

Immediate Laparoscopic Nontransvesical Repair without Omental Interposition for Vesicovaginal Fistula Developing after Total Abdominal Hysterectomy

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ABSTRACT

Background and Objective: We conducted this study to evaluate the feasibility and efficacy of immediate laparoscopic nontransvesical repair without omental interposition for vesicovaginal fistula (VVF) developing after total abdominal hysterectomy (TAH), which causes not only social and economic misery for the patient but also considerable stress to the physicians who perform the surgery.

Methods: We performed a retrospective review of 5 women who underwent immediate laparoscopic nontransvesical repair without omental interposition for VVFs, developing after TAH from October 2007 to March 2009. In terms of laparoscopic procedure, cystoscopy was performed to confirm the location of fistula and ureteral openings, initially. Without opening the bladder, the fistula tract was identified, and the bladder was dissected from the vagina. The bladder defect was closed by using intracorporeal, continuous, and double-layer suturing, laparoscopically. The vaginal defect was closed using interrupted and single-layer suturing, vaginally. A Foley catheter was inserted for 2 weeks and removed after bladder integrity was confirmed with a retrograde cystogram.

Results: The median age and body mass index of the patients were 47 years and 22.3 kg/m², respectively. Operating time, hemoglobin change, and hospital stay were 95 minutes, 1.1 g/dL, and 5 days, respectively. There were no complications or laparoconversions. During follow-up (median 56.1 weeks; range 26.6 to 74.0), there was no evidence of recurrence.

Conclusions: Immediate laparoscopic nontransvesical repair without omental interposition might be an effective, feasible alternative to the traditional methods in select patients with small sized (<1 cm) VVF developing after TAH.

Key Words: Complication, Hysterectomy, Laparoscopy, Vesicovaginal fistula.

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INTRODUCTION

In developing countries, vesicovaginal fistulas usually result from obstetrical causes. In developed countries, obstetrical vesicovaginal fistulas (VVFs) are uncommon, and most VVFs are related to radiation therapy, malignant disease, and surgical injury. The most common surgical procedure associated with subsequent formation of VVF is hysterectomy, and VVF occurs in 0.08% of the patients who undergo total abdominal hysterectomy (TAH).¹⁻⁴ The development of VVF after gynecologic surgery not only causes social and economic misery for the patient but also causes considerable stress to the physicians who perform the surgery.

Traditionally, most VVFs are treated surgically. However, there is no consensus on several matters: the time of operation (when is surgical management performed after the development of VVF?) and surgical methods (should the transabdominal approach or the transvaginal approach be used?). Recently, the laparoscopic and the robotic repair of VVF have been reported, and they make the choice of surgical procedure more difficult.⁵⁻¹¹ Additionally, in all of these studies omental interposition was

performed. By contrast, Goyal et al¹² reported a high success rate (97.5%) with the layered closure technique without omental interposition for (1 cm) VVFs performed using either the abdominal or vaginal approach.

Therefore, the authors conducted this study to evaluate the feasibility and efficacy of immediate laparoscopic nontransvesical repair without omental interposition for small VVF developing after TAH.

METHODS

In this retrospective study, we evaluated 5 patients who were referred for VVF developing after TAH. Each underwent laparoscopic nontransvesical surgery not accompanying the omental interposition at Kangbuk Samsung Hospital from October 2007 to March 2009. The VVF was confirmatively diagnosed by using the indigo carmine test. The initial preoperative evaluations included a medical history, physical examination, pelvic examination, hematological tests, intravenous pyelogram for identifying VVF and eliminating a possibility of ureteral injury, and diagnostic cystoscopy for identifying the locations of VVF and both ureteral openings. After being informed of the laparoscopic nontransvesical surgery not accompanying omental interposition, the relevant complications, the failure rate, and the possibility of laparoconversion, each patient gave informed consent.

We analyzed the patients' age, body mass index, the history of previous abdominal surgery, the size and location of VVF, the period from the previous TAH to the surgical treatment for VVF, operating time, hemoglobin change, the return of bowel activity, hospital stay, and any operative complications. The hemoglobin change was measured as the difference between the value before surgery and that on the first day after surgery. However, hemoglobin change is limited in that it might not reflect actual blood loss due to postoperative hemodilution and so forth. The operating time was defined as the time elapsed from the insertion of the first trocar to the closure of all trocar sites. The return of bowel activity was defined as the period from the end of general anesthesia to the first occurrence of bowel gas passage. Postoperatively, all patients were reevaluated by history taking, physical examination, and pelvic examination every 1 month to 6 months until this article was finished.

Operative Techniques

Preoperative patient preparation and the laparoscopic technique were the same as described in a previous jour-

nal article.¹³ Intravenous preoperative antibiotics, 2 g cefminox and 1.5 g metronidazole, were administered, and preoperative bowel preparation with Fleet Phosphosoda was done in all cases. After the port placement system was established, the inspection of the abdominal and pelvic cavity was performed, and any adhesions were sufficiently dissected using a bipolar coagulator, a dissecting Metzenbaum, and endoscissors. For identifying the border between the bladder and vagina, 250 mL normal saline was infused into the bladder through a Foley catheter. The peritoneum covering the border between the bladder and vagina was incised with endoscissors, and the bladder was carefully dissected away from the vagina until the VVF was exposed. The bladder surrounding the confirmed VVF was sufficiently desquamated. In 3 cases, the suture material used for TAH was located and removed. In this process, the blunt portion of a rubber suction bulb was inserted to expand the upper vagina, which helped with dissection of the vesicovaginal layer. The bladder defect was closed in an intracorporeal, continuous, and double layer with Vicryl 3-0 without debridement; the vaginal defect was closed in an interrupted single layer with Vicryl 1-0, vaginally (**Figure 1**). To confirm the urine leakage through the closed bladder defect laparoscopically, 250 mL normal saline was infused into the bladder through a Foley catheter repeatedly. A diagnostic cystoscopy was conducted to verify the repair and the ureteral opening. Following the completion of all surgical procedures, a drainage tube was inserted after both ureteral peristalsis and the absence of any bleeding foci in the abdominal cavity were confirmed. The omental interposition and the catheterization of the ureter during the surgery were not performed. A Foley catheter was kept in place for 2 weeks and then removed after it was confirmed that there was no urine leakage on the retrograde cytogram.

RESULTS

From October 2007 to March 2009, 5 patients were referred for VVF developing after TAH. Each one underwent laparoscopic nontransvesical surgery not accompanying omental interposition in our hospital. In these patients, the transvaginal approach was not preferred due to a high retracted fistula in a narrow vagina, and laparoscopic repair for VVF was performed, immediately.

The detailed clinical characteristics and operative results are presented in **Table 1**. Indications of TAH were symptomatic myoma in 4 women and adenomyosis in 1 woman. The median interval between TAH and fistula

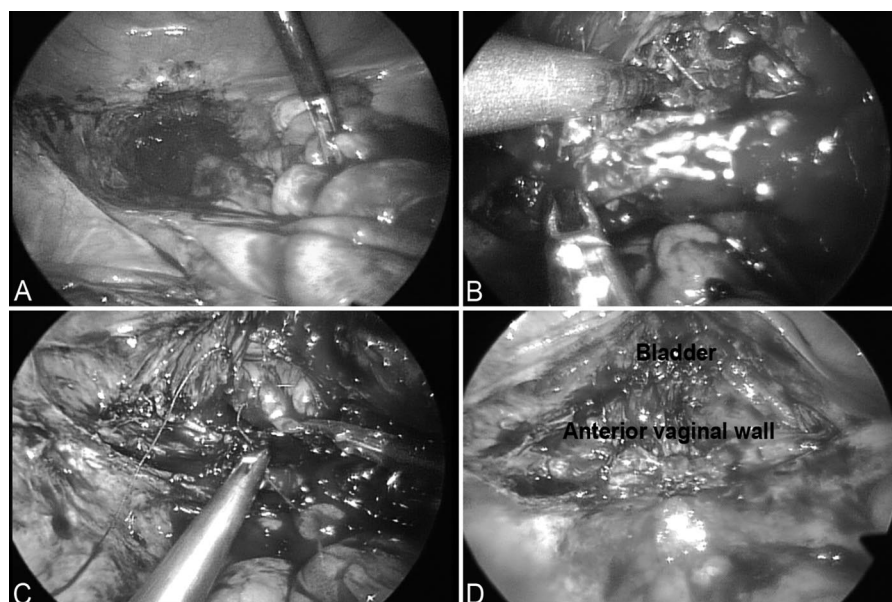


Figure 1. An actual image of laparoscopic nontransvesical repair for vesicovaginal fistula. A: A view of pelvic cavity after adhesiolysis. B: The suture material used for TAH was noted between bladder and vaginal vault. C: The bladder defect was closed in an intracorporeal, continuous, and double layer with Vicryl 3–0. D: An image after laparoscopic nontransvesical repair for vesicovaginal fistula.

Table 1.	
Clinical Characteristics and Operative Results	
Clinical Characteristic	Median (Range)
Age (years)	47 (40–51)
Parity	2 (1–2)
Body mass index (kg/m ²)	22.3 (20.4–27.2)
Number of previous abdominal surgery	1 (1–3)
Size of vesicovaginal fistula (cm)	0.6 (0.5–0.9)
Location of vesicovaginal fistula	Supratrigonal
Interval between primary surgery and fistula repair (days)	24 (14–289)
Operative Results	
Operating time (minutes)	95 (85–115)
Hemoglobin change (g/dL)	1.1 (0.4–2.3)
Return of bowel activity (hours)	29.3 (19.8–40.4)
Hospital stay (days)	5 (5–17)
Complications	0
Period of follow-up (weeks)	56.1 (26.6–74.0)

symptom onset was 24 days (range, 14 to 30). In an unusual case, one woman was transferred 289 days after TAH, because she had regarded the symptoms of VVF as

urinary incontinence without management for it before being transferred to our hospital. Intravenous pyelograms showed that there was no evidence of ureteral injuries in any of the patients. There were no intraoperative and postoperative complications or laparoconversions. During a median follow-up of 56.1 weeks (range, 26.6 to 74.0), there were no urologic sequelae associated with VVF or laparoscopic surgery for VVF, nor did any patient exhibit signs of recurrence through the last follow-up.

DISCUSSION

Since Nezhat et al¹⁴ initially reported the laparoscopic repair of VVF in 1994, several reports have advocated the feasibility and advantages of the laparoscopic approach compared with abdominal or transvaginal approaches.^{5–11} **Table 2** summarizes the following data from previous studies: whether bladder dome incision was performed, whether omental interposition was performed, closure methods of bladder or vaginal defects, and failure rate.

The surgical technique performed in our hospital has several characteristics that differentiate it from the other reports. First, we performed the laparoscopic repair immediately when the patient was transferred for VVF, regardless of the time of the previous surgery. The usual strategy delays the surgical repair for 3 to 6 months after

Table 2.
Comparison of Surgical Techniques for Laparoscopic Repair of Vesicovaginal Fistula on Previous Studies

Study	No. of Patients	Bladder Incision	Closure Method of Bladder Defect	Closure Method of Vaginal Defect	Omental Interpositioning	Failure Rate (%)
Ou et al. (2004) ²	2	Non-transvesical	Interrupted, Double layer	Continuous, Single layer	Performed	0
Sotelo et al. (2005) ³	15	Transvesical	Continuous, Double layer	Continuous, Single layer	Performed	7
Modi et al. (2005) ⁴	1	Transvesical	Continuous, Single layer	Interrupted, Double layer	Not performed	0
Tiong et al. (2007) ⁵	1	Non-transvesical	Continuous, Single layer	Interrupted, Single layer	Performed	0
Mahapatra et al. (2007) ⁶	12	Transvesical	Interrupted, Single layer	Not sutured	Performed	8.3
Nagraj et al. (2007) ⁷	13	Transvesical	Continuous, Single layer	Single layer	Performed	7.3
Current study	5	Non-transvesical	Continuous Double layer	Interrupted Single layer	Not performed	0

the injury, expecting the spontaneous closure of VVF and the control of inflammation. However, according to several recent reports, there are no benefits in delaying surgical repair once acute inflammation subsides, and early surgical repair can achieve success rates equal to those of the previously mentioned strategy.^{7,15,16} Because the size of fistula is small and the inflammatory reaction is not severe in most VVF developing after TAH, compared with VVFs that result from obstetrical complication or radiation therapy, the success rate of the early surgical repair seemed to be relatively high. Furthermore, considering that VVF developing after TAH have such negative effects on the patients, the early surgical repair is thought to have value more than the shortening of the treatment period or the saving of medical expenses. Accordingly, the authors believe that consideration of early surgical repair in VVF developing after TAH is meaningful. Of course, there may be the negative insistence against the early surgical repair in a small-sized VVF as that observed in this study, because VVF <1 cm has been reported to have the high possibility of spontaneous closure.¹⁷ Nonetheless, the authors recommend considering early surgical repair to limit negative effects of fistula in patients' lives. Second, the nontransvesical approach was used instead of the transvesical approach for fistula exposure in laparoscopic repair. The traditional surgical repair of VVF has been achieved by the transvesical approach for fistula exposure regardless of the abdominal or the laparoscopic method. In the previous reports, the urinary frequency, urgency, incontinence, or dyspareunia were observed in several

patients after the surgical treatment of VVF.^{18,19} In these symptoms, those related to detrusor instability seemed to be related to the severity of the bladder injury. During the traditional transvesical approach, there is the possibility of injury from the incision of the bladder performed to expose the fistula tract and correct it along with the damage from the VVF. Accordingly, the incidence of the symptoms related to detrusor instability should be high, a prediction that is supported by the relatively low incidence of these symptoms with the transvaginal approach.¹⁸ For these reasons, the nontransvesical approach is expected to have good results for the functional aspect of the bladder with abdominal or laparoscopic surgical repair of VVF. In addition, the small-sized VVF developing at the supratrigoanal area is thought to be able to be treated laparoscopically by gynecologic laparoscopists familiar with the interface of the bladder and the vagina, and better results can be anticipated for the functional aspect of the bladder. Lastly, the omental interposition was not performed in this series. In the study by Evans et al,²⁰ the success rate was 100% in cases when the interposition was performed for the abdominal surgery of VVFs. But in cases when the interposition was not performed, a success rate of 63.2% of cases of VVF resulting from benign disease and 66.7% of cases of VVF resulting from malignant disease were observed. Accordingly, even with VVF resulting from benign disease where the surrounding organs were well preserved, surgeons insisted on performing the interposition in all patients.²⁰ But, as the rate of relapse is not high in cases of a single VVF <1cm following nonobstetrical

reasons, some do not recommend interposition.^{12,21,22} In particular, Goyal et al¹² reported that the success rate of the layered closure technique without omental interposition for small (<1 cm) VVFs was 97.5% using a transabdominal or transvaginal approach. Nevertheless, in all reported studies for laparoscopic or robotic repair of VVFs, the omental transposition was performed. This results from a definite belief of the surgeon that performance of omental interposition can prevent recurrence. Based on the success rate of laparoscopic repair of VVFs in our study, the omental interposition may be omitted in the <1 cm VVF developing after TAH during the laparoscopic approach if the surgeon is equipped with sufficient laparoscopic suture techniques.

CONCLUSIONS

Immediate laparoscopic nontransvesical repair without omental interposition might be an effective and feasible alternative to the traditional methods in select patients with small-sized (<1 cm) VVF developing after TAH. However, our study was limited by the small number of cases and lack of randomization. Therefore, a large, prospective and randomized study is required.

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