

The relevance of fascial surgical repair in the management of pelvic organ prolapse (POP)

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Summary

Purpose: To evaluate the anatomical and functional outcomes and post-operative compliance of fascial surgical repair in the management of pelvic organ prolapse (POP). **Materials and Methods:** The authors analyzed 147 patients before and after surgical treatment for POP analyzing pre- and post-operative symptoms. Patients were divided into two groups: group A patients who underwent vaginal hysterectomy, associated with anterior, posterior, and/or both vaginal repair; group B that underwent only anterior and/or posterior surgical vaginal correction. **Results:** The average time of post-operative hospitalization was significantly longer in group A than in group B ($p = 0.019$). However group A showed a better outcome in terms of days after surgery regarding post voiding residual <100 cc ($p = 0.039$). During follow-up, urinary incontinence improved ($p = 0.001$), whereas pelvic pressure, regular bowel function, and improvement in sexual activity were not significant ($p > 0.05$). **Conclusions:** Currently we do not have a surgical procedure which can be considered the best for treating prolapse, so it seems that the best option is a personalized surgery tailored for each patient.

Key words: Pelvic organ prolapse; Urinary incontinence; POP surgery; POP-Q; Quality of life; Mesh; Hysterectomy; Sexual function.

Introduction

Pelvic organ prolapse (POP) is a disorder that affects over 50% of women aged over 79 years and 10% of those between 30 and 39 years [1]. The increase of average life expectancy highlights the importance of POP in terms of prevention and management. Among patients referred to the present Department, over 50% of them presented with an anatomical alteration of the pelvis, but only 3-6% reported associated symptoms that compromised quality of life. When conservative therapies, physiotherapy or vaginal pessaries can no longer control symptoms, surgical correction is the treatment most frequently used. Pelvic floor surgery is a functional surgery, which must seek to recover the quality of life of women while not always coinciding with anatomical healing. In the last 20 years the use of prosthetic surgery (mesh) for surgical correction of prolapse, which had raised hopes of a better outcome in terms of durability than fascial surgery, does not seem to have achieved the expected improvements, while some reported severe complications [2]. Traditional fascial surgery, based on the ability of original vaginal tissue to repair itself, played an important role in the treatment of prolapse and is now being reconsidered as the first choice when conservative treatment is no longer conclusive.

The aim of this study was to evaluate the anatomical and functional outcomes and postoperative compliance of fascial surgery.

Materials And Methods

The study was conducted at the Department of Surgery and Medicine and Translational Medicine, Sant'Andrea Hospital, Faculty of Medicine and Psychology at "La Sapienza" University of Rome, between January 2009 and December 2015. The study was reviewed and approved by the Institutional Review Board and was conducted in accordance to the Helsinki Declaration. Patients were divided into two groups according to the type of surgery: group A patients who were subjected to vaginal hysterectomy (with or without salpingo-oophorectomy), associated with anterior, posterior, and/or both vaginal correction; group B that had had only anterior and/or posterior surgical vaginal correction without vaginal hysterectomy. Three surgeons, experts in vaginal surgery, performed all surgical treatments. Among patients referred to the present Department, 147 were enrolled in the study. Inclusion criteria were the presence of symptomatic genital prolapsed or prolapse of grade III or IV according to the classification of POP-Q examination and patients who had undergone vaginal hysterectomy or plastic surgery of the vaginal walls. A questionnaire (P-QOL, Prolapse - Quality of Life, edited version 4) was performed from two to six years after surgery [3]. The data was processed using SPSS software version 21.0. For numeric variables, the authors verified the normal distribution with the application of the Kolmogorov-Smirnov test (K-S). In case of normal distribution (K-S test value of $p > 0.05$) we proceeded by the application of parametric tests (Student's T) to verify the significance between the mean values. Otherwise, with values of $p < 0.05$ for the K-S test, non-parametric tests were applied (Mann-Whitney U test). The presence of association between nominal variables was evaluated through the application of the Chi-Square test. McNemar's test was applied in order to verify the existence of significant differences in dichotomous data (presence/absence of a symptom) before and after surgery, and then to assess its effectiveness.

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Table 1. — *Features of study population.*

	n	Min-max	Mean (SD)	Median
Current age (years)	146	40-87	68.3 (8.8)	68.0
Age at surgery (years)	147	36-83	64.4 (8.9)	64.0
Weight (kg)	136	44-99	65.1 (9.6)	65.0
Height (m)	138	1.45-1.80	1.60 (0.06)	1.60
Max birth weights (gr)	56	1750-5000	3612.5 (595.6)	3600.0
Menopausal age	133	38-58	50.5 (3.9)	51.0

Results

The characteristics of the study population are summarized in Table 1. Concerning the BMI, out of 136 patients (11 patients were missing for incomplete data), 70 patients (51.5%) were normal weight, 40 (29.4%) were overweight, 21 (15.4%) were obese, and five (3.7%) were underweight. Regarding parity, 83 patients (56.5%) had had two deliveries, 27 patients (18.4%) three deliveries, 22 patients (15.0%) one delivery, 11 patients (7.6%) more than four deliveries, and four patients (2.7%) were nulliparous. The average birthweight was 3,612.5 grams (n=56; SD=595.6). The average age and median of menopausal women were respectively 50.5 (SD=3.9) and 51.0 years (Table 1). The most common comorbidities among these patients were hypertension (43.5%; n=64), followed by hypothyroidism (16.3%; n=24), chronic obstructive pulmonary disease (COPD) (8.8%; n=13), and diabetes (85.4%; n=8). The 147 patients were divided into two groups: group A (n=121; 82.3%) and group B (n=26; 17.7%) depending on the type of surgery, to evaluate the accuracy of surgical indication, post-operative course, and early and late complications. All

patients enrolled had a symptomatic genital prolapse (pelvic pressure, urinary incontinence, irregular bowel function, and sexual activity). The surgical technique chosen was based on the vaginal compartment involved (anterior, posterior, and apical), age, symptoms, and above all the patients requirements. There were no significant differences between the mean values of the variables, current age, age at time of surgery, BMI, maximum birth weight, and age at menopause and parity in the two groups (Table 2). Post-operative features analyzed were: time of hospital stay, post-operative temperature higher than 37.5°C, post-voiding residual greater than 100 cc, and time of catheter removal. The average time of post-operative hospitalization was significantly greater in group A (6.8 days) than in group B (6.2 days) ($p = 0.019$). Moreover group A showed a better outcome in terms of days after surgery with post-voiding residual < 100 cc ($p = 0.039$). The results are summarized in Table 3.

Five intra- and peri-operative complications (4%) were observed in group A. Out of these five, one was an accidental injury of the bladder that was immediately repaired; in two cases it was necessary to perform a laparoscopy in order to repair a lesion of the ovarian pedicle and to remove a patch. One patient experienced vaginal bleeding requiring suture (within 12 hours), and the last patient had a pelvic hematoma which resolved itself spontaneously.

The Chi-Square test showed no significance ($p > 0.05$) between the type of surgery and the comorbidities (hypertension, hypothyroidism, diabetes, and COPD).

Out of 147 patients, 119 were subjected to a questionnaire for the follow-up (25 patients were lost, two did not give their consent, and one patient had died). The aim of

Table 2. — *Mean of demographic and physical variables in the two different groups of patients.*

	Group A mean (SD)	Group B mean (SD)	<i>p</i> -value K-S	<i>p</i> -value Mann Whitney or Student's <i>t</i> -test
Current age (years)	68.7 (8.7)	66.3 (9.2)	< 0.05	0.493
Age at surgery (years)	64.9 (8.7)	62.2 (9.6)	< 0.05	0.444
Weight (kg)	65.8 (9.8)	61.7 (9.0)	< 0.05	0.069
Height (m)	1.61 (0.06)	1.59 (0.07)	< 0.05	0.119
Max birth weights (gr)	3618.5 (598.6)	3585 (612.4)	> 0.05*	0.874
Age at menopause	50.7 (3.9)	49.7 (4.3)	< 0.05	0.195
Childbirths number	2.2 (1.1)	2.2 (0.7)	< 0.05	0.571

*Student *t*-test was applied.

Table 3. — *Mean of post-surgical variables in the two different groups of patients.*

	Group A mean (SD)	Group B mean (SD)	<i>p</i> -value K-S	<i>p</i> -value Mann Whitney or Student's <i>t</i> -test
Total period of hospitalization (days)	10.5 (3.2)	10.2 (5.3)	< 0.05	0.153
Period of post-operative hospitalization (days)	6.8 (1.9)	6.2 (3.0)	< 0.05	0.019
Days with fever > 37.5°C	1.84 (1.3)	2.00 (0.9)	< 0.05	0.407
Catheter removal, post-operative day	3.4 (1.1)	3.5 (1.4)	< 0.05	0.989
Days with post-voiding residual > 100 cc	2.8 (2.3)	5.0 (1.7)	< 0.05	0.039

Table 4. — *Symptoms before and after surgery in the whole sample.*

			Post		Total	McNemar <i>p</i> -value
			Yes	No		
Pelvic pressure	Pre	Yes	5 (4.2%)	114 (95.8%)	119 (100.0%)	— *
		No	—	—	—	
		Total	5 (4.2%)	114 (95.8%)	119 (100.0%)	
Urinary incontinence	Pre	Yes	19 (38.8%)	30 (61.2%)	49 (100.0%)	0.001
		No	9 (12.9%)	61 (87.1%)	70 (100.0%)	
		Total	28 (23.5%)	91 (76.5%)	119 (100.0%)	
Regular bowel function	Pre	Yes	89 (98.9%)	1 (1.1%)	90 (100.0%)	1.000
		No	0 (0.0%)	29 (100.0%)	29 (100.0%)	
		Total	89 (74.8%)	30 (25.2%)	119 (100.0%)	
Improvement in sexual activity	Pre	Yes	—	—	—	— *
		No	39 (76.5%)	12 (23.5%)	51 (100.0%)	
		Total	39 (76.5%)	12 (23.5%)	51 (100.0%)	

*McNemar test was not been applied because there was only one answer mode in pre-operative time, respectively, "no" for pelvic pressure and "yes" for improvement in sexual activity.

Table 5. — *Symptoms before and after surgery in group A.*

			Post		Total	McNemar <i>p</i> -value
			Yes	No		
Pelvic pressure	Pre	Yes	1 (1.0%)	96 (99.0%)	97 (100.0%)	— *
		No	—	—	—	
		Total	1 (1.0%)	96 (99.0%)	97 (100.0%)	
Urinary incontinence	Pre	Yes	16 (42.1%)	22 (57.9%)	38 (100.0%)	0.016
		No	8 (13.6%)	51 (86.4%)	59 (100.0%)	
		Total	24 (24.7%)	73 (75.3%)	97 (100.0%)	
Regular bowel function	Pre	Yes	75 (98.7%)	1 (1.3%)	76 (100.0%)	1.000
		No	0 (0.0%)	21 (100.0%)	21 (100.0%)	
		Total	75 (77.3%)	22 (22.7%)	97 (100.0%)	
Improvement in sexual activity	Pre	Yes	—	—	—	— *
		No	34 (81.0%)	8 (19.0%)	42 (100.0%)	
		Total	34 (81.0%)	8 (19.0%)	42 (100.0%)	

*McNemar test was not applied because there was only one answer mode in pre-operative time, respectively, "no" for pelvic pressure and "yes" for improvement in sexual activity.

Table 6. — *Symptoms before and after surgery in group B.*

			Post		Total	McNemar <i>p</i> -value
			Yes	No		
Pelvic pressure	Pre	Yes	4 (18.2%)	18 (81.8%)	22 (100.0%)	— *
		No	—	—	—	
		Total	4 (18.2%)	18 (81.8%)	22 (100.0%)	
Urinary incontinence	Pre	Yes	3 (27.3%)	8 (72.7%)	11 (100.0%)	0.039
		No	1 (9.1%)	10 (90.9%)	11 (100.0%)	
		Total	4 (18.2%)	18 (81.8%)	22 (100.0%)	
Regular bowel function	Pre	Yes	14 (100.0%)	0 (0.0%)	14 (100.0%)	1.000
		No	0 (0.0%)	8 (100.0%)	8 (100.0%)	
		Total	14 (63.6%)	8 (36.4%)	22 (100.0%)	
Improvement in sexual activity	Pre	Yes	—	—	—	— *
		No	5 (55.6%)	4 (44.4%)	9 (100.0%)	
		Total	5 (55.6%)	4 (44.4%)	9 (100.0%)	

*McNemar test was not been applied because there was only one answer mode in pre-operative time, respectively, "no" for pelvic pressure and "yes" for improvement in sexual activity.

the questionnaire was to detect the presence of pelvic pressure, urinary incontinence, regular bowel function, and improvement of sexual activity, in order to compare symptoms before and after surgery (Table 4). The McNemar test cannot be applied for pelvic pressure and for improvement of sexual activity because in both cases the variable relating to pre-surgery presents only one answer mode. All patients had resolved pelvic pressure and 23.5% had restarted sexual activity. Sexual activity was not investigated in 68 patients because it was not possible to evaluate. Concerning urinary incontinence, McNemar showed a statistically significant difference ($p = 0.001$) between patients who had been cured (61.2%) or had improved (38.8%) after surgery.

Regular bowel function did not show any significant differences ($p = 1.000$) before and after surgery (Table 4). The trend was similar in the two groups (Tables 5 and 6). The average level of satisfaction on a visual scale from 1 to 10 among all patients was 8.7 (SD=2.0); the Mann-Whitney U test showed an average value significantly higher in group A (8.9) than in group B (7.7) ($p = 0.002$).

Discussion

POP is a common condition and various factors contribute to its onset. In this study most of the women were in menopause, in line with reports in medical literature that ageing affects the quality of muscle-fascial tissue of the pelvic floor [4]. It is due to the loss of estrogen receptors on the surface of pelvic tissues which can cause a condition of hypotrophy-atrophy that can induce the development of prolapse [5]. 82.3% of patients were multiparous, while 15% had one delivery, and only 2.7% were nulliparous. As shown in medical literature, each vaginal delivery can damage the pelvis, which is the main risk factor in relation to parity [4]. It is shown that in a group of women of the same age that pelvic floor disorders are more common in multiparous than in nulliparous women, confirming the role played by obstetric trauma [6]. The presence of genetic alterations of connective tissue of endopelvic fascia and vaginal wall, together with comorbidities (chronic bronchitis, hypertension or diseases requiring long-term treatment with corticosteroids) explain the need for surgical treatment for prolapse in nulliparous women [4, 7]. Moreover, Memon *et al.* [8] highlight a higher fetal size among risk factors; Viktrup *et al.* [9] identify a higher head circumference of the fetus as a cause of urinary incontinence onset. In the present study, the average birth weight was greater than the average standard values.

It is well known that the removal of the uterus involves a longer operative time and moderate blood loss increasing the time spent at hospital [10]. In fact, in the present sample, the group of women that underwent vaginal hysterectomy had also a significantly longer post-operative hospitalization. In group B, women took longer in order to

be able to urinate spontaneously. The accuracy of plastic vaginal surgery and the stress to which tissue is exposed during the operation influences the time required by the patient before being able to void spontaneously [11]. Pelvic pressure disappeared especially in patients subjected to vaginal hysterectomy. Withagen *et al.* [12] showed that also repair of cystocele using mesh, if associated with a hysterectomy, improves pelvic pressure [13]. Sexual activity significantly improved in 76.5% of patients. The present result is confirmed by the literature that shows how recovering an appropriate vaginal function depends on the simultaneous restoration of anatomical and neurovascular factors [14]. In the present study 12.8% of women had a *de novo* urinary incontinence. Prolapse and stress urinary incontinence (SUI) can occur simultaneously, but many women showed an underestimated incontinence with an increased risk of developing *de novo* SUI after surgical prolapse repair. Thus, performing an anti-incontinence procedure at the time of prolapse repair is an effective way in reducing the risk of hidden SUI postoperatively [15]. The analysis of the 13 cases of failure highlighted a pre-operative diagnostic error resulting in an unsatisfactory surgical result. In eight out of 13 cases (61.4%), a prolapse of central or anterior compartment was incorrectly diagnosed. In the remaining cases, the failure was due to the presence of several comorbidities (TIA, dementia) at the time of surgery or years later. In fact, even in the study of Marschalek *et al.* [10], patients who had maintained their uterus after surgery developed a new prolapse of the central compartment. Based on the low rate of surgical complications, the small number of recurrences and patient satisfaction, in the present authors' opinion, fascial surgery still plays a relevant role in the treatment of POP.

Conclusions

It is well known that only symptomatic prolapse must be operated. Nevertheless, age of patient, general health condition, location and number of anatomical defects, severity of associated symptoms, and nature of employment must be considered in order to decide the most appropriate procedure. Since there is still no technique considered to be the gold standard for prolapse, the authors believe it is necessary to always perform conservative surgery, to determine the timing and to personalize the surgery according to the needs of each patient.

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