Diagnosis and management of vesicovaginal fistulas: twenty years of experience

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ABSTRACT
A vesicovaginal fistula is the abnormal communication between the vaginal epithelium and the bladder epithelium, resulting in continuous urine leakage through the vagina. Its repair can be carried out with vaginal, abdominal, or laparoscopic approach.

Methods: A retrospective cross-sectional study was carried out that included case records of patients diagnosed with vesicovaginal fistula that were treated in the urology department of the Hospital General “Dr. Manuel Gea González”, SSA within the time frame of January 1, 1990 to July 31, 2010.

Results: Fifty-four case records of patients diagnosed with vesicovaginal fistula with mean age of 48 years were reviewed. A total of 77.5% of these patients belonged to low socioeconomic class. The number of children varied from one to ten with a mean of four. Active sexual life began at mean 18.8 years of age. All patients had undergone some type of gynecologic and obstetric surgery: five patients underwent cesarean section, twenty-seven underwent total abdominal hysterectomy, two had transobturator suburethral sling placement, four underwent colpoperineoplasty, five had vaginal tear repair, one underwent surgery with Burch technique plus transobturator suburethral sling, seven underwent cesarean section plus hysterectomy, and

RESUMEN
Una fistula vesicovaginal es la comunicación anormal entre el epitelio vaginal y vesical, resultando en fuga continua de orina a través de la vagina. Su reparación puede ser por abordaje vaginal, abdominal o laparoscópico.

Métodos: Estudio descriptivo, retrospectivo y transversal que incluyó expedientes de pacientes con diagnóstico de fistula vesico-vaginal tratadas en la división de urología del Hospital General Dr. Manuel Gea González, SSA entre el primero de enero de 1990 y el 31 de julio de 2010.

Resultados: Se revisaron 54 expedientes de pacientes con diagnóstico de fistula vesico-vaginal con una edad promedio de 48 años; 77.5% pertenecían a medio socioeconómico bajo. El número de hijos varió entre uno y 10 con un promedio de cuatro, el inicio de vida sexual activa fue en promedio de 18.8 años. Todas las pacientes se sometieron a algún tipo de cirugía gineco-obstétrica de las cuales cinco fueron sometidas a cesárea, 27 a histerectomía abdominal total, dos a cabestrillo suburetral transobturador, cuatro a colpoperineoplastia, cinco a reparación de desgarro vaginal, una a Burch mas cabestrillo suburetral transobturador, siete a cesárea más histerectomía y tres a histerectomía más Burch. Todas las pacientes acudieron por incontinencia urinaria total con salida de orina transvaginal. Las localizaciones fueron retrotrigonal en nueve, piso vesical en tres, cuello

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three underwent hysterectomy plus Burch technique. All patients sought medical attention for total urinary incontinence with transvaginal urine leakage. Localizations were retrotrigonal in thirty patients, intertrigonal in nine patients, bladder floor in three patients, bladder neck in one patient, right parameatal in two patients, left parameatal in one patient, paracervical in one patient, and bladder fundus in seven patients. Fistula diameter varied from 2-35 mm with a mean 7.5 mm and four patients presented with two fistulous orifices in the bladder. The length of time for fistula presentation was from one to sixty days. Transvaginal approach was carried out in sixteen patients, transvesical approach in thirty-four patients, and laparoscopic approach in four patients. Hospital stay for patients with transvaginal approach was eleven days, with transvesical approach nine days, and with laparoscopic approach four days. Only one patient presented with recurrence and was reoperated on at three months. Surgical wound infection presented in three patients.

Conclusions: Vesicovaginal fistula is a pathology that presents in patients with a history of gynecologic and obstetric surgery. In all of the cases reviewed, patients presented with total urinary incontinence with transvaginal urine leakage as primary symptom and clinical diagnosis was supported with imaging studies (excretory urography and cystography) and cystoscopy. The three approaches employed provided good results and the majority of cases were resolved with transvesical approach.

Key words: Vesicovaginal fistula, transvaginal, transvesical, laparoscopic, Mexico.

INTRODUCTION

Vesicovaginal fistula (VVF) is an abnormal communication between the vaginal epithelium and the bladder epithelium that results in continuous urine leakage through the vagina. It is one of the most significant and devastating urological and gynecological conditions. Vesicovaginal fistulas have been recognized since ancient times. However, their successful repair was not reported until 1852 with the work of James Marion Sims, who used silver sutures for fistula correction. Subsequent advances included MacKenrodt layer repair and Martius labial fat pad graft at the end of the 1920s. 1

The most common cause of VVF in developing countries continues to be obstetric trauma. In the United States and other industrialized countries, VVF occurs as a result of surgical trauma. The inadvertent placement of sutures in the bladder during vaginal cuff closure results in necrosis and subsequent fistula formation. Excessive blunt dissection of the bladder may result in ischemia and unintentional tearing of the posterior bladder wall. Approximately 75% of VVFs present after hysterectomy due to benign disease, occurring in one out of every 1800 patients undergoing this procedure. There is a 0.5-1% worldwide incidence of VVF after hysterectomy. Vesicovaginal fistulas also occur as a complication of suburethral slings, cystocele repair,
colposuspension procedures, and urethral and vesical diverticulectomy. In North America, 90% of VVFs are the result of gynecologic and obstetric procedures, 6% are caused by radiation, and the remaining 4% are caused by locally advanced cancers (vaginal, cervical, and endometrial), inflammatory intestinal disease, foreign bodies, and urinary tract infectious processes.2

Patients typically manifest continuous vaginal urinary leakage (day and night) shortly after pelvic or gynecologic surgery. All patients that present with continuous urinary incontinence soon after surgery should be evaluated for the possibility of VVF. Fistulas may become apparent immediately after surgery, but they often appear days or weeks later. Approximately 10% of patients have associated ureterovaginal fistula. During immediate postoperative period patients may present with fever, postoperative intestinal paresis, abdominal pain, hematuria, or lower urinary tract symptoms.3

Fistulas resulting from radiotherapy may present at any point from six months to twenty years after treatment. Transvaginal fluid can be urine, lymph, peritoneal fluid, liquid in a Fallopian tube, or vaginal secretions. Differential diagnoses to be considered are urethrovaginal fistula, ureterovaginal fistula, ectopic ureter, peritoneal fluid drainage, and vaginal cuff infection.1,4

In order to confirm that liquid leaking from the vagina is urine, creatinine test on the liquid should be done. Elevated creatinine level of the liquid compared with serum creatinine value will confirm that leakage liquid is urine. Physical examination continues to be the most important element in evaluating patients suspected of having fistula. Depth, diameter, and mobility of vaginal mucosa should be evaluated with vaginal specule. After hysterectomy, fistulas are commonly found at the vaginal cuff. Tests using dyes, such as methylene blue, should also be done. It is instilled by means of Foley catheter and the vagina is examined to find the leakage site of the dyed liquid. Another method is oral phenazopyridine administration: vaginal plug made of gauzes is left in place and then orange dye stain is looked for. If methylene blue test is negative and phenazopyridine test is positive, ureterovaginal fistula should be suspected. Patients with VVF should be evaluated by means of cystoscopy and upper urinary tract imaging studies. Fistula site is usually located by means of cystoscopy and its size and relation to ureteral opening is also determined. It is important to rule out the presence of a foreign body as the cause of fistula and to intentionally look for various fistula sites. In cases of fistula associated with malignancy or occurring after radiotherapy, fistula site biopsy should be carried out before repair is performed. Upper urinary tract evaluation can be carried out with excretory urography, retrograde pyelography, or computed tomography. Retrograde pyelography continues to be the most sensitive study for showing ureteral involvement in the presence or absence of VVF. Micturition cystourethrography is helpful in identifying and locating fistula.1

In very specific cases treatment can be conservative, such as bladder drainage with transurethral catheter. However, its success has only been reported in very small series.

There have been promising data on the use of fibrin but a lack of long-term follow-up. This technique is also associated with electrofulguration at the fistula site plus the use of collagen, fibrin, or fibrin glue. Electrofulguration or electrocoagulation can be used with curettage, strengthening edges and draining the bladder. Laser technique is similar and uses the same principles. Surgical resolution is the fundamental repair method in these cases. It requires adequate planning, taking all variables into account, and choosing the best surgical method for resolving the problem. The ideal moment for repair is dependent on when diagnosis is made. Early management should be carried out before 72 hours have passed because tissue is still flexible with a normal appearance and repair can be made vaginally or abdominally. It should be noted that precipitation of the procedure can result in infection and inflammation, negatively affecting surgical success. Early closure can be done if tissue quality allows for it and there is no infection.1

Contraindications for early closure are previous attempts at surgical closure, pelvic inflammation, enteric fistula, or radiotherapy. Fistula repair in these patients can be delayed for periods of 4-8 months, and merits interposed flap placement. Success rates of early and late repair vary from 60-100%.1

Medical and psychological support is important in all cases. Previous management of possible cystitis, vaginitis, and perianal dermatitis should also be satisfactorily resolved. The use of creams and emollients are necessary to improve vulvovaginitis and the area should be kept as dry as possible, using urine collectors. Nutritional support is necessary for the benefit of the patient. Videourodynamics is a key tool for evaluating bladder and urethral function as well as continence mechanisms.1

Small fistulas can close using a bladder catheter attached to a urine collecting bag and left open so urine can flow freely, or with electrocoagulation associated with catheter drainage. Davits and Miranda reported on spontaneous fistula closure (small fistulas) with prolonged Foley catheter use.

The numerous surgical approaches, whether vaginal or transabdominal, depend on many variables such as the fistula’s own characteristics and a history of previous
repair attempts. There is no one ideal technique but the best approach can be chosen to ensure a higher success rate. Choice depends on the surgeon’s experience and management. Sims or O’Connor techniques are used in the abdominal approach and modified Latzco technique in the vaginal approach.  

Vesicovaginal fistula can be repaired using the vaginal approach, abdominal (open or laparoscopic) approach, or a combination of the two in complex cases. Vaginal approach is more commonly used and has a 90% success rate. Compared with the abdominal approach it is less invasive, cystostomy is not required, there is less blood loss, less pain, and shorter hospital stay. 

Abdominal approach indications include: limited access due to a retracted fistula and narrow vagina, fistula proximity to ureters with the need for ureteral implant, associated pelvic pathology, complex fistula with multiple fibrous tracts due to previous radiation, narrow introitus, tissue or scar with poor preoperative replacement, and morbid obesity. The use of vaginal pedunculated flaps relieves suture line tension and vaginal plugging helps control profuse bleeding. In more difficult cases Latzco technique with elliptical stripping of the vaginal wall surrounding the fistulous tract is carried out (Image 1). The bladder portion is left intact and three-layer closure is done, without touching the bladder, enabling the vaginal wall to be converted into the bladder wall with adequate re-epithelialization. There was a 93% success rate with this technique in a series with 43 patients. Its main disadvantage is vaginal narrowing if there has been previous radiotherapy.

Many surgeons cite O’Connor as the first to use omental patch in fistula repair, but it was first described by Walkman and Walter (Image 2). 

Laparoscopic VVF repair was first reported in 1994 by Nezhat and up to the present date one of the largest series that was published in Venezuela in May 2005 was carried out by Dr. René Sotelo, with a case load of 15 patients. This approach is an alternative to the transvesical approach, and has the advantages laparoscopy offers such as visual magnification during the procedure, less blood loss, postoperative pain reduction, shorter hospital stay, and quicker reincorporation into normal activities.

**OBJECTIVE**

To know vesicovaginal fistula etiology and treatment in patients attended to at the Urology Division of the Hospital General Dr. Manuel Gea González, SSA.

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Image 1. Transvaginal repair.

Image 2. O’Connor transvesical repair.
METHODS
Case records were reviewed of patients diagnosed with vesicovaginal fistula treated at the urology division of the Hospital General Dr. Manuel Gea González of the SSA from January 1990 to July 2010. Information was put on a data-collecting sheet that included all study variables. Inclusion criteria were all the diagnosed VVF cases. Patients with incomplete case records were excluded.

The present study is observational, retrospective, and cross-sectional.

RESULTS
Fifty-four cases met the inclusion criteria. Mean age was 48 years (20-73 year range) and 77.5% of patients belonged to low socioeconomic status. Number of children varied from 1-10 with a mean of 4. All 54 patients had undergone some type of gynecologic and obstetric surgery. Five patients had undergone cesarean section, 27 total abdominal hysterectomy (20 for myomatosis, 2 for cervical intraepithelial neoplasia [CIN III], 4 for cervical cancer [CaCx], and 1 for endometrial cancer), 2 had suburethral transobturator sling placement, 4 had colpoperineoplasty, 5 had vaginal tear repair, 1 had undergone Burch technique plus suburethral transobturator sling placement, 7 had undergone cesarean section plus hysterectomy, and 3 had undergone hysterectomy plus Burch technique (Figure 3). All patients had sought medical attention for urinary incontinence with transvaginal urine leakage. All patients had excretory urography, cystography, and cystoscopy done (Figure 4).

Fistulas were retrotrigonal in 30 patients (55.55%), intertrigonal in 9 patients (16.66%), at the bladder floor in 3 patients (5.55%), at the bladder neck in 1 patient (1.85%), there was right parametral fistula in 2 patients (3.70%), left parametral fistula in 1 patient (1.85%), paracervical fistula in 1 patient (1.85%), and fistula was located at the bladder fundus in 7 patients (12.96%) (Figure 5).

Fistula diameter varied from 2-35 mm with a mean of 7.5 mm. Two fistulous openings in bladder were found in 4 patients. The length of time of fistula presentation varied from 1-60 days. Transvaginal approach was carried out in 16 patients (29.62%), transvesical approach in 34 patients (62.96%), and laparoscopic approach in 4 patients (7.4%). Patients that underwent transvaginal approach had mean hospital stay of 11 days, those with transvesical approach 9 days, and those with laparoscopic approach 4 days (Table 1). Labia minora flap interposition was carried out in 2 cases with transvaginal approach and there have been no complications or recurrence to date (Figure 6).

DISCUSSION
The most common cause of vesicovaginal fistula (VVF) in developing countries is obstetric trauma. Prolonged labor causes the fetal head to produce pressure necrosis of the underlying anterior vagina wall, the bladder wall, and the urethra, resulting in extensive tissue damage. This contrasts with cases observed in developed countries in which the majority of fistulas are caused by pelvic and gynecologic surgery complications (up to 90% of cases). According to the present study results, there is
a mixture of the causes observed in developed countries together with obstetric trauma as the principal cause in developing countries. Total abdominal hysterectomy was the cause in 50% of patients studied and this is a lower incidence than that reported in developed countries (75%). Vaginal tear continues to be a cause of VVF in 9.25% of patients seen at the authors’ service.

Regardless of the cause, surgical treatment is the criterion standard in VVF management. Of the three approaches currently employed in VVF repair, the transvesical approach is the most utilized at the authors’ institution, concurring with the international literature.1-4 There is a recurrence rate of up to 10% of cases.8,9 In the present study, only 1 (1.8%) of the 54 patients presented with recurrence.

Four patients have undergone laparoscopic repair at the authors’ service with good results up to the present and with no complications or recurrence in any of the cases. This approach is an alternative to transvesical approach offering the laparoscopic advantages of magnified vision during the procedure, less bleeding, postoperative pain reduction, shorter hospital stay, and faster reincorporation into normal activities.

### CONCLUSIONS

Vesicovaginal fistula is a pathology that principally presents in women having had multiple births and with a past history of gynecologic and obstetric surgery. Total abdominal hysterectomy is the gynecologic and obstetric procedure most frequently predisposing fistula development. In the study presented here the immediate postoperative symptom that presented in all patients was total urinary incontinence and VVF diagnosis was made clinically and supported by imaging studies (excretory urography and cystography) and cystoscopy.

The three types of approaches employed produced good results and transvesical approach was used in the majority of cases. The present authors recommend classifying fistula by location in order to determine surgical approach. Vaginal approach with labia majora fat flap rotation is the technique of choice for anterior (urethrocervical) fistula and abdominal approach (laparoscopic or open) gives best results for retrotrigonal (posterior) fistula. With the laparoscopic approach patients have shorter hospital stay and therefore a faster reincorporation into normal activities.

Immediate urinary leakage is the most important negative prognostic factor after repair.
BIBLIOGRAPHY