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How should we enter peritoneum in vaginal hysterectomy?

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Abstract

Aim: Anterior and posterior entrances to the peritoneal cavity are essential steps in vaginal hysterectomy. The objective of this study was to compare surgical techniques and results in women who had primarily anterior colpotomy or primarily posterior colpotomy to enter the peritoneum in vaginal hysterectomy.

Material and Methods: We analyzed the data of 90 women who underwent vaginal hysterectomy by the same surgical team in a university hospital between 2017 and 2021. The patients have divided into two groups: primarily anterior colpotomy or primarily posterior colpotomy. Operation time, amount of bleeding, and complication rates were compared between the two groups.

Results: First anterior colpotomy was performed in 44 patients, and the first colpotomy posterior was performed in 46 patients. Patient characteristics were similar in both groups. The mean age of the patients was 63.6±8.6 years, and the mean number of pregnancies was 3.07±1.05. The mean preoperative and postoperative hemoglobin difference was 1.5±0.6 g/dl. The mean uterine length was 9.33±2.07 cm, and the mean uterine weight was calculated as 118.1±42.2 g. The operation time was significantly shorter in the first colpotomy posterior group (67.5±7.7 min vs. 78.1±12.6 min $p<0.05$). While no significant complications were observed in the first posterior colpotomy group, one bladder injury was observed in the first anterior colpotomy group.

Discussion: In a vaginal hysterectomy, when posterior colpotomy is performed first, Entrance into the peritoneal cavity is safer and quicker. Thus, surgeons feel more comfortable and secure while performing a vaginal hysterectomy and return to abdominal procedures minimally.

Keywords

Vaginal Hysterectomy, Anterior Colpotomy, Posterior Colpotomy, Peritoneal Reflection

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Introduction

Hysterectomy is one of the most frequently performed operations in women [1]. It can be abdominal (AH), laparoscopic (LH), or vaginal (VH). Vaginal hysterectomy has better results and fewer complication rates than other methods and is the first method preferred in suitable patients [2,3]. However, nowadays, vaginal hysterectomies are gradually decreasing due to the increasing use of laparoscopy, the decrease in vaginal hysterectomy experience, and technical difficulties. In vaginal hysterectomy, unlike AH and LH, colpotomy is performed first, and the round ligament is ligated last. Classically, a circular incision is made around the cervix. The peritoneum is opened after the bladder dissection with anterior and posterior colpotomy. The uterosacral and cardinal ligament complex is clamped, and hysterectomy is started. Opening the peritoneum is a critical step in vaginal hysterectomy, and failure at this stage may result in conversion to laparotomy or laparoscopy. Our study aimed to compare surgical techniques and results of women who had primarily anterior colpotomy or posterior colpotomy at this critical stage and thus increase the frequency of vaginal hysterectomy.

Material and Methods

Ninety patients who underwent vaginal hysterectomy by the same surgical team for benign gynecological reasons in the university hospital between 2017 and 2021 were included in this study. Vaginal hysterectomy was performed on patients who met the following criteria: Pubic arch greater than 90 degrees, uterine descent is present, and uterine size is less than 12 weeks of size. Perineoplasty was also performed routinely in all patients who underwent vaginal hysterectomy. Vaginal hysterectomy was not preferred in patients with suspected malignancy, endometriosis, and no uterine descent. Patient files were scanned retrospectively, and the demographic characteristics of the patients, indications for surgery, uterine dimensions, operation times, and preoperative and postoperative hemoglobin differences were noted. Uterine weight was estimated sonographically using the formula of Harb and Adam: weight (g) = 50+(4/3 x π(Pi) x L/2 x W/2 x AP/2), where (L) is the length of the uterus from the dome of the fundus to the level of the external os, (W) is the maximum width of the uterus at the level of the cornea, and (AP) is the anteroposterior diameter of the uterus [4]. The patients were divided into two groups: those who underwent anterior colpotomy first and those who underwent posterior colpotomy first, and it was compared whether there was a difference between the two groups in terms of the operation time, amount of bleeding, and complications.

The ethics committee of university approved the protocol of this study.

Surgical Technique

The patients were placed in the dorsal lithotomy position under spinal anesthesia. A Foley catheter was placed in the bladder to prevent bladder injury. The cervix was held with a tenaculum, and a circular incision was made around the cervix at the level of the cervicovaginal junction.

In patients who primarily underwent anterior colpotomy, the uterus was pulled down, the anterior surface of the vaginal mucosa was held and stretched, and sharp and blunt dissection was performed to separate the vaginal mucosa from the cervical stroma until anterior peritoneal reflection was observed. The peritoneum was found, the peritoneal cavity was entered sharply, and a Deaver retractor was placed in the peritoneal cavity to protect the bladder. Afterward, the peritoneum was found by holding and stretching the vaginal epithelium with an Allis clamp from the posterior part of the incision made around the cervix. The peritoneal cavity was entered sharply. Then hysterectomy was started.

In patients who underwent posterior colpotomy first, the uterus was pulled upwards after a circular incision was made around the cervix. The peritoneum was found by holding and stretching the posterior vaginal epithelium with an Allis clamp. Once the posterior cul-de-sac was clear, the peritoneal cavity was entered sharply. The vesicouterine space was reached after the incision was widened by sliding the index and middle fingers over the uterus. When the fingertips were felt on the anterior peritoneum, the bladder was pushed bluntly to make the peritoneum visible on the fingertips.

A small incision was made between two fingers with scissors, and a Deaver retractor was inserted into the peritoneal cavity. Then hysterectomy was started.

Statistics

SPSS 23 software (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. All tests were two-sided, and p-values < 0.05 were considered statistically significant. Continuous variables were given as mean, standard deviation (SD), and categorical variables were given as the number of patients and percentages. The Kolmogorov-Smirnov test was used to evaluate the normal distribution of variables. The x2 test was used to analyze categorical variables, the t-test was used for normally distributed variables, and the Mann-Whitney U test was used for abnormally distributed variables.

Results

Ninety patients were included in the study. The patients were divided into two groups according to the order of colpotomy; first anterior colpotomy and first posterior colpotomy. While colpotomy anterior was performed first in 44 patients to enter the peritoneum, colpotomy posterior was first performed in 46 patients.

The mean age of the patients was 63.6±8.6 years, the mean number of pregnancies was 3.07±1.05. The mean operation time was 72.7±11.6 minutes, and the mean preoperative and postoperative hemoglobin difference was 1.5±0.6 g/dl. The average uterine length was 9.33±2.07 cm, and the mean uterine weight was calculated as 118.1±42.2 g; 21.1% of the patients had DM and asthma. VH was performed in 76 (84.4%) patients for pelvic organ prolapse, while 14 (15.6%) patients underwent VH due to abnormal uterine bleeding; 25.6% of the patients had a history of previous pelvic surgery, of which 18.9% a cesarean section.

According to the International Continence Society POP-Q classification [5], the degree of uterine prolapse was staged. In this system, pelvic organ prolapse is divided into five stages. No prolapse could be demonstrated in stage 0. In stage 1, the most distal point of the prolapse is 1 cm above the hymen level.

In stage 2, the most distal point of the prolapsus is 1 cm distal or proximal to the hymen level. In stage 3, the most distal point of the prolapse is more than 1 cm distal to the hymen level. In stage 4, there is a total eversion of the lower genital tract. According to this staging system, 33 patients (36.7%) had stage 4, 18 patients (20%) had stage 3, 30 patients (33.3%) had stage 2, and 9 patients (10%) had stage 1 uterine prolapse (the demographic characteristics of the two groups are compared in Table 1.). The operation time was significantly shorter in the first colpotomy posterior group (67.5±7.7 min vs. 78.1±12.6 min $p<0.05$). The operative time, hemoglobin difference and ultrasound variables between the two groups are shown in Table 2. Duration of the operation was not only affected by the priority of colpotomy but also inversely proportional to the degree of prolapse ($p<0.05$). While no major complications were observed in the first posterior colpotomy group, one bladder injury was observed in the first anterior colpotomy group.

Table 1. General characteristics between two groups

	First Anterior Colpotomy (n=44)	First Posterior Colpotomy (n=46)
Mean age (years)	64,8±8,3	62,5±8,9
Mean parity	3,1±1,08	3,02±1,04
Medical history (n, %)		
Hypertension and/or diabetes mellitus	7 (7,7%)	6 (6,6%)
Chronic obstructive lung diseases	1 (1,1%)	5 (5,5%)
Previous pelvic surgery (n, %)		
Abdominal pelvic surgery (myomectomy, ovarian surgery etc.)	3 (3,3%)	3 (3,3%)
Caesarean section	4 (4,4%)	13 (14,4%)
Indications (n, %)		
Pelvic organ prolapse	41 (45,5%)	35 (38,8%)
Abnormal uterine bleeding	3 (3,3%)	11 (12,2%)
Degree of pelvic prolapse (n, %)		
Stage 1	2 (2,2%)	7 (7,7%)
Stage 2	18 (20%)	12 (13,3%)
Stage 3	8 (8,8%)	10 (1,1%)
Stage 4	16 (17,7%)	17 (18,8%)
Complication	1 (1,1%)	0

Table 2. Operative time, hemoglobin difference and ultrasound variables between the two groups

	First Anterior Colpotomy (n=44)	First Posterior Colpotomy (n=46)	P-value
Mean operation time (min)	78,1±12,6	67,5±7,7	0.000
Hemoglobin (g/dl)			
Mean preoperative HgB	12,7±1,2	12,2±1,3	0.06
Mean postoperative HgB	11,2±1,2	10,7±1,1	0,12
Average hemoglobin difference	1,5±0,7	1,4±0,5	0,5
Ultrasound variables			
US length (cm)	9,01±2,04	9,6±2,08	0.23
US width (cm)	3,7±0,8	4,1±0,9	0.056
US AP (cm)	3,19±0,7	3,3±0,7	0.22
US estimated weight (g)	110,5±37,2	125,3±45,8	0.06

Values were expressed as mean+SD, unless otherwise stated

Discussion

While the vaginal approach is the most recommended hysterectomy option with low complication rates and proven advantages, it is being applied with decreasing frequency [6-8]. Although laparoscopic-assisted vaginal hysterectomy, total laparoscopic hysterectomy, and robotic-assisted hysterectomy show similar recovery times, complications, and patient comfort, the cost of the vaginal approach is more affordable [7,9-11]. According to a secondary analysis of the United States National Surgical Quality Improvement Program Database, which included 161,626 women undergoing vaginal or laparoscopic hysterectomy between 2008 and 2018, vaginal hysterectomy rates decreased from 51 to 13 percent, while total laparoscopic hysterectomy rates increased from 12 to 68 percent [12]. Increasing use of laparoscopy, insufficient training, and surgical experience have been blamed for decreasing vaginal hysterectomy rates [13-15]. In the survey study conducted in the United States to determine the attitudes of gynecologists towards hysterectomy and barriers to minimally invasive hysterectomy applications, the main barriers to performing VH were technical difficulty, the potential for complications, and caseload of VH [16]. One of the critical points in vaginal hysterectomy is the opening of the peritoneum. Peritoneal reflection may be higher than expected, especially in patients with cervical elongation.

In addition, the scar between the bladder and uterus in patients with a previous cesarean section may make anterior peritoneal access more complicated. This may cause bladder injury during dissection and bleeding from the bladder column due to the dissection shifting too much laterally. In our study, methods of entry into the peritoneum, which is one of the most critical steps of VH, were compared to increase VH frequency. It was found that the operation time was significantly shorter in the group in which the first colpotomy was performed posteriorly, and this is due to the surgeon not losing much time for bladder dissection. After entering the peritoneum with a posterior colpotomy, the vesicouterine junction is made visible, and the anterior peritoneum is entered more securely, which makes the surgeon feel confident during a vaginal hysterectomy. Thus, even complex cases will be completed vaginally without the need to return to laparotomy. Bladder injuries are most common during vaginal hysterectomy with a prevalence of 2% [17-19]. The risk of bladder injury is increased in women with previous pelvic and bladder surgery, including cesarean section. Bowel injuries were reported in 0.4% of women who underwent VH [20]. In our study, bladder and bowel injuries were not observed in 46 patients who underwent the first posterior colpotomy.

Conclusion

In a vaginal hysterectomy, when posterior colpotomy is performed first, it is entered into the peritoneal cavity more safely and quickly. Thus, surgeons feel more comfortable and safer while performing a vaginal hysterectomy and return to abdominal procedures minimally.

The study's limitations are its retrospective nature and small number of cases. Randomized controlled studies with a large number of cohorts are needed in this regard.

Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest
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