—Case Reports—

Laparoscopic Repair of Vaginal Evisceration after Abdominal Hysterectomy for Uterine Corpus Cancer: A Case Report and Literature Review

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Vaginal cuff dehiscence is a rare but serious complication that can develop after hysterectomy. Emergent surgical intervention is required for vaginal cuff dehiscence due to the potential subsequent vaginal evisceration, which may lead to necrosis of the small bowel. A 62-year-old nulliparous woman with a 30-year history of smoking, diabetes mellitus, and rheumatoid arthritis (treated with oral steroids) presented with a vaginal cuff dehiscence. Thirty-eight days before the admission, she had undergone a radical operation including total abdominal hysterectomy for uterine corpus cancer at another hospital. We performed emergent laparoscopic surgery to reduce the prolapsed small bowel into the abdominal cavity and repaired the vaginal cuff with a two-layer continuous closure using absorbable barbed sutures. The patient experienced no postoperative complications, and no recurrence of the vaginal cuff dehiscence occurred.

Vaginal cuff dehiscence and evisceration can be surgically managed using an abdominal, vaginal, or laparoscopic approach, and the choice of method should be based on patient characteristics and the surgeon's skills. Laparoscopic vaginal cuff repair with a two-layer continuous closure using absorbable barbed sutures is a minimally invasive technique that is safe and effective for medically stable patients with no small bowel injury or vascular compromise and no pelvic abscess.

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Key words: vaginal cuff dehiscence, evisceration, laparoscopic surgery, complication, uterine corpus cancer

Introduction

Vaginal cuff dehiscence is a rare but serious complication of hysterectomy, defined as "a full-thickness separation, partial or total, of the anterior and posterior edges of the vaginal cuff."[1] Dehiscence typically develops 5 to 7 weeks after the hysterectomy, as a result of sexual intercourse at a point when the vaginal cuff fusion is insufficient, and may manifest as atypical genital bleeding, increased vaginal discharge, lower abdominal pain, and vaginal discomfort[2]. Any of these findings in a patient who has undergone a hysterectomy should prompt immediate and thorough speculum and pelvic examination of the vaginal cuff closure. Irradiation, atrophic vaginitis, poorly controlled diabetes mellitus (DM), long-term steroid treatment, and tobacco smoking are known risk factors for vaginal cuff dehiscence, because each of these may prevent fusion of the vaginal cuff[2]. Vaginal cuff dehiscence is a surgical emergency, as prolapse of pelvic content is a potential outcome. If prolapse occurs, it usually involves the small bowel and may result in subsequent bowel injury, including necrosis.

Transabdominal, transvaginal, and laparoscopic approaches to vaginal cuff dehiscence have been described;[3–5] method selection requires an evaluation of the clinical conditions in each case. A laparotomy should be performed in cases involving diffuse peritonitis or pelvic abscess and where a bowel surgery is necessary. However, in stable patients and in the absence of the above

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Fig. 1 Colposcope examination findings
The vaginal cuff shows complete dehiscence and prolapse of the small bowel. The bowel's color is normal, indicating no apparent vascular compromise.

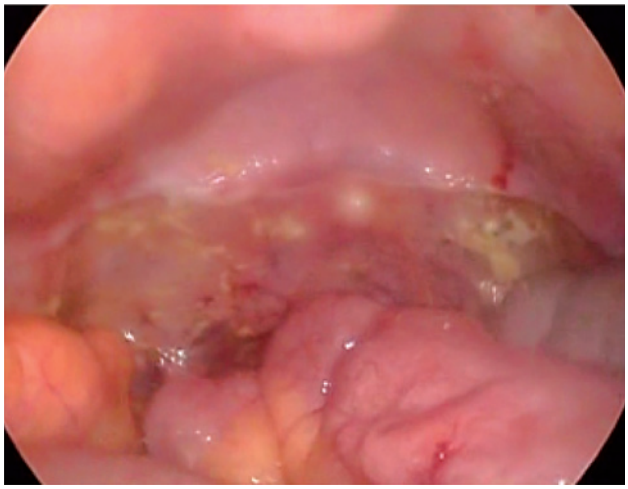

Fig. 2 Intraoperative finding-1
White devitalized tissue is present on the pelvic floor peritoneum. The bowel shows normal tone, and no pelvic abscess is identified.

conditions, a minimally invasive transvaginal closure should be considered a viable option. Moreover, due to the extended indications for laparoscopic surgery and technological improvements in recent years, surgeons should consider a laparoscopic repair in appropriate cases, as it is minimally invasive, yet allows peritoneal examination and washing. These features are an important advantage in the case of vaginal cuff dehiscence, which is often complicated by diffuse peritonitis and pelvic abscess. However, possibly reflecting the rarity of this complication, only four cases of postoperative vaginal cuff dehiscence and evisceration treated solely with laparoscopic surgery have been reported to date[10–13]. We herein present what we believe to be the first reported case of vaginal cuff dehiscence and evisceration occurring after a radical operation for uterine corpus cancer in a patient with multiple risk factors successfully repaired using laparoscopic surgery alone.

Case

A 62-year-old non-obese (body mass index: 18.7 kg/m^2) nulliparous woman with a medical history significant for untreated type 2 diabetes mellitus (DM), rheumatoid arthritis treated for 15 years with oral steroids, and 30 years of tobacco smoking presented with a vaginal cuff dehiscence 38 days after undergoing surgical treatment of uterine corpus cancer (FIGO stage IB) at another hospital. The previous procedure was a total abdominal hysterectomy, bilateral salpingo-oophorectomy, and pelvic lymphadenectomy with vaginal cuff closure using #0 absorbable sutures. Ten days postoperatively, the central section of the abdominal wall wound dehisced and was closed the same day. Twenty-eight days later the patient presented to her previous surgeon with a chief complaint of vaginal discomfort upon defecation. Physical examination revealed a dehiscence of the vaginal cuff and small bowel evisceration, resulting in emergency transfer to our hospital.

We identified the prolapsed small bowel in the vaginal cavity during our initial speculum examination. No injury or color change of the intestine indicating vascular compromise was found (**Fig. 1**).

As bowel resection appeared unnecessary, and the patient had already required abdominal wall dehiscence closure, we chose to perform a laparoscopic repair with peritoneal examination and washing instead of a second laparotomy. After obtaining the patient's informed consent, we proceeded with emergency surgery to avoid the possibility of secondary digestive tract necrosis due to small bowel evisceration and did not perform preoperative diagnostic imaging such as CT or MRI. With the patient in the lithotomy-Trendelenburg position under general anesthesia, a 1.5-cm vertical incision was made in the umbilical region and an abdominal wall lifting device was inserted. All layers of the abdominal wall were lifted, and a 5-mm port was placed through the same region. Three additional 5-mm ports were then introduced into the lower abdomen. During laparoscopic exploration, a superficial devitalized tissue was found on the circumference of the vaginal cuff through which the small bowel was prolapsed (**Fig. 2**). As we identified a small amount of hemorrhage indicating that the vascular sup-

Fig. 3 Intraoperative finding-2
The vaginal cuff tissue, viewed through a colposcope inserted through the vagina and vaginal cuff, shows trace hemorrhage indicating the presence of blood flow.

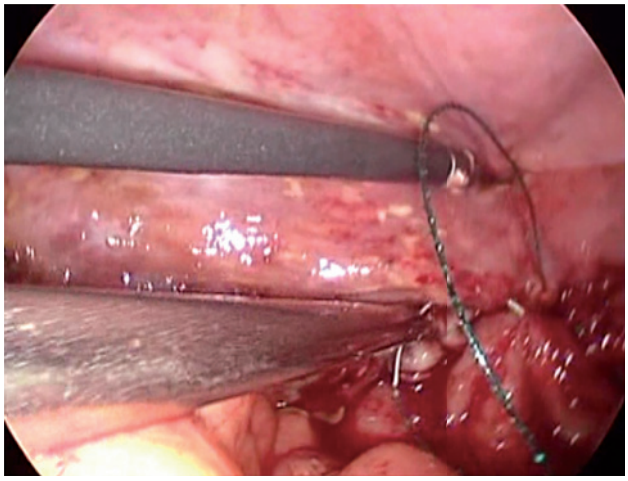

Fig. 5 Intraoperative findings-4
The peritonea of the bladder and rectal sides are closed using a continuous suture technique in the same manner as the vaginal cuff.

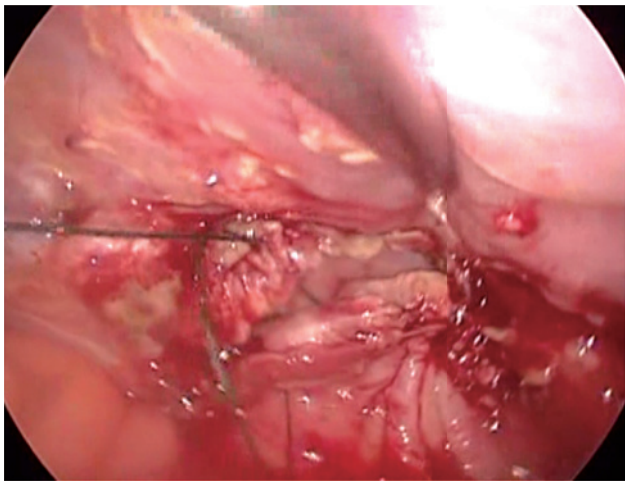

Fig. 4 Intraoperative findings-3
The vaginal cuff dehiscence is closed using a double-layer continuous suture technique using absorbable barbed suture (V-Loc) proceeding from the right to the left side, and returning to the right side.

Fig. 6 Intraoperative finding-5
The operation is completed by abundant saline washing and drain placement on the pelvic floor.

ply was sufficient for tissue fusion, we determined that debridement was unnecessary (**Fig. 3**). Peritonitis was negligible, and no pelvic or peritoneal abscess was detected. The prolapsed segment of the small bowel (20 cm) was reduced into the abdominal cavity using an atraumatic fenestrated forceps. The bowel was confirmed to have no injury and no interruption of the vascular supply; it showed normal color throughout its length. After meticulous peritoneal washing with abundant normal saline, the vaginal cuff was repaired with a two-layer continuous closure using absorbable barbed sutures (V-Loc; Medtronic, Minneapolis, MN, USA) (**Fig. 4**). Moreover, we used a single continuous suture to close the peritonea of the bladder and rectal sides (**Fig. 5**). We completed the procedure with the placement of a pleated drain on the pelvic floor (**Fig. 6**).

The postoperative course was uneventful, and on day three the drain was removed, and antibiotic administration discontinued. The patient was discharged following the initiation of treatment for her type 2 DM. Outpatient examinations performed two and six weeks postoperatively confirmed the intact complete vaginal cuff closure and normal healing.

The patient provided verbal and written informed con-

Table 1 Previous reports of the incidence of vaginal cuff dehiscence in TAH, TVH, TLH, and LAVH, respectively

Source		TAH	TVH	TLH	LAVH	Total
Uccella et al., 2012[3]	Dehiscence rate	0.21% (9/4,291)	0.13% (6/4,534)	0.64% (23/3,573)	N. A.	0.31% (38/12,398)
	Age*	48 (36–82)	68 (50–82)	50.5 (41–65)		
	Parity*	1 (0–3)	2 (1–4)	1 (0–3)		
Ceccaroni et al., 2011[4]	Dehiscence rate	0.25% (8/3,194)	0.15% (4/2,696)	0.80% (22/2,745)	N. A.	0.39% (34/8,635)
	Age*	47.5 (36–82)	69.5 (50–82)	50.5 (41–65)		
	Parity*	1 (0–3)	1.5 (1–2)	1.5 (0–3)		
Hur et al., 2011[5]	Dehiscence rate	0.15% (11/7,392)	0.08% (2/2,534)	1.35% (13/958)	0.28% (2/722)	0.24% (28/11,606)
	Age**	52.3	47	38.2	48.5	
	Parity***					
		0	2 (18.2)	0	3 (23.1)	0
		1	1 (9.1)	0	3 (23.1)	0
		2 or more	8 (72.7)	2 (100)	7 (53.8)	2 (100)

*Mean (Range), **Mean, ***Number (%)
TAH, total abdominal hysterectomy; TVH, total vaginal hysterectomy; TLH, total laparoscopic hysterectomy; LAVH, laparoscopic-assisted vaginal hysterectomy; N. A., not available

sent for the use of her anonymized clinical records and operative photographs for research, including the publication of this case report. This study was approved by the Chiba Hokusoh Hospital Institutional Review Board and conducted in accordance with the principles in The Declaration of Helsinki.

Discussion

Herein we present a case of vaginal cuff dehiscence associated with ileum evisceration as a complication of the radical surgery for uterine corpus cancer that was successfully treated with laparoscopic surgery alone. Furthermore, in contrast to the previously reported four cases of laparoscopic vaginal cuff dehiscence repair cited above, the present case was complicated by multiple risk factors, including poorly controlled DM, a 15-year history of oral steroid intake, and 30 years of tobacco smoking. Previous reports indicate the incidence of vaginal cuff dehiscence is 0.15–0.25%, 0.08–0.15%, and 0.64–1.35% after total abdominal hysterectomy, total vaginal hysterectomy, and total laparoscopic hysterectomy (TLH), respectively (**Table 1**)[3–5]. The risk of vaginal cuff dehiscence is increased by factors that negatively affect wound healing, including a history of radiotherapy, atrophic vaginitis, poorly controlled DM, long-term steroid treatment, and smoking[2–4]. In the present case, the patient had multiple risk factors for incomplete wound healing and, indeed, dehiscence of her abdominal wall wound had developed previously. While it is always necessary to inform a patient about the potential risk of dehiscence and the need for reoperation before a surgical procedure, it is of particular importance to emphasize this possibility to patients with multiple risk factors for wound dehiscence. To the best of our knowledge, only two investigations have compared the incidence of vaginal cuff dehiscence following the procedures performed for benign versus malignant disease. Weizman et al.[6] reported that malignant disease was not a risk factor for vaginal cuff dehiscence. On the other hand, Ceccaroni et al.[4] found that malignant disease was a significant and independent risk factor for vaginal cuff dehiscence and reported an incidence of 0.8% (9/1,153) after total hysterectomy for malignancy versus 0.2% (4/2,289) when performed for pelvic prolapse (p=.014). Although few investigations of this problem are available and they show conflicting results, vaginal cuff dehiscence after hysterectomy for a malignant tumor requires more intensive care, because these patients are elderly in many cases and more likely to have other risk factors than patients treated for benign diseases.

Vaginal evisceration complicates 35–67% of vaginal cuff dehiscence cases[4,5]. Although the distal ileum is the most frequently prolapsed organ, cases of omental, appendiceal, and fallopian tube prolapse are reported[7,8]. Small bowel evisceration is a surgical emergency because of its potential for bowel necrosis resulting from impeded blood flow, which occurs at a frequency of up to 30%[3]. Three methods are available for vaginal evisceration repair, including transabdominal, transvaginal, and laparo-

scopic approaches. When the color of the prolapsed bowel suggests necrosis or diffuse peritonitis results in a pelvic abscess, immediate laparotomy with bowel resection, peritoneal drainage, and vaginal cuff closure is preferable to other procedures. However, in medically stable patients free of these complications, vaginal surgery is an alternative[9]. Although the transvaginal approach has the advantage of being minimally invasive, it does not allow a detailed observation of the abdominal cavity. This drawback must be factored with the pathologic condition and patient characteristics in each case when considering the use of the transvaginal approach. In recent years, the indications for the laparoscopic approach to vaginal cuff dehiscence and evisceration have expanded with the increase in laparoscopic surgeons and the accumulation of clinical experience with laparoscopy[9]. Laparoscopic repair of vaginal cuff dehiscence is advantageous because it is a minimally invasive procedure that allows examination of the abdominal cavity, including the intraperitoneal side of the vaginal cuff and the entire bowel. The first case of vaginal evisceration successfully repaired solely by laparoscopic surgery was reported in 2002 by Lledó et al.[10], and three subsequent cases have been reported[11–13].

In contrast to the present case, none of these was performed after a hysterectomy for a malignant disease. Thomopoulos et al.[13] presented a review of 116 cases of vaginal evisceration reported between 1864 and 2016. They found that the use of laparoscopy alone for the repair of vaginal evisceration had rarely been described, only 2% of all cases. The fact that a good outcome was achieved in each of the cases of laparoscopic repair suggests the efficacy of laparoscopic surgery for vaginal cuff dehiscence and evisceration. At the same time, surgeons with the ability to safely and accurately perform laparoscopic suturing in the abdominal cavity must be available when such a repair is indicated.

Since their introduction in 2009, absorbable barbed sutures such as V-Loc and Quill (Surgical Specialties Corp., Braintree, MA, US) have frequently been used in laparoscopic surgeries, especially for vaginal cuff closure in TLH[14]. Bogliolo et al.[14] performed a systematic review of the articles in which absorbable sutures with or without barbs were compared, and reported that use of the former significantly decreased the time required for vaginal cuff closure (standardized mean difference= − 0.96, 95% CI 1.26−0.70; $p < .001$), and no difference was found in the incidence of genital bleeding or vaginal cuff dehiscence between the two.

The vaginal cuff can be closed in one or two layers. Shen et al.[15] conducted a randomized comparative study in which 427 patients undergoing laparoscopic-assisted vaginal hysterectomy were assigned to the one-layer suture group, two-layer suture group, or open vaginal cuff group. They reported that vaginal vault granulation and vaginal discharge were less likely to develop in the two-layer suture group than in the other two groups. Jeung et al.[16] prospectively investigated the incidence of vaginal cuff dehiscence following TLH in 248 patients allocated to the figure-of-eight suture group or the two-layer continuous suture group. They concluded that a two-layer continuous suture is safe and effective when compared to the figure-of-eight suture method, although they found no statistically significant difference in the incidence of vaginal cuff complications. Cronin et al.[17] reviewed previous case reports and the results of the retrospective investigations regarding vaginal cuff dehiscence and demonstrated that a two-layer closure using absorbable barbed suture and vaginal cuff incision using the monopolar current on cutting mode rather than coagulation mode may help to reduce the risk of vaginal cuff dehiscence after TLH. Although additional investigation is required, the reports discussed above indicate that a two-layer continuous closure using absorbable barbed suture, as we utilized in this case, is suitable for vaginal cuff dehiscence repair.

Although vaginal cuff dehiscence after hysterectomy is a rare complication, very careful postoperative care, including instructions regarding resumption of sexual intercourse and attention to the patient's symptoms, is required, especially for patients at high risk for poor wound healing. To date, no consensus exists regarding the ideal suturing method for the repair of a vaginal cuff dehiscence. Hence, the surgeon must choose the best approach based the characteristics of individual patients. Laparoscopic repair has two advantages, including minimal invasiveness and the ability to perform intraperitoneal examination and washing. However, the cases of vaginal cuff dehiscence complicated by bowel necrosis or peritoneal abscess are likely to require laparotomy.

Conclusion

To the best of our knowledge, this is the first case report of vaginal cuff dehiscence and evisceration performed after radical surgery for uterine malignancy repaired by a solely laparoscopic operation, and it was successful in spite of multiple patient risk factors for poor wound healing. Based on our review of the literature and practical experience, laparoscopic surgery appears to be a safe

and minimally invasive method for the repair of vaginal cuff dehiscence and evisceration, and a two-layer continuous technique using absorbable barbed suture is useful for the vaginal cuff closure. As vaginal cuff dehiscence is a rare complication with limited data available for analysis, verification of our findings requires further cases accumulation and subsequent clinical reports.

Conflict of Interest: The authors declare no conflict of interest.

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