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CLINICAL ARTICLE

Vaginal cuff dehiscence after hysterectomy

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ABSTRACT

Objective: To determine the incidence of vaginal cuff dehiscence (VCD) among women undergoing hysterectomy according to clinico-surgical factors including surgical route, and to describe patient characteristics associated with VCD. **Methods:** In a retrospective study, the medical records of all women who underwent hysterectomy between January 2005 and March 2011 at a university teaching hospital in Seoul, Republic of Korea, were reviewed. The incidence of VCD was determined in relation to the following factors: patient age, hysterectomy route, indication for hysterectomy, and extent of resection (either simple or radical hysterectomy). **Results:** Among 9973 hysterectomies, 37 (0.37%) cases of VCD were identified. The incidence of VCD was significantly higher after abdominal hysterectomy (0.6%) than after laparoscopic (0.2%) or vaginal (0.4%) hysterectomy ($P = 0.016$). Compared with laparoscopic approaches, abdominal hysterectomy was associated with a higher risk of VCD (odds ratio, 2.735; 95% confidence interval, 1.380–5.420). However, there was no significant difference in the incidence of VCD according to surgical indication or extent of resection. **Conclusion:** Laparoscopic hysterectomy was found to be associated with a lower risk of VCD compared with abdominal hysterectomy. The lower risk is probably related to the different techniques used for colpotomy and cuff closure.

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1. Introduction

Hysterectomy is one of the most frequently performed gynecologic procedures. A complication of this procedure is vaginal cuff dehiscence (VCD)—namely, partial or full thickness separation of the anterior and posterior edges of the vaginal cuff [1]. It is a rare occurrence in pelvic surgery with an incidence ranging from 0.14% to 4.1% [2]. Nevertheless, VCD can be a life-threatening development, particularly if it is complicated by bowel evisceration leading to intestinal ischemia and intra-abdominal infection. The mortality rate associated with vaginal evisceration has been reported to be 5.6% [3].

Despite its significance, VCD coupled with evisceration tends to be underestimated in terms of incidence, which varies among studies owing to underreporting and loss of patients to follow-up after hysterectomy. It has been reported that evisceration can develop in up to 70% of cases of VCD [4]. Until now, fewer than 100 cases of evisceration have been reported and an overall incidence of evisceration of 0.032% to 1.2% has been suggested [2].

For several years, there has been increasing effort to analyze the risk factors for VCD, including studies of patient demographics,

surgical techniques, and post-hysterectomy anatomic changes of the pelvis. Although evidence suggests that many diverse factors influence the rate of occurrence, it remains unclear whether the route of hysterectomy itself is an independent risk factor. Some studies have suggested that laparoscopic hysterectomy might have a higher risk of VCD compared with abdominal or vaginal hysterectomy [5,6], but this remains controversial.

The aim of the present study was to estimate the incidence of VCD and to identify potential risk factors, including surgical route and patient characteristics, that might be associated with VCD among women who underwent hysterectomy.

2. Materials and methods

In a retrospective study, the incidence of VCD was determined among all women who underwent hysterectomy at Asan Medical Center, Seoul, Republic of Korea, between January 1, 2005, and March 31, 2011. The study was conducted after approval by the institutional review board of Asan Medical Center. Informed consent was considered unnecessary because the study was performed retrospectively by chart review.

The surgical procedures were categorized into 5 groups according to both incision type and extent of resection: total abdominal hysterectomy (TAH), total vaginal hysterectomy (TVH), laparoscopy-assisted vaginal hysterectomy (LAVH), abdominal radical hysterectomy (ARH), and laparoscopic radical hysterectomy (LRH).

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Total laparoscopic hysterectomy (TLH) and robotic hysterectomy procedures were excluded from the analyses. In accordance with surgeon preference, LAVH is performed over TLH for laparoscopic hysterectomy at Asan Medical Center. As a result, TLH cases were extremely rare in the study population, being performed only when LAVH was considered unfeasible because of pelvic adhesions or advanced tumor invasion. Similarly, the use of robotic hysterectomy has been too sparse to clearly assess surgical outcomes.

Abdominal, vaginal, and laparoscopic hysterectomies were carried out by a standard procedure [7]. For abdominal hysterectomy, colpotomy was performed by using monopolar coagulation energy (40–45 W). The vault cuff was closed with interrupted sutures of 1-0 polyglactin (Vicryl; Ethicon, Livingston, West Lothian, UK) on each lateral side and then with locking running sutures in the remaining cuff. The pelvic peritoneum was left open or closed with a running suture according to the surgeon's preference. In LAVH, both removal of a uterine specimen and cuff closure with 1-0 polyglactin were performed vaginally after colpotomy was completed vaginally using monopolar coagulation. Radical hysterectomy consisted of a class II or III operation, defined as parametrial removal and ligation of uterine vessels at the level of the ureter, and parametrial removal lateral to the ureter and ligation of uterine vessels at the hypogastric vessel origin, respectively [7]. Vaginal suppositories were not used after any type of hysterectomy. Patients were examined by clinicians in outpatient clinics within 2 weeks of surgery in accordance with institutional policy. Sexual intercourse was discouraged for the first 2 months after surgery.

With regard to the development of VCD, massive irrigation with saline solution and reduction of the bowel were conducted. On the basis of the surgeon's decision, conservative management was attempted when the vault had partially ruptured and an eviscerated portion of the organ was small and easily returnable. For more severe ruptures, surgical repair was required and conducted via a vaginal or abdominal approach. The vault cuff was closed with continuous sutures of 1-0 polyglactin after resection of the cuff margin.

To investigate the association between various risk factors and VCD, data were extracted from the medical records on patient age, hysterectomy route, indication for hysterectomy, and extent of resection (simple vs radical hysterectomy). Surgical indication was classified into 3 groups: (1) pelvic prolapse; (2) benign disease other than prolapse; and (3) malignant disease including borderline tumors. All diagnoses were confirmed pathologically. In Korea, the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) coding system is used to classify diagnoses and procedures; these codes were extracted and applied to the present data.

Data were analyzed via SPSS version 12.0 (IBM, Armonk, NY, USA). Continuous variables were compared via the paired *t* test. Categorical variables were compared via a 2-tailed χ^2 test or Fisher exact test, as appropriate. Odds ratios and 95% confidence intervals (CIs) were calculated via a logistic regression model. A *P* value of less than 0.05 was taken to be significant.

3. Results

During the study period, 9973 hysterectomies were performed at Asan Medical Center: 5420 LAVH (54.4%), 3141 TAH (31.5%), 552 LRH (5.5%), 551 TVH (5.5%), and 309 RAH (3.1%). Among the study population, there were 37 cases of VCD, leading to an overall incidence of 0.37%. The annual incidence of VCD varied from 0.17% to 0.78% (Table 1).

There was no significant difference between women without and those with VCD on the basis of mean age, type of surgical procedure, indication for hysterectomy, or extent of hysterectomy (Table 2). When categorized by surgical procedure, the incidence of VCD did not differ significantly (0.2% of LAVH cases, 0.4% of TVH cases, 0.6%

of TAH cases, 0.6% of ARH cases, and 0.7% of LRH cases; *P* = 0.664). When categorized by surgical route, however, the incidence of VCD was 0.2% among women undergoing laparoscopic hysterectomy (both LAVH and LRH), 0.4% among those undergoing TVH, and 0.6% among those undergoing abdominal hysterectomy (both TAH and ARH) (*P* = 0.016).

With regard to indication for hysterectomy, the incidence of VCD did not increase for either pelvic prolapse or malignant diagnosis compared with benign disease (*P* = 0.779). On the basis of multivariate logistic regression analysis, a laparotomy approach was associated with an increased occurrence of VCD compared with laparoscopy (OR, 2.735; 95% CI, 1.38–5.42) (Table 3).

The clinical characteristics of the 37 patients with VCD were reviewed (Table 4). The most frequently performed type of hysterectomy was TAH (51.4%), and the interval between VCD and hysterectomy was 68 days (range, 5–512 days). In total, 26 patients underwent only conservative care including saline irrigation and packing the vagina with moist sponges, followed by stabilization and intravenous antibiotic therapy. For 11 women (29.7%), surgical repair was required and conducted via a vaginal (10 women) or abdominal (1 woman) approach. Although VCD complicated by bowel evisceration was observed among 9 women (24.3%), the postoperative course was uneventful for these women.

4. Discussion

The present analysis of 9973 hysterectomies indicates that an abdominal surgical route is an independent risk factor for VCD, even after adjusting for other variables such as age, indication for hysterectomy, and surgical extent of hysterectomy.

The incidence of VCD after any type of pelvic surgery is 0.03% [8,9]. A recent review identified only 44 publications on VCD, 68% of which were case reports that involved 2 or fewer patients [2]. Owing to the rarity of VCD, risk factors are difficult to identify. Moreover, because so many clinical and surgical factors can influence the occurrence of VCD, very few of them are supported by evidence. In 1994, Somkuti et al. [10] proposed the following 10 risk factors for VCD: increased age, coitus before healing, trauma or rape, corticosteroid therapy, use of the Valsalva maneuver, previous vaginoplasty, postoperative infection, hematoma, poor surgical technique, and radiotherapy [10].

On the one hand, it is broadly accepted that trigger events that increase abdominal pressure, such as vomiting or straining to defecate, increase the risk of VCD, along with vaginal atrophy or enterocele after hysterectomy. These events contribute to stretching of the vaginal wall and shifting of intra-abdominal pressure toward the vaginal apex, which increases the risk of cuff rupture [11,12]. On the other hand, 2 studies have reported no relationship between pelvic support strength and VCD [4,5]. These studies divided surgical indication into 3 groups (pelvic prolapse, benign uterine disease, and gynecologic neoplasia), none of which had a significant relationship with incidence of VCD, as confirmed by the present results.

In several case reports, malignant neoplasia, rather than benign disease, has been postulated as a possible risk factor for VCD after hysterectomy [11]. In such cases, patients tended to have advanced age, malnutrition, prolonged operation time, adjuvant chemotherapy or radiotherapy, intractable ascites, and increased rate of postoperative complications such as vaginal cuff infection or hematoma. In the present study, the incidence of VCD among patients undergoing adjuvant chemo- or radiotherapy was twice as high as that among patients with early coitus events (16.2% vs 8.1%). Furthermore, radical hysterectomy has been recently speculated to be a causative factor. Only 5 case reports of vaginal evisceration after radical hysterectomy have been published [13–17]. Among these cases, potential etiologies include a short vagina, reduced tissue vascularity, and possible involvement of tumor tissue [18]. In the present study, however, the difference

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