Single-incision transperineal repair of simple and recurrent rectovaginal fistula with a vital bulbocavernosus muscle flap

Tamer Youssef[a], Rafik Barakat[b], Mohamed Farid[c]

Departments of [a]Surgery, [b]Gynecology and Obstatrics, [c]General and Colorectal Surgery, Mansoura Faculty of Medicine, Mansoura University Hospital, Mansoura University, Mansoura, Egypt

Correspondance to Tamer Youssef, MD, Department of General and Endocrine Surgery, Mansoura Faculty of Medicine, Mansoura University Hospital, Mansoura University, Gomhoria st., Mansoura, Egypt
Tel: +20 050 2304344; fax: +20 050 2267016; e-mail: tamyousif@yahoo.com

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Background
Rectovaginal fistulas (RVFs) are abnormal epithelium-lined connections between the rectum and the vagina. RVFs may be simple or complex. This study analyzed the outcome of single-incision transperineal repair of simple RVFs with a vital bulbocavernosus muscle flap.

Patients and methods
A total of 11 consecutive patients with simple and recurrent RVFs were included and assigned to single-incision transperineal repair with a vital bulbocavernosus muscle flap. Postoperatively, patients were followed up at the outpatient clinic or through telephone interviews with specific questionnaires to collect information on the status of fecal control, flatus, or fecal leakage from the vagina, and on the quality of personal and social life. Functional results were evaluated after 6 months by means of anal manometry and a questionnaire reflecting the symptomatic results, Wexner Incontinence Score and the Female Sexual Functional Index.

Results
The mean hospital stay was 10.37 ± 1.12 days. The mean follow-up period was 8.81 ± 2.56 months. The results of mean anal pressure measurements postoperatively showed no significant differences compared with preoperative measurements. The results of preoperative and postoperative Wexner Incontinence scores and Female Sexual Function Indices showed high significant postoperative improvements in all patients ($P = 0.001$). By the time of the last follow-up, there was no recurrence of RVF, and all patients reported normal fecal continence and had returned to a normal life.

Conclusion
Although RVF is troublesome for surgeons, it can be cured using our procedure. It seems that this technique is both simple and effective, giving excellent anatomical and functional results without the need for a protecting stoma.

Keywords:
bulbocavernosus muscle flap, rectovaginal fistula, recurrent rectovaginal fistula

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Introduction

Rectovaginal fistulas (RVFs) are abnormal epithelium-lined connections between the rectum and vagina, being uncommon and accounting for only 5% of anal rectal fistulas [1]. They can be quite bothersome to both the patient and the surgeon because of their irritating and embarrassing symptoms and high failure rate after repair. RVFs can be the result of congenital malformations or acquired etiologies. Acquired RVFs may be caused by prolonged labor, with necrosis of the rectovaginal septum, obstetric injury with a third-degree or fourth-degree perineal tear, or due to episiotomy [2]. Cryptoglandular anorectal abscesses and Bartholin gland infections may spontaneously drain causing a low RVF [3]. Inflammatory bowel disease, diverticular disease, tuberculosis, lymphogranuloma venereum, radiation therapy, and malignancy have also been reported [4].

RVFs are classified on the basis of location, size, and etiology into simple and complex fistulas, which affects the treatment plan and prognosis [5,6]. Simple RVFs consist of small or medium, low or mid-zonal fistulas secondary to infection or trauma [7]. RVFs are considered complex if they are large, high, recurrent, or caused by inflammatory bowel disease. Small-sized fistulas are less than 0.5 cm in diameter, medium-sized fistulas are 0.5–2.5 cm, and large-sized fistulas exceed 2.5 cm. Low and mid-zonal RVFs are located between the lower-third of the rectum and the lower-half of the vagina, whereas high fistulas occur between the middle-third of the rectum and the posterior vaginal fornix [8,9]. Low fistulas generally have healthy, well-vascularized surrounding tissue, which can be repaired with local perianal techniques [7].

To provide the best chance of successful repair, healthy, well-vascularized tissue needs to be introduced after resection of diseased tissue [8,9]. In simple RVFs, rectal advancement flaps (RAF) are the most popular transanal procedures among colorectal surgeons [10,11]. Two newer approaches have been introduced: one approach

involves the use of a bioprosthetic fistula plug made from porcine intestinal submucosa (Anal Fistula Plug; Cook Surgical Inc., Bloomington, Indiana, USA) [12]; the second recently popularized surgical treatment is coined ligation of intersphincteric fistula tract [13]. A bulbocavernosus flap is a versatile flap for repair of simple vaginal fistulas. An anteriorly based flap is good for urogenital fistulas and a posteriorly based flap for RVFs [10].

In complex RVFs, abdominal resection procedures or tissue interposition techniques are used. Tissue interposition using a perineal approach includes a labial fat pad, bulbocavernous muscle, and pedicled muscle flaps (rectus, sartorius, and gluteal muscles), as well as bioprosthetic materials [14].

In our research, a single-incision transperineal repair with a left posteriorly based bulbocavernosus muscle flap, through the same incision, was applied on 11 cases of simple RVF.

Patients and methods

The potential study population comprised 16 patients with RVFs referred to our General and Colorectal Surgery Unit, Mansoura University Hospital, from January 2010 to January 2012 with one or more of the following symptoms: passage of flatus or liquid or solid stool per vagina, a malodorous vaginal discharge, recurrent vaginitis, and or dyspareunia. Patients with Crohn's disease with active proctitis, malignant or radiation-related fistula, stricture of the anorectum, or an external sphincter defect were excluded from the study. A total of 11 patients fulfilled the study criteria. A detailed informed consent was obtained from all patients after approval from the local ethics committee.

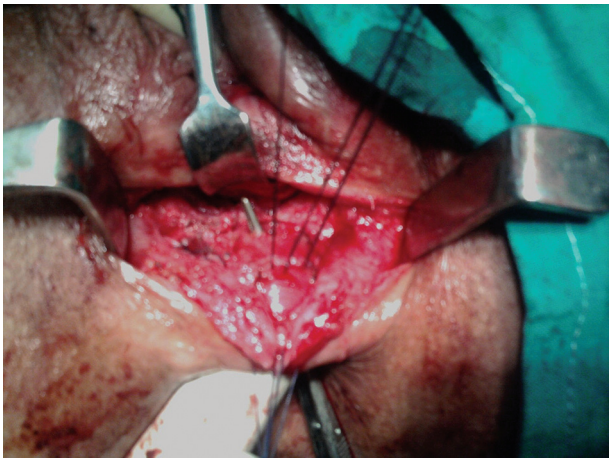
All patients were evaluated preoperatively by means of a clinical interview including the Wexner Incontinence Score (WIS) [15] and the Female Sexual Functional Index (FSFI) [16]. Anorectalmanometry using perfusion catheter systems (Synectics, Stockholm, Sweden) was performed on all patients for evaluating the mean anal resting pressure, mean anal squeezing pressure, and rectoanal inhibitory reflex.

Patients were given a mechanical bowel preparation the day before surgery, and an enema of sorbitol was administrated on the morning of the operation. The patient was placed in the lithotomy position under general anesthesia. Antibiotics in the form of third-generation cephalosporin and 500 mg of Metronidazole (Baxter, Deerfield, Illinois, USA) were given.

Submucosallidocain 5% in adrenalized saline at a ratio of 1 : 200 000 was injected around the fistula at the vaginal and rectal sides. Surgical excision of the fistula without the use of diathermy using scalpel number 15 was performed. Biopsies of rectal mucosa and the fistula margin were also obtained for pathological evaluation to exclude an underlying active IBD or malignancy. A transverse perineal incision was done with elevation of the posterior vaginal wall until the cervical uteri. Dissection of the internal sphincter fibers away from the external sphincter fibers was performed, allowing a tension-free rectal closure at the fistulous site (Fig. 1). Closure of the fistulous opening at the rectal side was done using Vicryl 3/0 sutures (Vicryl; Ethicon, Somerville, New Jersey, USA). This was followed by suturing of the rectovaginal septum to the internal sphincteric fibers using Vicryl 3/0 sutures (Fig. 2). The bulbocavernous muscle flap was harvested from the left side in all patients at its anterior part, preserving the posteroexternal vascular pedicle (Fig. 3), through the same incision, and sutured across the rectum to its counterpart on the other side (Fig. 4) using 2/0 Vicryl sutures. The vaginal flap was advanced at the fistula site and sutured to the perineal skin using Vicryl 3/0 sutures (Fig. 5). No suction drain was used. No covering stoma was done. Postoperatively, oral intake was restricted to intravenous fluids for 5 days, followed by clear oral fluids for another 5 days, with gradual return to food intake. Meanwhile, patients abstained from vaginal intercourse for 3 months.

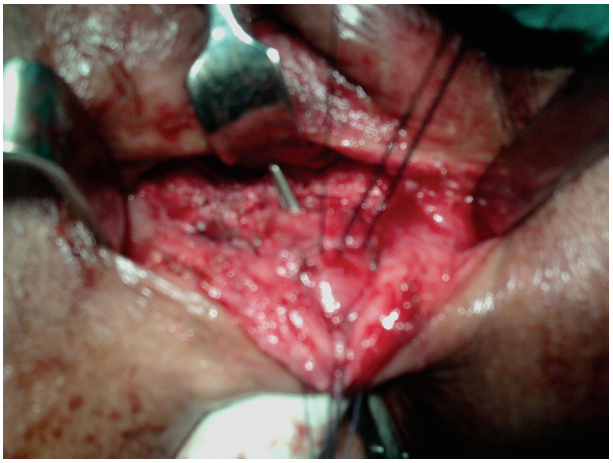
Postoperatively, patients were followed up at the outpatient clinic or through telephone interviews with specific questionnaires to collect information on the status of fecal control, flatus, or fecal leakage

Figure 1



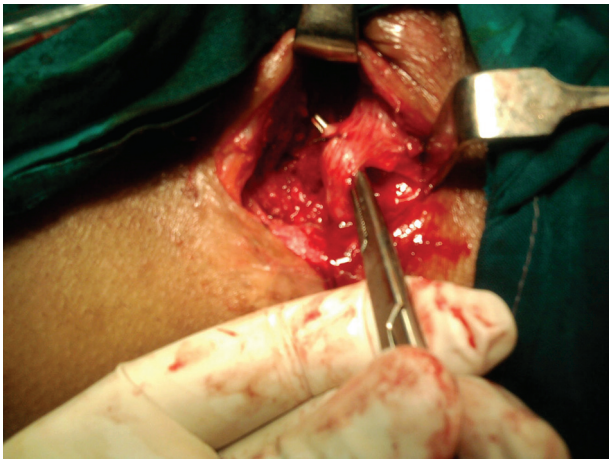
Dissection of internal sphincter fibers from external sphincter fibers.

Figure 2



Suturing of internal sphincter fibers to the rectovaginal septum.

Figure 3



Preparation of the bulbocavernosus flap.

Figure 4

Posterior muscle repair.

Figure 5

Vaginal advancement flap.

from the vagina, and on the quality of personal and social life. The interview was scheduled twice a month for the first 3 months, followed by once a month for 6 months. Functional results were evaluated after 6 months by means of anal manometry and a questionnaire reflecting the symptomatic results, involving both the WIS and the FSFI.

Success was defined clinically by the absence of any vaginal passage of feces, flatus, or mucous discharge.

Statistical analysis

The statistical analysis of the data in this study was performed using SPSS version 10 under windows XP (SPSS incorporation, Chicago, USA). The tests used were the arithmetic mean (average) and standard deviation, and the Student *t*-test ($P < 0.05$ was considered significant).

Results

The mean age of the patients was 31.26 ± 3.927 years (range 26–40). The etiologies of RVFs are shown in Table 1. Two of the 11 patients underwent two trials for RVF surgical repair. All patients had symptoms of passage of flatus or liquid or solid stool through the vagina and/or signs of vaginitis. Openings of the fistula were all located above the anal sphincter and varied between 5 and 25 mm in diameter. The preoperative mean anal resting pressure, mean anal squeezing pressure, and rectoanal inhibitory reflex were normal in all patients.

Symptoms occurring after the surgery included discomfort in the anus in all patients, tenesmus without diarrhea in three patients, and sensation of incomplete defecation in two patients. Mean hospital stay was 10.36 ± 1.12 days (range 9–12). All symptoms

Table 1 Patient characteristics and follow-up data of 11 patients

Patient's number	Age (years)	Multiparous	Etiology	Stoma	Previous repair	Follow-up (months)
1	29	Yes	Prolonged labor	No	No	7
2	32	Yes	Iatrogenic injury during rectocele repair	No	No	9
3	28	Yes	Iatrogenic injury during episiotomy	No	No	6
4	33	Yes	Prolonged labor	No	No	9
5	27	Yes	Iatrogenic injury during rectocele repair	No	No	6
6	34	Yes	Prolonged labor	No	No	9
7	40	Yes	Prolonged labor	No	No	6
8	32	Yes	Iatrogenic injury during episiotomy	No	No	10
9	33	Yes	Failed previous RVF repair	No	2	14
10	26	No	Failed previous RVF repair	No	2	12
11	30	Yes	Prolonged labor	No	No	9

RVF, rectovaginal fistula.

spontaneously disappeared within 2 weeks after surgery. Wound swelling was seen in three patients on the third postoperative day, which was caused by hematoma in one patient and infection in two patients. However, there was no incision disruption and all surgical wounds healed within 21 days after surgery. No postoperative mortality was seen.

Mean follow-up was 8.81 ± 2.56 months (range 6–14). Patients were followed up in the clinic or by telephone interview with specific questionnaires to collect information on the status of fecal control, flatus or fecal leakage from the vagina, and the quality of personal and social life. The interview was scheduled twice a month for the first 3 months, followed by once a month for 6 months. Functional results were evaluated after 6 months by means of anal manometry and a questionnaire reflecting the symptomatic results involving both the WIS and the FSFI. Two patients complained of mild dyspareunia, which required no further surgical management.

The results of the mean postoperative anal pressure measurements showed no significant differences compared with preoperative measurements (Table 2). The results of preoperative and postoperative WIS showed high significant postoperative improvements in all patients (P = 0.001) (Table 3). The results of preoperative and postoperative female sexual function indices showed high significant postoperative improvements in all patients (P = 0.001) (Table 3). By the time of the last follow-up, there was no recurrence of RVF, and all patients reported normal fecal continence and had returned to a normal life.

Discussion

Fistulas between the rectum and vagina are generally debilitating and often resistant to repeated repair procedures. The management of RVFs depends on the size, location, and cause of the fistula, on anal sphincter function, on the overall health of the patient, as well as on the skill and judgment of the surgeon [2,5,6].

Various surgical procedures have been suggested for the repair of these fistulas, including fecal diversion, primary repair, endorectal advancement flap, transvaginal repair, coloanal sleeve anastomosis, and transposition flaps [17,18]. The relative rarity of this type of fistula makes prospective studies and randomized controlled trials difficult to carry out.

Careful preoperative assessment of the fistula, the surrounding tissue, and the anal sphincter, and exclusion of associated disease, is essential. Timing of repair is also of importance. The chances of success are increased if the surrounding tissue is in optimal condition – that is, not inflamed or infected. A rest period of 3–6 months is suggested by some authors [19].

More importantly, underlying disorders such as IBD or tumor should also be diagnosed at the same time because these conditions can lead to repeated failure of a correct surgical procedure. Therefore, biopsy of the mucosa from the rectum or from the margin of the fistula, pelvic CT, and colonoscopy should be considered compulsory before surgical repair [2,3].

Noble first described the use of a sliding flap for repair of an RVF in 1902, and in 1983 Farkas and Gingold [20] described the first case of a RAF for RVF in Crohn's disease. The advantages of the flap procedure are as follows: absence of a perineal wound and of keyhole deformity; no worsening of incontinence; no aggravation of patients' symptoms in case of failure; and lack of requirement of a stoma [21].

The reported success rate of the RAF technique to repair RVFs in different series ranges from 29% in a mixed group of patients with both simple and complex fistulas after varying numbers of previous repair attempts to as high as 88% in patients with simple fistulas who had

Table 2 Comparison between preoperative and postoperative motility studies changes in our patients

Variables	Preoperative	Postoperative	*P* value
MARP	62.45 ± 2.20	62.81 ± 2.13	Nonsignificant
MASP	121.45 ± 3.45	121.36 ± 2.83	Nonsignificant

MARP, mean anal resting pressure; MASP, mean anal squeezing pressure.

Table 3 Comparison between preoperative and postoperative Wexner Incontinence Score and Female Sexual Functional Index changes in our patients

Variables	Preoperative	Postoperative	*P* value
MARP	20	0.91 ± 1.45	0.0001
MASP	13.07 ± 2.33	27.08 ± 2.50	0.0001

MARP, mean anal resting pressure; MASP, mean anal squeezing pressure.

an advancement flap as their primary procedure [18]. The success rate decreases with repeated attempts at repair. Successful repair correlates with the number of previous repairs – that is, none, 88% success; one, 85% success; two, 55% success [22].

A RAF is preferred whenever feasible because the flap is created on the high-pressure anorectal side of the fistula rather than on the low-pressure vaginal side [23].

In our study, transperineal combined rectal and vaginal advancement flaps with an intervening vital bulbocavernosus muscle flap were accomplished. Its use is based on the hypothesis that the interposition of tissue between the sutures lines will result in enhanced blood supply to the devascularized epithelium, obliteration of dead space, and the interruption of suture lines along the length of the multilayer closure. Furthermore, the flap interposition prevents vaginal stenosis.

Certain basic principles should be followed, including excision of the epithelialized tract, complete closure of the rectal opening, inversion of the rectal edges, adequate tissue mobilization, hemostasis, and tension-free multilayer closure.

As the described fistulas were located in the lower-half of the vagina, we decided, in consultation with the patients and as per their request, not to perform a protecting stoma. If the fistula is located in the upper-third of the vagina it may be prudent or even essential to divert the fecal contents by means of a temporary ileostomy or colostomy.

Rates of healing reported after other procedures appear to be lower. The Musset technique obtained good initial results in 87–100% of patients but with the risk for anal incontinence owing to the sphincterotomy required for this procedure [8]. RAF alone, which avoids direct anal sphincter damage, resulted in a healing rate of 80% of patients [12]. Repairing fistulas in patients with Crohn's disease has a lower success rate, which ranges from 50 to 70% [13]. We have successfully cured all of our patients without any significant morbidity, apart from two patients who experienced mild dyspareunia, for whom further treatment was not needed. Neither fecal incontinence nor recurrence was found during the time of follow-up.

Our success can be attributed to the following reasons. The etiology of fistulas in our patients was relatively simple, which may have contributed to the excellent outcome in these patients. Interposing a healthy and well-vascularized tissue avoids direct apposition of two suture lines and introduces well-vascularized tissue to the area. Understanding the anatomy of the rectum, anus, and pelvic floor, and the meticulous dissections, without diathermy, for protecting the blood vessel of the pedicle, is essential for successful repair.

Conclusion

Although RVFs are problematic for surgeons, they can be cured using our procedure. Despite the small patient cohort in this series, this technique seems to be both simple and effective, giving excellent anatomical and functional results without the need for a protecting stoma.

Acknowledgements

Conflicts of interest

None declared.

References

1 Cui L, Chen D, Chen W, Jiang H Interposition of vital bulbocavernosus graft in the treatment of both simple and recurrent rectovaginal fistulas. Int J Colorectal Dis 2009; 24:1255–1259.

2 Corman ML. Rectovaginal and rectourethral fistulas. In:Corman MLed. *Colon and rectal surgery*. 5th ed. Philadelphia: Lippincott Williams and Wilkins; 2004. 333–346.

3 Ruffolo C, Scarpa M, Bassi N, Angriman I A systematic review on advancement flaps for rectovaginal fistula in Crohn's disease: transrectal vs transvaginal approach. Colorectal Dis 2010; 12:1183–1191.

4 Gordon PH. Rectovaginal fistula. In:Gordon PH, Nivatvongs Seds. *Principles and practice of surgery for the colon, rectum and anus*. 3rd ed. NY and London: Informa HealthCare; 1992. 333–352.

5 Teresa H, Jaime L. Rectovaginal fistula. In: deBeche-Adams, Teresa H, Jaime L. Rectovaginal fistulas. *Clinics in colon and rectal surgery*. NY: Thieme Virlag; 2010. 23:99–103.

6 Reisenauer C, Huebner M, Wallwiener D. The repair of rectovaginal fistulas using a bulbocavernosus muscle-fat flap. Arch Gynecol Obstet 2009; 279:919–922.

7 McNevin MS, Lee PY, Bax TW. Martius flap: an adjunct for repair of complex, low rectovaginal fistula. Am J Surg 2007; 193:597–599. Discussion 599.

8 Lefèvre JH, Bretagnol F, Maggiori L, Alves A, Ferron M, Panis Y Operative results and quality of life after gracilis muscle transposition for recurrent rectovaginal fistula. Dis Colon Rectum 2009; 52:1290–1295.

9 Hannaway CD, Hull TL. Current considerations in the management of rectovaginal fistula from Crohn's disease. Colorectal Dis 2008; 10:747–755. Discussion 755–756.

10 Songne K, Scotté M, Lubrano J, Huet E, Lefébure B, Surlemont Y, *et al*. Treatment of anovaginal or rectovaginal fistulas with modified Martius graft. Colorectal Dis 2007; 9:653–656.

11 Sonoda T, Hull T, Piedmonte MR, Fazio VW Outcomes of primary repair of anorectal and rectovaginal fistulas using the endorectal advancement flap. Dis Colon Rectum 2002; 45:1622–1628.

12 Champagne BJ, O'Connor LM, Ferguson M, Orangio GR, Schertzer ME, Armstrong DN Efficacy of anal fistula plug in closure of cryptoglandular fistulas: long-term follow-up. Dis Colon Rectum 2006; 49:1817–1821.

13 Bleier JI, Moloo H, Goldberg SM. Ligation of intersphincteric fistula tract: an effective technique for complex fistulae. Dis Colon Rectum 2010; 53:43–46.

14 Palanivelu C, Rangarajan M, Sethilkumar R, *et al.* Laparoscopic management of iatrogenic high rectovaginal fistulas (type IV). Singapore Med J 2007; 48:96–98.

15 Rockwood TH, Church JM, Fleshman JW, Kane RL, Mavrantonis C, Thorson AG, *et al*. Fecal Incontinence Quality of Life Scale: quality of life instrument for patients with fecal incontinence. Dis Colon Rectum 2000; 43:9–16.

16 Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther 2005; 31:1–20.

17 Rothenberger DA, Goldberg SM. The management of rectovaginal fistulae. Surg Clin North Am 1983; 63:61–79.

18 MacRae HM, McLeod RS, Cohen Z, Stern H, Reznick R Treatment of rectovaginal fistulas that has failed previous repair attempts. Dis Colon Rectum 1995; 38:921–925.

19 Halverson AL, Hull TL, Fazio VW, Church J, Hammel J, Floruta C Repair of recurrent rectovaginal fistulas. Surgery 2001; 130:753–757. Discussion 757–758.

20 Farkas AM, Gingold BS. Repair of rectovaginal fistula in Crohn's disease by rectal mucosal advancement flap. Mt Sinai J Med 1983; 50:420–423.

21 Kodner IJ, Mazor A, Shemesh EI, *et al.* Endorectal advancement flap repair of rectovaginal and other complicated anorectal fistulae. Surgery 1993; 114:682–690.

22 Lowry AC, Thorson AG, Rothenberger DA, *et al.* Repair of simple rectovaginalfstulas. Infuence of previous repairs. Dis Colon Rectum 1988; 31:676–678.

23 Penninckx F, D'Hoore A, Filez L. Advancement flap plasty for the closure of anal and recto-vaginal fistulas in Crohn's disease. Acta Gastroenterol Belg 2001; 64:223–226.