

Behaviour of urinary incontinence in the face of sacrocolpopexy

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Abstract

The aim of this study was to determine whether an association exists between the performance of a sacrocolpopexy for genital prolapse and the bladder function. A case series study was performed that includes all patients who received sacrocolpopexy in a tertiary Spanish hospital. An analysis was performed to study the association of some variables and the occurrence or persistence of urinary incontinence after the surgery. Forty patients with indication of sacrocolpopexy were included. A year after sacrocolpopexy, the outcomes showed 97.3% of prolapse healing. 19.3% complained about *de novo* stress urinary incontinence, 33.3% recovered from it and another 66.7% remained the same. Only 10.8% asked for an anti-incontinence surgery after the sacrocolpopexy. The urethral hypermobility shows an increased risk of stress urinary incontinence after the sacrocolpopexy. Based on our results, we do not consider it necessary to perform a systematic anti-incontinence procedure simultaneously with sacrocolpopexy unless a woman without urethral anti-incontinence surgical background shows a urethral hypermobility.

Introduction

Pelvic floor dysfunction (PFD) is a highly prevalent health problem that has an impact on the patient's quality of life and the economy of the health system. It includes urinary incontinence (UI), pelvic organ prolapse (POP), fecal incontinence, sexual dysfunction and pelvic pain.

POP is a common condition, and it occurs in half of parous women when they lose pelvic floor support, thus resulting in some degree of prolapse.¹ It is estimated that at the age of eighty, 11% of women will require some type of surgical treatment for

this affection and 30% of these will require another operation.² It has also been said that an association might exist between POP symptoms and lower urinary tract dysfunction, which are two of the most common PFD.^{3,4}

Focussing on the specific genital prolapse of the vaginal vault, an estimated incidence between 0.2% and 45% has been reported. It appears to be attributed to a weakening of the first level of uterovaginal support described by De Lancey,⁵ or as a lack of a proper apical correction during a vaginal hysterectomy.

The correction of the vaginal vault prolapse has always been a challenge for all gynecologists. Sacrocolpopexy (SCP) is considered one of the most effective surgical treatments for repairing stage II-IV vault prolapse⁶ [based on pelvic organ prolapse quantification system (POP-Q)]. It is considered as the *gold standard* for the correction of vaginal vault prolapse, as it offers the best success rates with fewer relapses, and it enables adequate sexual functionality compared to other techniques. Originally, it was performed by laparotomy, but the endoscopic approach achieved a reduction in morbidity while maintaining the same high rate of success.^{7,8} The reported cure rate increases to 78-100% by laparotomy and 90-100% by laparoscopy.^{7,9}

This study aimed to describe what kind of effect this type of genital prolapse surgery could have on the bladder function as it had been published that SCP over time could lead to the appearance of *de novo* UI over time. In connection with that, this investigation attempted to consider the need for an anti-incontinence procedure combined with the prolapse surgery in women who planned to undergo SCP. Furthermore, it also strived to assess the surgical results of our group with this technique as well as to demonstrate our prolapse success rate to the ones described in the literature.

Materials and Methods

We conducted a case series study, based on STROBE guidelines, including all patients who underwent SCP because of a vault prolapse. Two specialised surgeons from our PFD unit in our Spanish University tertiary Hospital Vall d'Hebrón operated them all. This study was registered and received institutional review board approval by the Institutional Review Board at our centre.

The women enrolled were those who underwent SCP because of stage II to IV vault prolapse from 2002 to 2015. All of them signed an informed consent for the

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elective surgery, where they agreed with the prolapse correction and accepted the risk of UI among other possible complications. As the exclusion criteria were accepted, the women who visited our unit were not candidates for SCP or had refused this approach.

All epidemiological data was acquired all at once during the first visit to the unit. Trained urogynecologists interviewed and examined all women and all the information was collected in a Microsoft Excel® database.

Based on the examination, the interview and the International Continence Society (ICS) definitions,¹⁰ we define the POP as the presence of vaginal bulge; the stress UI (SUI) as the involuntary leakage on effort or exertion, or on sneezing or coughing; the occult or latent SUI when it appears after reducing of co-existent prolapse; the urge UI (UII) is the leakage immediately preceded by or associated with a sudden desire to void and mixed incontinence as that SUI associated to UII; and the mixed urinary incontinence (MUI) as the complaint of involuntary leakage associated with

urgency and also with exertion, effort sneezing or coughing. *De novo* stress or urgency was defined as the appearance of SUI or UUI after prolapse surgery, accepting that this term could only be used when the patient did not have any stress or urgent preoperative symptoms.

The information collected for the study included epidemiological data, obstetric and gynecologic history and gynecologic surgery history. Also included the assessment of SUI and/or UUI along with the grade of prolapse based on, the POP-Q examination for the prolapse evaluation, the Q-tip test for the urethral mobility appraisal (defining the urethral hypermobility as a straining angle of 30 degrees or greater relative to the horizontal) and finally the multichannel urodynamic test¹⁰ for the continence status exploration. Data about the surgery was also recorded. All patients underwent a laparoscopic, robotic or laparotomy SCP using a Y-shaped piece of polypropylene mesh. The two skilled specialists on this technique performed all surgeries. Outcomes were classified into prolapse restoration or the worsening of POP besides urinary tract symptoms or complications with the prolapse surgery.

A descriptive analysis was performed for the information detailed before. The SPSS 18 programme for Windows (SPSS, Chicago, IL, USA) was used for the statistical analysis of the association between variables and the occurrence of incontinence after SCP. To identify the risk factors associated with UI onset after the surgical procedure, we performed a univariate analysis. Variables with a P-value <0.1 in the univariate analysis were included in a multivariate logistic regression model. The level of significance was set at P<0.05.

Results

A total of 40 women with vaginal apex prolapse were included in this study. They were evaluated for UI symptoms and monitored over a year for UI resolution, remaining UI or onset UI after SCP performed in our centre from 2002 to the first quarter of 2015.

From the epidemiologic descriptive data collected and analysed, the mean age of the entire group at the surgery was 58 years old (range 39-72 years), the mean BMI was 27.2 (range 20.31-35.70) and 2.5% (n=1) were smokers. Regarding the obstetric and gynecologic variables reviewed, it was seen that the median parity was 2.2 children per woman, 97.5% (n=39) were post-menopausal and two were under hormone replacement therapy. Table 1

shows the outcome of gynecologic surgery history, emphasising that 27.5% (n=11) had been operated on before because of UI.

Focussing on the physical examination, it was outlined that the majority of them showed a high-grade POP: 55% (n=22) had a third degree and 35% (n=14) had a fourth degree. The classification by type of prolapse showed that 77.5% (n=31) had a vaginal vault prolapse, 55% (n=22) a rectocele, 32.5% (n=13) a cystocele, 27.5% (n=11) an enterocele and 2.5% (n=1) a uterine prolapse. 35% (n=14) of the women complained about a single affected vaginal compartment. And finally, a urethral hypermobility was seen in 45.2% (n=14) of them.

On the other hand, the presence of UI before surgery showed that 15% (n=6) were affected by SUI, 17.5% (n=7) UUI and 7.5% (n=3) mixed UI. It was noticed that 11 patients had a previous history of an anti-incontinence surgery prior to the SCP, 18.2% (n=2) complained about SUI, 36.4% (n=4) complained about UUI and 45.5% (n=5) did not complain about UI.

Looking closely at the urodynamic outcome and taking into account that only 77.5% (n = 31) had performed the study, where 32.3% (n=10) had an overactive detrusor muscle.

Concerning the surgical intervention, the same two skilled surgeons operated all patients. The selection process for approach to SCP was mainly based in the endoscopic approach, laparoscopically either robotically depending on the BMI resulting in that the main surgical approach was done in

77.5% (n=31) laparoscopically and 20% (n=8) robotically. While the other 2.5% (n=1) was performed by laparotomy due to a medical contraindication of a general anesthesia. 97.5% (n=39) of them underwent SCP, except for one woman (2.5%) who underwent a supracervical hysterectomy plus a cervicosacropexy. The overall surgical time was 285.12 minutes (from 150 to 390 minutes), and the average hospital stay was 3.02 days with no readmissions for any complication.

10% (n=4) of patients presented complications during surgery: two urinary bladder injuries, one vagina perforation and one rectum laceration with an immediate repair during the same surgical procedure among all of them. During the hospitalisation, 7.5% (n=3) showed minor complications such as two urinary tract infections and a vaginal vault hematoma that were resolved with antibiotic therapy.

Table 2 shows the follow-up during the first year after SCP, where it must be emphasised that 100% (n=40) of patients showed a full recovery from genital prolapse after one month of the intervention, which remained cured in 97.3% (n=36) one year later. Concerning the appearance of SUI after the surgery, it is demonstrated that at the first month, 15% (n=6) of women were affected by the appearance, and 12 months later, this increased to 27% (n=10). During the first year of the surgical procedure, it was observed that 10.8% (n=4) required an anti-incontinence surgery (between the 3rd and 12th month after SCP),

Table 1. Gynecologic surgery history patients who underwent a SCP.

	n	%
Presence of gynecologic surgery history	39	97.5
Hysterectomy	39	97.5
Anterior colporrhaphy	16	40
Posterior colporrhaphy	10	25
Anterior compartment Mesh surgery	9	22.5
Posterior compartment Mesh surgery	3	7.5
Richter technique	3	7.5
Anti incontinence surgery*	11	27.5

*Type of anti incontinence surgery: 3 Burch technique, 1 Marshall-Marchetti-Kantz, 2 TVT, 4 TOT and 1 unknown surgery.

Table 2. Outcomes and complications after the SCP (at 1, 6 and 12 months).

Outcomes post-SCP	1 st month (n=40)	6 th month (n=38)	12 th month (n=37)
Pelvic floor recovery	100% (n= 40)	97.4% (n= 37)	97.3% (n= 36)
SUI	15.0% (n=6)	26.3% (n=10)	27.0% (n=10)
UUI	7.5% (n=3)	5.2% (n=2)	5.4% (n=2)
MUI	5.0% (n=2)	10.5% (n=4)	10.8% (n=4)
Dyspareunia	5.0% (n=2)	13.1% (n=5)	5.4% (n=2)
Constipation	32.5% (n=13)	28.9% (n=11)	27.0% (n=10)
Mesh extrusion	0% (n=0)	2.6% (n=1)	2.7% (n=1)

of which 75% (n=3) required a transobturator tape and 25% (n=1) required a sub-urethral mini-sling. After the first 12 months, the postoperative follow-up continued annually. Focussing on the appearance of SUI and UUI after surgery, Table 3 summarises what happened before and after the SCP and during the first year that the patients were followed up at our unit. It has been reported that during the first month after surgery, 9.1% (n=3) developed *de novo* SUI, 57.1% (n=4) healed from the previous SUI and another 42.9% (n=3) remained with the same SUI; whereas, one year later, the *de novo* SUI increased to 19.3% (n=6), recovered SUI decreased to 33.3% (n=2) and persistent SUI rose to 66.7% (n=4). On the other hand, regarding UUI, it can be seen that during the first 30 days after SCP, 8.8% (n=3) of women showed *de novo* UUI, 100% (n=6) restored and 0% (n=0) persisted with urge symptoms after surgery. Twelve months later, 3.2% (n=1) developed *de novo* UUI, 83.3% (n=5) restored it and 16.7% (n=1) continued with the same UUI. Finally, regarding MUI, one month after the prolapse repair, 2.7% (n=1) complained about *de novo* MUI, 66.7% (n=2) recovered from the previous MUI and 33.3% (n=1) continued with the same MUI; whereas, one year later, 8.8% (n=3) developed *de novo* MUI, 66.7% (n=2) recovered from it and 33.3% (n=1) persisted with MUI. Figure 1 shows the behaviour of the different types of UI before and after SCP. It can be seen that there was only a slight increase of the UI group one year after. It must be said that the women with SUI who asked for an anti-incontinence surgery after they had already repaired the prolapse were included in the one-year follow-up as incontinent regardless of the surgical outcome. Some variables (such as age, BMI, history of previous SUI, UUI or MUI, history of previous anti-incontinence surgery and urethral hypermobility) were studied to analyse the association between them and the onset of SUI or UUI after surgery. It has only been statistically demonstrated (if a multivariate analysis is performed) that the presence of urethral hypermobility could increase the risk of SUI after SCP (OR = 35.29 95%, CI = 1.2 to 1036.0), mainly in patients without previous anti-incontinence surgery. No other variables have shown statistically significant results with SUI or UUI.

Discussion

The main goal of the reconstructive surgery for genital prolapse should be the restoration of the normal pelvic floor anat-

omy in order to maintain and repair a normal urinary, defecatory and sexual function.¹¹

SUI and POP, both conditions considered as a PFD, can often occur simultaneously, especially in extreme forms of prolapse, as it seems that they could share similar pathophysiological mechanisms.¹² However, when POP masks or reduces the severity of SUI symptoms, this is referred to as occult SUI.¹³

It has been described that 8-60% of women who undergo SCP may develop SUI after surgery.¹⁴ Even asymptomatic women

for SUI before surgery may experience it after surgery (up to 44%),¹⁵ suggesting that it might be due to the tortuous anatomical urethra or to a compression of it in the advanced condition that is corrected during surgery.¹³

About 40-50% of women who undergo a surgery for POP might have SUI symptoms before surgery, and the urinary symptoms will not disappear after the correction of the prolapse.¹⁶ Some studies demonstrate that up to 80% of women affected by occult SUI prior to the surgical correction of POP

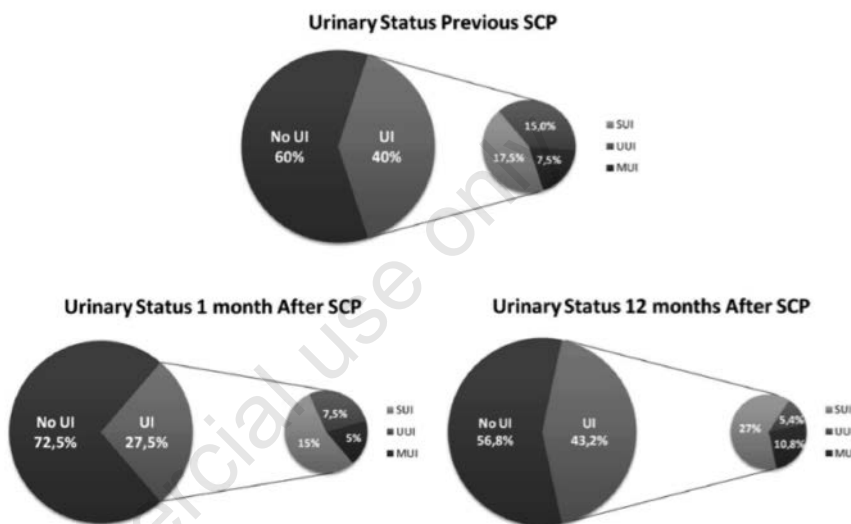


Figure 1. Behaviour of the different types of UI before and after SCP.

Table 3. Urinary incontinence status before and after SCP.

		SUI 12 months post SCP		Total
		No	Yes	
SUI before SCP	No	25	6	31
	Yes	81%	19%	100%
Total		27	10	37
		73%	27%	100%
		UUI 12 month post SCP		Total
		No	Yes	
UUI before SCP	No	30	1	31
	Yes	97%	3%	100%
Total		5	1	6
		83%	17%	100%
Total		35	2	37
		95%	5%	100%
		MUI 12 month post SCP		Total
		No	Yes	
MUI before SCP	No	31	3	34
	Yes	91%	9%	100%
Total		2	1	3
		67%	33%	100%
Total		33	4	37
		89%	11%	100%

will develop SUI after prolapse surgery.¹⁶

Currently, one of the most discussed and controversial issues in urogynaecology is whether to perform a systematic prophylactic anti-incontinence procedure during POP repair in women without UI symptoms in order to prevent the onset of SUI after the prolapse correction.

In the literature, regarding this topic, two different points of view can be found. Some authors recommend a two-stage anti-incontinence surgery after the POP correction.¹⁷ Yet others suggest an all-in-one surgical repair in order to reduce the costs and risks of a new hospitalisation and procedure.¹⁸⁻²⁰

An interesting meta-analysis published in 2014 by Van der Ploeg *et al.*¹⁶ compares the effectiveness and safeness of prolapse surgery alone and its correction combined with anti-incontinence in women with POP plus SUI, occult SUI or asymptomatic SUI. There is some risk of developing SUI after a POP surgical repair, so patients should be informed that the UI onset would be less frequent if a combined surgery is performed. In contrast, accepting that the rate of side effects from combined surgery is high and knowing that only 7% of asymptomatic patients will require a second surgery because of a postoperative SUI. Combined surgery should only be considered in women with prolapse and occult SUI, where the benefits of an all-in-one procedure outweigh the risks.

Matsukoda²¹ has recently published another meta-analysis where they conclude that performing any prophylactic anti-incontinence procedure at the same time as the reparative prolapse surgery reduces the incidence of SUI after surgery in patients who present occult SUI. However, the assessment of occult SUI still remains controversial. Only the patients who underwent retropubic TVT express a benefit.^{20,22,23} They estimate that 36-80% of women with severe POP have a occult SUI preoperatively. It is at that point when patients should be offered a combined surgery in order to prevent the occurrence of SUI postoperatively.

Focussing solely on the relationship between UI and SCP, the literature is quite scarce, and only a couple of interesting studies have been published. Jeon *et al.*²⁴ presents a prospective observational study where they conclude that a preoperative prolapse-reduction stress test alone is not sufficient to determine the need of anti-incontinence surgery at the time of SCP. However, women with SUI symptoms, despite a negative prolapse-reduction stress test, are more likely to experience postoperative SUI or the need for an additional anti-incontinence surgery.

The second article executed by LeClaire *et al.*²⁵ concludes in a retrospective cohort study that greater anatomic reduction and the laparotomy approach are risk factors for the appearance of SUI after SCP.

It is therefore crucial to carefully weigh the pros and cons of performing an anti-incontinence operation together with the prolapse repair. Preventing SUI in the same surgical procedure has some drawbacks, and recent literature provides increasing evidence that more serious complications may arise (such as increased risk of bladder perforation, bleeding or vessel laceration, intestinal perforation or even nerve injury, aside from other uncomfortable urinary symptoms that could arise later on).

The main strength of our descriptive study is, aside from the large sample size of SCP, that as a case series, it has been used to describe outcomes of novel treatments and it might be useful to lead focused studies of a stronger design afterwards. This article should be considered unique, as no other specific articles analysing the behaviour of UI in the face of SCP have been published before. Certain limitations must be also considered as it is a clinical series and it may suffer from the shortcomings of this type of study. The selection bias, an inherent bias in case series, could be detected apart from other limitations such as, the full follow-up duration after SCP of all the patients recruited and that tendencies for a vault prolapse repair changed since the FDA warn in 2011 implying a bias for the interpretation of results.

Conclusions

Considering our data, we conclude that a year after the SCP, our prolapse cure rate and our complication rate were similar to the standard described in the literature. Concerning the behaviour of UI after SCP, our study demonstrates that a month after prolapse surgery, more than the half of them recovered from their previous SUI and more than one third remained unchanged their SUI condition. Focussing on UUI and MUI disorders other less relevant data was obtained.

In general, this study shows that there was a slight increase in the overall UI rate in the first year after surgery. But this was at the expense of an increase in the SUI percentage, mainly in women who maintained the previous SUI status with a lower percentage of *de novo* condition, and a decrease in the UUI group. It is highlighted that 10% of the patients who complained about SUI after SCP required a two-stage anti-incontinence surgery. A urethral hyper-

mobility in the physical examination prior to the prolapse repair seems to be the only potential risk factor of SUI onset after SCP for those without any previous anti-incontinence surgery.

Based on our work, we consider that SCP reaches a high cure rate for vault prolapse and observes similar percentages to those described in the literature. Besides, since the approach is minimally invasive, it enables achieving lower incidence of minimal complications with the same results. Focusing on the behaviour of bladder dysfunction in the face of SCP, our data shows that, almost 50% of them recover spontaneously from SUI a year after the SCP without associating any anti-incontinence surgery. The need of a two-stage anti-incontinence surgery should only be considered when a SUI appears after the SCP, as the likelihood ratio shown is low. The only statistically significant predictor of SUI onset that is postoperatively demonstrated is the presence of urethral hypermobility in women who had never undergone an anti-incontinence surgery before.

Considering all these results, we might not consider the need for a systematic anti-incontinence surgery in those asymptomatic women who would undergo SCP unless a urethral hypermobility is shown in the clinical examination and the patient has never undergone any anti-incontinence surgery. Nevertheless, the risks and benefits of combined surgery should be explained in detail, and although the risk of *de novo* SUI appearance is reduced, some other adverse effects could appear after it. Further prospective randomised studies with larger sample sizes are needed in order to ensure the effect of SCP in the pelvic structures and the lower urinary tract.

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