CASUISTRY

Treatment of urogenital fistula in women

C. Göktaş, R. Horuz*, G. Faydacı, A.C. Çetinel, O. Akça, S. Albayrak

Urology Clinics, Kartal Training and Research Hospital, Istanbul, Turkey

Abstract

Introduction and objectives: We aimed to assess the results of the genitourinary fistula cases intervened in our center in a ten-year period.

Patients and methods: We evaluated the clinical data regarding genitourinary fistula from the medical records of 42 female patients who underwent surgery for this condition between May 2001 and June 2010. Age, previous medical history, diagnostic tools used, operative data and clinical outcomes of the patients were evaluated retrospectively.

Results: The mean age of patients was 51 years. Of 42 patients, 28 had vesicovaginal (VVF), 11 had ureterovaginal (UVF), and 3 had vesicouterine fistulas (VUF). Etiology of VVF was surgical trauma in 71.5% and obstetric trauma in 28.5% of the patients. O'Connor technique was performed as a single procedure in 12 VVF cases, and ureteroneocystostomy was added in 3. Transvesical repair was performed in 9, and transvaginal repair in 3 of the patients. All of 11 patients with UVF were of iatrogenic origin; ureteroneocystostomy was performed in 6, and Boari flap was performed in 5 of these patients. Three VUFs were repaired primarily. Success rates in VVF, UVF and VUF were 96, 100 and 100%, respectively.

Conclusion: In experienced hands and according with the related basic surgical principles, operative treatment in genitourinary fistula represents an effective modality with high success rate.

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PALABRAS CLAVE

Genitourinario; Fistula; Reparación quirúrgica

Tratamiento de la fistula urogenital en la mujer

Resumen

Introducción y objetivo: Nos hemos propuesto evaluar los resultados de los casos de fistula genitourinaria intervenidos en nuestro centro en un periodo de 10 años.

Material y métodos: Hemos evaluado la información clínica que respecta a la fistula genitourinaria a partir del historial médico de 42 pacientes femeninas, que se sometieron a cirugía por esta afección entre mayo de 2001 y junio de 2010. La edad, el historial médico, las herramientas de diagnóstico utilizadas, la información quirúrgica y los resultados clínicos de las pacientes fueron evaluados retrospectivamente.

Resultados: La media de edad de las pacientes fue de 51 años. De 42 pacientes 28 tenían fistula vesicovaginal, 11 ureterovaginal y tres vesicouterina. La etiología de la fistula vesicovaginal era

* Corresponding author.
E-mail address: rahimhoruz@yahoo.com (R. Horuz).
traumatismo quirúrgico en el 71,5% y traumatismo obstétrico en el 28,5% de las pacientes. La técnica de O’Connor se llevó a cabo como único procedimiento en 12 casos de fistula vesicovaginal, añadiendo la ureteroneocistostomía en tres. La reparación transvesical se llevó a cabo en 9 y la reparación transvaginal en tres de las pacientes. Los 11 casos de fistula ureterovaginal eran de origen yatrogénico. La ureteroneocistostomía se llevó a cabo en 6 de estas pacientes y el flap de Boari en 5. Fundamentalmente se repararon tres fistulas vesicouterinas. El índice de éxito en las fistulas vesicovaginal, ureterovaginal y vesicouterinas fue del 96, 100 y 100% respectivamente.

Conclusión: En manos expertas, y de acuerdo con los principios básicos de cirugía, el tratamiento quirúrgico en la fistula genitourinaria representa una modalidad efectiva con un alto índice de éxito.

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Introduction

The term “urogenital fistula” defines an abnormal passage or opening between the genital and the urinary tracts. Women with urogenital fistula usually present with a continuous leakage of urine from the vagina, and thus, with irritative symptoms of the vulvar or vaginal regions. A genitourinary fistula may develop either between the vagina and bladder (VVF), ureter (UVF), or urethra (urethropulmonary), or between the uterus and bladder (VUF). On the other hand, in some cases, multiple fistulas may occur simultaneously (complicated fistulas). Although it is not a life-threatening condition, the urogenital fistula has a significant negative impact on the quality of life of the patients.

Etiologic factors and prevalence rates of this condition vary from one country to another. While difficult labor cases are the leading causes in underdeveloped countries, gynecologic surgical operations and radiotherapy are important etiologic factors in developed countries.

In this study, we evaluated the results of the genitourinary fistula cases surgically repaired in our hospital in a ten-year period.

Materials and methods

We retrospectively evaluated the clinical data regarding genitourinary fistula in 42 women operated in our hospital between May 2001 and June 2010. Age, previous medical gynecological and obstetric trauma history, diagnostic tools employed, morphologic specifications about the lesion (localization, size), and operative data of the different surgical procedures were included in the analysis. Follow-up information was also assessed.

Results

The mean age of the patients in this series was 51 years (range 27–65), while the mean number of deliveries among the patients was 3.6 (range 1–7). Of 42 cases, 28 (67%) had VVF, 11 (26%) had UVF and 3 (7%) had UVF.

In VVF cases, etiologic factors were surgical trauma in 20 (71.5%), and obstetrical trauma in 8 (28.5%) cases. Of 20 surgical procedures, 17 were related to tumor hysterectomy, 2 cases with simple hysterectomy for benign conditions, and 1 with surgery for rectum cancer. Five VVF cases had a history of previous transvaginal repair in other centers (1 surgical session in 4 patients, and 2 sessions in 1 patient). Out of these 5 cases, the etiologic factors were obstetric trauma in 4 and hysterectomy for benign pathology in 1 patient.

While the cause of fistula was previous cesarean sections in all VUF cases, every case of UVF was secondary to tumor hysterectomy in this series. Imaging for diagnostic purposes was performed with intravenous pyelography (IVP) in all the cases, and completed for more accuracy with intravenous contrast computerized tomography (CT) in 7 of them. In addition, cystography was taken in 12 of the patients.

Diagnostic cystoscopy was consistently performed before the operation. We were able to observe all of the lesions during cystoscopical examination in VVF and UVF patients. Additionally, ureteroscopy was tried in UVFs. However, it was possible to advance into the ureter only in 8 of 11 patients. In this latter group, it was observed that ureters had an irregular and completely obliterated lumen at the mean level of the third centimeter.

In VVF patients, 4 of 8 patients with history of obstetrical trauma were primary cases who applied to our hospital meanly 2 (range 1–4) months after the development of the fistula. At the time of admittance to our hospital, three cases were in the first year of ineffective transvaginal fistula surgery. The last patient had applied with a history of two ineffective transvaginal fistula repairs 12 and 14 years earlier.

While the fistulas were located on the trigone and base of the bladder in 6 and 11 cases, respectively, the lesions of the remaining VVF cases were relatively larger and affected both the trigone and the base at the same time. The mean diameter of the fistula orifice calculated was 1.8 cm (range 1–6). The fistula orifice in cases of obstetrical trauma resulted slightly larger with a mean diameter of 2.5 cm, while in those of surgical etiology it was 1.5 cm (Table 1).

An opened abdominal approach for a “bisection” of the bladder through the distal part of the fistula (O’Connor technique) was performed as a single procedure in 12 of the VVF patients. Transvesical repair, O’Connor procedure combined with ureteroneocystostomy, transvaginal repair, and percutaneous nephrostomy were applied in 9, 3, 3 and 1 of the remaining patients, respectively (Table 1).

The reasons for the addition of an ureteroneocystostomy procedure in the aforementioned 3 patients were the involvement of the urethral orifice in 2 of the patients,
and the coexistence of UVF with VVF in the remaining patient. Detachment of the repaired fistula occurred in only one patient with VVF because of catheter involuntary obstruction during sleep. This detachment was transvaginally repaired after a period of 8 weeks. The urethral catheter was removed after a period of three weeks postoperatively in all the cases in this series. No case of incontinence after catheter removal or altered urodynamic pattern was observed during the follow-up. The surgical success rate in VVF repair was 96% (26 of 27 patients). When the patient transvaginally revised for detachment was added, the cumulative success reached 100%.

In UVF cases, all the lesions were located in the mid-lower ureter. The fistula was on the right side in 6 cases, and on the left side in 5 cases. The mean size of the defect was 2 (range 1–3) cm. Ureteroneocystostomy was performed in 6 and Boari flap in 5 of the cases. After 3 weeks of double-J stent catheterization, all the patients became dry, and so, the surgical success rate was assessed up to 100%.

In 3 cases with VUF, the defects were located on the conjunction of dome and base of the bladder, and they had a mean orifice size of 1 cm. Spontaneous closure was tried in all of the 3 patients with transurethral catheterization. Since the spontaneous closure was not achieved, excision of the fistula and primary repair were performed by transabdominal approach. Their transurethral catheters were removed after a period of three weeks and voluntary micturition was observed without any voiding problem.

**Discussion**

Genitourinary fistulas, particularly VVF, have been a significant health problem for centuries not only for their psychological and social aspects, but also for their challenging surgical aspects. Ibn Sina (Avicenna) was the first who defined the vesical fistula related to trauma during labor in the year 1030. On the other hand, Hedrick was the first surgeon who defined surgical repair of VVF in 1663, particularly emphasizing some factors as the basic principles of success for its performance. Those included the use of a speculum for good exposure and meticulous debridement of the orifice margins. Jobert de Lamballe (1852), J. Marion Sims (1852), and Gustav Simon (1854) were other leading authors who made significant contributions to the surgical technique aspect.

The overall incidence of iatrogenic urogenital fistula is reported to be 0.1–4% in the literature. Urogenital fistulas in women, particularly VVFs, have different prevalence in different regions of the world because of their various etiologies. While in underdeveloped countries, in which women give birth without any medical supervision, the obstetric cause is most frequent, in developed countries most of the cases are iatrogenic, and the most common cause is abdominal hysterectomy operation. Therefore, it is well known that a fistula may be the result of an unrecognised or accidental suturing, ligation, cauteryization, or surgical trauma. In other cases, the fistula may be related to previous surgery or radiotherapy treatment, or it may have some additional complicating factors such as bad hygiene or chronic infection. All these factors obviously make surgery more difficult and limit its success. Fistulas developing secondary to radiotherapy are reported as the most difficult ones to be repaired, and the success rate may decrease to as low as 40%. On the contrary, in fistulas resulting from iatrogenic factors other than radiation, the success rate was reported as 75–97% in the literature, and the failure rate may increase up to 10%. In only one case in the series, a patient who had a previous history of radiotherapy, surgery was not possible because a "frozen pelvis" was found during the clinical investigation and, thus, bilateral percutaneous nephrostomy was applied.

Although the VVF is the most common entity, the UVF, and the VUF are also seen among genitourinary fistulas in women. In our 10-year series presented in this study, 67% (n = 28) of the cases had VVF, and 20 of them had a history of gynecological operation as the etiological factor. In the 1970s, Ayhan et al. had reported obstetrical trauma as the etiological factor in more than 60% of the cases of our country. However, the incidence of iatrogenic fistulas currently appears to be increasing accordingly with the increasing number of gynec-oncological surgical interventions.

The VVF generally appears 1–6 weeks after gynecological or obstetrical surgery; recurrent cases develop generally within the first 3 months of primary repair. With the assumption that postponing repair 4–6 weeks after the emergence of the primary fistula would increase surgical success, we preferred to perform this intervention at a minimum of 8 weeks after the initial presentation.

The localization and the size of the fistula are important factors for the surgeon's repair plan. For that purpose, during diagnosis, endoscopic findings should be available in

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**Table 1** Patient and fistula characteristics, and operations performed.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Age (years)</th>
<th>Defect size (cm)</th>
<th>Etiology</th>
<th>No</th>
<th>Surgical procedure</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>VVF (n:28)</td>
<td>31</td>
<td>2.5</td>
<td>Delivery</td>
<td>8</td>
<td>O'Connor procedure</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>1.5</td>
<td>Surgical operation</td>
<td>20</td>
<td>Transvesical repair</td>
<td>9</td>
</tr>
<tr>
<td>UVF (n:11)</td>
<td>57</td>
<td>2</td>
<td>Surgical operation</td>
<td>11</td>
<td>Vaginal repair</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O'Connor + ureteroneocystostomy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bilateral PN</td>
<td>1</td>
</tr>
<tr>
<td>VUF (n:3)</td>
<td>35</td>
<td>1</td>
<td>Surgical operation</td>
<td>3</td>
<td>Ureteroneocystostomy</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Boari flap</td>
<td>5</td>
</tr>
</tbody>
</table>

VVF, vesicovaginal fistula; UVF, ureterovaginal fistula; VUF, vesicouterine fistula; PN, percutaneous nephrostomy.
addition to the diagnostic imaging studies. IVP and CT may be helpful in localizing the lesion, although ultrasonography should be the first choice in order to document any suspected hydronephrosis or urinoma. Consequently, we were able to define the lesions with anatomical detail using IVP in addition to cystoscopy as routine study in our patients. We performed IVP in all the UVF cases to localize the lesion and performed cystoscopy to confirm the diagnosis and to exclude coincidental lower urinary pathologies of another origin. In addition, to examine whether the ureteral lesion was suitable to be treated only with ureteral stenting (partial occlusion or not), an attempt on ureteroscopy was performed in all of the UVF cases. Stenting was not possible in any case as the ureteral lumen was found totally obstructed and, thus, open surgical repair was planned.

The basic surgical principles for repairing genitourinary fistulas outlined in 1852 by James Marion Sims still remain valid. These were "good exposure, tension free anastomosis of the opposite margins of the lesion, using thin and tissue-compatible suture materials, and drainage of the bladder with appropriate duration". Although selection of the technique largely depends on the specific features of the lesion (i.e., localization or size) and the characteristics of the patient (i.e., comorbidities or clinical status), the most decisive factor would be the surgeon's experience, as the success of the procedure is directly related with this fact. Thus, it may be concluded that experience together with the respect of some certain basic surgical principles are of key importance in the success of either transabdominal or transvaginal repair of a urogenital fistula. In the repair of the VF, vaginal, abdominal, or combined approaches may be used. In the last decades, laparoscopy has also been a successfully used modality. Current evidence suggests that transvaginal repair could be more appropriate in trigonal or supratrigonal simple fistulas, while a transabdominal approach should be preferred in more complex cases.

O'Conner procedure is a commonly and successfully used method in the repair of VVF or UVF. In this transabdominal technique, after appropriate mobilization on the anterior–superior and posterior planes, the bladder should be totally "bisected" with a vertical incision until the end of the fistula. Handling the inferior plane of the bladder with care, and catheterization of the ureters before the operation may be helpful in avoidance of potential ureteral injury during the "bisection". The bladder walls surrounding the fistula are released from the vagina and debrided in all directions until the healthy tissue is reached. Although it was not required in our series, peritoneal or omental tissues may be used for interposition between the vagina and the bladder, if necessary. The surgical field should be appropriately cleared from any sign of infection by the help of preoperative systemic antibiotics and local measures.

There is not a consistent or universal reference in selecting the method of VVF repair. It is reported that vaginal or abdominal approaches have similar success. In a study by Angiolli et al., the success rate was reported as 91% and 97% in vaginal and abdominal approaches, respectively. The authors conclude that the best technique is that which the surgeon has most experience in. The success rate in our results is comparable with those reported in the literature.

Since the lesion may involve a significantly large region of the bladder in some VVF cases, the ureteral orifices, and trigone may generally be at risk. It has been reported that during surgical operations of the neighboring anatomy, especially in gynecological ones, iatrogenic ureteral injury may occur as frequently as about 30%. If they are recognized and repaired in the same surgical session, they generally do not cause any problems. However, when they are missed during the surgery, they may be complicated as UVFs. Etiological factors, which are related to the VVF and have been mentioned above, may also be responsible for the development of the UVF. In all our cases, the accidental suturing during gynecological operation was the reason for the development of the UVF. In this study, there were fistulas that affected the mid-lower ureter or orifices, and they were repaired with the addition of ancillary procedures such as uretero-neocystostomy. Additionally, in one of our cases, the ureter had been involved because of coincidence of UVF with VVF. Although the VUF is a rare pathology, there were 3 patients (7%) in our series with history of cesarean section in etiology. VUF patients usually present with symptoms of recurrent cyclic hematuria and amenorrhea (Youssef's Syndrome), and vaginal urinary incontinence. Contrast cystography and cystoscopy are mostly sufficient in the diagnosis. It is reported that spontaneous closure of the fistula with transurethral catheterization may be possible in lesions <1 cm. In our cases, the defects were about 1 cm; however, after 3 weeks of transurethral catheterization, the fistulas persisted and open surgical repair was required. Surgery was successful in all of the 3 cases. We may conclude that, according to our experience, transabdominal VUF repair is easier than VVF.

Conclusions

Urogenital fistulas mostly result from iatrogenic causes and significantly affect the quality of life of the patients negatively. This pathology should always be evaluated in the context of its psychological, social, and economic aspects. Results derived from our study are in compliance with the literature. In spite of the fact that the incidence of VVF results from obstetric causes is decreasing, urinary fistulas related to gynecological surgery and radiotherapy, on the contrary, are becoming more prevalent. Nevertheless, surgical repair of urogenital fistulas with high success rate is possible when performed in accordance with certain principles of fistula surgery, and by experienced centers.

Conflict of interest

The authors declare that they have no conflict of interest.

References