

Transposition of Cardinal Ligaments for Stages II–III Uterine Prolapse: A Minimally Invasive Procedure

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Abstract

Uterine and other pelvic organ prolapse (POP) are becoming more frequently encountered due to increased life expectancy among menopausal women. Traditionally, most surgical procedures included hysterectomy as an integral part of the management. POP might, however, though less commonly, affect women not willing to accept hysterectomy, especially young females who did not complete their family. For these patients, uterine prolapse could be managed by a number of uterine-sparing surgical procedures that are performed through either abdominal or vaginal route according to patient's condition, surgeon's choice, and skills. Most of these operations, however, are usually lengthy, invasive, need good experience, and sometimes special accessories and instruments. We performed anterior transposition of the cardinal ligaments on two patients with POP quantification Stages II-III uterine prolapse without amputating the cervix. Both patients were interviewed at 6, 12, and 18-month intervals and reported no undue pain or dyspareunia with complete satisfaction regarding self-assessment of gynecologic anatomy. Furthermore, examination by the lead author revealed satisfactory anatomic correction. We recommend this simple, easy, and minimally invasive vaginal procedure to fellow gynecologists for repair of mild degrees of uterine prolapse in women declining hysterectomy or amputation of the cervix.

Keywords: Cardinal ligaments, pelvic organ prolapse, uterine-sparing surgery, vaginal approach

INTRODUCTION

Uterine prolapse is defined as the downward descent of the uterus where the cervix is displaced from its normal position in the pelvic center toward or through the hymenal ring.^[1] It is a part of pelvic organ prolapse (POP) which is a common disorder affecting women of all age groups, but with increasing incidence with advancing age,^[2] where peak incidence is reported to be among women aged 70–79 years.^[3] Although POP is not a disease but rather a deviant anatomic condition and is usually asymptomatic, nevertheless, symptoms can become bothersome in advanced stages giving rise to pressure symptoms, as well as sexual, urinary, or bowel dysfunctions.^[4]

Reconstructive pelvic surgery is a challenging and growing field of gynecologic surgery, and in fact, it was predicted that over the next 30 years, growth in demand for services to care for female pelvic floor disorders will increase at twice the rate of growth of the same population.^[3] Traditionally, hysterectomy, either abdominal or vaginal, was the common step among all surgical procedures intended to correct the prolapsed uterus. This step has

been widely criticized, as it was obvious not to improve the outcome attained by performing the reconstructive surgery alone.^[5-7] Furthermore, uterine-sparing surgical treatment has gained popularity with the intention to decrease operative time and hysterectomy-related morbidity for all groups and at the same time aiming to preserve fertility in young age groups. Several abdominal, vaginal, and laparoscopic techniques are now available for reconstruction of uterine prolapse. Herein, we describe a simple, minimally invasive, transvaginal technique used for a young woman with POP quantification (POPQ) Stage III uterine prolapse who was keen to preserve her fertility (Case 1) and for another older woman with Stage II but declined hysterectomy (Case 2).

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PRESENTATION OF THE CASES

Case 1

A 38-year-old G5P2A3 L2 female presented with a complaint of pelvic heaviness and a bulging mass per vagina of 1-month duration. She had also new-onset dyspareunia and lower urinary tract symptoms. Her first vaginal delivery, 11 years earlier, was difficult, following which she developed anterior and posterior vaginal wall prolapse. Four years later, she underwent combined anteroposterior colporrhaphy. Her second delivery was by an elective cesarean section 2 years later and since then has been wearing an intrauterine device for contraception. She disclosed that she was planning for one or two more pregnancies in the near future. On physical examination, and after applying Valsalva, she had centrally located anterior vaginal wall and uterine prolapse (POPQ III). Urine analysis was normal. A Pap smear was taken without the need of a speculum as the cervix was found to extrude through the introitus and showed no dysplastic changes. The patient underwent anterior transposition of cardinal ligaments and anterior colporrhaphy [Figures 1 and 2] and was discharged home on day 1 postoperative. At 6, 12, and 18-month follow-up visits, she reported subjective satisfaction in sexual life, and pelvic examination revealed no recurrence of uterovaginal prolapse with a POPQ Stage 0 [Table 1].

Case 2

A 59-year-old G4P4A0 L4 female presented to us complaining of pelvic heaviness and bulging mass per vagina of few years duration. She denied any urinary symptoms or difficulty at defecation. She had four uncomplicated vaginal deliveries, last of which was 24 years earlier. She had been menopausal for 5 years before presentation and sexually active but with some difficulties related to this bulging mass. She is known to have well-controlled hypertension. She was offered a transvaginal hysterectomy by another gynecologist but admitted that she was scared of that surgery and asked for a uterine-sparing alternative procedure. On physical examination and after applying Valsalva, she had uterine and posterior vaginal wall prolapse (POPQ II). Her urine analysis and Pap smear were normal. The patient underwent anterior transposition of cardinal ligaments and posterior colporrhaphy [Figures 1 and 2] and was discharged home on day 1 postoperative. At 6, 12, 18, and 24-month follow-up visits, she reported the absence of symptoms or any perineal bulge [Figure 3]. Pelvic examination revealed the absence of uterovaginal prolapse and a POPQ Stage 0 [Table 1].^[8]

DESCRIPTION OF THE OPERATIVE PROCEDURE

Both patients received intravenous cefazolin 1 g 30 min before call to operative theatre. Under spinal anesthesia, the patient was prepped and draped in the dorsal lithotomy position. The cervix was grasped anteroposteriorly with a single-toothed tenaculum. A transverse anterior incision was made at the level of cervicovaginal junction. The bladder was dissected sharply and bluntly off the cervical tissue and

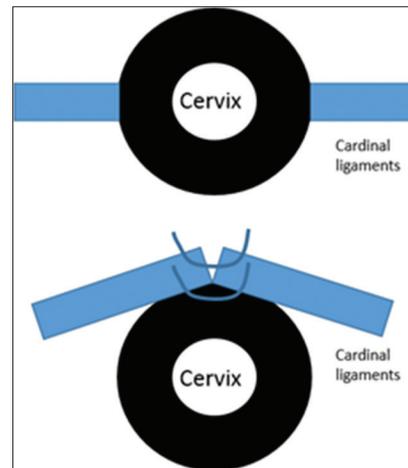


Figure 1: A schematic diagram of the operation. Freeing of cardinal ligaments (blue bars) from their lateral cervical attachments then transposition of both ligaments anterior to the cervix (black disc)

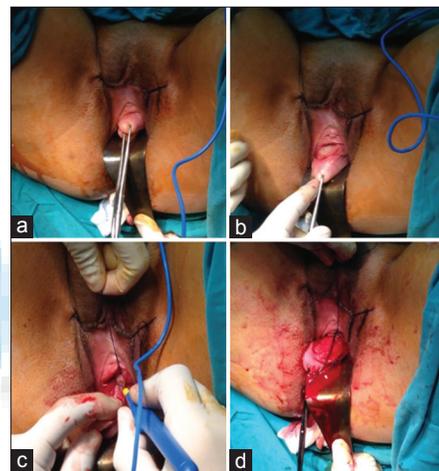


Figure 2: The steps of the anterior transposition of cardinal ligaments. (a) The cervix is grasped by a single-toothed tenaculum. (b) Anterior transverse incision at the level of cervicovaginal junction, dissection and elevation of the bladder, then exposure of left and right cardinal ligaments. (c) Freeing of left and right cardinal ligaments. (d) Approximation of cardinal ligaments and fixation to the cervical tissue



Figure 3: Location of the cervix × 2 years postoperation

Table 1: Pelvic organ prolapse quantification scoring of both patients before surgery and at 18-month follow-up

	Case 1		Case 2	
	Preoperative score	Score at follow-up	Preoperative score	Score at follow-up
Aa	-3.0	-3.0	-3.0	-3.0
Ba	0.0	-3.0	-3.0	-3.0
C*	+2.0	-4.0	0.0	-5.0
GH	3.0	2.0	5.0	3.0
PB	2.0	2.0	1.0	2.0
TVL	7.0	8.0	9.0	10.0
Ap	-3.0	-3.0	-3.0	-3.0
Bp	-3.0	-3.0	0.0	-3.0
D	-5.0	-8.0	-6.0	-8.0

*Marked improvement of cervical prolapse

elevated upward after bilateral ligation of the vesicocervical pillars. The transverse incision was extended laterally at both sides to expose the cardinal ligaments which were freed from the overlying vaginal mucosa, clamped by a Kocher, and divided from the cervix. This step is exactly similar to what is done during transvaginal hysterectomy except here the ligaments are freed from surrounding tissues to allow medial mobilization. Gentle medial mobilization anterior to the cervix was done till both ligaments apposed each other and were suture-ligated together in two perpendicular planes by absorbable braided polyfilament (No 1). Both ligaments were then fixed to the cervical tissue by a single absorbable polyfilament (No 1) [Figures 1 and 2]. Finally, the vaginal mucosa was closed with interrupted sutures to its anatomic position using absorbable polyfilament (No 2.0) after securing hemostasis [Figure 2]. After conclusion of the procedure, instant change of the longitudinal axis of the uterus was observed. The uterine fundus was inclined anteriorly, and the cervix was directed posteriorly. The uterine cervix was also noted to occupy higher level inside the vagina and was not apparent at or near the hymenal ring. The procedure took 12 min in case 1 and 15 min in Case 2. Anterior colporrhaphy was done in the first case, while posterior colporrhaphy was done in the second as indicated. A vaginal pack and a Foley catheter were kept overnight and removed the next morning. Both cases were discharged 24 h postoperative and were instructed to the use frequent sitz baths and paracetamol for pain relief, if any. The four grid tables explaining the POPQ scores of both patients before and 18 months postoperative are displayed in Table 1.

DISCUSSION

Pelvic organs in the female are held in their normal anatomic location by combined action of the pelvic floor muscles, most notably the levator ani muscle, and the strong attachment to the bony pelvis by several surrounding ligaments such as the uterosacral and cardinal ligaments. Uterine prolapse, which is part of the POP, is referred to the descent of the cervix toward

or through the hymenal ring.^[1] The degree of descent is graded by the POPQ system which was introduced in 1996.^[8] Most women with POP are asymptomatic. Others have symptoms related to the prolapsed organ such as sensation of vaginal bulge or pressure, urinary or defecatory symptoms, and decreased sexual function.^[7] Management options vary widely depending on the patient preference, symptoms, age, as well as the stage of the prolapse.^[9] These include conservative and surgical treatment. Hysterectomy has been the cornerstone of any surgical treatment.^[10] Many women, however, decline hysterectomy most probably because the uterus represents an essential element of the woman's body image or they want to preserve their fertility. Hence, it appeared that there is a need to rely on reconstructive surgical techniques without removing the uterus (uterine-sparing techniques). Several uterine-sparing surgical techniques are currently used in the reconstruction of uterine prolapse. Transabdominal approaches include sacral-hysteropexy and uterosacral ligament suspension or plication. Sacral hysteropexy or promontofixation whether open or by laparoscopy has recently gained a lot of popularity and became the standard of care in many centers due to its efficacy in adequate restoration of normal vaginal axis by the use of different types of synthetic meshes.^[11,12] The use of such foreign body may, however, carry an increased risk of infection and mesh erosion.^[13] Uterosacral ligament suspension is performed through laparoscopy by attaching the cervix to each ligament near the level of ischial spine. This procedure is effective in 80% of cases with recurrence rate of 16%.^[14] Uterosacral ligament plication is also another uterine-sparing technique done laparoscopically where multiple sutures are used to shorten these ligaments, thereby restoring the normal position of the uterus.^[15] Various transvaginal procedures exist to treat uterine prolapse, the oldest of which was the famous Manchester-Fothergill operation introduced in 1888. It consists of cervical amputation, colporrhaphy, and fixation of the cervical stump to the cardinal ligaments.^[16] Cutting and transposing the cardinal ligaments was modified later to use the uterosacral ligaments.^[17] Unfortunately, cervical amputation led to infertility and pregnancy wastage in up to 50% of cases, along with the increased risk of hematometra and pyometra.^[18] Although still done in few centers around the world, this technique was abandoned by most gynecologists. Sacrospinous hysteropexy, first described in 1989, consists of extraperitoneal dissection till identification of the right sacrospinous ligament then its fixation to the posterior cervix.^[19] This requires high operator skills and the use of special ligature carriers such as Miyazaki hook, Deschamps needle ligature carrier, or the Capio suture capturing device to facilitate the procedure. Although it is highly effective, it carries an increased risk of apical recurrence in up to 27% of cases,^[20] it creates vaginal asymmetry that may lead to dyspareunia in up to 7% of cases.^[21] Shirodkar procedure^[22] and transvaginal uterosacral suspension/plication^[23] consist both of performing a posterior colpotomy and opening the cul-de-sac to identify the uterosacral ligaments. This may lead to increased risk of visceral injuries. No single procedure is considered

to be superior to others and the final decision on the type of surgical repair remains at the disposal of the gynecologist according to his skills and experience and probably tailored to the patient's needs. After this brief overview of the various uterine-sparing surgical techniques used in the reconstruction of uterovaginal prolapse, it was evident that most of them were invasive with relatively long operative time in addition to the need of general anesthesia in laparoscopic procedures. These individual disadvantages should be contrasted to the merits of the technique we described earlier. Anterior transposition of cardinal ligament has many features that conform to being a minimally invasive procedure. The procedure is transvaginal, takes an average of 12–15 min, and can be done under spinal or even pudendal anesthesia in women with morbidities who cannot withstand lengthy procedures. It needs minimal dissection and does not need special accessories. This procedure is not new as it was a part of the original Manchester-Fothergill procedure, but, to our best knowledge, it is the first time to be used alone in the reconstruction of uterine prolapse. The efficacy of this procedure should be confirmed by larger series with longer follow-up.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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