Original Article

Clinical outcome after laparoscopic assisted vaginal hysterectomy with transvaginal uterosacral ligament fixation

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Abstract

Objective: We report here the clinical outcome of a simplified method to suspend the vaginal cuff during laparoscopic assisted vaginal hysterectomy.

Materials and Methods: This is a retrospective study. Fifty patients underwent laparoscopic assisted vaginal hysterectomy and received transvaginal uterosacral ligament fixation for vaginal cuff support (LAVHUS). Follow-up examinations were conducted for at least 24 months and included vaginal examination with prolapse grading using the POP-Q system. Subjective outcomes were measured using a questionnaire that asked patients to describe postoperative lower urinary tract symptoms and satisfaction with the procedure.

Results: The mean follow-up duration was 106 weeks (range 102−120 weeks).The postoperative POP-Q point C and total vaginal length were effectively sustained during this period. There were no intraoperative or postoperative complications, and no adverse postoperative lower urinary tract symptoms were reported.

Conclusion: The present study demonstrated satisfactory subjective and objective clinical outcomes following LAVHUS.

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Keywords: laparoscopic assisted vaginal hysterectomy; transvaginal; uterosacral ligament fixation; vaginal cuff support

Introduction

Vault prolapse or prolapse of the pelvic organs has become more common because life spans have increased, with a consequent increase in aging processes. Hysterectomy is a common risk factor for developing prolapse [1]. The incidence of surgical repair for apical prolapse is increased in any woman with a history of hysterectomy; this incidence is further increased when the cause of operation is prolapse [2,3]. Laparoscopic assisted vaginal hysterectomy (LAVH) shares the benefits of laparoscopic surgery, which involves tiny incisions, reduced pain, and shorter recovery periods, and has become the procedure of choice in modern gynecologic

surgery [3]. In addition, 70% of major gynecologic operations performed at Chang Gung Memorial Hospital have used laparoscopic surgical procedures even in gynecologic oncology [4−8].

Adjunctive apical suspension may reduce the incidence of vault prolapse after LAVH. In 1927, Miller proposed the use of uterosacral ligaments to resuspend the prolapsed vaginal apex [9]. Our goal was to adapt Miller's technique to suspend the vaginal cuff during LAVH procedures. The purpose of our study was to determine the efficacy of vaginal cuff support as measured by the POP-Q questionnaire and patient satisfaction.

Materials and methods

Patients

Between January 2002 and June 2005, 50 patients with benign uterine pathology underwent laparoscopic assisted vaginal hysterectomy and transvaginal uterosacral ligament

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fixation (LAVHUS). Additional surgical procedures were performed concomitantly as indicated, and none of our patients had symptomatic anterior or posterior vaginal wall prolapse that required correction. The patients included in our study did not have previous continence operation procedures, stage II pelvic prolapse [10], or neurologic deficits. All patients were followed up for at least 24 months postoperatively.

Study design

Preoperative evaluations included a medical history, physical examination, urinalysis, and urine culture. Both before and after surgery, all patients underwent assessments using the pelvic organ prolapse quantification system (POP-Q) using the previously described standardized technique [10]. We also performed standardized telephone interviews before and after surgery. The interviews consisted of a patient satisfaction questionnaire [11], which assessed patients' perceptions of lower urinary tract symptoms, incontinence, and satisfaction with the procedure (Table 1). A multichannel urodynamic study was performed if indicated. Institutional Review board approval and informed consents were obtained for the patients included in the study.

Surgical procedures

LAVHUS was performed for women with benign uterine pathology without advanced pelvic prolapse. The surgical procedure was performed with the patient in a semi-lithotomy position with the legs in a downward position. Both arms were placed along the chest and abdomen. A prophylactic broad-spectrum antibiotic was administered. Pneumoperitoneum was achieved after insertion of a Veress needle into the lower umbilical fold. Following achievement of pneumoperitoneum, three trocars were placed [in the umbilicus (5 mm) and on the right (5 mm) and left (5 mm) at the level of McBurney's point]. The patient was placed in the Trendelenburg position (approximately 30°) to inspect the pelvic cavity using a 0° laparoscope.

Vaginal cuff suspension

After removal of the uterus using conventional LAVH procedures [12], we closed the peritoneal layer, except that the pedicles of the right and left uterosacral ligaments were transfixed with sutures (2-0 Coated Vicryl; Ethicon, Livingston, UK) and marked by a Kelly artery forceps (Fig. 1). The two tips of the transfixation sutures for the right and left uterosacral ligaments were pulled through the upper and lower edges of the vaginal mucosa after closure of the peritoneum. The point of insertion was usually located approximately 1 cm away from the edge to avoid kinking of the ureter (Fig. 2). The vaginal mucosa was closed first, and then the bilateral string tips were tied as supporting sutures (Fig. 3). This maneuver will usually raise the vaginal cuff by at least 0.5–1.0 cm. Intraoperative cystoscopy was performed for the first 10 cases to ensure ureteral patency.
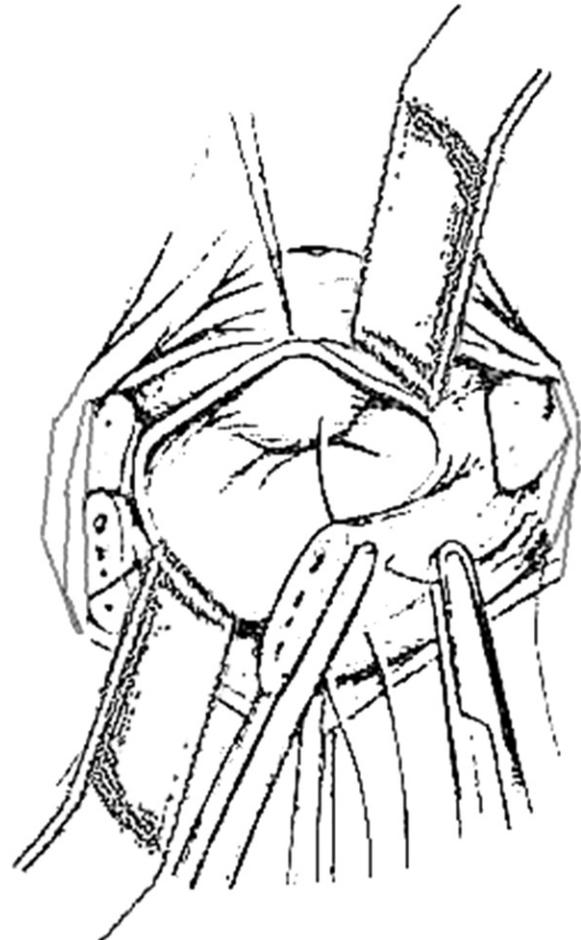
Fig. 1. Suture transfixation of uterosacral ligaments attached to a Kelly artery forceps.

Table 1
Patient satisfaction questionnaire.

| Question |
| --- |
| **1. How satisfied are you with your progress?** |
| Completely satisfied |
| Somewhat satisfied |
| Not satisfied |
| **2. How would you compare your bowel symptoms?** |
| Better |
| About the same |
| Worse |
| **3. Currently, do you feel that your bladder symptoms are** |
| Better |
| About the same |
| Worse |
| **4. Do you have coital problems after surgery?** |
| Not at all |
| Some of the time |
| All of the time |
| **5. How satisfied are you with the results of your surgery?** |
| Satisfied |
| Acceptable |
| Dissatisfied |
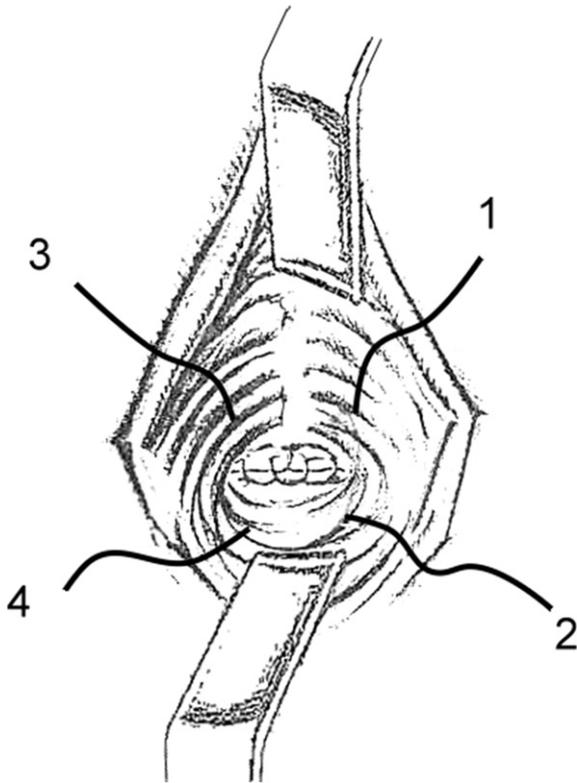
Fig. 2. The string tips of the transfixation sutures for the right and left ute-rosacral ligaments are pulled throughout the upper and lower edges of the vaginal mucosa after closure of the peritoneum (1, 2: left side; 3, 4: right side).

Statistical analyses

Values were given as means. Independent sample *t* tests (for continuous variables) and Chi-square or Fisher's exact tests (for categorical variables) were performed to evaluate differences between groups, as appropriate. All tests were performed using SPSS-PC software (SPSS, Inc., Chicago, IL, USA). A value of $p < 0.05$ was considered significant.
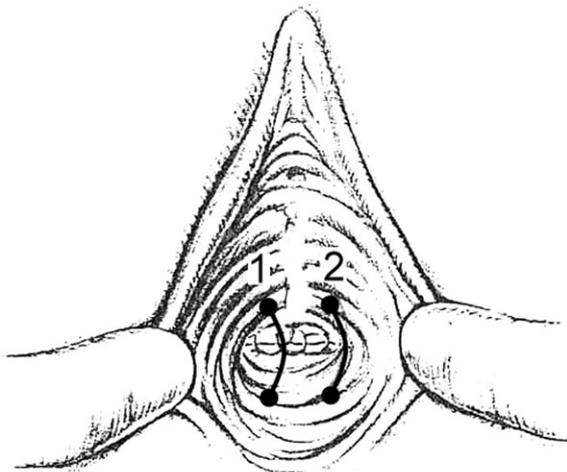

Fig. 3. The right and left string tips are tied (1: left side; 2: right side) after approximation of the vaginal mucosa.

Results

Table 2 lists patients' demographic data. Fifteen (35%) of 50 patients had concomitant procedures, including six patients for whom transobturator tape placement was performed and five patients for whom salpingo-oophorectomy was performed. There were no intraoperative or postoperative complications. The mean uterine weight in patients receiving LAVHUS was 400 g. Mean estimated blood loss was 198 mL (range 150–500 mL).

Mean duration of follow-up was 106 weeks (range 112–120 weeks). Comparisons of the preoperative and postoperative POP-Q parameters are expressed as mean values (Table 3). As an objective evaluation of the effectiveness of vault suspension, the postoperative POP-Q point C and total vaginal length (TVL) were effectively sustained during this follow-up period (point C −5.0, −6.8, and −6.9, respectively, $p > 0.5$; TVL 8.4, 8.0, and 7.9, respectively, $p > 0.5$). There were no statistically significant differences for the other parameters measured. No patient required surgery for prolapse during the follow-up period.

All patients responded to the satisfaction questionnaire during the postoperative follow-up period. Ninety-six per cent (48/50) and 4% (2/50) of patients were completely or somewhat satisfied with their progress, respectively. A total of 60% (30/50) and 40% (20/50) of patients felt that their bowel symptoms were better or the same after surgery, respectively. Similarly, 64% (32/50) and 36% (18/50) of patients felt their bladder symptoms were better or about the same after surgery, respectively. Ninety-six per cent (48/50) and 4% (2/50) of patients had no complaints or some complaints about coital problems after surgery. In addition, 98% (49/50) and 2% (1/50) of patients were satisfied with surgery or reported acceptable results, respectively (Table 3).

Discussion

Pelvic organ prolapse is believed to be a consequence of a generalized process and a combination of individual defects

Table 2
Demographics and surgical outcomes of the patients who underwent laparo-scopic assisted vaginal hysterectomy with transvaginal uterosacral ligament fixation (LAVHUS).

	LAVHUS ($n = 50$)
Age (years)[a]	46.5
Parity[a]	2.3
Body mass index (kg/m^2)[a]	25.3
Co-morbidity	
Hypertension, *n* (%)	6 (12)
Diabetes mellitus, *n* (%)	1 (2)
Concomitant procedures	
Transobturator tape, *n* (%)	6 (12)
Salpingo-oophorectomy, *n* (%)	5 (10)
Others, *n* (%)	4 (8)
Estimated blood loss (mL)[a]	198
Uterine weight (g)[a]	400
Perioperative complications	0

[a] Values are expressed as means.

Table 3
Comparison of pre/postoperative POP-Q parameters during the 0—24 follow-up month period, showing comparisons (mean values) of parameters at 12 and 24 months.

	Preoperative values	12 months	24 months	*P* value
Aa	−1.8	−2.1	−2.2	NS
Ba	−1.6	−1.7	−1.7	NS
C	−5.0	−6.8	−6.9	NS
GH	3.4	2.8	2.7	NS
PB	3.1	3.0	3.1	NS
TVL	8.4	8.0	7.9	NS
Ap	−2.5	−2.6	−2.7	NS
Bp	−2.6	−2.7	−2.8	NS
D	−6.8	N/A	N/A	NS

a, anterior wall; C, cervix or cuff; D, posterior fornix; GH, genital hiatus; N/A, not applicable; NS, not significant; p, posterior wall; PB, perineal body; TVL, total vaginal length.

that affect a localized area [13]. The types of prolapse following hysterectomy depend on the degree of disruption of the supporting tissue. DeLancey [13] described three levels of anatomical vaginal support. Level I support seems to be crucial, which is compatible to the level of the vaginal apex and includes cardinal ligament and uterosacral ligament originate from S1—S4 to insert near the cervix and are thought to constitute the main connective tissue supports of the upper vagina. The incidence of vault prolapse following hysterectomy is between 0.2% and 43% [14, 15]. Apical prolapse is currently believed to result from a defect in the integrity of the endopelvic fascia or muscularis at the vaginal apex. Therefore, the anterior endopelvic fascia and rectovaginal septum near the apex should be directly approximated to ensure the continuity of the vaginal muscularis after the uterus is removed.

Many techniques that prevent prolapse after hysterectomy have been suggested. Jaszczak and Evans [16] have reported that intrafascial hysterectomy preserves the cardinal—uterosacral ligament complex and provides good vaginal support. Wall [17] has described a modified McCall culdoplasty technique, performed at the time of abdominal hysterectomy, which decreases the incidence of post-hysterectomy vaginal vault prolapse and enterocele formation. Cruikshank [18] has recommended the use of prophylactic sacrospinous fixation at the time of vaginal hysterectomy as an adjunctive step in patients at risk for vault prolapse.

In this study, we sought to determine if LAVHUS had an impact on vaginal cuff support. Patients included in our study had benign uterine pathology without advanced prolapsed, and no additional surgery was required for cystocele or rectocele repair. The additional procedure, which needs no specialized instruments, added an average of approximately 10 minutes to the original operation time. The postoperative POP-Q point C and TVL were effectively sustained during the follow-up period. These data indicated that LAVHUS offered an anchor effect for vaginal cuff support. In addition, no adverse lower urinary tract symptoms were reported.

Gustilo-Ashby et al [19] reported that vaginal surgery for pelvic organ prolapse carried an intraoperative ureteral obstruction rate of 5.1%. Transvaginal uterosacral ligament fixation is associated with a ureteral obstruction rate of

1.0—10.9% [20], which is attributed to postoperative anatomic change or adhesion formation. To prevent this complication, we secured the uterosacral ligament 1 cm away from the edge to avoid overt tension after closure of the vaginal mucosa (Fig. 3). Moreover, surgeons can check the integrity and path of ureters using the laparoscopic view and solve problems if ureteral obstruction is suspected. Thus, there is no need to perform cystoscopy during our modified procedure.

Although postoperative subjective and objective evaluations demonstrated satisfactory results for the LAVHUS procedure without major complications, the current study is not without limitations. One limitation is that it is a single-arm study with a relatively short-term follow-up. In addition, the aging process may contribute to pelvic organ prolapse. Therefore, a large prospective randomized control trial with long-term follow-up is needed to validate our findings.

Conclusions

In summary, our data demonstrated satisfactory subjective and objective clinical outcomes after LAVHUS. This technique has low complication rates and is easy to perform as an adjunct to ordinary procedures.

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