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Comparison of the Abdominal and Transvaginal Techniques in the Surgical Treatment of Vesicovaginal Fistula and Analyzing the Factors Affecting Its Recurrence

Vezikovajinal Fistülün Cerrahi Tedavisinde Abdominal ve Transvajinal Tekniklerin Karşılaştırılması ve Nükse Etki Eden Faktörlerin Analizi

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What's known on the subject? and What does the study add?

Vesicovaginal fistulas are disorders with different etiologies and have significant psychological and social consequences. The incidence of fistula due to gynecologic trauma can reach up to 10%. Surgical treatment of complex fistulas can be performed by vaginal or abdominal techniques. However, there is limited data in the literature on comparisons of these techniques. In this study comparing the results of these two techniques, we found that abdominal technique provides more successful results and we concluded that the risk of recurrence increases in patients with a history of radiotherapy.

Abstract

Objective: To compare the abdominal and transvaginal techniques in the surgical treatment of vesicovaginal fistula (VVF) and analyze the factors affecting its recurrence rate.

Materials and Methods: Patients were divided into two groups according to the operation technique used (abdominal-transvaginal) and the recurrence status (recurrent and non-recurrent). The primary endpoint of the study was the comparison of the factors related to fistula and surgical techniques.

Results: The number of cases with radiotherapy history was found to be higher in the recurrent group (68.2% vs 11.5%, p<0.001). Although fistulas were more subtrigonally located in the transvaginal repair group, the supratrigonal localization was more frequent in those operated with abdominal technique (p=0.019). While the rates of first and second recurrences were more in the cases managed by the transvaginal technique (p=0.041), the length of hospitalization and the mean operation time were longer in women managed by abdominal technique (p=0.025 and p=0.019, respectively).

Conclusion: The abdominal technique provides more favorable outcomes by allowing extensive tissue exposure and omental tissue flep in the surgical treatment of VVF. Patients with a history of radiotherapy are more likely to have a recurrence after the surgery and repetitive treatment may be needed.

Keywords: Vesicovaginal fistula, Vesicovaginal fistula repair, Gynecological trauma, Transvaginal technique, Abdominal technique

Öz

Amaç: Vezikovajinal fistül (VVF) onarımında abdominal ve transvajinal tekniklerin karşılaştırılması ve nükse etki eden faktörlerin analizini yapmaktır.

Gereç ve Yöntem: Hastalar operasyon tekniğine göre (abdominal-transvajinal) ve nüks durumuna göre (nüks edenler-nüks etmeyenler) gruplara ayrıldı. Fistül ve cerrahi yöntemlerle ilişkili faktörlerin karşılaştırılması, çalışmanın birincil sonlanım noktasıydı.

Bulgular: Radyoterapi öyküsü olan olgu sayısı rekürren grupta daha fazlaydı (%68,2 vs %11,5, p<0,001). Transvajinal onarım yapılan grupta fistüller sıklıkla subtrigonal yerleşimli iken, abdominal teknikle ameliyat edilenlerde supratrigonal yerleşim daha sık görüldü (p=0,019). Transvajinal teknikle tedavi edilen olgularda hem birinci hem de ikinci rekürrens oranı daha fazlaydı (p=0,041). Hem hastanede kalış süresi hem de ortalama operasyon süresi abdominal teknikle ameliyat edilenlerde daha uzundu (sırasıyla, p=0,025 ve p=0,019).

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Sonuç: Abdominal teknik, VVF'nin cerrahi tedavisinde geniş doku ekspojuruna ve omental doku flepine olanak sağlayarak daha olumlu sonuçlar sağlar. Radyoterapi öyküsü olan hastalarda ameliyat sonrası nüks riski daha yüksektir ve tekrarlayan tedaviler gerekebilir.
Anahtar Kelimeler: Vezikovajinal fistül, Vezikovajinal fistül onarımı, Jinekolojik travma, Transvajinal teknik, Abdominal teknik

Introduction

Vesicovaginal fistula (VVF) is an abnormal pathological connection between the bladder and the vagina that allows a continuous and involuntary discharge of urine into the vaginal vault. VVF, besides having variable etiology, is a cause of physiological and social problems in both developing and developed countries (1). The most common reason for this in the developed countries is the overlooked trauma of the genitourinary tract during gynecological operations such as hysterectomy, endometrioma, and prolapse surgery. Other rare reasons include radiation therapy and locally advanced pelvic organ cancers. It is estimated that the incidence in developed countries is between 0.3% and 2% (2). The incidence of VVF is reported to be about 0.5% after simple hysterectomy and 10% after radical hysterectomy (3,4). The most common reason with respect to underdeveloped countries is the labor, which is responsible for >90% of the cases. In Africa, the low socioeconomic status and early marriages are some of the important factors (5). Small, non-irradiated, and single fistulas are classified as simple fistulas; whereas, large, irradiated, recurrent, and multiple fistulas are classified as complex fistulas. Simple fistulas are usually managed by vaginal technique and complex fistulas by vaginal or abdominal techniques using a myocutaneous flep (4). The Latzko and layered closure techniques are the two commonly used methods in transvaginal technique (6). The abdominal technique, on the other hand, can be performed with both transvesical (excision of the fistula) or extravesical (bivalve technique) approaches. In both approaches, the bladder is opened and mobilized before the incision in the bivalve technique (7), while the fistula is made apparent through the bladder dome in the transvesical approach (8).

The success rates of the transvaginal and transabdominal techniques are reported to be about 50-100% and 80-100%, respectively (9-12). However, it is impossible to make an exact suggestion as to which technique is more appropriate for which patient, because the techniques differ among the patient groups and their follow-up periods are not standardized. There are a limited number of studies comparing the two techniques head-to-head in the literature (13). Therefore, the aim of this study was to compare the outcomes of these two techniques used in the surgical treatment of VVF.

Materials and Methods

Formation of Patient Groups and Data Collection

This study was conducted in a university hospital between January 2016 and January 2019. A total of 124 patients diagnosed with VVF had been treated at the hospital, out of which, 28 patients whose data were inconsistent were excluded and the remaining 96 patients were included in the study.

Thirty patients underwent VVF repair by transabdominal technique and 66 through transvaginal technique. Data on comorbidities, diabetes, history of hysterectomy, cesarean and non-gynecological surgery, history of radiotherapy, oral medication use from diagnosis to operation, time from prior operation to VVF repair, time from gynecologic operation to fistula formation, double-J stent insertion, method and duration of postoperative catheterization, postoperative complication, length of hospital stay, first and second recurrences, mean recurrence time, and post-recurrence operation technique were obtained from the hospital registration system.

The authors declare that the research was conducted adhering to the principles of the World Medical Association Declaration of Helsinki: "Ethical Principles for Medical Research Involving Human Subjects," (as amended in October 2013). All patients gave a written informed consent before the surgery for the use of the collected data at any given time.

Diagnosis of VVF

The diagnosis of VVF was made after a detailed anamnesis and speculum examination with a full bladder. Stress test with cough maneuver was made to exclude a possible leakage from urethral meatus. Diagnosis was confirmed by the presence of suspicious site of fistula in the cystoscopy, visualization of the tract through the speculum, and the fluid coming from the vagina. In suspected cases, first, the bladder was filled with methylene blue, and the patients with blue vaginal tampon were diagnosed with VVF. Patients with continuous urine leakage after the first operation were evaluated for recurrence, and a re-operation was planned for them. Patients with urinary tract infection were treated with appropriate antibiotic medications according to culture-antibiogram results.

Evaluation Criteria and Classification of Fistula

A procedure was considered as successful when the patients had no urine leakage after the removal of the catheter in the postoperative period. Any urine leakage after a period of dryness was considered as recurrence. Fistula location was categorized into three groups according to the intertrigonal line as follows: fistulas located in the distal of the trigone was named as subtrigonal; those located in the trigonal line as trigonal; and those located in the proximal of the trigone as supratrigonal.

Operation Techniques

Transvaginal Technique

The Latzko procedure was used in patients treated with the transvaginal technique (6). The location and size of the fistula were evaluated through an endoscope in the lithotomy position under general anesthesia. Transvaginal inspection was performed with a speculum. A small right angle clamp was inserted through the fistula tract and it was confirmed by endoscopy that the tip of the clamp was in the bladder. A 12 Fr Foley catheter was inserted through the transvaginal fistula tract with a right angle clamp and the balloon was inflated with 5 mL saline. Vaginal exposure was made after the bladder was emptied with the Foley catheter. The fistula tract was cut annular completely with the traction of Foley catheter. The bladder and vaginal mucosa were separated from each other by sharp dissections without excision of the fistula tract. The bladder mucosa and the vaginal mucosa were sutured in a water-tight manner with 3/0 polyglactin sutures separately. We did not use any fleps in transvaginal technique. An 18 Fr Foley catheter was inserted to the bladder at the end of the procedure. The catheter was removed after 21 days of bladder drainage.

Abdominal Technique

For the patients treated with abdominal technique, the bivalve technique was used (7). In this technique, the bladder was exposed with a median incision in the supine position, then opened through the dome. Bladder was incised from the dome to the fistula tract. The fistula tract was excised after annular incision. The bladder around the excised fistula tract was also closed perpendicular to the vagina after the closure of the vagina. An omental tissue flep was inserted between the vagina and the bladder. The bladder was completely closed and the procedure was terminated with an 18 Fr Foley catheter insertion. The catheter was removed after 21 days of bladder drainage.

Some patients used oral anticholinergic treatment preoperatively. For patients diagnosed at an external center, a homogenization could not be provided for the initiation of medication in the preoperative period. Postoperatively, all patients received anticholinergic treatment and topical estrogen treatment for six months. The anticholinergic treatment was started from the time of diagnosis of fistula to the postoperative sixth month, and no specific agent was recommended. The topical estrogen treatment was started in the postoperative period and 1×1 daily in the first week and then twice a week for a total of six months was recommended. Our preferred agent for topical estrogen treatment was intravaginal 10 mcg estradiol.

Outcome Measures

The patients were divided into two groups (group I; VVF repair by transvaginal technique, group II; VVF repair by abdominal technique). The primary endpoint was the comparison of the factors specific to the disease and surgical techniques between the two groups. Then, the patients were again divided into two groups but according to recurrence (group A; recurrent, group B; non-recurrent). The secondary endpoint was the analysis of the factors affecting the recurrence rate.

Statistical Analysis

Fisher's exact and Pearson's chi-square tests were used for analyzing the frequency of categorical variables. The normality analysis for continuous variables was made through the Kolmogorov-Smirnov test. While, Student's t-test was used for normally distributed variables, Mann-Whitney U test was used for non-normally distributed variables. Normally distributed data were presented as mean ± standard deviation, whereas non-normally distributed data were presented as median (minimum-maximum). $P<0.05$ was considered as statistically significant. All statistical analysis was performed using the IBM SPSS Statistics version 24.0.

Results

In this study, the data of 96 patients who underwent a VVF surgery between January 2016 and December 2018 were analyzed. Thirty patients (31.2%) were included in the abdominal group and 66 (68.8%) in the transvaginal group. Patients' data on the mean age, comorbidity, and diabetes history were similar between the two groups ($p>0.05$). The rate of radiotherapy history was also similar in patients operated via the two techniques ($p=0.584$). The length of hospital stay and the mean operation time were longer in the abdominal group than the transvaginal group ($p=0.025$ and $p=0.019$, respectively). No significant pre- and postoperative complications were observed in both groups. There was no significant difference between the two groups in terms of estimated blood loss. While the fistulas were more subtrigonally located in the transvaginal group, supratrigonal localization was more frequent in those operated with abdominal technique ($p=0.019$). There was no significant difference between the groups in terms of fistula size according to the operation technique and the recurrence status ($p=0.904$ and $p=0.519$, respectively). We did not encounter any donor-site complications in any of the patients with fleps.

The number of both first and second recurrent cases was higher in the transvaginal group than the abdominal group ($p=0.004$ and $p=0.041$, respectively). The comparison of categorical and continuous variables according to the operation techniques is summarized in Table 1.

Forty-four patients experienced a recurrence (45.8%). The length of hospital stay and the mean operation time were shorter in the recurrent group than the non-recurrent group ($p=0.011$

and p=0.034, respectively). While the rate of anticholinergic use from the diagnosis of fistula to the operation was lower in the recurrent group (9.1% vs 34.6%, p=0.014), the subtrigonal location was higher in this group (p=0.033). The rate of radiotherapy history was higher in recurrent patients (68.2% vs 11.5%, p<0.001). Table 2 shows the comparison of categorical and continuous variables according to the recurrence.

Table 3 summarizes the recurrence rates according to the operation techniques in patients with a radiotherapy history

Table 1. Comparison of categorical and continuous variables according to the operation technique

Variables	Group I (n=66)	Group II (n=30)	p
Comorbidity	16 (24.2)	4 (13.3)	0.388*
Diabetes Mellitus	6 (9.1)	0 (0)	0.542*
Operation history	66 (100)	30 (100)	–
Hysterectomy	62 (93.9)	26 (86.7)	0.579*
Cesarean section	6 (9.1)	4 (13.3)	0.642*
Radiotherapy history	22 (33.3)	14 (46.7)	0.584*
Anticholinergic use from diagnosis of fistula to operation	14 (21.2)	8 (26.7)	0.418*
Double-J stent implementation	4 (6.1)	6 (20.0)	0.307*
Postoperative catheterization Foley catheter Cystostomy catheter	66 (100) 66 (100) 32 (48.5)	30 (100) 30 (100) 20 (66.7)	– – 0.241**
Postoperative complication Hemorrhage Infection	0 (0) 0 (0) 0 (0)	2 (6.7) 0 (0) 2 (6.7)	0.313* –
Fistula location			
Supratrigonal Trigonal Subtrigonal	12 (18.2) 21 (31.8) 33 (50.0)	18 (60.0) 6 (20.0) 6 (20.0)	**0.019****
Fistula size (mm)	12.6±2.8	10.4±1.9	0.904***
Recurrence	40 (60.6)	4 (13.3)	**0.004***
Second recurrence	18 (27.3)	0 (0)	**0.041***
Age	51.3±6.46	50.0±4.89	0.297***
Duration from the operation to the fistula repair (month)	2.24 (1-10)	2.4 (3-12)	0.641****
Cystostomy catheterization time (day)	18 (14-25)	21.82 (12-24)	0.227****
Foley catheterization time (day)	19 (13-28)	21 (14-26)	0.323****
Hospitalization time (day)	4.00±3.31	7.07±3.34	**0.025*****
Operation time (min)	28.10±9.64	42.88±24.13	**0.019*****
Estimated blood loss (mL)	45.11±9.72	66.71±12.90	0.611***
Recurrence time (month)	1.25 (1-3)	3.48 (1-7)	**0.001*****

Data were presented as mean ± SD or median (minimum-maximum), Group I, transvaginal technique; Group II, transabdominal technique, *Fisher's Exact test; **Pearson's chi-square; ***Student t-test, ****Mann-Whitney U test, SD: Standard deviation

Table 3. Recurrence rates according to the operation techniques in patients with radiotherapy history

	Group I (n=66)		Group II (n=30)		p*
	RT+	RT–	RT+	RT–	
Number	22 (33.3)	44 (66.7)	14(46.7)	16 (53.3)	0.584
Recurrence	20 (90.9)	20 (45.4)	4 (28.6)	–	**<0.001**

Group I: Transvaginal method, Group II: Transabdominal method, RT: Radiotherapy, Data are presented as number (%), *Fisher's Exact test

Table 2. Comparison of the categorical and continuous variables according to the recurrence status

Variables	Group A (n=44)	Group B (n=52)	p
Comorbidity	8 (18.2)	12 (23.1)	0.677**
Diabetes Mellitus	6 (13.6)	0 (0)	0.052**
Operation history	40 (90.9)	48 (92.3)	1.000*
Hysterectomy	26 (86.7)	62 (93.9)	0.579*
Cesarean section	6 (13.6)	4 (7.7)	0.649*
Radiotherapy history	30 (68.2)	6 (11.5)	**<0.001***
Anticholinergic use from diagnosis of fistula to operation	4 (9.1)	18 (34.6)	**0.014***
Double-J stent implementation	6 (13.6)	4 (7.7)	0.649*
Postoperative catheterization Foley catheter Cystostomy catheter	44 (100) 44 (100) 20 (45.5)	52 (100) 52 (100) 32 (61.5)	– – 0.265**
Postoperative complication Hemorrhage Infection	(0) 0 (0) 0 (0) 0	2 (3.8) 0 (0) 2 (3.8)	1.000* – 1.000*
Fistula location			
Supratrigonal Trigonal Subtrigonal	9 (20.5) 6 (13.6) 29 (65.9)	32 (61.5) 13 (25.0) 7 (13.5)	**0.033****
Fistula size (mm)	13.8±2.1	11.9±1.7	0.519***
Second recurrence	18 (40.9)	0 (0)	**<0.001***
Operation technique			
Transabdominal Transvaginal	4 (9.1) 40 (90.9)	26 (50) 26 (50)	**0.004***
Age	50.13±6.50	51.61±5.57	0.235***
Duration from the operation to the fistula repair (month)	3.2 (3-5)	3.6 (2-6)	0.304****
Cystostomy catheterization time (day)	21.00 (21-28)	19.16 (14-25)	0.313****
Foley catheterization time (day)	19.62 (14-29)	17.13 (13-28)	0.358****
Hospitalization time (day)	4.14±3.72	7.08±3.17	**0.011*****
Operation time (min)	26.22±10.09	39.13±13.45	**0.034*****
Estimated blood loss (mL)	71.42±16.82	52.23±14.83	0.482

Data are presented as number (%), mean ± SD, or median (minimum-maximum), Group A: Recurrent, Group B: Non-recurrent, *Fisher's Exact test, **Pearson's chi-square, ***Student t-test, ****Mann-Whitney U test, SD: Standard deviation

Table 4. Recurrence rates of the surgical techniques according to fistula location							
	Group I (n=66)			Group II (n=30)			p*
	Fistula location			Fistula location			
	Supratrigonal	Trigonal	Subtrigonal	Supratrigonal	Trigonal	Subtrigonal	
Number	12 (18.2)	21 (31.8)	33 (50.0)	18 (60.0)	6 (20.0)	6 (20.0)	**0.019**
Recurrence	10 (83.3)	16 (76.2)	14 (42.4)	1 (5.6)	1 (16.7)	2 (33.3)	**<0.001**
Group I: Transvaginal technique, Group II: Transabdominal technique, data are presented as number (%), *Fisher's Exact test							

and shows that the recurrence rates in such patients were significantly higher in both groups (p<0.001).

Recurrences were most frequently seen in supratrigonal location for the transvaginal group and in subtrigonal location for the transabdominal group (p<0.001). Table 4 shows the comparison of the recurrence rates in both groups according to the location of the fistula.

Discussion

VVF is a disease that generally develops due to obstetric and gynecological etiology and causes extreme discomfort that often leads to social isolation in women. In this study, we analyzed the outcomes of patients who underwent a VVF repair. It was found that the history of radiotherapy and the use of anticholinergic medication were important factors for the recurrence of the disease, and that the abdominal technique can yield a higher success rate than the transvaginal technique. Although, the estimated blood loss was similar in both methods, the length of hospital stay and the mean operation time were shorter in the transvaginal technique.

While there is no clear consensus on the "gold-standard" surgical treatment of VVF, a recent meta-analysis showed that the transvaginal (39%), combined transabdominal/transvaginal (36%), and laparoscopic/robotic (15%) approaches were the most commonly preferred methods for VVF repair (14). Abdominal transvesical approach – as described by O'Conor and Sokol in the early 1950s - is considered as the gold-standard for the supratrigonal VVF treatment (15,16). The most important advantage of the abdominal approach is the availability of a peritoneal or omental flep. It is recommended that the abdominal approach should be performed after a failed transvaginal VVF repair, in ureteral involvement, and if vaginal access to the fistula is not possible. Transvaginal approach has been shown to provide shorter operation and hospitalization duration and less blood loss. In addition, peritoneal flep, Martius fat flep, and gracilis muscle flep can be used in this method. While the success rates of the vaginal and abdominal approaches were similar (3), the main disadvantages of the former are as follows: there may be a dead space in the Latzko technique and shortening of vaginal length (17); the basic surgical principles of VVF repair are good exposure, adequate mobilization of tissues, suturing without tension, good hemostasis, and water-tight bladder closure (18,19); there was a shorter operation and hospitalization duration similar to the literature in the cases that were operated with the transvaginal technique, but the success of this technique was significantly lower than the abdominal technique, contrary to the literature. We believe that the repair with transvaginal technique without the excision of the fistula as described in the Latzko technique and the use of omental fleps in the abdominal method are responsible for this difference. However, the success rates in both techniques were lower than those reported in the literature. In this study, a significant proportion (approximately half) of the patients had a history of radiotherapy, which was found to be an important factor for the recurrence in both groups. This effect, in particular, was more pronounced in patients who were treated by transvaginal technique. The use of fleps in the repair of these fistulas is very critical due to the poor vascularization of the fistula field after radiotherapy. Radiotherapy is also known for being an important factor for complex fistula development (3).

Many surgeons place a tissue interposition graft between the bladder and the vagina in VVF repair. These tissues serve as a barrier between the suture lines. The presence of another tissue that is well-vascularized between the two organs is believed to be a factor that reduces the likelihood of recurrence. Although omental fleps are predicted to accelerate healing by reducing the risk of infection and fluid collection by providing lymphatic drainage during the healing process (16), a body of evidence indicates that there is no difference in the healing process of VVF repairs with and without grafts (20). Non-tissue grafts such as fibrin glue may also be used, but the routine use of it is not recommended as the data is based on small case series (21). In our study, we used omental fleps in the abdominal technique and the success rate turned out to be higher than the other group. Our results support the view that fleps increase the success of surgery.

Conservative treatment can be recommended for treating simple fistulas diagnosed shortly after surgery. There are many studies showing that approximately 10% of cases with fistula are closed with bladder drainage and anticholinergic treatment for 2-8 weeks after the diagnosis (22,23). However, in a recent meta-analysis, only 8% of 239 patients managed conservatively by catheter drainage for 2-12 weeks spontaneously regressed

and the remaining 92% underwent surgical repair (14). The data on anticholinergic use prior to VVF repair is inadequate in the literature. Approximately one-fourth of our patients used preoperative anticholinergics and the recurrence rate was significantly lower in such patients. This may be due to the accelerated tissue healing by reduction in bladder contractions due to the use of anticholinergics.

The timing of fistula repair is another debate. The vitality of the surrounding tissue and the repair performed in the presence of this tissue are important factors for a successful closure. It is believed that 6-12 weeks of waiting period will be sufficient to disperse granulation and exudate tissue, and increase the success rate. However, some recent studies have reported that surgery after 1-2 weeks will provide similar success rates (24,25). On the other hand, the presence of a healthy tissue is important for early planned operations. Delaying surgery for 2-3 months decreases inflammation, infection, edema, and necrosis and increases the success rate. In our study, the mean operative time was 8 weeks and the operation time was not an important factor for the recurrence rate. The timing of the VVF repair must be considered individually.

For a long time, the excision of the fistula tract was a definite recommendation for successful repair. However, this approach has recently been disputed. While some authors suggest that the remaining healthy tissue edges can increase success after the excision of the tract (26), others argue that if a wide excision is made, a large defect will increase the tension in the sutured tissue and the risk of recurrence (27).

The choice of fistula repair methods described in the literature is mainly based on the location, size, and severity of the fistula, in particular the experience and preference of the surgeon (28). Numerous data on transabdominal, transvaginal, laparoscopic, and robotic VVF repair are available in the literature, but none of them are currently considered as the "gold standard" (29,30). The most important criteria we have considered while deciding the surgical method were fistula location, size, and experience of the surgeon. We prefer mostly transvaginal technique for fistulas <2 cm and close to the bladder neck. In our study, we found that the transvaginal method was the most commonly performed method for subtrigonal fistulas and the transabdominal method was the most common for supratrigonal fistulas. However, recurrence locations were, on the contrary, most commonly supratrigonal for the transvaginal method and subtrigonal for the transabdominal method. The distal location of the subtrigonal fistulas and its close proximity to the vagina are more challenging for the transabdominal approach than for the proximal fistulas. On the other hand, it is easier to access and repair the fistulas located distally by the transvaginal method, while repairing the proximal fistulas may be more challenging with transvaginal exposure. In a recent study, 10-yeear results of 58 patients who underwent transvaginal VVF repair were reported. The authors concluded that transvaginal repair of vaginally accessible fistulas provides similar outcomes with lower morbidity rates than the abdominal method. However, unlike ours, fistulas secondary to radiotherapy were excluded and the majority of fistulas (60%) were subtrigonal. In addition, flep interposition was performed in the majority of patients, although there was no significant effect on the outcome (31). Fistula size has been discussed as another factor affecting repair success. Thus, 0.5 cm and 2.5 cm thresholds are used to differentiate between simple and complex fistulas (3). In the study of Kumar et al. (31), fistula size was not an important factor affecting the outcome in patients who underwent transvaginal repair, whereas Kati et al. (32) emphasized that the surgical success was higher in patients with fistula <20 mm in size and those without a history of urinary infection. In our study, fistula size was not an important factor affecting the outcome, similar to Kumar et al. (31) study.

Study Limitations

The retrospective nature and the relatively small number of cases were the major limitations of our study. Although the most common method used was transvaginal for subtrigonal fistulas and transabdominal for supratrigonal fistulas, and that the transabdominal method had more outstanding outcomes, selection bias, which is a result of the method of operation based on the fistula location, may be another limitation of the study.

Conclusion

In this study, we have achieved significant outcomes in the treatment of VVF; the abdominal method provides more successful results by providing extensive tissue exposure and omental tissue flep. Patients with a history of radiotherapy are more likely to have recurrence and such patients should be informed that repetitive treatment may be needed. Anticholinergic drug use from diagnosis until surgery should be recommended as a factor that can reduce the recurrence rate. A waiting period of approximately two months after the onset of the fistula formation is sufficient for repair. Shorter mean operation time and length of hospital stay can be achieved through transvaginal method. It should also be noted that recurrent interventions may be required in patients undergoing VVF repair.

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Ethics

Ethics Committee Approval: Retrospective study.

Informed Consent: All patients provided written informed consent.

Peer-review: Externally peer-review.

Authorship Contributions

Concept: F.K., A.Ş., Design: F.K., A.Ş., Data Collection or Processing: F.K., T.Ö., B.A., S.K., Analysis or Interpretation: F.K., A.Ş., C.Ö., Literature Search: F.K., Writing: F.K.

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