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Management of complex pelvic floor dysfunctions: Combined versus single surgical procedure in a multidisciplinary approach. A prospective study

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ABSTRACT

Objectives: The management of pelvic floor dysfunction (PFD) is challenging because of high failure rates after surgery. The objective of this study was to compare the combined surgical treatment for complex PFD versus single procedures to improve the outcome.

Materials and Methods: A prospective series of consecutive patients (n=30) undergoing single pelvic procedure (SP group) was compared to patients (n=30) operated with combined procedure (CP group) over a 24-month period in a tertiary referral university center in Italy. The primary outcome was the overall rate of PFD recurrence and "*de novo*" PFD at 24-months after surgery. Secondary outcomes included postoperative complications, functional outcomes, quality of life, and patient satisfaction.

Results: At 24-months after surgery, we observed more recurrences in the SP group compared to CP group (6.7% vs 3.3%). *De novo* defects occurred more frequently in the SP group than in CP group (30% vs 6.7%; p=0.022). Ten percent of women of SP group underwent further surgery, compared to 3% in the CP group. Minor complications occurred in 33.3% of women in SP group and 43.3% in CP group. Postoperative improvement of pelvic prolapse was better in CP group (p=0.009). PFDI and PFQI questionnaires revealed significant postoperative clinical and quality-of-life improvement (p<0.0001) in both groups. Defecatory symptoms improved significantly in CP group (p=0.049). Minor fecal incontinence worsened in CP group while urinary symptomatology resulted improved in both groups. Patient satisfaction was very good in both groups.

Conclusion: The combined surgical approach to PFD is effective and safe.

Keywords: Pelvic floor dysfunction; pelvic organ prolapse; obstructed defecation; laparoscopic rectopexy; combined pelvic surgery; multidisciplinary pelvic floor

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INTRODUCTION

Pelvic floor disorders (PFD) are an increasing global health problem involving millions of women throughout the world, especially in the elderly population. Approximately one in five women undergoes surgery for genital prolapse [prolapse of the pelvic organs (POP)] or urinary incontinence (UI) by the age of 85 years, and it has been estimated that the demand for pelvic reconstructive surgery will increase of 45% over the next years.[1] However, the management of these patients is still difficult with incomplete resolution of symptoms and high failure rates after surgery requiring further procedures. Re-operation rates for POP and UI in parous women are unacceptably high and vary widely in the literature, ranging from 10% to 56%.[2,3] Most of the factors that influence reoperation have not yet been identified. The suboptimal results obtained after surgery for PFD may be attributable to the incomplete study of pelvic function: UI rarely presents as an isolated symptom, but it is more often associated with other pelvic disorders, such as POP or fecal incontinence (FI); 80% of patients with POP have UI; one-third of women with POP have symptoms of obstructed defecation syndrome (ODS).[4] Moreover, surgical interventions aimed at treating an isolated pelvic dysfunction may unmask or exacerbate pre-existing symptoms in other compartments or even lead to the development of new symptoms, undoing previously implemented compensation strategies (*de novo* UI, coping strategies).[5] The diffusion of the unifying concept of viewing the pelvic floor as an integral system,[6] overcoming the traditional compartmentalized single-specialty approach to PFD, and the spread of the multidisciplinary outpatient clinic (MOC) has contributed to improved outcomes.[7] Combined surgical treatment of multiple PFD in the same surgical operation has been performed to reduce the risk of reoperation for recurrence or "*de novo*" dysfunctions. It appears that suspension techniques performed by either open or laparoscopic approach allow for the correction of more pelvic compartments, adjusting the pelvic anatomy and preserving bowel, bladder, and sexual function.[8-11] Similarly, trans-perineal techniques allow the correction of defects of multiple pelvic compartments.[12,13] It is also possible to combine a suspension technique with a trans-perineal technique.[14] At present, there are very few published data on the impact of combined surgical approach to complex PFD on clinical outcome and patient satisfaction,[15] (Table 1). A comparison of the different surgical procedures is difficult, because of data lacking and difficult standardization of the multiple surgical procedures; furthermore, evidence-based guidelines do not exist. The objective of this study was to compare the outcome of combined surgical treatment of PFD versus single procedures within a multidisciplinary pelvic floor pathway, to try to clarify what is the most correct surgical approach to complex PFD. The primary aim was to evaluate effectiveness of single procedure surgery versus combined surgical treatment. Secondary aims were to evaluate safety, functional outcomes, quality of life, and patient satisfaction in the two approaches.

MATERIALS AND METHODS

This prospective trial was designed to evaluate the efficacy and safety of combined surgery for treatment of complex PFD. From April 2018 to April 2019, we recruited all consecutive patients with complex PFD with indication for surgical treatment referring at the MOC for PFD at the University Hospital of Ferrara, Italy. Complex PFD were managed by multi-compartmental pelvic surgical procedure in the experimental group [group "combined procedure", (CP)]. In the control group patients were surgically treated with single-compartmental pelvic surgical procedure [group "single procedure", (SP)]. The inclusion criteria were age over 18 years, diagnosis of complex PFD by joint assessment at the MOC for PFD with indication for surgery. The diagnosis of complex PFD was attributed by the joint assessment of the multidisciplinary team (MDT) consisting of a gynecologist, a urologist, and a colorectal surgeon if more than one symptom (vaginal bulging/prolapse, stress UI, urge UI, bladder voiding symptoms, dyspareunia, FI, constipation, and obstructed defecation), and more than one pelvic floor defect (cystocele, uterine or apical prolapse, enterocele, rectocele, internal rectal prolapse, and descending perineum) were present. The type of surgical procedure (single or combined) was decided by the MDT after the joint evaluation based on symptoms and pelvic defects. The exclusion criteria were neoplastic diseases treated during the 12 months prior to the first PFD visit, previous pelvic radiotherapy, pregnancy, chronic inflammatory diseases (endometriosis, inflammatory bowel diseases, diverticulitis), neurological diseases, external full-thickness rectal prolapse, follow-up performed at another hospital, explicit refusal to complete the questionnaires. During preoperative PFD MDT visit and at the 24-months visit after surgery, patients underwent pelvic organ prolapse quantification system (POP-Q)[16] measurement of the prolapse and they were administered the following self-filling questionnaires about PFD, constipation, ODS, FI, and patient satisfaction:

-Pelvic floor distress inventory (PFDI-20 score, short form) and pelvic floor impact questionnaire (PFIQ-7 score, short form) which are valid and reliable short forms of 2 condition-specific quality-of-life questionnaires for women with PFD, investigating urinary, pelvic organ prolapse, and colorectal-anal distress.[17] In both PFDI-20 and PFIQ-7, patients reported whether they experienced symptoms of pelvic floor dysfunction, and how

Table 1. Review table on combined surgical approach for POP

Combined surgical approach	Surgery for SUI	Abdominal surgery	Combined transvaginal and transrectal	Combined abdominal and transvaginal	Combined abdominal, transvaginal, and transrectal	Reference
Multi compartmental POP	Concurrent Sub urethral sling 5	LRCS 38 LH 2				Martín del Olmo JC et al, Surg Endosc 2019
Multi compartmental POP		ORCS 29				Lim M et al, DCR 2007
Multi compartmental POP		LRCS 10				Sagar PM et al, DCR 2008
Multi compartmental POP		RASC and RR 16				Park H et al. J Minimally Invasive Gyn 2014
Multi compartmental POP	Concurrent TVT-O 24		VARE 23 VAHY 21 STARR 68			Boccasanta P, Am J Surg. 2010
Multi compartmental POP			Posterior VWR 15 anterior, posterior VWR and VAHY 3 STARR 18			Ascanelli S et al, Minerva Chirurgica 2018
Multi compartmental POP		Concurrent resection rectopexy 7			LVR, posterior VWR and VCS 74	Slawik S et al, Colorectal Dis 2008
Multi compartmental POP	Concurrent burch procedure 7 marshall-marchetti-krantz bladder suspension 1 bladder neck suspension 1	Concurrent LSR 1 LMR 3 OMR 2 ORR 8 OSR 9 Abdominal sacral colpopexy 11 uterine suspension 1 transabdominal hysterectomy 3		Cystocele repair 5 paravaginal repair 9 McCall culdoplasty 2 uterosacral plication 2 anterior repair 2 perineoplasty 4 transvaginal hysterectomy 2 vaginal sling 1	Transvaginal rectus fascial sling 1 posterior repair 4 enterocele repair 3	Riansuwan W et al, Colorectal Disease 2010

POP: pelvic organ prolapse; SUI: stress urinary incontinence; LRCS: laparoscopic ventral mesh recto/colpo/sacropexy; LH: laparoscopic hysterectomy; ORCS: open mesh sacrocolporectopexy surgery; RASC: robotic assisted laparoscopic mesh sacrocolpopexy; RR: robotic mesh rectopexy; VARE: vaginal repair of enterocele; VAHY: vaginal hysterectomy; STARR: stapled transanal rectal resection; TVT-O: transobturator tape; VWR: vaginal wall repair; LVR: laparoscopic ventral rectopexy; VCS: vaginal sacrocolpopexy; LRR: laparoscopic resection rectopexy; LSR: laparoscopic sutured rectopexy; LMR: laparoscopic mesh rectopexy; ORR: open resection rectopexy; OSR: open-sutured rectopexy; OMR: open mesh rectopexy

much these symptoms bothered them. The PFDI-20 has three scales: Pelvic organ prolapse distress inventory, colorectal-anal distress inventory, and urinary distress inventory. Response options for rating distress associated with each symptom range from 0 to 4. Higher scores indicate more symptom distress. The PFIQ-7 measures impact of bladder, bowel, and vaginal symptoms on daily physical activity, travel, social/relationships, and emotional health. The PFIQ-7 has three scales: The urinary impact questionnaire, the colorectal-anal impact questionnaire, and the pelvic organ prolapse impact questionnaire. Response options range from 0 to 3. Higher scores indicate more impact on daily activity.

-Wexner cleveland clinic constipation scoring system (CSS), the most widely adopted instrument for evaluation of constipation, easy to understand and administer. It consists of 8 items scored from 0 to 4 for a maximum score of 30,[18]

-Altomare score for ODS, a validated instrument specifically designed for ODS. It consists of 7 items scored from 0 to 4 with a maximum score of 27,[19]

-Cleveland clinic Florida fecal incontinence questionnaire (CCF-FI), a frequently used instrument containing five questions on solid and liquid fecal soiling, flatus control, pad wearing and adjustments to daily living made necessary by FI,[20]

-Visual analogue scale (VAS) for patient satisfaction, the well-known horizontal line of 100-mm long with at the beginning and at the end, two descriptors representing extremes of satisfaction (no satisfaction and extreme satisfaction). The patient rated his satisfaction by making a vertical mark on the 100-mm line. The measurement in millimeters was converted to the same number of points ranging from 0 to 100 points. The question was "Are you satisfied with your surgical treatment?".[21]

All patients complaining UI or urinary voiding symptoms underwent urodynamic tests. All patients complaining constipation and ODS, with Wexner Constipation and ODS score more than 10 at the first MDT visit, underwent pre-operative defecography and rectal manometry. The obtained scores, as well as the presence of pelvic floor defects and symptoms were compared before and 24 months after surgery. All patients were visited by the MDT at 7 days, 1 month, 6, 12, and 24 months after surgery. All data concerning pre- and post-operative clinical data, diagnostic tests, and questionnaires scores, produced by the MDT were collected prospectively and stored in the electronic reports in the hospital information system systems applications products. Data were collected by two researchers (LC and SM) who were not member of the MDT. Written informed consent was obtained from all patients. The study was conducted in accordance with the principles of Helsinki Declaration, with approval of the Regional Medical Ethics Review Board (identification code: 160597). The primary outcome was the overall rate of PFD recurrence, "*de novo*" pelvic floor defects, and re-operation rate at 24 months after surgery in CP group vs SP group to evaluate effectiveness of combined surgical treatment versus single procedure surgery. Secondary outcomes included postoperative complications according to Clavien-Dindo Classification[22] to evaluate safety. To compare functional outcomes, quality of life, and patient satisfaction we measured the variations of POP-Q score, PFDI-20 and PFQI-7 scores, Wexner CSS score, ODS score, CCF-FI score, and VAS scoring in the two groups, before and 24 months after surgery.

Surgical Technique

Patients underwent single or combined surgery. All surgical procedures in both study groups were performed by staff surgeons trained in pelvic surgery and advanced laparoscopy: The procedures were performed by the same gynecologist (RM), and/or the same urologist (CI), and/or the same colorectal surgeon (SA) individually or in combination. The techniques performed were:

1)Trans-perineal techniques:

a) Colpo-hysterectomy (CH) for the correction of uterine prolapse, always associated with anterior colporrhaphy (AC), or vaginal cystopexy according to Kelly, and with posterior colporrhaphy (PC)[23]

b) Anterior colporrhaphy (AC) or vaginal cystopexy[24]

c) Posterior colporrhaphy (PC)[25]

d) Correction of stress UI with urethral suspension by placement of a polypropylene tape [trans-obturator tape (TOT)][26]

e) transanal prolassectomy with stapler [stapled trans anal rectal resection (STARR)] for the correction of rectal prolapse associated with ODS according to technique codified by Longo[27]

2) Abdominal suspension techniques:

a) Laparoscopic correction of uterine prolapse with the use of polypropylene prosthesis: Lateral uterine suspension (LUS)[28]

b) Laparoscopic sacrocolpopexy (LSCP) for vaginal vault prolapse using polypropylene prosthesis anchored to the sacral promontory[29]

c) Laparoscopic correction of the rectal prolapse by ventral rectopexy (LVR) with biological prosthesis according to D' Hoore technique.[30]

These procedures were variably associated in the combined approach.

Statistical Analysis

The sample size of this trial was based on expected indication to surgery for complex PFD of 10-20%[5] and a two-sided 95% confidence interval for a single proportion extended to 10% on either side, with an assumed dropout rate of 5% at 6 months. Given that about 400 women are visited each year at the MOC for PFD of the University Hospital of Ferrara, the final sample size was determined to be 60 patients in a period of 12 months: Thirty patients treated with single pelvic procedure and 30 patients treated with multiple combined procedures in one surgical operation. Data were expressed as median (interquartile

range- 25-75) and mean ± standard deviation according to distribution assessed by Shapiro-Wilk test. Categorical data were presented as numbers. Data were analyzed using chi-square, Student's t-test, and Mann-Whitney U tests as appropriate. Cox regression analysis was used to assess independent predictors of improvement of POP-Q.[9] Significance was considered for values of $p<0.05$. Statistical analysis was performed with IBM SPSS Statistics for Windows, Version 24.0 (IBM Corp. Armonk, NY: IBM Corp.). This report complies with strengthening the reporting of observational studies.

RESULTS

From April 2018 to April 2019, 389 patients suffering from complex PFD were visited at the MOC of the University Hospital of Ferrara, Italy. Of these, 66 women (17%) were candidates for surgical treatment: Thirty-four women underwent SP, while 32 women underwent CP. Of these, 6 patients were lost during follow-up: Four patients in the SP group, and 2 patients in the CP group for a final count of 30 patients analyzed per group (Figure 1). The baseline characteristics of the patients are reported in Table 2. The two groups were homogeneous, except for childbirth modes: The vaginal delivery was significantly more frequent in the CP group, while the percentage of caesarean section was significantly higher in SP group. The most frequent pre-operative symptoms were urinary symptoms, recurrent urinary infections, constipation, vaginal bulge, and ODS in both groups (Figure 2). After surgery, there was a general improvement of all symptoms: In particular, bulging, urinary symptoms, and ODS decreased significantly in the CP group (Figure 2). Regarding the pelvic floor defects before surgery, the two groups were homogeneous. Rectocele, cystocele, rectal prolapse, and descending perineum were the most frequent defects. We observed postoperative improvement of defects with no significant differences between the two groups (Figure 2). Surgical procedures performed in the two groups are listed in Table 3. The most frequently SP performed were LVR, LUS, and STARR. The most frequently CP performed were trans-perineal procedures such as STARR in combination with CH, AC, PC, or TOT. Among mixed (suspension and trans-perineal) procedures, the most frequently procedure performed was LUS in association with STARR. The median duration of operation was longer in CP group (145 minutes vs 125 minutes; $p=0.022$). Mesh was used in suspension procedures: In particular, the cross-linked Permacol mesh (Medtronic) was always used in LVR, while synthetic polypropylene mesh was always used for LUS and LSCP. The median length of stay was longer in CP group (4 days vs 3 days), without statistical significance (Table 4). We observed 33.3% of minor complications in SP group and 43.3% in CP group, but this difference was not statistically significant (Table 4). Grade I and grade II complications are listed in Table 4. One case of intestinal obstruction (grade III complication) occurred in CP group after LSCP with STARR due to the adhesion of ileus to the polypropylene mesh. The patient underwent reoperation with ileal resection. All patients underwent pelvic floor rehabilitation within 6 months after surgery. At 24 months after surgery, we observed more PFD recurrences (ODS and rectocele) in the SP group compared to CP group (6.7% vs 3.3%), but the difference was not statistically significant (Table 4). *De novo* defects occurred more frequently in the SP group than in CP group (30% vs 6.7%; $p=0.022$), especially affecting the posterior compartment (Table 4). Ten percent of women of SP group underwent further surgery, in comparison with 3% in the CP group, but this difference was not statistically significant. MOC evaluation at 24 months after

Table 2. Baseline characteristics of patients

Baseline characteristics of patients	SP group (n=30)	CP group (n=30)	*p*
Age (years) (mean ± SD)	65.1±8.63	67.1±9.18	0.393
BMI (kg/m^2) (mean ± SD)	25.63±3.75	27.45±4.18	0.081
ASA [n (%)] I II III	 4 (13.3) 21 (70) 5 (16.7)	 2 (6.7) 16 (53.3) 12 (40)	0.121
COPD [n (%)]	6 (20)	7 (23.3)	0.756
Smoke [n (%)]	14 (46.7)	15 (50)	0.797
Diabetes [n (%)]	7 (23.3)	8 (26.7)	0.767
Depression [n (%)]	8 (26.7)	7 (23.3)	0.767
Age at menopause (mean ± SD)	50.2±3.98	50.6±2.89	0.631
Hormone replacement therapy [n (%)]	17 (56.7)	14 (46.7)	0.442
Fibromyalgia [n (%)]	11 (36.7)	11 (36.7)	0.999
Anticoagulant drugs [n (%)]	8 (26.7)	6 (20)	0.544
Previous hysterectomy [n (%)]	2 (6.7)	7 (23.3)	0.073
Parity >1 [n (%)]	16 (53.3)	23 (76.7)	0.060
Vaginal delivery	21 (70)	29 (96.7)	0.010
Episiotomy	6 (20)	9 (30)	0.411
Dystocic delivery	2 (6.7)	1 (3.3)	0.536
Perineal tears (grade III/IV)	9 (30)	4 (13.3)	0.103
Caesarean section	9 (30)	1 (3.3)	0.010

BMI: body mass index; ASA: American society of anesthesia score; COPD: chronic obstructive pulmonary diseases; SD: standard deviation

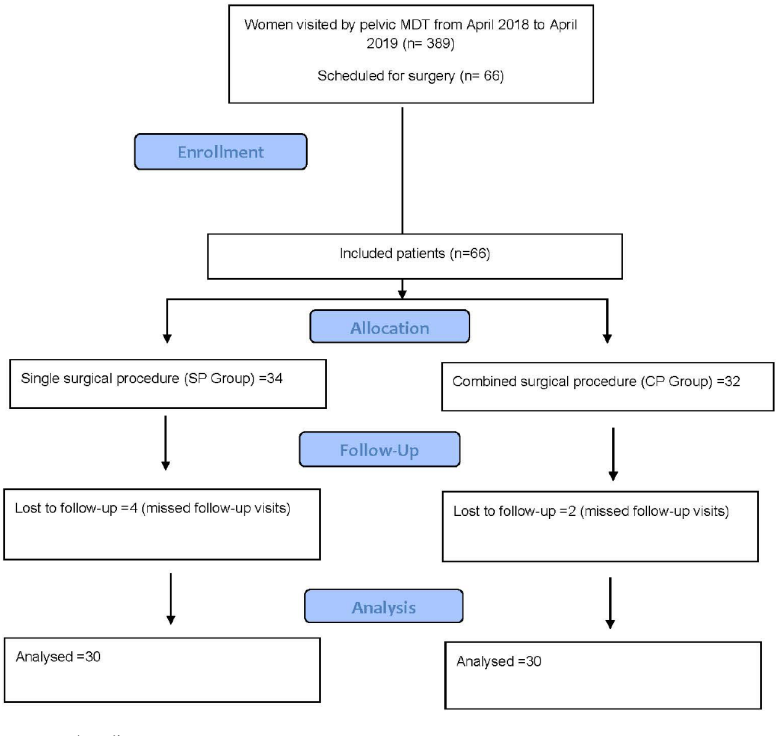

Figure 1. Flow diagram

MDT: multidisciplinary team

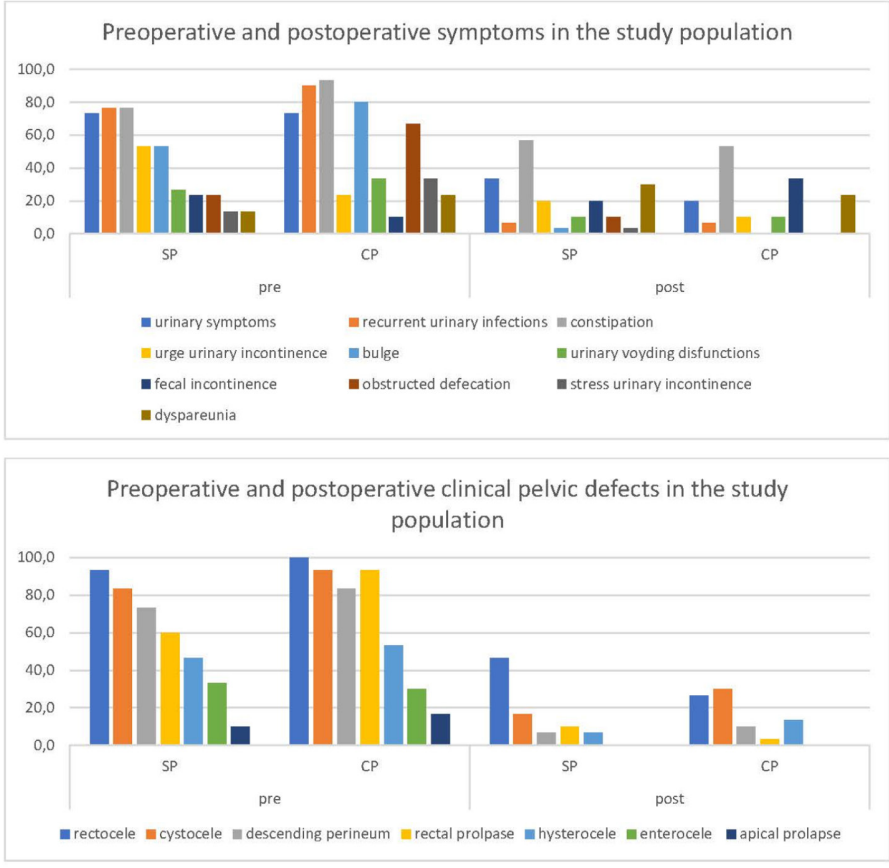

Figure 2. Preoperative and postoperative symptoms and clinical pelvic defects in the study population

SP: single procedure; CP: combined procedure

Table 3. Surgical procedures

	SP (n=30)	CP (n=30)	
1a (n, %) CH	3		
1b (n, %) AC	3		
1c (n, %) PC	0		
1d (n, %) TOT	2		
1e (n, %) STARR	6		
2a (n, %) LUS	6		
2b (n, %) LSCP	1		
2c (n, %) LVR	9		
1a + 1b + 1c + 1d (n, %)		2	
1a + 1b + 1c + 1e (n, %)		6	
1b + 1e (n, %)		1	
1b + 2c (n, %)		1	
1b + 1c + 1e (n, %)		1	
1c + 1e (n, %)		1	
1c + 1e + 2a (n, %)		1	
1c + 2a (n, %)		2	
1c + 1d + 1e (n, %)		1	
1d + 1e (n, %)		1	
1d + 2b (n, %)		1	
1d + 2c (n, %)		4	
1d + 1e + 2a (n, %)		1	
1e + 2a (n, %)		4	
1e + 2b (n, %)		1	
2a + 2c (n, %)		2	
Duration of operation (min), median (1Q 3Q)	125 (50 160)	145 (110 185)	p=0.022

CH: colpo-hysterectomy; AC: anterior colporrhaphy or vaginal cystopexy; PC: posterior colporrhaphy; TOT: trans obturator tape; STARR: stapled trans anal rectal resection; LSCP: laparoscopic sacrocolpopexy; LVR: laparoscopic ventral rectopexy

surgery showed significant postoperative improvement of pelvic prolapse (reduction in POP-Q) compared to preoperative grade in both groups (p<0.0001), with better result in CP group compared to SP group (p=0.009) (Table 5). PFDI and PFQI questionnaires revealed significant clinical and quality-of-life improvement (p<0.0001) in both groups after surgery, regardless of the single or combined procedure (Table 5). Defecatory symptoms such as constipation and ODS improved significantly after surgery especially in CP group (p=0.049) where patients had higher initial scores (Table 5). Minor FI expressed with CCF-FI score worsened in CP group after surgery, without significant difference (Table 5). Urinary symptomatology resulted improved in both groups after surgery with a significant better improvement of urge UI after combined surgery Figure 2. Patient satisfaction was very good in the two groups without significant differences (Table 5).

DISCUSSION

The surgical correction of multiple pelvic compartments at the same time seems to be associated with better outcome in comparison to surgical treatment of single pelvic defect. Combined surgery consents to prevent the manifestation of *de novo* pelvic symptoms which may occur after single pelvic defect approach or the worsening of a pre-existing symptom.[5,6,15,20] Symptoms such as UI may occur or become more severe after the first surgical correction of prolapse and, therefore, the simultaneous correction seems to prevent the appearance of UI.[2,3,23,26] In the presented series *de novo* defects occurred more frequently in SP group than in CP group (30% vs 6.7%; p=0.022), especially affecting the posterior compartment (16% in SP group; 6.7% in CP group) and anterior one (10% in SP group; 0 in CP group) (Table 4). In addition to the lower rate of *de novo* symptoms, patients undergone combined surgery presented lower rate of PFD recurrence after 2 years (3.3% in CP group vs 6.7% in SP group), and lower need for subsequent surgery (3% in CP group vs 10% in SP group) (Table 4). These results indicate good quality of treatment within the multidisciplinary pelvic flow pathway being in line with the literature in which the need to re-interventions for PFD recurrences ranges between 10% to 30%.[3] However, very few studies have been carried out comparing single compartment surgery to multi-compartmental surgery, especially in terms of functional outcome.[2] In the current study the significant postoperative improvement of prolapse, measured with POP-Q, in both groups, but with a statistically significant better result in the CP group (p=0.009) (Table 5) suggests that the simultaneous correction of multiple prolapse is the optimal way to correct the pelvic floor defects with better results in terms of objective correction. On the other hand, when several surgical procedures are combined there could be an increased risk for complications. Our data showed a slight, not statistically significant increase of grade II postoperative complications in CP group (Table 4). We observed one case of intestinal obstruction (grade III complication) occurred in CP group after LSCP with STARR due to the adhesion of ileus to the polypropylene mesh. The patient underwent reoperation with ileal resection. In this case the complication was due to the synthetic mesh rather than the combination of the two procedures. Other studies have confirmed the lack of statistically significant differences in terms of overall morbidity between combined and single procedures.[2] FI is a major concern after pelvic surgery involving the posterior compartment.[15,27,30] In the present study minor FI expressed with CCF-FI score worsened in CP group after surgery, without significant difference (Table 5).

Table 4. Short- and long-term (24 months) outcome results

Outcome results	SP (n=30)	CP (n=30)	*p*
Lenght of stay, median (1Q 3Q)	3 (3 3)	4 (3 4)	0.999
Early complication (Clavien-Dindo) (n, %)	10 (33.3)	13 (43.3)	0.591
I	0 (-)	1 (3.3)	0.999
II	10 (33.3)	11 (36.6)	0.999
Urinary tract infections	4 (13.3)	4 (13.3)	
Bladder retention	2 (6.7)	2 (6.7)	
Ileus	1 (3.3)	1 (3.3)	
Thrombosis in external hemorrhoids	1 (3.3)	1 (3.3)	
Anal fissure	1 (3.3)	0 (-)	
Fecal impaction	0 (-)	1 (3-3)	
Wound infection	1 (3.3)	2 (6.7)	
III	0 (-)	1 (3.3)	0.999
Ileal obstruction	0 (-)	1 (3.3)	
PFD recurrence at 24 months (n, %)	2 (6.7)	1 (3.3)	0.999
ODS	1	1	
Rectocele	1	-	
***De novo* PFD at 24 months (n, %)**	9 (30)	2 (6.7)	0.022
SUI	2 (6.7)	0 (-)	
UUI	1 (3.3)	0 (-)	
ODS	2 (6.7)	1 (3.3)	
FI	1 (3.3)	0 (-)	
Rectocele	2 (6.7)	1 (3.3)	
Apical prolapse	1 (3.3)	0 (-)	
Re-operation at 24 months (n, %)	3 (10)	1 (3.3)	0.614
LVR	1 (3.3)	1 (3.3)	
TOT	1 (3.3)	0 (-)	
LSCP	1 (3.3)	0 (-)	
Length of follow-up (months), median (1Q 3Q)	33 (29 36)	31.5 (30 73)	0.958

PFD: pelvic floor dysfunction, ODS: obstructed defecation syndrome; SUI: stress urinary incontinence; UUI: urge urinary incontinence; FI: fecal incontinence; LVR: laproscopic ventral rectopexy; TOT: trans-obturator tape; LSCP: laparoscopic sacrocolpopexy

In contrast, major FI (CCF-FI >10) improved in both groups after surgery. The improvement of PFD-related symptoms and quality of life in both groups after surgery, as showed by significant reduction in PFDI and PFQI scores despite single or combined procedure (Figure 2, Table 5) suggests considerations about the role of surgical approach in improving women symptoms because perceived symptomatology and objective pelvic defect do not always match. Other studies have shown that, after surgery for prolapse, there is persistent improvement in quality of life despite recurrences, and that surgical correction of the objective pelvic defect is only weakly correlated with an improvement in quality of life even when comparing surgical versus conservative treatments.[17] Overall patient satisfaction was high in both groups after surgery, demonstrating the correct surgical approach chosen by the MDT. Multidisciplinary approach is the cornerstone for a correct approach to complex PFD.[7] MDT meetings consent to standardizing care, agreeing on the management plan and type of combined or staged surgery according to the patient's real needs, balancing the pros and cons of strategies, and improving quality of the service received by patients.

Study Limitations

The limits of the present study are represented by the small sample size, the lack of randomization, and the short follow-up time. We thought it was non-ethical to randomizing patients to one treatment rather than another because the treatment was tailored to the patients' symptoms and defects. We are continuing to enroll patients to increase the sample size, trying to better standardize the procedures to allow for comparison.

CONCLUSION

The combined treatment of pelvic defects and prolapses in multiple compartments in multidisciplinary approach is feasible and safe because it consents a better restoration of the pelvic floor anatomy, it reduces recurrences, *de novo* defects, and the need for further surgical correction, without increasing postoperative complications. Other studies comparing the outcome of single and combined pelvic procedures are necessary to achieve evidence-based guidelines supporting surgeons' choices.

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ETHICS

Ethics Committee Approval: The study was conducted in accordance with the principles of Helsinki Declaration, with approval of the Regional Medical Ethics Review Board (identification code: 160597).

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Internally peer-reviewed.

Contributions

Surgical and Medical Practices: S.A., L.C., S.M., R.M., C.I., P.C.; Concept: S.A.; Design: S.A., R.M., C.I., P.C.; Data Collection or

Table 5. Clinical, functional, and quality of life results

Outcome results	Single procedure (SP) n=30	Combined procedure (CP) n=30	*p*
pre POP-Q, median (1Q 3Q)	3 (2 3)	3 (3 3)	0.042
post POP-Q, median (1Q 3Q)	1 (0 1)	0 (0 1)	0.009
p	<0.0001	<0.0001	
pre PFDI (mean ± SD)	105.04±64.68	135.14±56.96	0.061
post PFDI (mean ± SD)	55.35±39.22	51.36±50.52	0.733
p	<0.0001	<0.0001	
pre PFQI (mean ± SD)	89.59±89.28	130.106±74.37	0.061
post PFQI (mean ± SD)	43.92±55.47	31.74±36.68	0.320
p	0.0014	<0.0001	
pre ODS, median (1Q 3Q)	9 (0 14)	16 (14 18)	0.0005
post ODS, median (1Q 3Q)	0 (0 8)	0 (0 4)	0.216
p	0.012	<0.0001	
pre Wexner CSS, median (1Q 3Q)	9.5 (0 12)	12.5 (10 16)	0.002
post Wexner CSS, median (1Q 3Q)	5 (0 10)	2.5 (0 5)	0.049
P	0.026	<0.0001	
pre CCF-FI score, median (1Q 3Q)	0 (0 0)	0 (0 0)	0.210
post CCF-FI score, median (1Q 3Q)	0 (0 0)	0 (0 4)	0.258
p	0.528	0.386	
VAS satisfaction, median (1Q 3Q)	8 (7 9)	9 (8 9)	0.067

POP-Q: pelvic organ prolapse quantification system; PFDI: pelvic floor distress inventory; PFQI: pelvic floor impact questionnaire; ODS: altomare score for obstructed defecation syndrome; Wexner CSS: constipation scoring system; CCF-FI: cleveland clinic score for fecal incontinence; VAS: patient satisfaction visual analogue scale; SD: standard deviation

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DISCLOSURES

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