

## Laparoscopic Repair of Vesicovaginal Fistula\*

RODRIGO ARTUR PEREIRA OTSUKA, M.D.,<sup>1</sup> JOÃO LUIZ AMARO, M.D.,<sup>1</sup>  
MILTON TATSUO TANAKA, M.D.,<sup>2</sup> EDUARDO EPACAGNAN, M.D.,<sup>2</sup>  
JOSÉ BARBOSA MENDES JR., M.D.,<sup>2</sup> PAULO ROBERTO KAWANO, M.D.,<sup>1</sup>  
and OSCAR EDUARDO HIDETOSHI FUGITA, M.D.<sup>1</sup>

### ABSTRACT

**Purpose:** Vesicovaginal fistula (VVF) is one of the most devastating surgical complications that can occur in women. The primary cause remains an abdominal hysterectomy. Approach to this condition can be transvaginal or transabdominal. Laparoscopic repair of VVF may be an alternative approach to this treating rare condition. We present seven cases of VVF treated with transperitoneal laparoscopic technique and our results.

**Methods:** We retrospectively reviewed the charts of 7 women ranging from 37 to 74 years in age (mean age 52.8 years) at our institution who underwent laparoscopic transperitoneal repair of VVF between February 2004 and March 2006. Etiology of the VVF, surgical technique, operative time, length of hospital stay, and complications were reviewed.

**Results:** Six of the seven VVFs we repaired laparoscopically resulted from gynecologic procedures, and one patient presented with a VVF after a ureterolithotripsy. Mean operative time ranged from 130 to 420 minutes (mean 280 minutes), and mean hospital stay was 7 days. In one patient conversion to open surgery was necessary due to prolonged operative time. Two complications occurred: a urinary tract infection in one patient and an inferior limb compartment syndrome in another.

**Conclusion:** Transvaginal laparoscopic repair of VVF is feasible and safe and provides excellent results. It is a good alternative to the abdominal approach. However, advanced laparoscopic skills are mandatory.

### INTRODUCTION

A VESICOVAGINAL FISTULA (VVF) is one of the most devastating surgical complications that can occur in women. Abdominal hysterectomy remains the most common cause of VVF, occurring in 1/1800 hysterectomies<sup>1</sup> and accounting for about 85% of cases, while radiation (10%) and obstetric injury (5%) are the other major causes.<sup>2</sup> Since Sims' report on the successful closure of VVFs in a large series of female slaves,<sup>3</sup> there has been little substantial change in the basic principles of surgical correction of VVF. For most early simple fistulas the transvaginal approach is simple and direct. The abdominal approach may be most suitable after radiation therapy and for difficult or contaminated fistulas. Since its introduction, laparoscopy has become the first-line approach to treat many surgical urologic conditions because of its minimal invasiveness and short convalescence. We present our transperi-

toneal laparoscopic technique for repair of vesicovaginal fistulas and our results.

### MATERIAL AND METHODS

We retrospectively reviewed the data of seven patients with VVFs that underwent laparoscopic transperitoneal repair from 2004 to 2006.

#### *Surgical technique*

All patients underwent cystoscopy for bilateral urethral catheterization. A urethral or Foley catheter was placed vaginally through the fistula and pulled out of the bladder. The patient was placed in Trendelenburg position and a primary 10-mm port was inserted at the umbilicus, and pneumoperitoneum was achieved using a Veress needle. Two other ports (5 and 10

<sup>1</sup>Faculdade de Medicina de Botucatu—Universidade Estadual Paulista, and <sup>2</sup>Master Clinica de Cascavel, Botucatu, Brazil.

\*Submission to the 2006 Endourological Society Essay Contest.

TABLE 1. DEMOGRAPHIC AND FISTULA-RELATED DATA

Patient	Age	Body mass index	Etiology	Previous treatment for the fistula
ATOR	37	28.05	Endometrial nodule resection	No
CL	51	30	Hysterectomy	Yes
IMC	49	24.8	Hysterectomy (for malignancy)	No
VMP	46	28.05	Hysterectomy	No
DB	58	30	Hysterectomy (for malignancy)	Yes
MVMD	49	23.53	Hysterectomy	Yes
MJSM	74	31.96	Hysterectomy	No

mm) were placed in the inferior abdominal wall. Placement of the 10-mm port depends on the fistula's location, and it is placed on the same side as the fistula. A 5-mm port was also necessary to aid in retracting the bladder during suturing.

In five patients, the posterior bladder wall was vertically incised in the proximity of the fistula and dissection continued until the catheter could be seen. The incision was carried downward until the fistula tract was excised. At that point the bladder could easily be separated from the vagina, exposing the sponge retractor in the vaginal orifice of the fistula. The remaining borders of the fistulous tract were excised and viable tissue margins in both the bladder and vagina were created.

Suturing began at the top of the incision made in the bladder with the initial knot at the outer bladder surface. We used 3-0 polyglactac acid suture in a one-layer running continuous vertical fashion. The vagina was closed in the same fashion except that the suture was placed transversely. The most inferior suture in the bladder was also used to anchor an omental flap interposed between the bladder and the vagina.

In two patients, the initial approach was via the vesicovaginal space. In these cases, the fistulous tract was identified and excised without opening the bladder. Bladder and vaginal closure were made as previously described.

Two patients concomitantly had a pubovaginal sling added secondary to urinary stress incontinence. The urethral catheter used during the procedure was removed at the end of the operation, but an indwelling urethral catheter was placed to allow bladder drainage. Postoperatively, oral antibiotics were continued and anticholinergics were administered as needed. Patients were instructed to have ambulation as early as possible, to avoid strenuous physical activity, and to avoid sexual intercourse for 2 months.

A voiding cystourethrogram was performed before removal of the Foley catheter, usually 4 weeks post-surgery.

## RESULTS

The seven patients ranged from 37 to 74 years of age (mean age 52.8 years). In six patients the fistula was the result of gynecologic surgical procedures, and one patient presented with a VVF after a ureterolithotripsy. Six fistulas occurred after hysterectomy, and one after resection of an endometrioma (Table 1). All fistulas were located above the bladder trigone.

Of the seven patients, three had undergone previous attempts at surgical fistula repair, including endoscopic fulguration of the fistulous tract in one patient, and open abdominal repair in two others.

Operative time ranged from 130 to 420 minutes (mean 280 minutes). In one patient, conversion to open surgery was necessary due to prolonged operative time and difficult dissection (Table 2). Two complications occurred: a urinary tract infection and an inferior limb compartment syndrome. Two patients underwent a concomitant procedure to create a pubovaginal sling secondary to urinary stress incontinence.

Hospital stay ranged from 2 to 20 days (mean 7.2 days). Follow-up ranged from 2 months to 2 years and no patient presented with recurrence of the VVF.

## DISCUSSION

The true incidence of vesicovaginal fistulas is unknown, but it is currently recognized that in developed countries the majority result from gynecologic surgery.<sup>4</sup> The diagnosis of a vesicovaginal fistula is usually straightforward, but some areas of controversy still remain, such as the appropriate timing of fistula repair and the best surgical approach: transabdominal or transvaginal. Apparently, there are no differences in terms of results after early

TABLE 2. SURGICAL AND POST-OPERATIVE DATA

Patient	Operative time (minutes)	Complications	Hospital stay (days)	Follow-up (months)
ATOR	130	No	3	24
CL	390	Compartment syndrome led to open procedure	20	19
IMC	300	No	5	18
VMP	180	No	2	7
DB	300	No	4	4
MVMD	290	No	3	2
MJSM	420	Urinary tract infection led to open procedure	14	2

or late repair. In both series, including those in whom repairs were done within 3 months post-injury, and in those in whom the repairs were intentionally delayed, success rates ranged from 86% to 100%.<sup>5-9</sup> In our series, the time of repair ranged from 7 months to 3 years after the surgery that caused the VVF.

In terms of the best surgical approach, controversy continues as to whether the transabdominal or the transvaginal route is more desirable for repair of VVF. To date there are no significant statistical data that indicate that either approach is superior. The vaginal approach seems to be simpler, safer, and quicker for most early simple fistulas,<sup>10</sup> while the abdominal approach may be indicated to address supratriangular vesicovaginal fistulas,<sup>11</sup> or more complex fistulas such as those resulting from radiation therapy in women with small bladder capacities.<sup>12</sup> Laparoscopic repair of a VVF offers the patient the advantages of a shorter hospital stay, more rapid postoperative recovery, and better cosmetic results than the traditional abdominal approach. Also, laparoscopy allows an excellent view and good exposure of pelvic structures, and provide quick and direct access to the fistula, and relatively simple fistula resection.

The long operative times for some of our cases (>300 minutes) were attributable to difficulty in identification of the fistulous tract, difficult dissection of the vesicovaginal space, and need for intracorporeal suturing. Three of our seven cases (43%) had previously undergone an unsuccessful open procedure to correct the VVF, which made locating the fistulous tract more difficult secondary to excessive scar tissue. The case with the shortest operative time (130 minutes) was secondary to resection of an endometriotic lesion in the vaginal dome. The VVF was located high in the bladder, which allowed the surgeon to locate the fistulous tract easily. The operative times seen in the literature for laparoscopic repair of VVF range from 70 to 240 minutes.<sup>13-16</sup> Sotelo<sup>16</sup> and associates incorporated concomitant cystoscopy to help guide the bladder incision, facilitating quick access to the VVF, and avoiding unnecessary dissection in the vesicovaginal space. Laparoscopic freehand intracorporeal suturing, particularly in the pelvis, can be cumbersome, and rigorous training and substantial practice time is mandatory when performing this type of surgery.

We had one conversion to open surgery, attributable to difficulty with dissection and prolonged operative time, and another patient presented with compartment syndrome of the left leg, probably caused by inappropriate use of the dorsal lithotomy position and prolonged operative time. Fasciotomy was performed and the patient's recovery was uneventful except for a prolonged hospital stay (20 days).

All of our patients had effective laparoscopic correction of their VVFs. The use of an omental flap between the suture lines, particularly when the surrounding tissues are not healthy and well-vascularized, seems to be important in achieving the best result.<sup>17</sup> In all of our cases, interposition of the omental flap was easily performed, and may have increased lymphatic drainage and vascularization of the area, promoting excellent surgical results.

## CONCLUSIONS

Transvaginal laparoscopic repair of a vesicovaginal fistula is feasible, safe, and provides excellent results, and for many pa-

tients is a good alternative to the transabdominal approach. However, advanced laparoscopic skills, particularly with intracorporeal suturing and pelvic surgery, are mandatory.

## REFERENCES

1. Miller EA, Webster GD. Current management of vesicovaginal fistulae. *Curr Opin Urol* 2001;11:417-421.
2. Symmonds RE. Incontinence: Vesical and urethral fistulas. *Clin Obstet Gynecol* 1984;27:499-514.
3. Sims JM. The treatment of vesicovaginal fistula. *Am J Med Sci* 1852;23:59-82.
4. Lee RA, Simmonds RE, Williams T. Current status of genitourinary fistula. *Obstet Gynecol* 1988;72:313-319.
5. Persky L, Herman G, Guerrier K. Nondelay in vesicovaginal fistula repair. *Urology* 1979;13:273-275.
6. Cruikshank SH. Early closure of post hysterectomy vesicovaginal fistulas. *South Med J* 1988;81:1525-1528.
7. Raz S, Bregg KJ, Nitti VW, Sussman E. Transvaginal repair of vesicovaginal fistula using a peritoneal flap. *J Urol* 1993;150:56-59.
8. Tancer ML. The post-total hysterectomy (vault) vesicovaginal fistula. *J Urol* 1980;123:839-840.
9. Wein AJ, Malloy TR, Carpinello VL, Greenberg SH, Murphy J. Repair of vesicovaginal fistula by a suprapubic transvesical approach. *Surg Gynecol Obstet* 1980;150:57-60.
10. Goodwin WE, Scardino PT. Vesicovaginal and ureterovaginal fistulas: A summary of 25 years of experience. *J Urol* 1980;123:370-374.
11. O'Connor VJ Jr., Sokol JK, Bulkley GJ. Suprapubic closure of vesicovaginal fistula. *J Urol* 1973;109:51-54.
12. Blaivas JG, Heritz DM, Romanzi LJ. Early versus late repair of vesicovaginal fistulas: Vaginal and abdominal approaches. *J Urol* 1995;153:1110-1113.
13. Nezhat CH, Nezhat F, Nezhat C, Rottenberg H. Laparoscopic repair of a vesicovaginal fistula: A case report. *Obstet Gynecol* 1994;83:899-901.
14. Theobald P, Hamel P, Febraro W. Laparoscopic repair of a vesicovaginal fistula using an omental J flap. *Br J Obstet Gynecol* 1998;105:1216-1218.
15. Chiber PJ, Shah HN, Jain P. Laparoscopic O'Connor's repair for vesicovaginal and vesicouterine fistulae. *BJU Int* 2005;96:183-186.
16. Sotelo R, Mariano MB, Garcia-Segui A, et al. Laparoscopic repair of vesicovaginal fistula. *J Urol* 2005;173:1615-1618.
17. Evans DH, Madjar S, Politano VA, Bejany DE, Lynne CM, Gousse AE. Interposition flaps in transabdominal vesicovaginal fistula repairs: Are they really necessary? *Urology* 2001;57:670-674.

Address reprint requests to:  
*Oscar Eduardo Hidetoshi Fugita, M.D.*  
 Av. Indianopolis, 2244  
 Planalto Pautista  
 CEP: 04062-002  
 São Paulo, SP, Brazil

## ABBREVIATION USED

VVF = vesicovaginal fistula.

