Urologia Internationalis

Original Paper

Urol Int 2021;105:137–142
DOI: 10.1159/000510530

Received: May 25, 2020
Accepted: July 27, 2020
Published online: October 19, 2020

Pelvic Organ Prolapse Repair with Mesh: Description of Surgical Technique Using the Surelift® Anterior Repair System

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Keywords
Pelvic organ prolapse · Pelvic floor dysfunction · Female · Surgical repair · Urogynecology · Transvaginal mesh

Abstract
Introduction: Although the use of transvaginal mesh (TVM) in the repair of pelvic organ prolapse (POP) has been restricted, there are still some cases in which TVM may be the most appropriate approach. The TVM Surelift® anterior repair surgical technique has not been described previously. ***Objective:*** The aim of this study was to describe the surgical technique and to report our preliminary results regarding efficacy and complications. ***Methods:*** A step-by-step description of surgical technique is presented. A descriptive retrospective analysis was performed to evaluate our preliminary results in 17 women who underwent POP repair using the Surelift® anterior repair system in our department between 2014 and 2017. TVM was offered to patients with symptomatic apical (primary or recurrent) or recurrent anterior POP stage ≥2. POP recurrence was classified as asymptomatic anatomic or symptomatic. Patients rated satisfaction with surgery on a scale from 0 to 10. Complications during follow-up were classified according to the International Urogynecological Association/International Continence Society recommendations. ***Results:*** Median (IQR) follow-up was 19.9 months (24.8). Two (11.8%) anatomic recurrences were identified, both symptomatic, but neither required further surgery. No cases of pelvic pain, dyspareunia, voiding, or defecatory dysfunction were detected. Two (11.8%) patients presented a <1-cm vaginal mesh exposure (2AaT3S2) requiring partial mesh removal through a vaginal approach. At the end of follow-up, median satisfaction (IQR) with the surgery was 9 (3.1). ***Conclusion:*** The Surelift® anterior repair system is effective in correcting apical or recurrent anterior POP, with a high patient satisfaction rate. Complications after this surgery are infrequent and are mostly related to vaginal mesh exposure.

Introduction

Pelvic organ prolapse (POP) is a significant health issue in women worldwide, affecting an estimated one in 9 women [1]. As surgical repair using native tissue is associated with a long-term failure rate of up to 20% [1], the concept of incorporating a synthetic material was adopted and the use of transvaginal mesh (TVM) spread [2]. Recently, controversies have arisen regarding the use of

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mesh in pelvic surgery due to the increasing number of reports of mesh-related complications, including pain, dyspareunia, and exposure [3]. Thus, the European Urology Association and the European Urogynaecological Association have stated that POP repair with mesh should be restricted to complex cases, such as those in which other surgical procedures have already failed, requires extended patient counseling, and should be performed only by expert surgeons in specialized departments [1].

It has recently been shown that the use of mesh is not associated with midterm anatomic or clinical benefit in patients with primary anterior or posterior prolapse [4]. However, the evidence with respect to apical and recurrent prolapse is still limited [5]; consequently, there are no guidelines on which technique, vaginal or abdominal and with or without mesh, is best in these cases [5].

In our department, TVM has been used for POP correction since 2004. Since 2014, Surelift® (Neomedic International, Terrassa, Spain), a 6-arm type 1 [6] polypropylene mesh, has been used. From our point of view, this mesh system, the only one presently available in our country, presents some advantages as it is lightweight (28 g/cm^2), uses biocompatible anchors which represents a reliable fixing system, and offers anterior and lateral support with minimal tension. This has led to the development of an established and standardized surgical technique for which apical or recurrent prolapse has to date represented a common indication. In such cases, satisfactory results and a low complication rate have been obtained [7]. Since the publication of the European Urology Association/European Urogynaecological Association consensus document [1], and in accordance with the recent clinical recommendations of the Ibero-American Society of Neurourology and Urogynecology [8], we have also restricted the use of TVM in our own practice. However, we acknowledge that there are still some cases in which TVM will be the most appropriate approach. As the surgical technique used for Surelift® placement has not been previously described, our main aim here is to describe the surgical technique used in our department. A secondary objective is to report our preliminary results regarding efficacy and complications.

Materials and Methods

This is a descriptive retrospective analysis of a case series of women who underwent repair of POP using the Surelift® anterior repair system in our department between 2014 and 2017. Data collection was performed in an ongoing, prospective fashion. Permission from our institution's ethical board was obtained, and all patients gave written permission for data collection.

Preoperative Assessment

The baseline evaluation included complete history, physical examination, and urodynamic studies, which were performed in accordance with the International Continence Society (ICS) recommendations [9]. The degree of POP was quantified using the Baden-Walker system [10]. The Surelift® anterior repair system was offered to patients with symptomatic apical (vaginal vault or uterine, either alone or multicompartmental, primary or recurrent) or recurrent anterior POP stage ≥2. Symptomatic POP was defined as any complaint relating to a bothersome vaginal bulge or other prolapse-related symptoms according to the International Urogynecological Association/ICS terminology recommendations [11], confirmed by physical examination.

Concurrent transobturator tape placement was offered to patients with clinical or occult stress urinary incontinence (SUI) assessed by urodynamics with a pessary in place, after discussing the related risks and benefits with the patient. No hysterectomies were performed at the time of mesh placement. In the absence of contraindications, vaginal estrogen therapy was offered to all patients 6 months prior to surgery. Preoperative antibiotic prophylaxis was done with amoxicillin and clavulanic acid 30 mg/kg (gentamicin 1.7 mg/kg in the case of penicillin allergy).

Surgical Technique

The Surelift® anterior repair mesh consists of 6 arms; the posterior 2 are fixed to the sacrospinous ligament (SSL) with 2 polyaryletherketone anchors, and the other 4 are passed through the obturator foramen after passing needles in an outside-in fashion. The procedure is begun with a vertical incision in the anterior vaginal wall, starting at the level of the bladder neck and proceeding toward the vaginal vault or the cervix. Then, a full-thickness dissection is completed in the avascular vesicovaginal space laterally to the level of the arcus tendineus in both directions and then caudally until the ischial spines are reached. Once the ischial spines have been identified, a medial digital sweep is completed to dissect the SSL, which does not need to be visualized. Then, the anchors are prepared with the Anchosure System® applicator. This system consists of 2 handles, 1 external white handle, and 1 internal blue handle with the anchor at its tip. A polypropylene thread with a knot in the middle and 2 free ends is attached to the anchor (Fig. 1).

The applicator is then inserted through the vaginal incision and positioned over the SSL about 2 cm (2 fingers) medial to the ischial spine to avoid pudendal vessel injury. Maintaining firm compression of the external white handle against the SSL, the internal blue handle is pushed down to the end, fixing the anchor to the SSL. The applicator can then be pulled out, leaving the anchor and the thread attached to the SSL, which is free for any movement working in a pulley system (Fig. 1). The thread is finally fixed to 1 posterior arm of the mesh, which can be moved toward the anchor on the SSL. The same steps are repeated on the opposite side.

Once the posterior arms are in place, the anterior arms are inserted using the smaller circular needle passer. To do this, the anterior mesh arm tip threads are inserted into the hole of the needle tip and pulled out through the obturator muscle like a standard transobturator tape (Fig. 2). Finally, the central arms are inserted using the longer needle passer (Fig. 2). This needle is inserted through the obturator muscle and digitally guided behind the levator ani muscle to a point 1 cm above and 1 cm external to the ischial spine. At this level, the central arm tip threads are inserted into the hole of the needle tip and pulled out again to the skin.

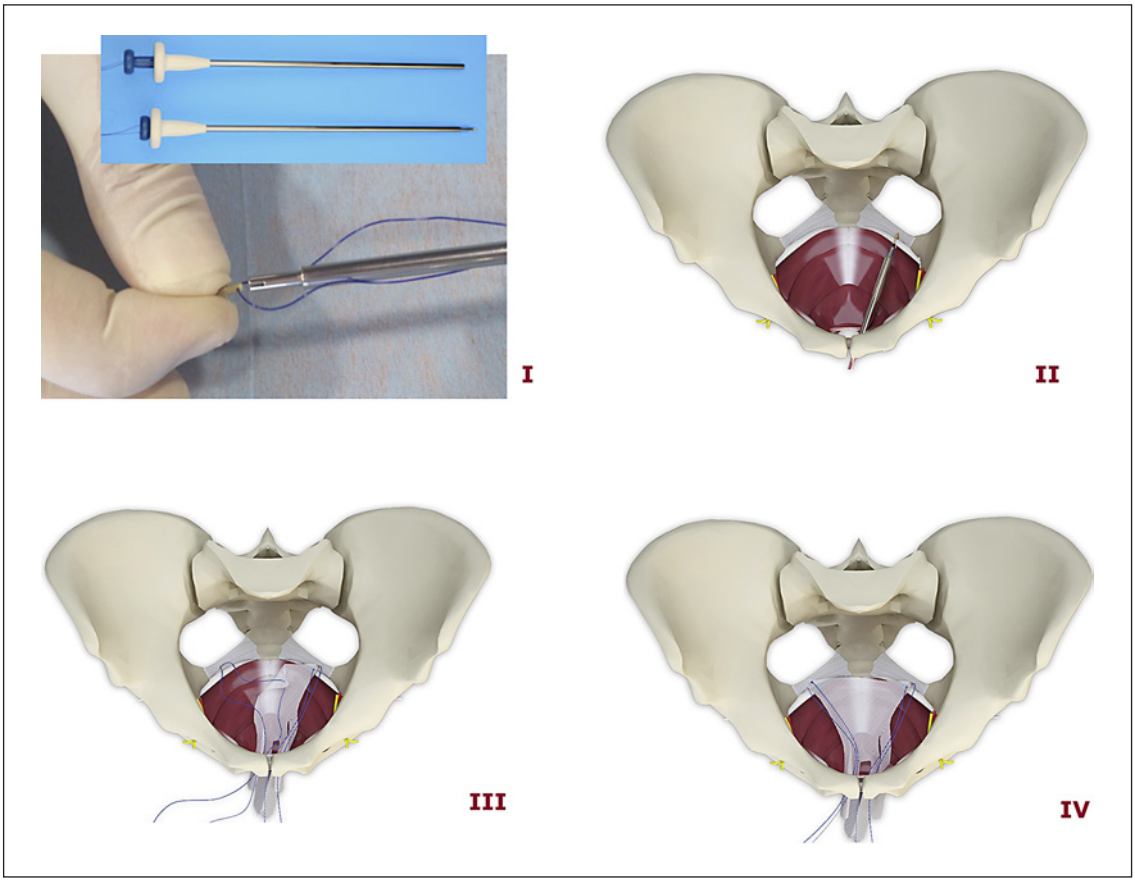

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Fig. 1. The Anchosure System® applicator (**I**) and fixation of the posterior arms to the SSL (**II–IV**). With permission of Neomedic®. SSL, sacrospinous ligament.

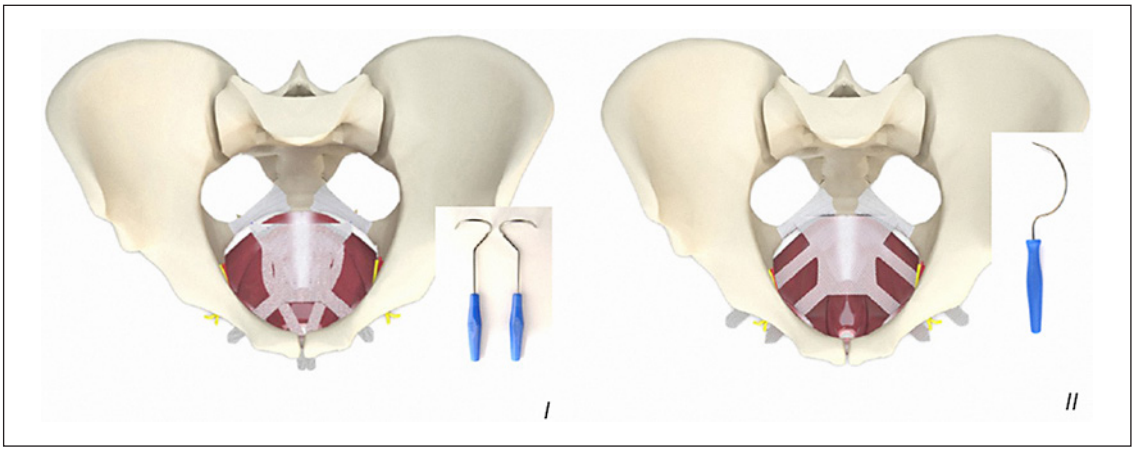

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Fig. 2. Needles used for placement of the anterior arms (**I**) and central arms (**II**). With permission of Neomedic®.

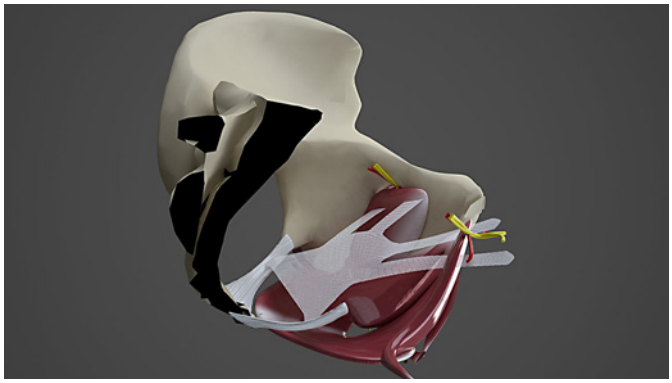

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Fig. 3. Lateral vision of the final position of the Surelift® anterior repair system. With permission of Neomedic®.

Finally, the mesh is adjusted from the 6 points in a tension-free manner, and excess mesh is cut at the level of the skin (Fig. 3). Minimal to no vaginal epithelium is excised, and the incision is closed with a 3–0 absorbable running suture. If an incontinence procedure has to be completed concomitantly, a separate suburethral incision is made and the tension-free sling placed utilizing the standard technique. A Foley catheter and vaginal packing are placed for 48 h and, in the absence of complications, the patient is discharged on the third day.

Follow-Up

Follow-up evaluation was carried out at clinical visits at 6 weeks and, in the absence of complications, at 6–9 months and annually thereafter. POP recurrence was classified as asymptomatic anatomic (POP detected only by physical examination, without the presence of prolapse-related symptoms [11]) or symptomatic (when the patient complained of prolapse-related symptoms) [11]. Patients completed a 10-point satisfaction questionnaire (scale 0–10) in response to the question "How satisfied are you with the outcome of your treatment?" Mesh-related complications during the follow-up were classified according to the International Urogynecological Association/ICS recommendations [12].

Descriptive variables were analyzed using the statistical program IBM® SPSS® v.22.0 (IBM Corp., Armonk, NY, USA). Continuous variables are expressed as median (interquartile range, IQR), while qualitative variables are expressed as number (percentage).

Table 1. Demographic characteristics and operative outcomes of patients included in the study

Total, *N*	17
Age, median (IQR), years	67 (14.5)
BMI, median (IQR), kg/m^2	26.4 (4.5)
Smoking, *N* (%)	0 (0)
Vaginal deliveries, median (IQR)	2.5 (2)
Postmenopausal, *N* (%)	17 (100)
Chronic constipation, *N* (%)	2 (11.8)
Chronic cough, *N* (%)	0 (0)
Prior hysterectomy, *N* (%)	3 (17.6)
Prior POP repair, *N* (%)	5 (29.4)
Anterior colporrhaphy, *N* (%)	4 (23.5)
TVM, *N* (%)	1 (5.9)
Anterior POP, *N* (%)	16 (94.1)
Anterior POP grade, median (IQR)	3 (1)
Apical POP, *N* (%)	14 (82.3)
Apical POP grade, median (IQR)	3 (2)
Posterior POP, *N* (%)	4 (23.5)
Posterior POP grade, median (IQR)	0 (1.5)
Preoperative urinary urgency, *N* (%)	7 (41.2)
Preoperative urgency incontinence, *N* (%)	7 (41.2)
Preoperative stress incontinence, *N* (%)	3 (17.6)
Preoperative number of pads required, median (IQR)	0 (1)
Preoperative detrusor overactivity, *N* (%)	7 (53.8)
Bladder volume at the first IC, median (IQR), mL	170 (38)
*P*det of the maximum IC, median (IQR), cmH2O	31 (12)
Preoperative occult stress incontinence, *N* (%)	1 (5.9)
Concurrent midurethral sling, *N* (%)	2 (11.8)
Intraoperative complications, *N* (%)	0 (0)
Operative time, median (IQR), min	150 (30)
Blood loss, median (IQR), mL	50 (75)
Spinal/general anesthesia, *N* (%)	6 (35.3)/ 11 (64.7)
Length of stay, median (IQR), days	4 (2)
Postoperative complications, *N* (%)	1 (5.9)
Urinary tract infection, *N* (%)	1 (5.9%)

Continuous variables are expressed as median (IQR) and qualitative variables are expressed are number (percentage). IQR, interquartile range; POP, pelvic organ prolapse; IC, involuntary contraction; P_{det}, detrusor pressure; TVM, transvaginal mesh.

Results

Seventeen women underwent a POP repair with the Surelift® Anterior Repair system. Their demographic characteristics and operative outcomes are summarized in Table 1.

Median (IQR) follow-up was 19.9 months (24.8). Two (11.8%) anatomic recurrences were identified after a median of 7.4 (5) months: one grade 2 and one grade 3 apical prolapse. Both recurrences were symptomatic but neither required further surgery. No cases of anterior prolapse recurrence were observed. At the end of follow-up, the median satisfaction rating was 9 (3.1).

No cases of pelvic pain, including groin pain, dyspareunia, or voiding or defecatory dysfunction, were detected during follow-up. Two (11.8%) patients, both with a history of prior POP repair, presented vaginal mesh exposure of less than 1 cm after a median of 2.6 (2.3) months. Both cases were asymptomatic, with no related pain

(2AaT3S2) and required partial mesh removal through a vaginal approach. No cases of bladder or urethral exposure were detected.

Eight (47.1%) patients presented with de novo SUI during follow-up, 2 of whom required placement of a transobturator tape. Other cases of SUI were mild and did not require further treatment. Two (11.8%) patients had persistence of urinary urgency after surgery; one of them, with urge incontinence, was treated with anticholinergics and neither required further treatment.

Discussion

In this study, we describe the surgical technique of POP repair with the Surelift® anterior repair system and report on the preliminary results after this surgery. In our series, at 20 months of follow-up, anatomic results were good, and only one of the 2 patients who presented with anatomic recurrence was stage >2. This is consistent with the fact that after POP repair, it is common for patients to present with a prolapse stage of ≤2 [13], but when using the hymen as a threshold for treatment success, the success rate increases significantly [13]. Moreover, neither of the patients with a symptomatic recurrence sought further surgical treatment, and the satisfaction rate at the end of follow-up was high.

Concerning the safety of the procedure, bleeding was minimal in most cases, with a median blood loss of 50 mL. No patients developed postoperative hematoma or required blood transfusion. No bladder, rectal, or vascular injuries occurred during surgery. The only complication detected during the postoperative period was a febrile urinary tract infection which required antibiotic treatment.

Regarding the complication rate after this surgery, we would stress that the only complications detected during follow-up were small vaginal mesh exposures, with a rate similar to that reported by other authors (3.2–19%) [14]; these cases could be treated using a minimally invasive approach. However, mesh exposure has been reported up to 7 years after surgery [14], and the results of long-term series have shown an exposure rate as high as 42% [15]. Thus, longer follow-up would be needed to confirm that the exposure rate does not increase over time.

We believe that the Surelift® anterior repair procedure presents various strengths. First, it allows for concomitant apical and anterior support with a reproducible, minimally invasive procedure and with a surgical time significantly shorter than that of laparoscopic repair [16]. Second, attachment of the posterior arms of the mesh to the mid portion of the SSLs, requiring minimal dissection, entails low risk of nerve injury. This assertion is supported by our results, with no patients developing postoperative pain or dyspareunia. Another advantage of the Surelift® anterior repair system is that it offers a 6-point fixation, which allows good anatomic repositioning, maintaining the mesh in a tension-free fashion. Finally, polyaryletherketone, the material composing the anchors, has a high wear resistance, fixing the posterior arms in a very stable fashion.

Other groups have already reported good results in terms of prolapse correction and safety profile with the Surelift® system [17], even in patients at high risk of recurrence, such as those with previous pelvic floor surgery [18], who accounted for one-third of our patient group. However, the surgical technique used by those groups had not been previously described, which in our opinion is of special relevance to proper interpretation of the results. As previously stated, the recommendations of our reference guidelines [1, 8] have to be followed. However, in our opinion, it is useful to know a standardized transvaginal technique for those cases in which the TVM approach is the best option.

Our study has some limitations. We acknowledge the limited number of patients included in the study and its retrospective nature. The Baden-Walker grading system was used because at the time of starting the study, POP-Q had not been fully implemented in our department. In order to avoid using different assessment methods and to ensure homogeneity of the population, we persisted with the Baden-Walker system records. Similarly, validated questionnaires were not in use in our department when the first Surelift® placements were performed; thus, results of such questionnaires could not be included in the study. However, the satisfaction rating scale from 0 to 10 can be considered a reliable patient-related outcome, taking into account that objective anatomic evaluation of POP shows a poor correlation with patients' complaints [19]. Finally, we must point out that our main objective was to describe the Surelift® anterior repair surgical technique, not previously reported, rather than presenting our retrospective results.

Our results indicate the Surelift® anterior repair system to be effective in the correction of anterior and apical prolapse, with a high patient satisfaction rate. Complications after this surgery are infrequent, mostly being related to vaginal mesh exposure, and can be managed uneventfully using a minimally invasive procedure.

Statement of Ethics

All the procedures performed in this study were in accordance with the ethical standards of the institution, the institutional research committee, and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All of the participants provided written informed consent.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

Funding Sources

The authors did not receive any funding.

Author Contributions

L. Mateu: project development, data collection, manuscript writing, and editing. C. Gutiérrez: project development and manuscript editing. J. Palou: manuscript editing. C. Errando: project development and manuscript writing and editing.

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