Vesicovaginal Fistula Repair Using a Transurethral Pointed Electrode

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The most common cause of vesicovaginal fistula is injury to the bladder at the time of surgery. The operation most frequently responsible for vesicovaginal fistula formation is hysterectomy. The first successful transvaginal approach to vesicovaginal fistula repair was reported by Sims in 1838. Although many surgical procedures exist, there is no best approach for all patients with vesicovaginal fistula. However, it is an essential surgical principle that the fistulous tract and scar should be excised completely. Here we report our technique using a transurethral pointed electrode for the treatment of multiple, small vesicovaginal fistulas and its outcome.

Key Words: Vesicovaginal fistula; Bladder; Electrodes

Case

The patient, a 46-year-old female, visited our hospital with postoperative, consistent urinary incontinence. Her medical history included a laparoscopic hysterectomy due to uterine myoma three months before her current visit. Because injury to the urinary bladder was found immediately postoperatively, she had twice undergone restoration of the bladder through the vagina and the abdomen and had an artificial ureter in place for three months as the result of partial injury in the right ureter. The results of blood tests at the time of her current visit showed that her vital signs were within the normal range, her hemoglobin was 13.0 g/dL, and her serum creatinine was 0.80 mg/dL. High magnification of urinalysis exhibited a number of both erythrocytes and leukocytes, and Escherichia coli was cultured in the urine culture test. No abnormal findings were observed in the right ureter in urography after re-
moval of the artificial ureter. When around 200 cc of contrast medium was injected in cystography, some efflux of the medium into the vagina was observed, but the exact position of the vesicovaginal fistula could not be detected. In cystoscopy, vesicovaginal fistulas of 2 cm and 0.7 cm, respectively, were seen in the medial inlet of the right ureter and one vesicovaginal fistula of 1 cm in size was seen in the bladder neck (Figure 1). Because of the susceptibility of the preoperative urine culture of the patient, the operation was conducted after antibiotic treatment.

The operation was conducted under spinal anesthesia with the patient in the lithotomy position. First, the three vesicovaginal fistulas were identified with a cystoscope, and a 6 Fr ureter catheter was retained within the renal pelvis through both ureters in order to prevent injury to

**Figure 1.** Vesicovaginal fistulas were seen between the right ureteral orifice and the bladder neck. The dotted line is the incision line.

**Figure 2.** After excision of a vesicovaginal fistula using a transurethral pointed electrode. BN: Bladder neck B-Bladder, RUO: Right ureteral orifice, LUO: Left ureteral orifice VS: Vaginal stump, PVW: Posterior vaginal wall
the ureter. Using a transurethral pointed electrode, we totally excised the vesicovaginal fistulas and surrounding scar located in the vesical trigone at the medial inlet of the right ureter and bladder neck (Figure 2). The bladder mucosa and muscles were sutured by identification of the ureter catheter in order to prevent injury in the ureter. A Martius flap was conducted by using bulbospongious muscle and fat by nymphotomy, and the vaginal epithelium was sutured horizontally at the end of the operation. No pre- or postoperative complications were observed, and there were no abnormal findings or urinary incontinence observed in blood tests. The catheter was kept in place for three weeks. In cystography at the third postoperative week, some 300 cc of contrast medium was injected but no efflux of the medium was observed around the bladder. The patient was discharged after removal of the catheter, and no symptoms of urinary incontinence were shown during follow-up observation.

**Discussion**

Vesicovaginal fistulas are the most common fistula in the urinary system [3], and their etiology varies in different nations. In developed countries, at least 75% of vesicovaginal fistulas are caused by pelvic operations of gynecology, urology, and others, with obstetric operations making up most of the operational causes. A vesicovaginal fistula after hysterectomy may be caused by an intraoperative bladder incision that was not recognized around the sleeve or other mechanisms such as tissue necrosis due to cauterization or suture. Intraoperative bladder injury is a significant factor in the development of postoperative vesicovaginal fistulas. Other causes include a past history of uterus operation, endometriosis, infection, diabetes, and a past history of radiotherapy. Vesicovaginal fistulas are at least three times more common in hysterectomy conducted by approaching through the abdominal wall than in that conducted by approaching through the vagina.

The most common symptom of vesicovaginal fistula is urinary efflux via the vagina, and the amount of urinary efflux is different in patients and is proportional to the size of the fistula. Other symptoms include irritation of the vagina, pudendum, or perineum recurrent cystitis mycotic infection of the vagina and pelvic pain.

Physical examination is important in the diagnosis of a vesicovaginal fistula. For most vesicovaginal fistulas after hysterectomy, the fistula is located along the posterior vaginal wall or the sleeve of the vagina. Urinalysis and urine culture tests are conducted, and cystography is favored for detecting fistulas. Because ureter injury or ureter fistulas can be produced in around 12% of postoperative vesicovaginal fistulas, urography or retrograde urography is needed [4]. The number, size, and location of the fistula are identified by using cystoscopy. When a vesicovaginal fistula is suspected, it can be definitely diagnosed after it is seen at the vagina from the uretercatheter.

The purpose of treatment of a vesicovaginal fistula is to correct urine efflux, and Davits et al. [5] treated vesicovaginal fistulas of selective patients who were newly diagnosed by using retention of the catheter and administration of anticholinergic agents. Such conservative treatment is useful when the fistula is small, with a diameter of 2 to 3 mm.

The time of treatment of a vesicovaginal fistula is still controversial. For a vesicovaginal fistula caused by delivery, the operation is delayed for 3 to 6 months to clarify the boundary of ischemic tissue and to allow recovery from edema or inflammatory response. For a vesicovaginal fistula caused by radiation, the operation may be delayed for 6 to 12 months. There are recent reports of early operations to lessen the inconvenience and pain of patients with a simple vesicovaginal fistula after gynecological operations, but these showed insufficient differences in the success rates of the operations [6-7].

Operational methods can be roughly divided into transabdominal and transcervical approaches. In the transabdominal approach, the operation is delayed for 3 to 6 months, and it has the merit of not changing the length of the vagina. Usually, the gastrocolic omentum is used as a flap, followed by the peritoneum and Gracilis muscles. In the transcervical approach, immediate operation is possible when no complications or
infection are observed. The approach can change the length of the vagina, and a Martius flap is usually used by using the subcutaneous fat of the labium [8]. The operational approach is usually selected by preference of the operator. For successful operation, certain basic principles must be satisfied as follows. First, the ischemic tissue should be completely removed by sufficient exposure of the fistula, and healthy tissue with sufficiently retained blood vessels should be used as a flap. Second, the suture should be performed in multiple layers, without overlapped sutures, and tension should be carefully avoided. Third, urine efflux should be retained by catheter postoperatively and inflammation should be avoided. The success rate of treatment of a simple vesicovaginal fistula is reported to be around 75% to 97%, but that of combined vesicovaginal fistula is reported to be lower in cases of recurrence, with the existence of a tumor, or with a history of radiation treatment.

We decided to apply a common operational method to the patient in this case study, because only one vesicovaginal fistula at the vaginal vault was observed, the course of the fistula was abnormal and irregular, and a multicentric, large vesicovaginal fistula was observed by cystoscopy. Therefore, for complete removal, the vesicovaginal fistula including the surrounding scar was excised by using a transurethral pointed electrode. We were able to precisely excise the ischemic tissue of the vesicovaginal fistula with the transurethral pointed electrode because it allowed us to view the side of the excision due to the small amount of bleeding by use of the enlarged view. Also, with this method, it is possible to identify injury to the ureter when the fistula is excised in the medial inlet of the ureter.

As seen in our case, when excision of a vesicovaginal fistula using a transurethral pointed electrode is applied to patients with multicentric or combined vesicovaginal fistulas, it is easy to secure a view and to arrest bleeding, and exact excision of the ischemic tissue is possible. Thus, the success rate of the operation may be enhanced when excision of a vesicovaginal fistula using a transurethral pointed electrode is applied to patients with multicentric or combined vesicovaginal fistulas.

References