A modified technique for paravaginal repair for the treatment of anterior vaginal prolapse and cystocele：a retrospective study

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Abstract

Background: We aimed to determine the efficacy and safety of a modified protocol for paravaginal repair for treating symptomatic paravaginal defects and cystocele.

Methods: This study was an observational case series of 98 consecutive female patients, referred to our hospital between June 2014 and May 2018, with symptomatic grade II to IV paravaginal defects and cystocele. Our modified technique for paravaginal repair is based on the conventional protocol but incorporates reverse bridge repair and the cross-stitching of bilateral sutures. The curative effect of this new technique was evaluated subjectively and objectively during postoperative follow-up.

Results: All operations were successful. Patients were followed up for 12 to 48 months, until June 2019; the mean follow-up period was 32.4 months. Three months after surgery (98 cases), the subjective cure rate was 100%; in each case, the top of the vagina lay above the level of the sciatic spine. The objective cure rate was 100%. The objective cure rate was 94.9% (93 cases) twelve months after surgery (98 cases), 91.0% (61 cases) twenty-four months after surgery (71 cases), and 76.2% (16 cases) forty-eight months after surgery (21 cases). Four cases required a second round of surgery; three of these cases were treated with sacrocolpopexy, and one case was treated with sacrospinous ligament fixation.

Conclusion: Our modified technique for paravaginal repair was safe and effective for the treatment of anterior vaginal prolapse and cystocele, as confirmed by the results observed over a mean follow-up period of 32.4 months.

Background

Anterior vaginal prolapse and cystocele are the most challenges to overcome when treating cases involving prolapse of the pelvic organs[1]. Controversy and debate over which surgical procedure to select when performing cystocele repair persist, due to the need to repair a series of complicated issues[2]. Traditional forms of repair surgery are associated with a high recurrence rate[3]. There is now strong and high-quality evidence to state that the use of synthetic non-absorbable mesh in multiple vaginal compartments, compared with native tissue repair, can improve anatomic outcomes[4]. There is an increasing body of evidence reporting adverse events related to mesh, including the exposure of vaginal mesh, pain, infection, issues related to urination, neuromuscular injury, vaginal scars or contractures, issues related to sensation, and even death [10]. The U.S. Food and Drug Administration (FDA) issued two successive safety warnings related to the side effects of transvaginal mesh in 2008 and 2012[5]. In August 2012, Johnson & Johnson announced that the prolift pelvic floor repair system had become delisted worldwide and was therefore unavailable. Consequently, clinicians began to re-evaluate the surgical technique used for pelvic floor repair[6]. Non-mesh repair surgery also began to receive renewed attention [7]. The traditional form of surgery involves the removal of excess vaginal mucosa and repair of the bladder fascia, but this practice is associated with a high rate of recurrence. In 2001, Young et al. were the first to introduce the process of paravaginal repair; these authors described 100 cases of anterior

vaginal wall prolapse with paravaginal defects treated with paravaginal repair[8]. We began performing the original technique for paravaginal repair in 2007. However, in 2010, we created a modified technique for anterior vaginal wall repair by combining the conventional surgical approach with anterior wall reverse bridge repair. There was a low rate of recurrence. Our modified technique appears to be safe.

Methods

Here, we present a retrospective study of patients who received modified paravaginal repair for anterior vaginal prolapse and cystocele at Beijing Hospital during the period from June 2014 to May 2018. Patients were included if they had been diagnosed with prolapse of the anterior wall with a paravaginal defect and had undergone modified paravaginal repair. Patients were excluded if there were <24 months' follow-up by May 2020 and/or if medical records were not complete. The Ethics Advisory Group at Beijing Hospital approved this study. As this was a retrospective study, the Ethics Advisory Group waived the need for informed consent. All participants received a complete clinical examination, with particular emphasis on pelvic examinations and the assessment of prolapse. Pelvic evaluations were performed using Pelvic Organ Prolapse Quantification (POP-Q). Urinary incontinence was evaluated by asking patients to perform the cough test. They also completed a short version of the pelvic floor quality of life questionnaire, which included POP-Q, as well as subscale scores for the Pelvic Floor Distress Inventory-20 (PFDI-20), the Pelvic Floor Impact Questionnaire-7 (PFIQ-7) , and the Pelvic Organ Prolapse Urinary Incontinence Sexual Questionnaire 12 (PISQ-12). The Chinese version of these questionnaires has already been validated [9, 10]. Participants who reported urinary symptoms, or who had urinary leakage during the prolapse examination, underwent urodynamic testing.

Patients were followed at 1, 3, 6, 12, 24, 36, and 48 months after surgery. Objective success was defined as no prolapse beyond the hymen, as evaluated by the POP-Q examination (i.e., Ba, C, and Bp measurements ≤0) and no subsequent treatment for prolapse. We assessed subjective outcomes using the short version of the pelvic floor quality of life questionnaires (PFDI-20, PFIQ-7, PISQ-12). Subjective success was defined as the absence of bothersome bulging symptoms, as measured by question 5 on the PFDI.

Surgical technique

Our modified technique featured 7 key steps, as follows.

(1) The surgery was performed in the lithotomy position. If hysterectomy was required, the vaginal fragment was not closed using the traditional method.

(2) Bridge formation was performed. After bladder emptying, the anterior vaginal wall mucosa was incised 1–2 cm below the external urethral orifice. This incision was used to form a trapezoid in the vaginal mucosa; the top edge was 1–2 cm in length, 1–2 cm below the external urethral orifice. The bottom edge, 3–4 cm in length, lay at the margin of the vaginal incision. Secretory function was

destroyed by cautery with a Unipolar Electrotome (Hongsheng Co., Jining, China) (Fig. 1, Panel A), thus creating a bridge (Fig. 1, Panel B).

(3) To expose the pelvic fascia tendinous arch (denoted as a white line), we separated the bladder and the vaginal mucosa to the retropubic space (Fig. 1, Panel C).

(4) To close paravaginal defects, we sutured along the white line with No. 4 silk thread, on one side (Fig. 1, Panel D), at the level of the urethral bladder groove. We sutured on the edge of the anterior pelvic fascia tear (Fig. 1, Panel E) and then sutured the bridge with the same silk thread (Fig. 1, Panel F). This process was repeated on the other side (Fig. 1, Panel G and H). The four threads were then crossed and knotted (Fig. 1, Panel I and J). The same style of suturing was performed 1–1.5 cm below the level of the urethral bladder groove, and then 1–1.5 cm below the second level; this created a parallel network formed by 3–4 silk threads (Fig. 1, Panel K and L).

(5) Additional pelvic floor repairs were carried out if necessary.

(6) The mucosa of the anterior vaginal wall was then sutured, and the denuded trapezoid was buried by suturing the lateral vagina along the midline (Fig. 1, Panel M).

(7) Finally, the vaginal stump was sutured (Fig. 1, Panel N).

We also performed middle pelvic cavity repair (sacral ligament suspension or sacrospinous ligament fixation), old perineal laceration repair, or paraurethral fascia reinforcement, as required by the patient's condition.

We recorded intraoperative bleeding volume, operation time, and any postoperative complications.

Results

During the period from June 2014 to May 2018, 134 patients received modified paravaginal repairs at our hospital. Of these, 98 patients had a complete set of follow-up records, and were followed-up for 12 to 48 months until June 2019. The mean follow-up period was 32.4 months. Patient age at the time of surgery ranged from 49 to 82 years, with a mean of 56.7±5.1 years; the number of pregnancies ranged from 1 to 8, with a mean of 4.5±1.4 pregnancies. The numbers of deliveries ranged from 1 to 7, with a mean of 2.6±1.0 deliveries. Body mass index (BMI) ranged from 21.1 to 32.6 kg/m^2, with a mean of 25.8±4.3kg/m^2. POP-Q was used to measure the extent of pelvic organ prolapse. Overall, 8 patients (6.9%) were classified as grade II, 79 cases (82.8%) were classified as grade III, and 11 cases (10.3%) were classified as grade IV (Table 1).

All 98 patients underwent modified paravaginal repair; however, 90 patients (91.8%) also underwent hysterectomy and/or salpingectomy. Sixty-one patients (62.2%) underwent middle pelvic cavity repair (18 for sacral ligament suspension, 43 for sacrospinous ligament fixation). Twenty-nine patients (29.6%) underwent posterior colporrhaphy/perineorrhaphy. Thirty-one patients (31.6%) underwent procedures for

stress incontinence (12 for transvaginal tension-free mid-urethral suspension, 19 for paraurethral fascial reinforcement). Fifty-five patients (56.1%) received general anesthesia, while 43 patients (43.9%) received spinal anesthesia/combined spinal-epidural anesthesia. Surgical time ranged from 54.0 to 175.0 minutes, with a mean of 94.5±42.3 minutes (Table 2). The time taken for paravaginal repair ranged from 25.0 to 45.0 minutes, with a mean of 31.3±13.5 minutes. The volume of intraoperative bleeding ranged from 50–800 mL, with a mean of 213±92 mL. The duration of postoperative hospital stay ranged from 2 to 13 days, with a mean of 4.1±1.7 days.

The rate of complications was low. One patient (1.0%) underwent cystotomy during surgery, followed by bladder repair. Two weeks later, the catheter was removed without any leakage or discomfort. Four patients (4.1%) received blood transfusions during hospitalization. One patient (1.0%) had a pulmonary embolism two days after surgery; this patient also had deep vein thrombosis. The patient was transferred to the respiratory department and discharged 10 days later. Four patients (4.1%) suffered from vaginal bleeding for >1 month after surgery; three of these patients had fallopian tube prolapse. One of these patients had granulation in the vaginal stump wound (Table 3).

All 98 patients were followed for at least 12 months; 71 patients were followed for 24 months, 45 patients were followed for 36 months, and 21 patients were followed for 48 months. All cases showed improvement, as indicated by subscale scores on the PFDI-20, PFIQ-7, and PISQ-12.

The rate of success was 100.0% when assessed 3 months after surgery, 96.9% when assessed 6 months after surgery, 94.9% when assessed 12 months after surgery, 91.0% when assessed 24 months after surgery, 86.7% when assessed 36 months after surgery, and 76.2% when assessed 48 months after surgery (Table 4). Four cases required a second round of surgery; 1 case recurred within 24 months, 2 cases recurred within 24–36 months, and 1 case recurred within 36–48 months. Three cases underwent sacrocolpopexy, and one case underwent sacrospinous ligament fixation.

Discussion

Our current data, acquired 48 months after surgery, indicate that our modified version of paravaginal repair is a very effective native-tissue operation for the treatment of anterior vaginal prolapse and cystocele. The rate of success was 94.9% when assessed 12 months after surgery, 91.0% when assessed 24 months after surgery, and 76.2% when assessed 48 months after surgery. The cure rate was significantly higher than that achieved with most other types of mesh or non-mesh repair surgery. The success rates for paravaginal defect repair have been reported to range from 60% to 89%[10]. Menefee et al. previously reported that repairs for anterior vaginal wall prolapse with mesh were associated with a significantly lower anatomical failure rate (18%) than repairs for anterior vaginal wall prolapse with colporrhaphy (58%) when assessed 2 years after surgery [12]. In the present study, our anatomical failure rate was 9%; this was lower than that achieved with mesh repair, as reported by Menefee et al. With our new technique, only a limited number of silk sutures remain under the vaginal mucosa; this minimizes the risk of vaginal bleeding, granulation, and suture exposure. All vaginal bleeding beyond one month

postoperatively was caused by prolapse of the fallopian tubes and granulation in the vaginal stump. The silk sutures under the vaginal mucosa appeared to be unrelated to vaginal bleeding. In general, modified paravaginal repair is a safe and effective mesh-free procedure for the treatment of anterior vaginal prolapse. However, for patients with apical prolapse, modified paravaginal repair is not an effective treatment. In these cases, middle pelvic cavity repair (sacral ligament suspension/sacrospinous ligament fixation) was always performed simultaneously. This was only a retrospective study without control groups. In order to acquire higher levels of evidence, we need to perform randomized controlled trials. The mean length of postoperative hospital stay was 4.1±1.7 days, which was longer than expected. This was predominantly due to management policies; our department required that patients to be discharged at least 72 hours after surgery. In recent months, we have discharged patients 24 hours after surgery.

Polypropylene mesh is easy to use, does not prolong the time required for surgery, and is associated with a low rate of recurrence[13]. This form of mesh can be used for various pelvic floor repair operations. However, there is an increasing body of publications reporting adverse events that are related to the use of mesh, including the exposure of vaginal mesh, pain, infection, issues related to urination, neuromuscular problems, vaginal scars or contractures, issues related to sensation, and even death[14]. In January 2012, the FDA announced that transvaginal mesh should be considered as a class III medical device and forced manufacturers to conduct post-marketing monitoring research. A subsequent Cochrane review [15] (published in 2016) described the results obtained when repairs were carried out with a synthetic non-absorbable mesh, compared with standard (native tissue) repair. The review included 37 trials involving 4023 women and concluded that repairs with synthetic non-absorbable mesh were associated with fewer prolapse symptoms or measurable prolapse, and less likely to be followed by repeat prolapse surgery. However, insufficient evidence was available to indicate whether women had a better quality of life after repair with a synthetic non-absorbable mesh.

Over recent years, the importance of non-mesh repair surgery has been revisited. The main disadvantage of non-mesh repair surgery is the rate of symptom recurrence [16].According to the traditional view, cystocele is likely to result from overstretching and thinning of the vaginal wall and other structures supporting the bladder. Notably, traditional repair of the anterior vaginal wall required surgeons to suture the urethra and the bladder fascia in order to tighten the pubic cervical fascia. However, the recurrence rate for this technique was as high as 40%, suggesting that our traditional understanding of the pathogenesis of cystocele may be incomplete. As early as the early 20th century, White proposed that tears in the white line, which fixes the pubic cervical fascia onto the lateral pelvic wall, were the main causative factor for cystocele [17]. White also proposed a surgical method with which to correct this injury. However, White's theory and surgical proposal were not recognized until the 1970s. Raz [18] and Safir [19] subsequently proposed a simplified classification scheme for cystocele (types I, II, and III) in accordance with the anatomical mechanisms associated with severe cystocele. Type I refers to a central defect in the pubic cervical fascia. Type II refers to defects in the attachment of the pubic cervical fascia to the vagina. Type III refers to a defect with characteristics of type I as well as type II defects. These authors believed that patients with severe cystocele often have type III defects. Because most instances of cystocele are

caused by paravaginal defects, surgical repair should focus on reconnecting the pubic cervical fascia with the lateral pelvic wall. In another paper, Young et al. described their experience of paravaginal repair and reported a good short-term rate of objective cure[8]. However, subsequent research showed that the long-term objective cure rate for paravaginal repair was inferior to that achieved with mesh [7,11]. To address this problem, we developed a modified technique for paravaginal repair. Our surgical procedure features two modifications to the traditional technique used for paravaginal repair. First, our technique combines paravaginal repair with reverse bridge repair of the anterior wall. Second, our technique involves cross-knotting of the bilateral paravaginal sutures. We also advocate an individualized approach that considers the specifics of a particular case when selecting treatment options. For example, in our case series, we performed middle pelvic cavity repair (sacral ligament suspension/sacrospinous ligament fixation) for patients with apical prolapse. In total, 61 patients (62.2%) received middle pelvic cavity repair (sacral ligament suspension, n=18; sacrospinous ligament fixation, n=43).

The vaginal apex plays a crucial role in maintaining the integrity of the pelvic floor. Vaginal apical suspension may therefore be the most important step in preventing and treating vaginal vault prolapse and for preventing recurrent POP [20]. For patients with apical prolapse, sacral ligament suspension, sacrospinous ligament fixation, and sacrocolpopexy (SCP) are the first-line choices. SCP has long been regarded as the gold standard for the treatment of POP[21]. SCP is also an effective option for primary anterior compartment prolapse repair[22]. However, in their meta-analysis, Coolen et al. [23] reported that a standard treatment could not be used for vaginal vault prolapse. In our study, four patients required a second round of surgery; vaginal apical suspension was not performed during the first operation in any of these cases. Three cases were treated with sacrocolpopexy, and 1 of these cases was treated with sacrospinous ligament fixation during repeat surgery. No recurrences occurred in any of these four patients after the second round of surgery. SCP can be performed to repair defects in the middle and anterior pelvis. However, SCP is a mesh-based form of repair for POP. Sacral ligament suspension and sacrospinous ligament fixation are native-tissue repair operations for vaginal apical POP. However, they are not effective for primary anterior compartment prolapse repair. Vitale et al.[24] studied the efficacy of transvaginal bilateral sacrospinous fixation (TBSF) and its impact on quality of life (QoL) and sexual function in women with second recurrences of vaginal vault prolapse (VVP). In the study reported by Vitale et al., women with low anterior compartment prolapse underwent concomitant paravaginal repair. Our modified paravaginal repair was safe and effective for the treatment of anterior vaginal prolapse and cystocele. Thus, the combination of middle pelvic cavity repair (sacral ligament suspension/sacrospinous ligament fixation) and modified paravaginal repair may represent a good choice for non-mesh repair.

Pelvic organ prolapse is a very complex condition because it includes both physical and functional aspects. Numerous instruments can be used to assess a patient's quality of life before and after surgery, including the Short Form-36 (SF-36), the Female Sexual Function Index (FSFI), the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12), the IUGA-Revised Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-IR), the Pelvic Floor Distress Inventory

questionnaire (PFDI-20), the Prolapse Quality of Life Questionnaire (P-QOL), and the Pelvic Floor Impact Questionnaire-7 (PFIQ-7) [25~27]. Only recorded data were included in this retrospective study. If a prospective research study is carried out, these instruments should be chosen carefully.

In our study, the rate of fallopian tube prolapse was 3.1% (3/98); this seems rather high. Prolapse of the fallopian tube into the vaginal vault is a rarely reported complication that may occur after hysterectomy. Prolapse of the fallopian tubes is often neglected and misdiagnosed [28]. According to our clinical experience, the rate of fallopian tube prolapse is higher than reported in the literature. This may also be due to the way we sew up the vaginal stump: we suture the fallopian tube stump to the vaginal stump. Additional research is now needed to investigate the efficacy of this particular part of the procedure.

The effect of pelvic organ prolapse on the quality of a patient's sexual life includes both physical and psychological aspects. Surgery can improve the quality of a patient's sexual life by reducing prolapse [29]. In this study, the PISQ -12 score was significantly improved after surgery. Since the surgery was performed without mesh, there were no negative effects relating to the use of mesh.

Conclusion

The results of our study indicate that our modified technique for paravaginal repair was safe and effective for the treatment of anterior vaginal prolapse and cystocele. Further studies with higher evidence levels are required.

Declarations

Ethics approval and consent to participate

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The Ethics Advisory Group at Beijing Hospital approved the study. As this was a retrospective study, the Ethics Advisory Group waived the need for informed consent.

Consent for publication

Written informed consent was obtained from all patients.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

None of the authors have any conflicts of interest to declare.

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Authors' contributions

SH and QL initiated study conception and design. SH performed the data collection and acquisition of data. SH and YL performed the data analysis. SH, QL, YL, ML and SZ interpreted the data. SH wrote the manuscript. QL, YL, ML and SZ edited the manuscript. SH had a role in critical revision. All authors have read and approved the manuscript.

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Abbreviations

POP-Q: Pelvic Organ Prolapse Quantification; PFDI-20: the Pelvic Floor Distress Inventory-20; PFIQ-7: the Pelvic Floor Impact Questionnaire-7; PISQ-12: the Pelvic Organ Prolapse Urinary Incontinence Sexual Questionnaire 12; SD: standard deviation; BMI: body mass index; COPD: chronic obstructive pulmonary disease; TVT-O: transvaginal tension-free mid-urethral suspension obturator; TVT-A: transvaginal tension-free mid-urethral suspension-Abbrevo; UDI: Urinary Distress Inventory; POPDI: Pelvic Organ Prolapse Distress Inventory; CRADI: Colorectal Anal Distress Inventory; UIQ: Urinary Impact Questionnaire; POPIQ: Pelvic Organ Prolapse Impact Questionnaire; CRAIQ: Colorectal Anal Impact Questionnaire; TBSF: Transvaginal Bilateral Sacrospinous Fixation; QoL: Quality of Life; SF-36: Short Form-36; FSFI: Female Sexual Function Index; PISQ-IR: IUGA-Revised Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire; P-QOL: Prolapse Quality of Life Questionnaire.

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Tables

Table 1. Patient characteristics prior to surgery

Characteristic	
Age at surgery, mean years (SD)	56.7±5.1
Pregnancies, mean (SD)	4.5±1.4
Deliveries, mean (SD)	2.6±1.0
Vaginal deliveries, mean (SD)	2.4±1.1
History of cesarean delivery, mean (SD)	0.3±0.6
BMI (kg/m2), mean (SD)	25.8±4.3
Diabetes mellitus, N (%)	14 (14.3%)
Hypertension, N (%)	32 (32.7%)
Coronary heart disease, N (%)	13 (13.3%)
COPD, N (%)	8 (8.2%)
Sexually active, N (%)	42 (42.9%)
Prior prolapse surgery, N (%)	9 (9.2%)
POP-Q stage, N (%)	
Stage 2	8 (6.9%)
Stage 3	79 (82.8%)
Stage 4	11 (10.3%)

SD, standard deviation; BMI, body mass index; COPD, chronic obstructive pulmonary disease; POP-Q, Pelvic Organ Prolapse Quantification

Table 2. Additional surgeries performed at the same time as modified vaginal repair

Additional surgeries	Number of cases (%)
Hysterectomy and/or salpingectomy, N (%)	90 (91.8%)
Middle pelvic cavity repair, N (%) □	61 (62.2%)
Sacral ligament suspension, N (%)	18 (18.4%)
Sacrospinous ligament fixation, N (%)	43 (43.9%)
Posterior colporrhaphy/perineorrhaphy, N (%)	29 (29.6%)
Stress incontinence procedures, N (%)	31 (31.6%)
TVT-O/TVT-A, N (%)	12 (12.2%)
Paraurethral fascial reinforcement, N (%)	19 (19.4%)
General anesthesia, N (%)	55 (56.1%)
Operation time (minutes), mean (SD)	94.5 (42.3)

SD, standard deviation; TVT-O, transvaginal tension-free mid-urethral suspension obturator; TVT-A, transvaginal tension-free mid-urethral suspension-Abbrevo

Table 3. Complications and adverse events (AEs)

Complications and adverse events	Number of cases (%)
Ureteral injury during surgery, N (%)	0 (0%)
Cystotomy/urethral injury, N (%)	1 (1.0%)
Blood transfusion during hospitalization, N (%)	
Blood transfusion during hospitalization, N (%)	4 (4.1%)
Bowel injury, N (%)	0 (0%)
Vascular injury, N (%)	0 (0%)
Nerve injury, N (%)	0 (0%)
Deep vein thrombosis, N (%)	1 (1.0%)
Pulmonary embolism, N (%)	1 (1.0%)
Vaginal bleeding (more than 1 month postoperatively), N (%))	4 (4.1%)
Granulation, N (%)	1 (1.0%)
Fallopian tube prolapse, N (%)	3 (3.1%)

Table 4. The outcomes of prolapse treatment, as determined by the subscales scores on the Pelvic Organ Prolapse Quantification (POP-Q), Pelvic Floor Distress Inventory-20 (PFDI-20), Pelvic Floor Impact

Questionnaire-7 (PFIQ-7), and Pelvic Organ Prolapse Urinary Incontinence Sexual Questionnaire 12 (PISQ-12))

Characteristic	Before surgery	3-month follow-up	6-month follow-up	12-month follow-up	24-month follow-up	36-month follow-up	48-month follow-up
Patients	98	98	98	98	71	45	21
Ba, mean (SD)	3.9(2.1)	-2.8(0.5)	-2.7(0.7)	-2.6(0.8)	-2.3(1.2)	-2.1(1.2)	-2.0(1.4)
Bp, mean (SD)	1.1(3.5)	-2.9(0.3)	-2.9(0.3)	-2.8(0.5)	-2.9(0.5)	-2.8(0.6)	-2.6(0.8)
C, mean (SD)	1.3(2.6)	-5.7(1.2)	-5.2(1.5)	5.0(1.9)	4.9(2.2)	4.7(2.5)	-4.4(2.7)
UDI, mean (SD)	78.1(50.2)	23.0(32.1)	20.4(30.2)	21.3(33.8)	29.5(36.3)	32.3(38.2)	34.6(40.1)
POPDI, mean (SD)	108.4(62.6)	28.2(34.2)	27.8(32.7)	28.6(33.9)	33.8(36.9)	35.2(37.1)	38.6(39.4)
CRADI, mean (SD)	74.5(72.3)	29.4(38.9)	28.8(36.2)	27.3(37.4)	30.5(40.6)	32.4(40.2)	33.9(44.1)
UIQ, mean (SD)	50.3(51.7)	10.2(12.3)	4.3(7.4)	4.5(7.8)	4.2(7.6)	8.2(9.4)	9.5(11.5)
POPIQ, mean (SD)	48.2(54.8)	6.3(7.6)	6.7(8.2)	5.8(7.1)	7.4(8.1)	7.2(7.5)	8.4(9.3)
CRAIQ, mean (SD)	30.2(43.1)	9.8(8.3)	10.6(8.8)	9.4(8.2)	10.3(9.4)	11.4(9.9)	12.7(10.3)
PISQ-12, mean (SD)	32.8(7.1)	36.7(6.3)	36.8(6.7)	36.8(6.8)	37.0(7.1)	36.7(7.0)	36.5(7.2)
Absence of bothersome bulging, N (%)		98(100.0%)	98(100.0%)	97(99.0%)	66(93.0%)	40(88.9%)	17(81.0%)
No report of retreatment, N (%)		98(100.0%)	98(100.0%)	98(100.0%)	70(98.6%)	43(95.6%)	19(90.5%)
Success, N (%)		98(100.0%)	95(96.9%)	93(94.9%)	61(91.0%)	39(86.7%)	16(76.2%)

SD, standard deviation; POP-Q, Pelvic Organ Prolapse Quantification; UDI, Urinary Distress Inventory; POPDI, Pelvic Organ Prolapse Distress Inventory; CRADI, Colorectal Anal Distress Inventory; UIQ, Urinary Impact

Questionnaire; POPIQ, Pelvic Organ Prolapse Impact Questionnaire; CRAIQ, Colorectal Anal Impact Questionnaire; PISQ-12, Pelvic Organ Prolapse Urinary Incontinence Sexual Questionnaire.

a Success was defined as the absence of bothersome bulging symptoms (as measured by question 5 on the PFDI), no prolapse beyond the hymen (a measurement ≤0 on Ba, C, and Bp on the POP-Q examination), and no subsequent treatment for prolapse

Figures

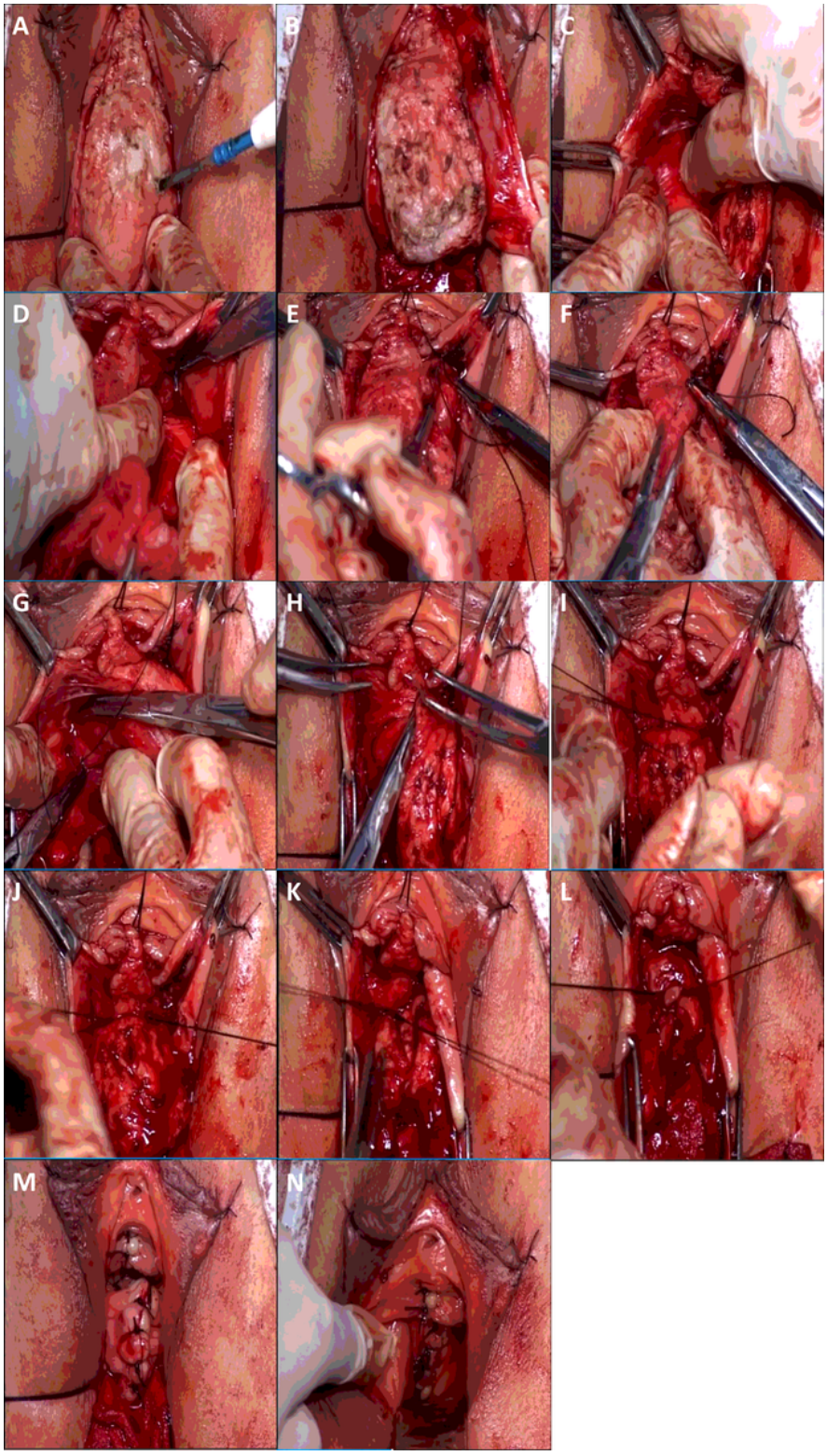

Figure 1

A modified technique for paravaginal repair: (A) Secretory function was destroyed by cauterization of the bridge; (B) Creation of the bridge; (C) Exposure of the tendinous pelvic fascia (right); (D) Sutures along the white line (left); (E) Sutures along the edge of the anterior pelvic fascia tear; (F) Sutures along the bridge; (G) Sutures along the white line; (H) Sutures along the bridge (right); (I) The four threads were crossed and knotted; (J) Closure of the first row; (K) Closure of the second row; (L) Closure of the third row; (M)

The mucosa of the anterior vaginal wall was sutured, and the denuded trapezoid was buried by suturing the lateral vagina along the midline; (N) Finally, the vaginal stump was sutured.