

# Vaginal hysterectomies in patients without uterine prolapse: ten-year experience

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**Objective** To review the results of vaginal hysterectomies in patients without uterine prolapse.

**Design** Retrospective chart review.

**Setting** University affiliated hospital, Hong Kong.

**Patients** All patients who had vaginal hysterectomies in the absence of uterine prolapse from 1999 to 2005 inclusive (first period) and 2006 to 2009 inclusive (second period).

**Main outcome measures** The number of such hysterectomies, indications, operative procedures, complications, use of preoperative gonadotropin-releasing hormone agonist, and concomitant vaginal salpingo-oophorectomies performed.

**Results** In all, 94 and 98 patients fulfilling the necessary inclusion criteria within the two respective periods underwent vaginal hysterectomy. The indications for hysterectomy in the respective groups were similar, and 89 (95%) and 90 (92%) of the patients were Chinese. The respective proportions having additional procedures were 11% versus 23% ( $P=0.018$ ) and the respective vaginal bilateral salpingo-oophorectomy rates were 1% versus 15% ( $P<0.001$ ). The vault haematoma rate decreased significantly in the second period (from 12% to 1%;  $P=0.002$ ). There were no significant differences between the periods with respect to mean operative blood losses, uterine weights, and operating times. The use of gonadotropin-releasing hormone agonist resulted in reduced mean uterine sizes (12 weeks vs 10 weeks;  $P=0.041$ ). A decreasing trend in mean operating times and blood losses was also observed after such use. Vaginal hysterectomy and bilateral salpingo-oophorectomies were successfully performed in 12 (80%) patients without laparoscopic assistance. For this procedure, a learning curve was also evident.

**Conclusions** Surgeons' experience can influence the complication rate and the chance of successful vaginal salpingo-oophorectomy. More liberal use of gonadotropin-releasing hormone agonist may further reduce the complication rate and allow more vaginal hysterectomies.

## Key words

Gonadotropin-releasing hormone;  
Hematoma; Hysterectomy, vaginal;  
Ovariectomy

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## New knowledge added by this study

- This study confirms that vault haematoma can be prevented by experienced surgeons and by paying particular attention to potential 'bleeders' at 'four- and eight-o'clock regions'.
- Our study confirms the feasibility of introducing vaginal hysterectomy for patients without uterine prolapse, by undertaking laparoscopy-assisted procedures.

## Implications for clinical practice or policy

- Use of gonadotropin-releasing hormone agonist in these patients may reduce complication rates and increase the number of suitable candidates for this operation.

## Introduction

Hysterectomy is a commonly performed major procedure. The preferred route of hysterectomy should be vaginal, whenever feasible.<sup>1,2</sup> When compared with all hysterectomies for benign indications, in different countries the proportion of vaginal hysterectomies varies from 23% to 55%.<sup>3</sup> Based on territory-wide audits published by the Hong Kong College of Obstetricians and Gynaecologists,<sup>4</sup> the proportions of vaginal hysterectomies

## 為無子宮脫垂的患者進行下陰式子宮切除術： 十年工作經驗分享

**目的** 探討為無子宮脫垂的患者進行下陰式子宮切除術的結果。

**設計** 回顧研究。

**安排** 香港一所大學附屬醫院。

**患者** 1999至2005年（第一階段）以及2006至2009年（第二階段）期間，所有進行下陰式子宮切除術的無子宮脫垂患者。

**主要結果測量** 進行子宮切除術的次數、適應症、手術方式、併發症、手術前促性腺激素釋放素激動劑的使用，以及同時進行的經陰道輸卵管卵巢切除術。

**結果** 第一及第二階段中分別有94名和98名合乎研究標準的患者進行下陰式子宮切除術。兩組的子宮切除術適應症相似，並分別有89名（95%）和90名（92%）為華籍患者。兩組中要額外進行手術的比例為11%及23%（ $P=0.018$ ），其進行雙側經陰道輸卵管卵巢切除術的比例為1%及15%（ $P<0.001$ ）。第二階段患者的血腫率顯著減少，由12%下降至1%（ $P=0.002$ ）。兩組間在術中失血、子宮重量和手術時間方面並無顯著分別。促性腺激素釋放素激動劑的使用令子宮縮小（12週比10週； $P=0.041$ ），也縮短手術時間及減少術中失血量。在無腹腔鏡協助的情況下，成功為12名（80%）患者進行下陰式子宮切除術及雙側經陰道輸卵管卵巢切除術。這些技術明顯存在着學習曲線的規律。

**結論** 外科醫生的經驗可以影響併發症發生率以及經陰道輸卵管卵巢切除術的成功率。多用促性腺激素釋放素激動劑或可進一步降低併發症發生率，並增加陰道子宮切除術的可行性。

performed locally in 1999 and 2004 were estimated to be 13.1% and 11.8%, respectively. Most of the vaginal hysterectomies performed in these years (75.1% and 82.9%, respectively) were for patients with genital prolapse.<sup>4</sup> These estimates were derived by dividing the numbers of vaginal hysterectomies with pelvic floor repair (338 and 420, respectively) by the total number of vaginal hysterectomies (450 and 507, respectively). In our department, until 1995, the vaginal route was rarely chosen for patients without genital prolapse. In that year, we performed our first laparoscopically assisted vaginal hysterectomy (LAVH). From 1995 to 1998, 93 LAVHs were performed. We performed our first vaginal hysterectomy on a patient without genital prolapse in 1999. Our first series (from 1999 to 2005) was reported in 2007.<sup>5</sup> Here we review our subsequent series, and share our experience introducing the technique of vaginal hysterectomy for patients without genital prolapse.

## Methods

Queen Mary Hospital is a university-affiliated facility serving the population of Hong Kong Island West. A retrospective chart review was performed for all patients who had vaginal hysterectomies in the absence of genital prolapse carried out in the inclusive periods 1999-2005 and 2006-2009. Corresponding subjects were identified using scheduled elective operation lists in the computerised clinical database (Clinical Management System, Hospital Authority, Hong Kong), and those scheduled for vaginal hysterectomy were identified. Information on the indications, operative procedures, and complications was extracted and analysed. Vaginal hysterectomy was offered for patients with a uterine size equivalent to a pregnancy of less than 12 weeks and unrestricted uterine mobility.<sup>6</sup> Because of the retrospective nature of this study however, the actual number of suitable patients not offered or who refused this option could not be determined. Since 2006, if the uterine size was larger than or equal to 12 weeks, the patient was given a gonadotropin-releasing hormone agonist (GnRHa) injection intramuscularly (11.25 mg leuprorelin acetate) 3 months prior to the operation. Vaginal hysterectomies were performed as previously described<sup>5</sup> under general anaesthesia with prophylactic antibiotics being given at induction. If bilateral salpingo-oophorectomies were to be done, the infundibulopelvic ligaments were clamped as close to and as medial as possible to the ovary. The ovary and tube were severed and the pedicles double-ligated.<sup>7</sup> Quantitative data were analysed using the Statistical Package for the Social Sciences (Windows version 18.0; SPSS Inc, Chicago [IL], US). Student's *t* tests were used for continuous variables that were normally distributed and the Mann-Whitney *U* test was used for skewed data. Chi squared or Fisher's exact tests were used for dichotomous outcomes. Results were considered significant when the *P* value was  $<0.05$ . The study protocol was approved by the Institutional Review Boards of the University of Hong Kong and the Hospital Authority (Hong Kong West Cluster).

## Results

The different indications for hysterectomies performed in our department for benign diseases from 1999 to 2005 and 2006 to 2009 are listed in Table 1. Demographic data pertaining to these two patient groups are listed in Table 2. In the first period, seven gynaecologists including trainees under supervision carried out a total of 94 vaginal hysterectomies in patients without genital prolapse. Six of these gynaecologists with one new trainee carried out a total of 98 vaginal hysterectomies in the second period. Apart from vaginal hysterectomies, 10 and 23 patients, respectively had additional procedures

TABLE 1. Preoperative diagnoses

Preoperative diagnoses	No. (%) of patients	
	1999-2005 (n=94)	2006-2009 (n=98)
Uterine fibroid	77 (82)	80 (82)
Adenomyosis	5 (5)	5 (5)
Microinvasive carcinoma of cervix/cervical intraepithelial neoplasia	6 (6)	6 (6)
Dysfunctional uterine bleeding	3 (3)	4 (4)
Endometrial hyperplasia	1 (1)	1 (1)
Other	2 (2)	2 (2)

TABLE 2. Demographic data

Demographics*	1999-2005 (n=94)	2006-2009 (n=98)	P value
Median (range) age (years)	44 (39-62)	46 (37-71)	0.001
No. of Chinese patients	89 (95%)	90 (92%)	-
No. with previous LSCS	18	25	0.061
One	13	13	
Two	3	12	
Three	2	0	
No. with previous LEEP or cone biopsy	6	5	0.703
Median (range) uterine size (weeks)	8 (4-12)	10 (6-18)	<0.001
Mean (range) operative blood loss (mL)	334 (50-2000)	427 (50-2820)	0.522
Mean (range) uterine weight (g)	226 (40-504)	245 (23-670)	0.308
Mean (range) operating time (mins)	77 (35-197)	91 (35-290)	0.056
Additional procedures	10 (11%) Patients (1 prophylactic salpingo-oophorectomy)	23 (23%) Patients (15 prophylactic salpingo-oophorectomies)	0.018 (<0.001 <sup>†</sup> )
Conversion to laparoscopy/laparotomy	3 (3%)	16 (16%)	0.003
Laparoscopy	1 For haemostasis 1 For ovarian cyst	3 For haemostasis 4 For pelvic adhesions 6 Due to no uterine descent 1 For ovarian cyst	-
Laparotomy	1 For haemostasis	1 For haemostasis 1 For limited vaginal access	-

\* LSCS denotes lower segment caesarean section, and LEEP loop electrosurgical excision procedure

† This is the P value for patients having vaginal bilateral salpingo-oophorectomies

(P=0.018). In the second period, there were 15 concomitant bilateral salpingo-oophorectomies. Regarding the remaining eight procedures, they entailed excision of incidental fimbrial (paraovarian) cysts (n=4); laparoscopic left salpingo-oophorectomy for a left ovarian fibroma; removal of the Hulka clip for a previous tubal occlusion; marsupialisation for a Bartholin's cyst and breast mass excision; and laparoscopic repair of an operative bladder injury. Respectively in the two periods, conversion rates to laparotomy were similar (1% vs 2%), 2 and 14 patients had conversions to laparoscopy, 1 and 2 to laparotomy, and 8 and 1 did not receive prophylactic antibiotics. The uterus was removed intact in 11 and 12 patients, respectively. The remaining patients underwent removal of the uterus, sometimes combined with bisection, morcellation, or myomectomy. A drain was inserted at the end of the procedure in 24 and

TABLE 3. Complication rates with vaginal hysterectomy

Complication	1999-2005 (n=94)	2006-2009 (n=98)	P value
Unexplained fever	4 (4)	3 (3)	0.659
Bowel injury	0 (0)	0 (0)	-
Bladder injury	3 (3)	1 (1)	0.292
Transfusion rate	9 (10)	8 (8)	0.731
Vault haematoma	11 (12)	1 (1)	0.002

21 patients, respectively. In all, 32 and 19 patients did not take any analgesics after their operations. Median hospital stays were 3 days in both periods; 9 and 6 patients stayed longer than 5 days, respectively. Table 3 lists complications related to the procedure. The rate of vault haematoma development decreased

**TABLE 4.** Preoperative gonadotropin-releasing hormone agonist (GnRHa) use in patients having a uterus equal to or larger than 12 weeks of gestation

	GnRHa not given (n=19)	GnRHa given* (n=21)	P value
Median (range) uterine size during operation (weeks)	12 (12)	10 (8-18)	0.041
Mean (range) duration of operation (mins)	107 (44-290)	93 (44-199)	0.915
Mean (range) intra-operative blood loss (mL)	695 (50-2000)	413 (100-950)	0.347
Transfusion rate	3/19 (16%)	3/21 (14%)	0.894
Bladder injury	1/19 (5%)	0/21 (0%)	0.287
Conversion to laparoscopy/laparotomy	6/19 (32%) 1 Laparoscopy for haemostasis 3 Laparoscopic assistance for no descent 2 Laparoscopic assistance for intra-abdominal adhesion	4/21 (19%) 1 Laparoscopy for haemostasis 1 Laparoscopic assistance for no descent 1 Laparoscopic assistance for intra-abdominal adhesion 1 Laparotomy due to limited vaginal access†	0.361

\* Leuprorelin acetate (11.25 mg) was given 3 months prior to the operation

† Never sexually active

**TABLE 5.** Vaginal hysterectomy with bilateral salpingo-oophorectomies during 2006-2009

	Data
No. of patients	15/98 (15%)
Median (range) uterine size during operation (weeks)	10 (6-18)
Mean (range) duration of operation (mins)	112 (53-195)
Mean (range) intra-operative blood loss (mL)	485 (50-2000)
No. of conversion to laparoscopy	3/15 (20%)

significantly in the second period (from 12% to 1%; P=0.002). In the second period, there were 40 patients with preoperative uterine sizes equal to or larger than 12 weeks of gestation (Table 4). In all, 21 patients received preoperative GnRHa 3 months prior to the operation. Table 4 also shows uterine sizes, operation durations, blood loss volumes, and complication rates in recipients and non-recipients of this treatment.

Only one concomitant bilateral salpingo-oophorectomy was performed in the first period. Bilateral vaginal salpingo-oophorectomies were performed in 15 patients in the second period (Table 5); laparoscopic assistance was resorted to for three of these. All adnexae looked normal at the time of operation, except that one patient had bilateral 2-cm endometriotic cysts, for which conversion to laparoscopy was deemed necessary due to pelvic adhesion encountered during vaginal hysterectomy. In all, 12 procedures were carried out by the most experienced surgeon, with only one conversion to laparoscopic assistance (due to pelvic adhesions resulting from endometriosis). Three procedures were by another surgeon, with two conversions to laparoscopic assistance (due to pelvic adhesions and a fibroid over the anterior wall close to the cervix).

## Discussion

In our previous report,<sup>5</sup> we observed that the surgeon's experience was an important factor in reducing complications. In particular, attention to 'bleeders' at the 'four- and eight-o'clock regions' reduced the frequency of vault haematomas. We suggested that use of GnRHa may increase the chance of successful vaginal hysterectomy.

The importance of the surgeon's experience was confirmed in the current series. Three bladder injuries occurred in the first period, all within the first 10 cases operated on by the respective surgeon. Only one bladder injury occurred in the second period. The patient had had a prior appendectomy and two previous lower segment caesarean sections. The uterine size was 12 weeks and GnRHa was not given. Similarly, the frequency of vault haematomas decreased significantly from 12% to 1% (P=0.002). There was no difference in postoperative management in these two periods. Any decision to investigate for the presence of a vault haematoma depended on the attending doctor's clinical suspicions, often based on a decrease in haemoglobin level, fever, or detection of a pelvic mass. There was no postoperative haemorrhage warranting a second operation in the second period, whilst there were three in the first period. There were no significant differences in mean operative blood losses, uterine weights, or operating times, though more additional procedures were performed in the second period.

We started using preoperative GnRHa in 2006, and about half of our patients (with uterine size of ≥12 weeks of gestation) received such injections. The use of GnRHa resulted in a reduction in mean uterine size in the second period (12 weeks vs 10 weeks; P=0.041). A trend towards a decrease in operating time and blood loss was also evident after its use. With more liberal use of GnRHa, the number

of vaginal hysterectomies may increase further and complication rates may diminish further.

Only one bilateral salpingo-oophorectomy was performed in the first period. In the second period, salpingo-oophorectomies were attempted in 15 patients, and successfully completed vaginally in 12 (80%) of the patients. The most experienced surgeon performed the procedure on 12 patients with only one conversion. Another surgeon performed the remaining three procedures with two conversions, possibly reflecting the importance of the surgeon's experience.

It was suggested that introduction of LAVH into gynaecology training could increase the confidence and skill of surgeons performing this intervention,<sup>8</sup> though we cannot identify any publication to support this suggestion. We managed to introduce vaginal hysterectomies for patients without genital prolapse by starting with LAVH. The vaginal part of LAVH is the same as that for vaginal hysterectomies. We also learned to remove the uterus after its bisection or morcellation when we performed LAVH. In our experience, the uterus could be removed intact only in about 10% of our patients. In retrospect, it seems that performance of LAVH is an important step before the introduction of vaginal hysterectomies on patients without genital prolapse. After mastering the technique, LAVH should be reserved for patients for whom laparoscopy can produce an advantage, for example by allowing thorough intraperitoneal adhesion assessment and subsequent adhesiolysis.

Interestingly, more than 90% of our patients were Chinese, but information in the English

literature on vaginal hysterectomies without prolapse in this patient group was minimal. Our findings demonstrate that the introduction of the procedure appeared equally applicable to the Chinese.

This was a retrospective study comparing application of the same technique in two different time periods. Thus, the inconsistent use of preoperative GnRHa may have affected the complication rate. The median uterine size was larger in the second period (8 weeks vs 10 weeks;  $P < 0.001$ ). Patients with borderline uterine size may not receive preoperative GnRHa before attempting vaginal hysterectomy. This too may explain the increased conversion rate to laparoscopy in the second period.

## Conclusions

We believe that LAVH is a useful preliminary step to developing the skills needed for vaginal hysterectomies in patients without uterine prolapse. The frequency of complications can be reduced with experience. The use of GnRHa may reduce the complication rate and increase the number of suitable candidates for this operation. Vaginal bilateral salpingo-oophorectomies can be introduced at a later date when more experience is accumulated.

## Declaration

No conflicts of interest were declared by the authors.

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