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CLINICAL ARTICLE

Medium-term outcomes after combined trachelectomy and uterosacral ligament suspension among young women with severe uterine prolapse☆

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ABSTRACT

Objective: To evaluate anatomic and sexual outcomes among young women with severe pelvic organ prolapse undergoing combined trachelectomy and laparoscopic high uterosacral ligament suspension (LHUS). *Methods:* In a prospective study in Beijing, China, patients (aged ≤50 years) with pelvic organ prolapse of stage III or higher according to the Pelvic Organ Prolapse Quantification (POP-Q) were enrolled between November 2007 and August 2011. After combined trachelectomy and LHUS, patients were followed up at 6 weeks, 6 months, 12 months, and yearly thereafter. Anatomic success was defined as POP-Q lower than stage II. Sexual outcomes were assessed at 6 months via the validated Short-Form Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12), and compared with a control group of 39 healthy age-matched women. *Results:* Among 49 patients, surgical success and patient satisfaction rates were 100% after a median follow-up of 54 months. Among 48 patients who were sexually active at follow-up, 39 (81%) completed the PISQ-12 questionnaire. The 6-month PISQ-12 score was higher than the preoperative score overall (38.1 vs 26.4, $P < 0.001$) and for all three subscale domains ($P \leq 0.001$). The PISQ-12 score of postoperative patients was similar to that of control women (36.8, $P = 0.52$). *Conclusion:* Trachelectomy combined with LHUS produced satisfactory medium-term anatomic and functional outcomes for young women with severe uterine prolapse.

1. Introduction

Uterine prolapse is a common problem for women of all ages worldwide, affecting approximately 50% of women who have undergone childbirth [1]. Among nulliparous young women with a uterus, approximately 2% have had some form of prolapse [2], which highlights the importance of finding a safe and feasible treatment approach with uterine preservation and maximum protection of sexual function.

In 1927, Miller [3] first described attachment of the uterosacral ligament to the vaginal apex (high uterosacral ligament suspension). In 1997, Wu [4] performed laparoscopic high uterosacral ligament suspension (LHUS) for seven women with uterine prolapse. Subsequently, the anatomic success rate of LHUS among larger samples has been reported to range from 79% to 87% [5,6]. The success rate varies widely, in part because LHUS might not be successful for women with uterine prolapse who also have significant cervical elongation [7]. Many of these women continue to feel a symptomatic bulge after surgery, and the prolapse can recur.

Although there is no exact definition of cervical elongation, many textbooks describe the "normal" length of the uterine cervix to be about 3–4 cm. In a previous magnetic resonance imagining study [7], cervical elongation was defined as greater than 33.8 mm.

At Peking Union Medical College Hospital (PUMCH), a tertiary referral center in China, more than 500 patients with uterine prolapse are treated each year. During clinical practice it has been observed that, for most young women with uterine prolapse of Pelvic Organ Prolapse Quantification (POP-Q) stage III or higher, the prolapse is associated with cervical elongation (cervical length ≥4 cm). Previous data also indicate that younger, premenopausal women with uterine descent are more likely to have a longer cervix than are older women with better apical support [7].

Taken together, these observations prompted us to perform trachelectomy combined with LHUS instead of LHUS alone when treating women with cervical elongation. The aim of the present study was to evaluate the medium-term anatomic and sexual function outcomes among young women with severe uterine prolapse who were surgically treated by trachelectomy combined with LHUS.

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2. Materials and methods

The present prospective study included women with severe pelvic organ prolapse, defined as stage III POP-Q or higher, attending PUMCH, Beijing, China, between November 1, 2007, and August 31, 2011. All participants met the following six criteria: interactive POP-Q stage III or IV [8]; POP-Q point D measurements above −3 cm, because the cervical length can be explained by the descent of point D; age 50 years or younger; parous; a history of regular menstrual cycles with normal uterus body, fallopian tubes, and ovaries revealed by B-ultrasonography, and with cervical lesions (if present) less than cervical intraepithelial neoplasia grade 3; and a desire for uterine preservation. In addition, all participants had cervical elongation, defined as a cervical length of 4 cm or more. Women who could not tolerate LHUS were excluded from the study. The study protocol was approved by the ethical review board of PUMCH, and all participants provided written informed consent.

One researcher (L.Z.) performed the surgery, which combined trachelectomy and LHUS and has been described in detail [9], for all patients. The procedure began with trachelectomy. First, the cervix was incised circumferentially to the depth of the cervical stroma at the level of the bladder fold at the cervix with an electrosurgical generator to form a vaginal cuff. The cylinder of tissue over the cervix was then grasped and retracted, and sharp dissection was used to separate the vagina from adjacent structures. The bladder was pushed gently up to the level of the internal os so that the descending vaginal could be located, divided, and then transected at the level of the internal os. Bipolar diathermy was used for hemostasis. Last, the cervix was re-epithelialized with Sturmdorf suturing. It was checked that the cervical canal remained open and easily accessible.

Next, the LHUS was performed. After video-laparoscopy was established, blunt dissection was used to visualize the ureters, and hydro-dissection was performed by injecting 20–30 mL of physiologic saline and 1:200 000 angiotensin into the retroperitoneal space between the ureter and uterosacral ligament. The ureter was pushed outside, and the peritoneum was opened upward from the level of the internal os. Subsequently, the two uterosacral ligaments, both approximately 4-cm long, were respectively grasped with forceps and ligated with non-absorbable sutures (Ethibond, Ethicon, Somerville, NJ, USA). Tie knots were used to shorten the two uterosacral ligaments and to unite them across the midline. Last, the pouch of Douglas was closed to end the surgical procedure. At the end of the surgery, the POP-Q point C should be located at the level of the ischial spine or above.

Postoperative assessments were conducted by examiners in the Department of Obstetrics and Gynecology, PUMCH, who were masked to other study data. Anatomic results were assessed by a clinical examination at 6 weeks (when wound healing was also evaluated), 6 months, 12 months, and then yearly after surgery. For each patient, the most recent measurements were evaluated in the present study. For both the anterior and posterior segments, surgical success was defined as POP-Q stage I or lower in accordance with the NIH Standardization Workshop [10]. If the wound had healed well, the patient was encouraged to become sexually active 3 months after surgery.

Patient satisfaction was evaluated by the question "How satisfied are you with the results of your surgery?" at 6 months and 12 months after surgery and then annually thereafter. The response options included "very satisfied," "satisfied," "neutral," "unsatisfied," and "very unsatisfied" [11].

Sexual outcomes were assessed at 6 months after surgery using the Short-Form Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) [12], which is easy to understand and has been validated for Chinese-speaking populations [13]. Twelve items are used to assess sexual function and feelings over the previous 6 months in three areas: behavioral/emotive (score range 0–16); physical (0–20); and partner-related (0–12). These scores yield a composite total score of 0–48. Higher scores indicate better sexual function.

To compare postoperative sexual function, a group of 39 age-matched women who underwent health examinations at the Physical Examination Center, PUMCH, during the same period were recruited as a control group and completed the PISQ-12 questionnaire. All the PISQ-12 questionnaires were self-administered by the patients in the outpatient clinic.

Statistical analysis was performed with SPSS version 16.0 (SPSS Inc, Chicago, IL, USA). The means of variables with normal or approximately normal distributions (determined by Shapiro–Wilk test) were compared by paired t test. The Mann–Whitney test was used to compare PISQ-12 scores between the surgical and control groups. Significance was set at $P < 0.05$.

3. Results

During the study period, 49 patients who had trachelectomy combined with LHUS were enrolled (Fig. 1). The mean age at the time of surgery was 37.1 years (range 34–45 years). All the patients had various degrees of other site-specific defects, including cystocele and rectocele. The characteristics of the 49 study women and 39 healthy control women are given in Table 1. All 49 study participants were followed up for more than 3 years.

The mean operating time for trachelectomy combined with LHUS (excluding other concurrent operations) was 51.0 ± 8.4 minutes, and the mean blood loss was 32.0 ± 17.5 mL. No intraoperative complications such as injuries or pelvic hematoma occurred. Within 24 hours of surgery, all the participants experienced similar mild buttock pain, which resolved gradually within 2 weeks. No pain relief medication was needed to help ease discomfort. Postoperatively, there were no complications such as ureteric obstruction due to distal kinking, lower extremity sensory nerve symptoms that might be related to LHUS, or cervical stenosis that might be related to trachelectomy.

Over the mean follow-up time of 54 months (range 36–82 months), the anatomic success rate was 100%. Preoperative and postoperative POP-Q measurements demonstrated significant improvements after surgery, as measured by POP-Q points Aa, Ba, C, D, Ap, Bp, GH (genital hiatus), and PB (perineal body; all $P < 0.01$) (Table 2). In particular, the POP-Q scores for points C and D were significantly higher after the operation than before surgery (both $P < 0.001$). The total vaginal length remained unchanged. In a subjective assessment, 100% of the study patients felt "very satisfied" or "satisfied" after surgery.

Preoperatively, 48 of the 49 patients had engaged in sexual intercourse within the past few years. One patient was widowed and had not engaged in sexual intercourse for several years. Among the 48 patients who had had sexual intercourse recently, 17 were sexually active (defined as having sexual intercourse at least 2–3 times a week) at the time of the study. Postoperatively, the 48 patients returned to sexual activity and became sexually active within 6 months. No de novo dyspareunia was reported.

Among the 48 sexually active patients, 39 (81%) answered the PISQ-12 questionnaire completely. The other nine patients received the PISQ-12 questionnaire but did not complete it: several participants replied that the subject was too intimate to be discussed. When asked during the clinical follow-up whether they were satisfied with their postoperative sexual intercourse, they all responded that their sex life was "much better" than before surgery.

For the 39 patients who were sexually active after surgery and completed the pre- and postoperative PISQ-12 questionnaires, significant improvements were observed both in the total score and in all three subscale domains at 6 months (Table 3). The percentage improvements from baseline for individual item scores of the questionnaire, representing various aspects of sexual function, are presented in Fig. 2.

The mean PISQ-12 score for 39 age-matched (34.7 ± 2.4 years vs 37.1 ± 5.3 years, $P = 0.46$) healthy women was not significantly different from that of patients 6 months after LHUS (Table 3). Considering the mean score of each domain, the study women who underwent surgery