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Original Article

Outcomes of laparoscopic hysteropexy and supracervical hysterectomy plus cervicopexy: A retrospective study

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Abstract

Objectives: The objective of this study is to compare the outcomes of laparoscopic hysteropexy (LHP) and laparoscopic supracervical hysterectomy plus cervicopexy (LSHCP) for the treatment of pelvic organ prolapse (POP). **Materials and Methods:** We retrospectively included patients who had undergone laparoscopic sacral hysteropexy or hysterectomy plus cervicopexy between January 2015 and May 2019 at Hualien Tzu Chi Hospital, Taiwan. Age at surgery, body mass index (BMI) at admission, the initial stage of genital prolapse, operative and postoperative data, and anatomical results were recorded. Cure for uterine prolapse was evaluated objectively through vaginal examinations using the POP quantification scale. Visual analog scale (VAS) scores were recorded at 24 h postoperatively. The Mann–Whitney U-test was used to compare continuous variables. **Results:** A total of 23 women were included in the study; 12 had received LHP (n = 12) and 11 had received LSHCP (n = 11). No differences existed in age, parity, BMI, blood loss, or hospital stay between groups. The difference in mean surgical times between the LHP and LSHCP groups was nonsignificant (154 and 176 min, respectively; P = 0.2). VAS scores were significantly lower in the LSHCP group than in the LHP group (0.1 vs. 1.75; P = 0.004). Furthermore, mean hospital stay was significantly longer in the LSHCP group than in the LHP group (4.0 vs. 3.1 days; P = 0.016). The procedure was successful in 100% of patients (23 of 23), with no objective evidence of uterine prolapse on examination at follow-up at 6 months. **Conclusion:** LHP had a significantly shorter hospital stay and a higher VAS score than LSHCP. LHP and LSHCP are both feasible and effective procedures for correcting uterine prolapse.

Keywords: *Cervicopexy, Hysteropexy, Mesh, Pelvic organ prolapse, Pelvic organ prolapse-quantification*

Introduction

Pelvic organ prolapse (POP) is common in postmenopausal women, with a lifetime risk of 11% [1]. The etiology of POP is multifactorial and includes neuromuscular dysfunction and fascial defect. Uterine prolapse may be caused by weakness of the ligament complex. Surgery with native tissue repair such as anterior or posterior colporrhaphy had a high recurrence rate [2].

Surgery choices for POP include vaginal hysterectomy and transvaginal mesh (TVM). However, vaginal hysterectomy has been associated with a high recurrence rate of apical prolapse because it cuts all ligaments attached to the uterus [2,3]. By contrast, TVM repair has not only high success rate but also increased complications such as mesh exposure, dyspareunia, and hematoma [4-6]. The United States Food and Drug Administration announced that mesh repair is a high-risk procedure [7].

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During the last decade, laparoscopic sacrocolpopexy has become popular because most TVM procedures have been unavailable, and POP correction has shown strong results [8]. Both laparoscopic and abdominal sacrocolpopexy were recommended for POP treatment and yielded strong results [9]. Uterine sparing surgery for POP (laparoscopic hysteropexy [LHP]) was one choice because it effectively eases prolapse symptoms and enhances sexual function and psychological well-being [10]. Furthermore, this type of surgery preserves the ligaments around the cervix and can be strengthened using nonabsorbable materials [11]. Laparoscopic

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total hysterectomy plus sacral colpopexy (LTHCP) had reported with a controversial outcome. One study reported despite the increased surgical time, there was no benefit in POP repair [12]. On the contrary, another study reported LTHCP provided a durable outcome than LHP [13]. The outcome of laparoscopic supracervical hysterectomy plus cervicopexy (LSHCP) was reported with benefit for POP repair [14,15].

Therefore, the aim of the present study was to compare the surgical outcomes of LHP and LSHCP for the treatment of POP.

Materials and methods

This study was a retrospective study in our department for comparing two different surgical techniques for POP repair. This study was conducted in accordance with the Declaration of Helsinki and was approved by the Local Ethics Committee of the institute (Number: IRB 108-111-B). Informed written consent was waived because the study was a retrospective data analysis.

Patients

In this study, we retrospectively included patients who had undergone laparoscopic sacral hysteropexy or hysterectomy plus cervicopexy between January 2015 and May 2019 at Hualien Tzu Chi Hospital, Taiwan. The women with symptomatic uterine prolapse with POP Quantification (POP-Q) stage equal to or more than Stage 2 were included in the study. The exclusion criteria were cervical elongation and colpopexy only. If there were no uterine pathology, and the patients wanted to preserve their uterus, they were assigned to LHP group. The other patients choose to receive LSHCP. Data were extracted from the patients' medical charts: age at surgery, body mass index (BMI) at admission, the initial stage of genital prolapse, operative and postoperative data, and anatomical results. Genital prolapse stage was classified according to the International Continence Society POP-Q scale [16].

Surgical techniques

Laparoscopic sacral cervicopexy was performed by a single-trained surgeon in all cases. A nonabsorbable polypropylene mesh (Alyte Y-mesh, JUNE Medical, Buckinghamshire, London, UK) was sutured to the anterior and posterior wall of the cervix. Supracervical hysterectomy was performed if a uterine abnormality was diagnosed (menorrhagia or enlarged uterus).

When the Y-mesh was used during hysteropexy (uterus sparing surgery), we cut both leaves of the mesh into the same width as the posterior leaf (3 cm wide), leaving 5 cm in length on both leaves to enable circling the cervix and applying an extracorporeal nonabsorbable suture (2-0 Ethibond, Ethicon, J and J, New Brunswick, NJ, USA) at the anterior cervical region. We adapted the previously published hysteropexy method [Figure 1] [17]. In brief, the peritoneum of the anterior and posterior cul-de-sacs was exposed using unipolar scissors, and holes were created over the bilateral uterine artery region. Subsequently, we placed both leaves of the mesh through the holes, circled the cervix, and fixed mesh using sutures. The mesh tail was nailed on the presacral region using a Protec device (Medtronic corp., Minneapolis, MN, USA). Next, we approximated the peritoneum with a 1/0 V-Loc suture (Medtronic corp.).

Postoperative pain control

Postoperative pain was evaluated at the recovery room, 24 and 48 h after surgery. Only 24 h of pain score was included in this study. Pain score was obtained from the patients by the visual analog scale (VAS) with 10 cm length from 0 (no pain) to 10 (the most severe pain) [18]. In this study, postoperative pain control in both groups using the same regimen. Intravenous analgesics were including ketorolac 30 mg (Yung Shin Pharm. Ind. Co., Ltd., Taichung, Taiwan) and morphine 10 mg. Oral analgesics were including acetaminophen 500 mg (Yung Shin Pharm. Ind. Co., Ltd., Taichung, Taiwan) and naproxen 250 mg (China Chemical and

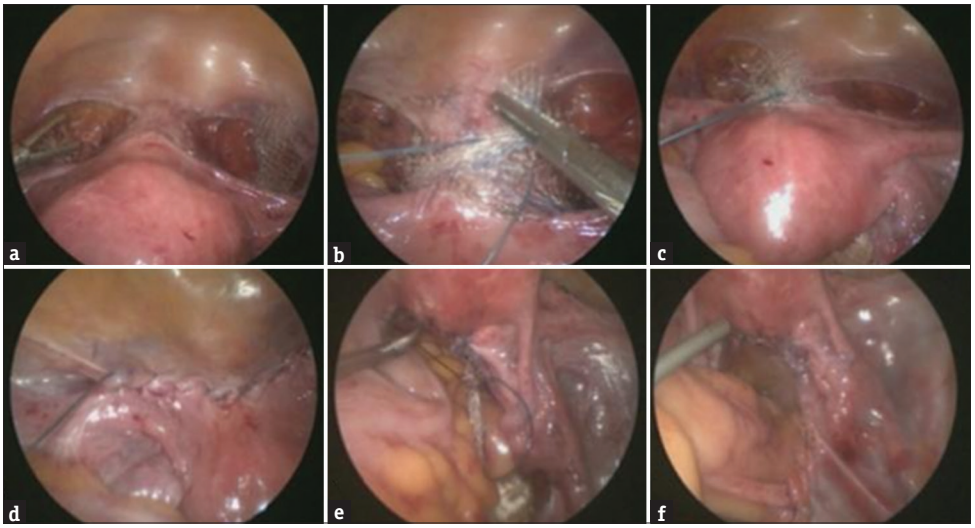

Figure 1: Surgical technique of laparoscopic hysteropexy. (a) The mesh was inserted through windows in the broad ligament. (b) Both leaves of the mesh were approximated into the central portion of the cervix. (c) The mesh was sutured over the anterior cervix. (d) Closure of the uterovesical peritoneum was performed. (e) Peritonization of the mesh of the posterior cervical region was conducted prior to its fixation to the sacral promontory. (f) Peritonization was completed

Pharmaceutical Co., Ltd., Hsinchu, Taiwan). Intramuscular analgesic was Dynastat 40 mg (Pfizer, New York City, NY, USA).

Prolapse outcome evaluation

The primary outcome of the study was to evaluate the objective success rates of both types of laparoscopic surgical techniques.

The objective success is defined by anatomical position. The cure was defined when POP-Q < Stage 2 prolapse in all vaginal compartments (anterior, apical, and posterior) at 6-month postoperatively. Postoperatively (at 6 months of follow-up), clinical results were assessed objectively using the POP-Q scale.

The secondary outcomes were surgical and admission parameters, such as duration, blood loss, pain score, and hospital stay. The surgical time was counted from the first incision to last skin stitch. The blood loss amount was estimated from the suction bottle and deduction of irrigation water amount.

Statistical analyses were performed using SPSS 20.0 (IBM, Armonk, NY, USA). The Mann–Whitney U-test was used to compare continuous variables; values of $P < 0.05$ were considered statistically significant.

Results

In total, 23 patients received LHP (n = 12) or LSHCP (n = 11); their mean ages were 60 and 59 years, mean BMI values were 24.5 and 23.4, and mean parities were 2.9 and 2.7, respectively [Table 1].

The surgical outcomes revealed that the mean surgical time in the LHP group was shorter than in the LSHCP group but without statistical significance (154 and 176 min, respectively; P = 0.2). Furthermore, postoperative VAS pain scores were significantly higher in LHP than in LSHCP group (1.75 and 0.1 in the LHP and LSHCP groups, respectively, P = 0.004). Moreover, the mean blood loss amounts were 64.1 and 54.4 mL in the LHP and LSHCP groups, respectively (P = 0.5). The mean hospital stays were 3.1 and 4.0 days in the LHP and LSHCP groups (P = 0.016), respectively [Table 1].

All the women were available for follow-up at the clinic 6 months after their operations. The procedure was successful in 23 out of 23 women (100%), with no objective evidence of uterine prolapse on examination at follow-up [Table 2]. No statistical difference was found between groups in terms of POP-Q stage.

Table 1: Patients' demographic data

	Mean±SEM		*P**
	Hysteropexy (n=12)	SH + cervicopexy (n=11)	
Age (year)	60.7±3.7	59.2±2.5	0.7
BMI (kg/m^2)	24.5±1.1	23.4±0.9	0.4
Parity	2.9±0.3	2.7±0.3	0.8
Surgical time (min)	154±12.8	176±13.5	0.2
VAS score (24 h)	1.75±0.3	0.1±0.1	0.004
Blood loss (ml)	64.1±8.9	54.4±4.5	0.5
Hospital stay (day)	3.1±0.2	4.0±0.2	0.016

*Mann-Whitney U-test. SH: Supracervical hysterectomy, SEM: Standard error of the mean, BMI: Body mass index, VAS: Visual analog scale

Discussion

Both LHP and LSHCP resulted in objective improvements without the evidence of uterine prolapse at the 6-month follow-up. LHP was significantly associated with shorter hospital stay and higher pain scores than LSHCP. Age, parity, BMI, and operation blood loss were similar in both groups. Thus, our findings provide support for LHP being feasible for the clinical treatment of women who require fertility conservation with satisfactory outcomes.

A recent systematic review of 94 studies suggested that uterine-preserving prolapse surgeries decrease operating time, blood loss, and morbidities without worsening short-term prolapse outcomes [19]. In our study, the LHP group had blood loss 64.1 ± 8.9 mL compare to LSHCP group 54.4 ± 4.5 mL (P = 0.5) and with longer operation time in LSHCP group than in LHP group (P = 0.2). However, blood loss and operative time were not significant between both groups in our study. We speculated other pelvic reconstruction procedure such as colporrhaphy may contribute to longer blood loss and operative time.

In this study, the mean hospital stay was significantly longer in the LSHCP group than in the LHP group (4.0 vs. 3.1 days; P = 0.016), whereas Visual analog scale scores were significantly lower in the LSHCP group than in the LHP group (0.1 vs. 1.75; P = 0.004). The reason for a longer hospital stay in LSHCP group despite low VAS score, we thought that may be due to the health insurance regulation. The insurance provided 4 days of hospital stay for LSHCP, but no regulation for LHP. Therefore, we speculated that would cause longer hospital stay for LSHCP. The pain in LHP may cause by mesh traction cervical ring toward the presacral region.

Vaginal hysterectomy was considered a traditional surgical treatment for uterine prolapse, even in the absence of uterine disease [20]. Today, surgeons may offer several management options to women with symptomatic POP, including vaginal, abdominal, laparoscopic, and robotic procedures [21]. Studies have suggested that hysterectomy is associated with hypertension, hyperlipidemia, coronary artery disease, obesity, and lower urinary tract symptoms [22-24]. Furthermore, uterine conservation is crucial for women who wish to preserve their fertility, improve their sexual function, and retain their self-confidence, self-esteem, or the sense of femininity [25]. In addition, a randomized controlled trial showed higher rates of repeat apical surgery at 1 year in its vaginal hysterectomy group compared with its LHP group [11]. In another study, the repeat apical surgery rate in patients undergoing LHP was low (2.8%) based on a cohort studied over 10 years [26]. Therefore, the popularity of preserving the uterus during prolapse surgery has increased [14].

Laparoscopic uterine preservation surgery for POP has developed rapidly because it is a minimally invasive surgical

Table 2: Objective outcomes of laparoscopic hysteropexy (Group 1, *n*=12) and laparoscopic supracervica hysterectomy plus cervicopexy (Group 2, *n*=11): Pelvic organ prolapse quantification measurements

	POP-Q measurements (cm)[#]								
	Aa		*P*	Ba		*P*	C		*P*
	Group 1	Group 2		Group 1	Group 2		Group 1	Group 2	
Preoperative	−0.7±1.7	−0.4±1.5	0.6	−0.6±1.8	−0.1±2.0	0.3	−2.3±1.8	−2.4±2.4	0.8
Postoperative	−2.8±0.5	−2.9±0.3	1	−2.9±0.2	−2.9±0.3	1	−6.6±1.4	−7.2±1.2	0.5
Change (postoperative - preoperative)	−2.0±1.6	−2.4±1.4	0.6	−2.2±1.8	−3.0±1.9	0.3	−4.3±1.4	−4.8±2.2	0.4
	D		*P*	Ap		*P*	Bp		*P*
	Group 1	Group 2		Group 1	Group 2		Group 1	Group 2	
Preoperative	−5.3±1.8	−5.1±2.7	1	−2.0±0.6	−2.2±0.6	0.3	−1.9±0.7	−2.2±0.6	0.3
Postoperative	−8.4±1.1	−8.7±0.7	0.3	−2.6±0.6	−2.9±0.3	0.5	−2.7±0.4	−2.9±0.3	0.5
Change (postoperative- preoperative)	−3.0±1.6	−3.5±2.8	0.6	−0.6±0.4	−0.6±0.6	0.8	−0.8±0.7	−0.6±0.6	0.5
	gh		*P*	pb		*P*	tvl		*P*
	Group 1	Group 2		Group 1	Group 2		Group 1	Group 2	
Preoperative	3.8±0.5	4.0±0.6	0.7	2.2±0.5	2.2±0.4	0.8	7.1±0.9	7.4±1.2	0.2
Postoperative	3.2±0.5	3.2±0.4	0.3	2.6±0.4	2.8±0.5	0.8	8.9±0.9	8.4±0.8	0.7
Change (postoperative- preoperative)	−0.5±0.8	−0.7±0.6	0.5	0.3±0.6	0.5±0.6	0.9	1.7±1.1	1.0±1.3	0.4

[#]POP quantification points, with measurements in centimeters relative to the position of the general hiatus. Statistical test: Mann-Whitney U-test. The data were expressed as mean±SD. Aa: A point located 3 cm proximal to the external urethral meatus and in the midline of the anterior vaginal wall, Ba: The most distal/dependent point on the anterior vaginal wall from point Aa to the anterior vaginal fornix or vaginal cuff, C: The most distal/dependent edge of the cervix or vaginal cuff, D: The position of the posterior fornix, Ap: A point located 3 cm proximal to the hymen and in the midline of the posterior vaginal wall, Bp: The most distal/dependent point on the posterior vaginal wall above point Ap, gh: Genital hiatus length, pb: Perineal body length, tvl: Total vaginal length, POP-Q: Pelvic organ prolapse quantification, SD: Standard deviation

approach with superior visualization, reduced blood loss, shorter hospital stay, and decreased postoperative pain. Several types of procedure have been reported that involve laparoscopic suspension of the uterus: from the round ligaments (ventrosuspension), uterosacral ligaments, or sacral promontory [17]. LHP, which was performed in our study, is a laparoscopic procedure with a bifurcated synthetic mesh anchoring the uterus to the sacral promontory for uterovaginal prolapse; it was first reported in 2001 by Leron and Stanton [27]. Studies on LHP have demonstrated high success rates after a medium-term follow-up (14–48 months), ranging between 90% and 100% [26,28-31]. Gracia *et al*. were the first to compare the two laparoscopic approaches for POP repair (LHP and LSHCP) in the Spanish population. Their study indicated that LSHCP achieved higher success rates at the apex compared with LHP (90% and 46.7% at 12 months, respectively; $P = 0.002$) [14]. However, in the present study, no significant difference was observed in postoperative changes of POP-Q scores in all compartments (anterior, posterior, and apical) between the two groups. Therefore, the addition of hysterectomy may be unnecessary for POP repair if there is no uterine lesion. Besides, uterine sparing surgery may harbor many advantages regarding cardiovascular disease developed after hysterectomy [22,24].

Relevant studies have argued that hysteropexy alone was linked to a risk of cervical elongation, requiring repeat surgery [13,14,32]. In a prospective study by Rosen *et al*., 14.3% of patients had cervical elongation or level-1 prolapse after laparoscopic pelvic floor repair without hysterectomy [12]. They postulated that inadequately tensioned fixation high in the pelvis without counter pressure from an adequate pelvic floor resulted in the cervical elongation [32]. However, the prevalence of cervical elongation in women with POP has ranged from 40% to 97.6% [33,34]. Most studies have not measured the cervical length before and after operations and thus have been unable to prove an association between *de novo* cervical elongation and hysteropexy.

This is the first study to compare LHP and LSHCP in the Asian population. All laparoscopic operations were performed by the same surgeon, ensuring consistency in intervention procedures. Despite a limited number of participants, the demographic characteristics were similar in both groups. We acknowledge several limitations of the study, including the retrospective method, small sample size, and short-term follow-up. Moreover, this study also lacked subjective outcomes such as lower urinary tract symptoms before and after the operation. Furthermore, some patients received anterior and posterior colporrhaphy concurrently (3 patients underwent a-p colporrhaphy, 2 patients posterior colporrhaphy, and 4 patients anterior colporrhaphy), but we did not eliminate the repair time; the actual surgical time could be shorter.

Conclusion

The study showed that uterine-preserving prolapse procedures had a significantly shorter hospital stay than LSHCP. The safer and efficient transabdominal mesh repair for POP should be further developed and investigated in future studies.

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Conflicts of interest

There are no conflicts of interest.

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