walls (n = 116; 61.7%) (Table 2 and 3).

Table 2. Preoperative Pelvic Organ Prolapse Quantification system staging of women submitted to the adapted sacrospinous fixation for apical prolapse repair, Recife, PE, Brazil, 2019.

Characteristics (preoperative)	Median (IQR)	Variation
Point Ba	4 (3 – 6)	(-4) – (+12)
Point Bp	0 (-3 – 3)	(-6) – (+12)
Point C	4 (0 – 6)	(-7) – (+12)
Gh	5 (4 – 5)	(1) – (8)
Pb	3 (2 – 4)	(1) – (6)
TVL	8 (7 – 9)	(4) – (12)

Ba: point of greatest prolapse in the anterior vaginal wall; Bp: point of greatest prolapse in the posterior wall; C: point of greatest apical prolapse; Gh: genital hiatus; Pb: perineal body; TVL: total vaginal length, IQR: interquartile range.
Source: authors (2023).

Table 3. Pelvic Organ Prolapse Quantification system stage and postoperative periods of women submitted to the adapted sacrospinous fixation for apical prolapse repair, Recife, PE, Brazil, 2019.

POP-Q	Preoperative	Postoperative	p-value
Anterior vaginal prolapse – n (%)	193 (100)	110 (100)	< 0.001*
Stage 0	7 (3.6)	47 (42.7)	
Stage 1	2 (1.0)	12 (10.9)	
Stage 2	21 (10.9)	36 (32.7)	
Stage 3	89 (46.1)	10 (9.1)	
Stage 4	74 (38.3)	5 (4.5)	
POP-Q < stage 2	9 (4.7)	59 (53.6)	< 0.001*
POP-Q ≥ stage 2	184 (95.3)	51 (46.4)	
Posterior vaginal prolapse – n (%)	188 (100)	107 (100)	< 0.001*
Stage 0	58 (30.9)	93 (86.9)	
Stage 1	14 (7.4)	5 (4.7)	
Stage 2	42 (22.3)	4 (3.7)	
Stage 3	23 (12.2)	3 (2.8)	
Stage 4	51 (27.1)	2 (1.9)	
POP-Q < stage 2	72 (38.3)	98 (91.6)	< 0.001*
POP-Q ≥ stage 2	116 (61.7)	9 (8.4)	
Apical prolapse – n (%)	193 (100)	110 (100)	< 0.001*
Stage 0	15 (7.8)	87 (79.1)	
Stage 1	12 (6.2)	3 (2.7)	
Stage 2	32 (16.6)	6 (5.5)	
Stage 3	61 (31.6)	10 (9.1)	
Stage 4	73 (37.8)	4 (3.6)	
POP-Q < stage 2	27 (14.0)	90 (81.8)	< 0.001*
POP-Q ≥ stage 2	166 (86.0)	20 (18.2)	

* Chi-squared test.

Source: authors (2023).

The mean surgery duration was 143 ± 55 min. Simultaneous repair of the anterior wall was required in 75.2% (n = 149) of women, followed by simultaneous repair of the posterior wall (52.0%; n = 103). Also, a hysterectomy was performed in 19.2% (n = 38) of women, and a simultaneous sling for SUI repair in 44.4% (n = 88) of women (Table 4).

A total of 34 women (18.9% of those with available data) had one or more surgical complications, resulting in 37 events.

Five perioperative complications (2.5%) were observed; two urinary tract infections and three surgery-related complications. Of the surgery-related complications, one was a surgical site infection (gluteal abscess), and two were bladder injuries (one during a retropubic sling) (Table 4).

Five cases of mesh extrusion or exposure (5%) were observed at physical examination at regular follow-ups; four in women submitted to hysteropexy and one in a previously hysterectomized woman. Of these, one woman was treated exclusively with vaginal estrogen, and four needed reoperation (Table 4).

Four women (2%) reported pain: gluteal pain on palpation of the ischial spine during vaginal touch; vaginal and right lower limb pain after resolution of gluteal abscess; dyspareunia and exposure of the synthetic mesh; and inguinal pain during vaginal touch directed to the mesh (without extrusion or exposure), maintaining a conservative treatment since the pain was mild and did not impair the quality of life (Table 4).

The most frequent complications were related to urinary incontinence, in which eight (4%) women reported postoperative SUI and twelve (6%) reported UUI. Among those with urinary incontinence, four reported both types of incontinence. Most women maintained a conservative treatment with pelvic physical therapy, anticholinergics, or both, and one woman developed recurrent urinary infections (Table 4).The median follow-up in the postoperative period was nine months, in which 8.4% (n = 14) of women presented POP recurrence and needed reoperation (Table 4). Of these, four women were submitted to a new SSF, four to abdominal sacrocolpopexy, two to SSF using the Capio™ SLIM suture capturing device (Boston Scientific, Massachusetts, USA), two to trachelectomy and colpoperineorrhaphy, and two to colpectomy (data not shown), totaling 14 patients with recurrent stages 3 or 4 apical prolapse. Most women presented postoperative POP-Q stages 3 or 4: 13.6% (n = 15) in the anterior vaginal wall, 12.7% (n = 14) in the apical wall, and 4.7% (n = 5) in the posterior wall (Table 3).

The bivariate analysis assessed the association between POP recurrence or mesh-related complications and age ≥ 60 years, menopause, low education level, multiparity, fetal macrosomia, previous hysterectomy, comorbidities (diabetes mellitus, chronic obstructive pulmonary disease, smoking, and constipation), POP-Q ≥ stage 2 in any vaginal wall, hysteropexy during the adapted SSF, or urinary infection. However, no significant associations were observed ($p < 0.20$); thus, multivariate logistic regression analysis was not performed (Table 5).

Table 4. Surgical characteristics, complications, recurrence, and reoperation of women submitted to the modified sacrospinous fixation for apical prolapse repair. Recife, PE, Brazil, 2019.

Characteristics	
Surgical duration (min) - mean (SD)	143 (55)
Time for hospital discharge (days) - median (IQR)	3 (3 – 4)
Time of follow-up (months) - median (IQR)	9 (2 – 18)
Simultaneous repair of other vaginal walls - n (%)	284 (100)
Anterior	149 (75.2)
Posterior	103 (52.0)
None	32 (16.1)
Simultaneous hysterectomy - n (%)	38 (19.2)
Simultaneous SUI repair - n (%)	88 (44.4)
TOT sling - n (%)	85 (42.9)
RP sling - n (%)	3 (1.5)
Complications - n (%)	34 (18.9) *
Intraoperative	
Infection **	3 (1.5)
Bladder injury	2 (1.0)
Late postoperative	
Mesh exposure or extrusion	5 (2.5)
Dyspareunia	1 (0.5)
Chronic pelvic pain	2 (1.0)
Inguinal pain	1 (0.5)
De novo SUI	8 (4.0)
De novo UUI	12 (6.0)
Recurrent UTI	3 (1.5)
Recurrence - n (%)	14 (8.4)
Reoperation due to prolapse recurrence	14 (8.4)
Reoperation due to surgical mesh (except for sling mesh)	4 (2.0)

SD: standard deviation; IQR: interquartile range; TOT: transobturator; RP: retropubic; SUI: stress urinary incontinence; UUI: urge urinary incontinence; UTI: Urinary tract infection. * Women may have one or more complications, resulting in 37 events. ** two patients had urinary tract infection and one gluteal abscess.
Source: authors (2023).

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Table 5. Association between risk factors, recurrence, and vaginal mesh-related complications of women submitted to sacrospinous colpofixation by the transgluteal approach for apical prolapse correction. Recife, PE, Brazil, 2019.

Variables	Recurrence						Complications (mesh)					
	n	Yes n (%)	No n (%)	PR	CI 95%	p-value	n	Yes n (%)	No n (%)	PR	CI 95%	p-value
Age (years)	167			1.28	0.29 – 5.56	1.00 *	149			0.26	0.06 – 1.24	0.21 *
≥ 60		10 (7.5)	123 (92.5)					3 (2.5)	115 (97.5)			
< 60		2 (5.6)	32 (94.1)					3 (9.7)	28 (9.3)			
Education (years)	138			**	**	1.00 *	122			0.24	0.03 – 1.90	0.52 *
< 12		8 (6.2)	121 (93.8)					4 (3.5)	111 (96.5)			
≥12		0 (0.0)	9 (100.0)					1 (14.3)	6 (85.7)			
Vaginal delivery	167			1.06	0.33 – 3.39	1.00 *	149			0,55	0.12 – 2.64	0.73 *
≥ 3		8 (7.3)	101 (92.7)					3 (3.1)	93 (96.9)			
< 3		4 (6.9)	54 (93.1)					3 (5.7)	50 (94.3)			
Macrosomia	87			1.72	0.25 – 11.62	0.94 *	77			0.78	0.74 – 8.27	1.00 *
Yes		2 (6.3)	30 (93.7)					1 (3.3)	29 (96.7)			
No		2 (3.6)	53 (96.4)					2 (4.3)	45 (95.7)			
Postmenopause	160			**	**	0.97 *	142			0.27	0.03 – 2.18	0.57 *
Yes		12 (7,9)	139 (92.1)					4 (3.0)	129 (97.0)			
No		0 (0,0)	9 (100.0)					1 (11.1)	8 (88.9)			
Previous hysterectomy	162			0.84	0.24 – 2.97	1.00 *	144			0.52	0.06 – 4.31	0.93 *
Yes		3 (6,5)	43 (93.5)					1 (2.5)	39 (97.5)			
No		9 (7,8)	107 (92.2)					5 (4.8)	99 (95.2)			
DM	164			1.50	0.48 – 4.72	0.70 *	146			**	**	0.28 *
Yes		4 (9,8)	37 (90.2)					0 (0.0)	40 (100.0)			
No		8 (6,5)	115 (93.5)					6 (5.7)	100 (94.3)			
COPD	163			**	**	1.00 *	145			**	**	1.00 *
Yes		0 (0,0)	3 (100.0)					0 (0.0)	1 (100.0)			
No		11 (6,9)	149 (93.1)					6 (4.2)	138 (95.8)			
Smoking	159			**	**	0.76 *	141			**	**	1.00 *
Yes		0 (0,0)	13 (100.0)					0 (0.0)	11 (100.0)			
No		11 (7,5)	135 (92.5)					6 (4.6)	124 (95.4)			
Constipation	159			1.88	0.58 – 6.08	0.47 *	141			**	**	0.49 *
Yes		4 (10.8)	33 (89.2)					0 (0.0)	34 (100.0)			
No		7 (5.7)	115 (94.3)					5 (4.7)	102 (95.3)			

Anterior	167			**	**	0.79 *	149			**	**	1.00 *
≥ 2		12 (7.7)	143 (92.3)					6 (4.4)	131 (95.6)			
< 2		0 (0.0)	12 (100.0)					0 (0.0)	12 (100.0)			
Posterior	167			1.67	0.52 – 5.33	0.57 *	149			0.80	0.17 – 3.81	1.00 *
≥ 2		8 (8.8)	83 (91.2)					3 (3.6)	80 (96.4)			
< 2		4 (5.3)	72 (94.7)					3 (4.5)	63 (95.5)			
Apical	167			1.10	0.25 – 4.47	1.00 *	149			0.46	0.09 – 2.40	0.63 *
≥ 2		10 (7.3)	127 (92.7)					4 (3.3)	117 (96.7)			
< 2		2 (6.7)	28 (93.3)					2 (7.1)	26 (92.9)			
Histeropexy	166			1.03	0.24 – 4.44	1.00 *	148			0.98	0.12 – 8.06	1.00 *
Yes		2 (7.4)	25 (92.6)					1 (4.0)	24 (96.0)			
No		10 (7.2)	129 (92.8)					5 (4.1)	118 (95.9)			
SUI association	163			0.17	0.02 – 1.28	0.07 *	145			2.02	0.42 – 9.64	0.63 *
Yes		1 (1.8)	56 (98.2)					3 (6.3)	45 (93.7)			
No		11 (10.4)	95 (89.6)					3 (3.1)	94 (96.9)			
UUI association	162			1.01	0.34 – 3.06	1.00 *	144			0.70	0.13 – 3.70	1.00 *
Yes		5 (7.5)	62 (92.5)					2 (3.3)	58 (96.7)			
No		7 (7.4)	88 (92.6)					4 (4.8)	80 (95.2)			

Kg: Kilograms; SUI: stress urinary incontinence; UUI: urge urinary incontinence; DM: diabetes mellitus; COPD: chronic obstructive pulmonary disease. (*) Fisher's exact test (**) Not calculable.

Source: authors (2023).

DISCUSSION

Although most women submitted to the adapted SSF presented POP-Q ≥ stage 2, 75.2% and 52% were submitted to simultaneous repair of the anterior and posterior wall (respectively), suggesting that the apical prolapse repair reduced the need for repair in the other walls. These data corroborated the hypothesis that apical prolapse repair is essential for the success of POP surgery, even with the involvement of different walls.[15]

Thus, the prevalence of hysterectomy with the adapted SSF was 19.2% since hysteropexy was preferable. This decision was supported by a meta-analysis of 12 randomized clinical trials involving 1,177 women, which did not observe differences in recurrence, reoperation, or complications between hysteropexy and hysterectomy during POP repair. However, women submitted to hysteropexy had reduced perioperative bleeding and surgical and hospitalization duration.[16]

In cases of colpocytological changes in the preoperative evaluation, it was decided to perform a hysterectomy, instead of the excision of the transformation zone to define this approach. This is due to local difficulties in accessing health services, risk of loss to follow-up, and future technical difficulties in case of the need for a hysterectomy after sacrospinous fixation has been performed. However, the number of hysterectomies performed for this reason nor the associated colpocytological findings were not evaluated.Intraoperative complications occurred in only five women, while late postoperative complications occurred in just 4,5% of cases. This finding corroborated other studies showing few complications.[17-18] In a recent meta-analysis, 0.9% of women submitted to SSF presented bleeding, 12.7% presented dyspareunia, and 3.2% presented infection.[18]

In the present study, de novo urinary infection was the most prevalent complication (eight cases of SUI and twelve of UUI), which occurred in 10% of women. This finding corroborated other studies reporting an incidence of postoperative urinary infection between 11% and 44%.[17] Also, the recurrence of symptoms compatible with overactive bladder may occur in 12% of women submitted to several POP repairs.[19]

In this study, 36.3% and 41.4% of women had preoperative SUI and UUI (respectively). Of these, 44.4% of women received a suburethral sling; 96.6% through the transobturator route. None of the eight cases (4%) of SUI after the surgery received a sling during the POP repair. In a randomized controlled trial, 50% of women submitted to POP repair without vaginal slings had urinary incontinence in a one-year follow-up.[20] Also, 71.9% of those who had a positive stress test in the preoperative period and did not receive a sling had urinary incontinence after three months of follow-up.[20] The UUI recurrence of 6% (n = 12) in the present study was lower than the observed in the literature, possibly due to the short follow-up and differences in population, diagnosis, surgical indication, and type of material.

Complications in POP repair using surgical mesh can reach 12% of women, which may be explained by the different outcomes, types of meshes, and lack of long-term follow–up.[7-8] Young women, smokers, perimenopausal or with a history of hormone replacement therapy, multiparity, diabetes mellitus, hysterectomy during POP repair, or operated by a young surgeon had increased risk of mesh erosion.[21]

Mesh-related complications corresponded to 2.5% of the studied women; four (2.0%) were submitted to reoperation to remove a mesh fragment. This rate was lower than the observed in the literature, which may be explained by differences in surgical techniques (e.g., deep implantation or use of a small synthetic mesh to prevent erosion) or bias in the retrospective data collected.[7] Reoperation due to mesh-related complications may range from 3% to 11%.[9] Despite not demonstrating a difference in the subjective cure rate, POP correction with transvaginal mesh was superior to correction with native tissue considering Ba and/or C < 0 in the POP-Q. Furthermore, regarding safety, the use of transvaginal mesh was shown to be non-inferior to correction with native tissue.[22]

The median follow-up was only nine months, which may be due to the resolutive aspect of the surgery, leading some women to not return for long-term follow-up. Other explanations may be the socioeconomic and access difficulties from the Brazilian reality and the fact that our institution is a regional reference center, leading women to attend the follow-up at their residence municipality.

In this study, 8.4% of women needed reoperation due to POP recurrence. Although literature showed different results on vaginal surgeries using synthetic mesh, a study reported about 7% of reoperation after 48 months in women operated using synthetic mesh.[17] Thus, our reoperation rate was similar to the literature, even with differences in techniques, materials, and approaches. However, small

recurrences may have led women to not seek attendance due to difficulties in health care access or lack of impairment in the quality of life, masking the reported recurrence.

Some authors described similar apical sling techniques to those in this study.[10-13] These studies reported anatomical success ranging from 78% to 100% between 6 and 12 months of follow-up, with improved quality of life and reduced complications. For example, Shkarupa et al. observed 0.7% recurrence and 96.5% efficacy in 174 women with anterior and apical prolapse operated using a unilateral apical sling technique with hysteropexy and followed up for 12 months. Also, they observed only one case of dyspareunia, without mesh exposure or chronic pelvic pain.[12]

This was the first study describing the results of a low-cost SSF technique with mesh-related complications similar to those described in the literature that meets the daily reality of low-medium-income countries. In addition, it contributes to the planning of prospective and controlled studies in the future and provides previously unavailable data that allows for better clinical shared advice. However, this study had some limitations, such as the retrospective and observational nature that hindered data extraction from medical records. The lack of data on the reasons for hysterectomies performed, mainly due to colpocytological changes, the sample size was probably insufficient since the prevalence of mesh erosion (2.5%) was lower than the observed in the literature (12%). This fact may explain the lack of association in multivariate logistic regression analysis, highlighting the need for adequate sample size and prospective studies. The lack of a long-term follow-up with assessment of the quality of life of women was also a limitation.

CONCLUSION

This study demonstrated that the adapted SSF was effective in repairing POP and presented mesh-related complications, POP recurrence needing reoperation, and reduced postoperative urinary infection similar to results in the literature. Further larger prospective studies should be conducted to ensure an accurate and effective assessment of long-term outcomes.

CONTRIBUITIONS

Contributed to the conception or design of the study/research: Souza FD, Rangel AEO, Souza ASR, Costa AAR. Contributed to data collection: Souza FD. Contributed to the analysis and/or interpretation of data: Souza FD, Rangel AEO, Souza ASR, Costa AAR. Contributed to article writing or critical review: Souza FD, Rangel AEO, Souza ASR, Costa AAR. Final approval of the version to be published: Souza FD, Rangel AEO, Souza ASR, Costa AAR.

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