Case Report

Gracilis muscle repair of rectovaginal fistula that developed after low anterior resection of the rectum. Report of two cases.

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Introduction

Rectovaginal fistula occurs after low anterior resection for rectal or cervical carcinoma, proctocolectomy for ulcerative colitis or familial polyposis. It is difficult to cure the fistula if the radiation therapy was performed.

Low anterior resection is one of the most common surgeries for rectal cancer. It has become a relatively safe procedure for tumors in the lower rectum, because of the improvement of stapling devices. Although anastomotic leakage following low anterior resection occurs occasionally, the frequency of the development of rectovaginal fistula due to anastomotic leakage is very low. However, once it occurs, it is difficult to cure[1]. Various surgical procedures for the treatment of rectovaginal fistula have been reported.

Once a local attempt to repair a rectovaginal fistula has failed, a management problem arises. Lowry *et al.* found that patients with simple fistulas had an 85% chance of successful repair with an endorectal advancement flap after the first attempt of local repair failed. However, this percentage dropped to 55% with a third attempt at repair. They recommended a different mode of treatment be used for these nonhealing fistulas[2]. In sexually active women, this complication can be distressing, and may require a permanent ileostomy. The authors used a pedicled gracilis muscle flap after local repair failed in two patients who developed rectovaginal fistula following low anterior resection, and report and discuss their experience with this technique.

(Key words: rectovaginal fistula, gracilis muscle repair, rectal cancer, ulcerative colitis)

Case Report

Patient 1:

In February 2004, a 59-year-old woman underwent neoadjuvant radiation therapy for rectal cancer. In March 2004, she underwent low anterior resection with double stapling colonic J-pouch rectal anastomosis and loop ileostomy. The pathologic specimen confirmed the diagnosis of rectal cancer with invasion perforating the muscularis propria. Vaginal discharge appeared early during her postoperative course. She was discharged from the hospital 15 days after the operation, and she was subsequently followed up at the outpatient clinic. She received

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3 cycles of 5FU/l-LV as adjuvant chemotherapy. The postoperative vaginal discharge continued for6months. In October 2004, Gastrografin® enema of the colonic pouch showed leakage of the contrast medium from the colonic pouch to the vagina. Then closure of the fistula and interposition of the gracilis muscle between the vagina and the anastomosis was performed. The operation time was 2 hour 35 minutes. The blood loss was 180 ml. This patient felt a light wound pain at the right thigh, and there were no major postoperative complications. Until February 2005, complete healing was confirmed on examination with Gastrografin® enema and the ileostomy was closed. The fistula had not recurred as of the one-year follow-up.

Patient 2:

In July 2003, a 58-year-old woman with lower rectal cancer underwent low anterior resection with double stapling colonic J-pouch rectal anastomosis. The pathologic specimen confirmed the diagnosis of rectal cancer with invasion penetrating the muscularis propria. Vaginal discharge appeared during her early postoperative course. Anastomotic leakage and rectovaginal fistula were confirmed. On the 14 th postoperative day, a diverting transverse colostomy was constructed due to disabling fecal drainage through the vagina. She was discharged 30 days after the initial operation, and she was observed as an outpatient. The postoperative vaginal discharge continued for a period of 4 months. In November 2003, Gastrografin® examination of the pouch showed leakage of the contrast medium from the colonic J-pouch to vagina. One month later, local repair of the fistula was performed with a vaginal advancement technique. Successfully, In January 2005, Gastrografin® examination of the pouch showed recurrence of the rectovaginal fistula. And then gracilis muscle interposition was performed similar to that in the first patient. The operation time was 2 hour 15 minutes. The bleeding quantity was 210 ml. That patient felt a light wound pain at the right thigh, too. There were no major postoperative complications. November 2005, rectovaginal fistula was healed completely, which was confirmed by two Gastrografin® enemas. In November 2005, the transverse colostomy was closed. Since then, one month after the closure of colostomy, vaginal discharge occurred again. However in January 2006, the discharge disappeared, and the fistula has been closed for three months.

Operative technique

It was not necessary for the patients to undergo full mechanical bowel preparation preoperatively because of loop colostomy or ileostomy. The patients were placed in the lithotomy position and an indwelling urinary catheter was inserted. The dissection was initiated with a 2-cm transverse incision on the posterior wall of the vagina at the level of the fistula. A 2-cm middle vertical incision toward the orifice of the vagina was added to provide better exposure for the discussion between the vaginal wall and the rectal wall. The dissection was performed to separate the posterior vaginal wall from the anterior rectal wall. This procedure made a space for the transposition of the pedicled gracilis muscle.

A longitudinal incision was made directly over the gracilis muscle from the inguinal skin crease to its tendinous insertion in the popliteal fossa. The gracilis muscle was identified and

dissected (Figure. 1, Schema. 1), and was divided distally at its tendon. Mobilization continued proximally to within several centimeters of its neurovascular bundle, which entered the muscle belly, 5-cm distal to the inguinal skin crease. The fistula opening on the rectal side at the anastomosis was closed by interrupted suture using absorbable sutures. The distal end of gracilis muscle was brought through a subcutaneous tunnel and was inserted between the vagina and rectum (Figure 2, Schema 2). The distal end of the gracilis muscle was fixed on the opposite side to the connective tissue between the rectum and the vagina with absorbable sutures.

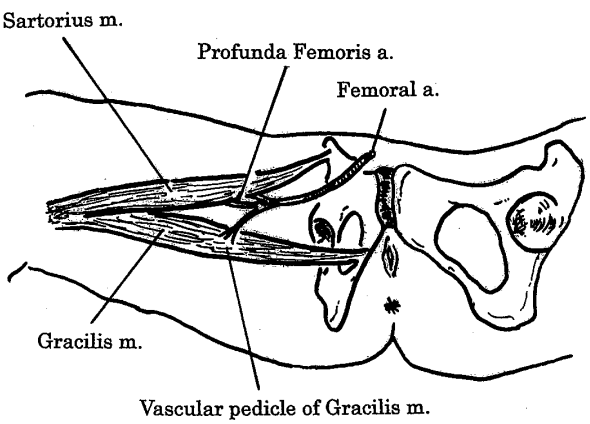
The incisions on the posterior vaginal wall were closed with absorbable sutures. The rectal opening of the fistula was left open for drainage. The thigh incision was closed over a suction drain. Ambulation started on the 3rd postoperative day.

Discussion

The most common cause of rectovaginal fistula is obstetric injury; composing up to 88% of all cases in reported studies[3]. Other forms of trauma to the perineal area include gynecologic, proctologic, violent injury and foreign body manipulation. Fistulae may also arise from neoplasms, inflammatory bowel disease, such as Crohn's disease, infections and congenital conditions[4].

In rectal cancer patients who have developed rectovaginal fisutula, although the fistula itself

Figure 1. Intraoperative photograph of the gracilis muscle. (Case 1.)



Schema 1. Anatomy of the gracilis muscle and its vascular pedicle. (from citation 12)

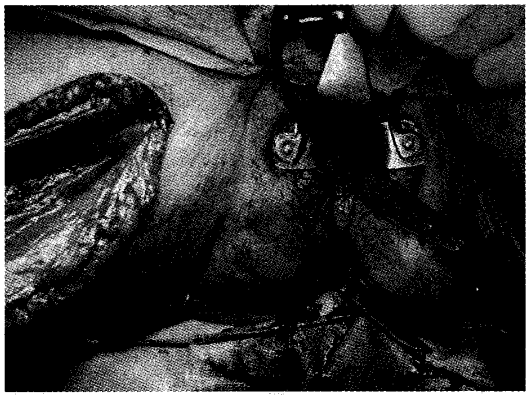
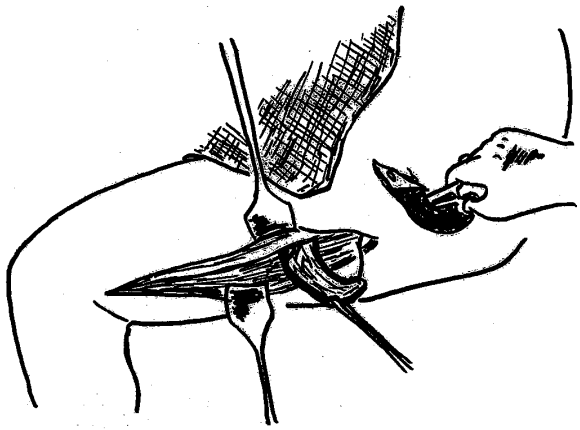


Figure 2. Intraoperative photograph of the gracilis muscle which drawn into the vagina. (Case 1.)



Schema 2. The gracilis muscle was drawn through the foramen obturatorium into the vagina. (from citation 13)

does not affect the prognosis, patients suffer from a poor quality of life.

One of the treatments for rectovaginal fisutula is the construction of colostomy or ileostomy. However, it is difficult to have complete closure of the fistula by stoma creation alone. When patients are followed up without stoma closure, patients suffer from a poor quality of life. It is difficult to cure the fistula by simply suturing the fistula, because of the narrow space between the rectum and the vagina, impaired blood supply at the site of the fistula, fibrotic changes and continuous inflammation.

J. Rius *et al.* described seven cases of gracilis transposition in rectovaginal fistula and unhealed perineal wounds after proctocolectomy. Although restorative ileostomy or colostomy was performed in five cases and advancement flap repair was attempted in four cases, the fistulas or perineal wounds did not heal. The application of gracilis muscle repair resulted in healing of the fistulas and wounds in five cases[5].

MacRae stated that advancement flap repair is generally not recommended for persistent complex fistulas or for simple fistulas that have failed following a previous advancement flap repair[6]. Bastiaanse reported good results from interposition of the peritoneum, omentum, and bulbocavernous flaps[7].

The method of gracilis interposition as a treatment for irradiation fistulas was presented by Ingelman-Sundberg in 1952[8]. Graham described the interposition of the gracilis muscle, and

stated that because of the proximal neurovascular supply the muscle is highly suitable for transfer from its normal location in the thigh to the site of the rectovaginal fistula[9]. A success rate of 76% has been reported for the repair of rectovaginal fistulae following radiotherapy using a gracilis muscle sling interpositioned between the rectum and vagina[10].

The pedicled gracilis muscle graft possesses good blood flow and it is possible to move without generating excessive tension. Although the normal function of gracilis muscle is adduction of the femoral bone and flexion of the knee joint, there have been no reports of any dysfunctions after transplantation of this muscle.

Pedicled gracilis muscle transposition has been used not only for radical treatment of rectovaginal fistula but also for radical treatment of rectourethral fistula, vesicovaginal fistula, intractable pelvic abscess, repair of injury to the perineum and plasty of the anal sphincter muscle. However, in Japan only ten cases of gracilis muscle repair for rectovaginal fistula have been reported[1][10].

We considered that it is necessary to separate the posterior vaginal wall from the anterior rectal wall, and to use a graft that exhibits good blood flow and resistance to bacterial infection.

Based on the reasons stated above, we selected pedicled gracilis muscle repair for recurring rectovaginal fistula and experienced good results without causing any functional problems of the leg.

The mobilization and the preparation of the gracilis muscle should better be done by a plastic surgeon, which was the case in our patients. The placement and the fixation of the mobilized gracilis muscle in between the vagina and the rectum can be carried out without difficulty by a colorectal surgeon with a help of the plastic surgeon who mobilized the muscle. With the experience of several cases, a colorectal surgeon will probably become able to acquire the technique of mobilizing the gracilis muscle in the thigh; however it would be difficult to have a good number of cases to achieve the skill because the rectovaginal fistula is the rare disease. We consider that a plastic surgeon should be called to carry out the mobilization of the gracilis muscle when the surgery for the intractable rectovaginal fistula is carried out by the interposition of the gracilis muscle.

Due to the good results in our experience and in previous reports we consider that gracilis muscle transposition is a useful treatment option for patients with intractable rectovaginal fistula.

Conclusion

The gracilis muscle transposition is a useful treatment option in patients with persistent rectovaginal fistula following low anterior resection of the rectum. In the treatment of rectovaginal fistula, when the first attempt of local repair, such as an advancement flap repair, fails, gracilis muscle transposition is considered to be an appropriate choice of treatment.

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薄筋弁を用いた低位前方切除術後直腸膣瘻の2例

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要　約

直腸膣瘻は，直腸癌に対する低位前方切除後や潰瘍性大腸炎などに対する大腸全摘術後に稀にみられる合併症である。低位前方切除術は直腸癌の根治手術として最も一般的な手術法であり，腸管の吻合に自動吻合器がよく用いられているが，その際に縫合不全を生じると，時に直腸膣瘻をひき起すことがある。一旦直腸膣瘻が形成されてしまうと保存的治療では治癒しない症例がほとんどであって，局所の安静のために人工肛門造設を行い，経肛門的，経膣的な瘻孔切除術や瘻孔閉鎖術を行っても，15%の症例で再発し，再手術の成功率は5割程度であるとの報告もあり，その治療に難渋することがしばしばみられる。また，人工肛門の存在する期間が長期間となれば，その患者のQOLや満足度は低下するため，治癒率が高く，機能障害を合併しない術式が求められる。我々は2例の薄筋弁充塡法を用いた直腸膣瘻根治術を行い，良好な結果を得ることができたので報告する。

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