Original Article
Transvaginal early fistula debridement and repair plus continuous vacuum aspiration via anal tube for rectovaginal fistula following rectal cancer surgery: report of four cases

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Abstract: Objective: To investigate the feasibility and superiority of transvaginal early fistula debridement and repair plus continuous vacuum aspiration via anal tube for rectovaginal fistula following rectal cancer surgery. Methods: The clinical data of four cases of rectovaginal fistula following rectal cancer surgery were retrospectively analyzed in our center. After adequate preoperative preparation, the patients underwent transvaginal fistula debridement and repair plus continuous vacuum aspiration via anal tube under continuous epidural anesthesia. After surgery and before discharge, anti-infection and nutritional support was administered for 2 d, and fluid diet and anal tube vacuum aspiration continued for 7 d. Results: All the four cases healed. Three of them healed after one operation, and the other patient had obvious shrinkage of the fistular orifice after the first operation and underwent the same operation for a second time before complete healing. The duration of postoperative follow-up was 2, 7, 8 and 9 months respectively. No recurrence or abnormal sex life was reported. Conclusions: Early transvaginal fistula debridement and repair plus continuous vacuum aspiration via anal tube are feasible for rectovaginal fistula following rectal cancer surgery. This operation has many advantages, such as minimal invasiveness, short durations of operation, short treatment cycles, and easy acceptance by the patient. In addition, it does not necessitate colostomy for feces shunt and a secondary colostomy and reduction.

Keywords: Fistula, debridement and repair, anal tube, continuous vacuum aspiration, after rectal cancer surgery, rectovaginal fistula

Introduction

In recent years, the cases of rectovaginal fistula have increased with the wide application of staplers and Dixon’s operation for low and middle-level rectal cancer in women [1, 2]. Rectovaginal fistula, a complication of rectal cancer, affects the well-being of the patient both physically and psychologically. Currently, most practitioners believe that proximal colostomy for feces shunt should be performed as the preliminary and basic management of rectovaginal fistula following rectal cancer surgery, and a secondary colostomy and reduction be performed after rectovaginal fistula healing [3]. This practice has many disadvantages, such as risks of two times of anesthesia and operation, long treatment cycles, and heavy economic burdens; hence, the patient is usually unwilling to accept this treatment modality. Since July 2009, we have been performing early debridement and repair plus continuous vacuum aspiration via anal tube for rectovaginal fistula after rectal cancer surgery and the effect has been satisfactory.

Data and methods

General data

The four patients aged 42, 53, 56 and 58 years respectively, (mean, 52.3 years), and all discharged feces and gas from their vagina from 15 to 18 d (mean, 16 d) after rectal cancer surgery. In order to reach a definite diagnosis, a strip of white gauze was inserted into the rec-
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Figure 1. Home-made anal three-manifold.

na and rectum were disinfected repeatedly. (2) The vagina was dilated using a vaginal dilator to expose the operating field. After the location of the fistular orifice was identified, the fistula and surrounding tissues were scratched using a curette until the fistula and surrounding tissues turned bright red. (3) The normal vaginal posterior wall tissue 1 cm away from the fistular orifice was scratched using a curette to form an artificial wound, which was prepared for suturing. (4) The fistula was sutured with absorbable suture in full thickness in an interrupted manner, and the stitches were over 0.8 cm away from the margin of the rectovaginal fistular orifice, with a stitch interval of approximately 0.3 cm. After fistula suturing, the vaginal wound tissue in the upper and lower margins of the fistular orifice was sutured with absorbable suture in full thickness to embed and strengthen the previously sutured fistula. (5) An anal three-manifold we designed was placed via the anus at more than 3 cm above the rectovaginal fistula level. The anal three-manifold comprises an air inlet tube, an air outlet tube and an anal tube, all of which are bound at the front end with a silk suture. The air inlet is a passage through which the air enters the rectum. The air outlet tube is linked to a vacuum aspirator, and the anal tube is linked to a drainage bag. The diagram of the anal three-manifold is shown in Figure 1.

Postoperative management

After surgery, anti-infection and nutritional support was administered for 2 d, and fluid diet and anal tube vacuum aspiration at - (40 ± 5) Kpa continued for 7 d.

Healing criteria

The anal tube was withdrawn at 7 d postoperatively and intestinal contents and gas were discharged from the anus instead of from the vagina. At postoperative 1 and 2 months, a strip of white gauze was inserted into the rectum, and it was not stained blue 3 - 5 min after intravaginal injection of methylthioninium chloride solution. The patients resumed a normal sex life.

Results

All the four cases healed. Three of them healed after one operation, and the other patient had
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obvious shrinkage of the fistular orifice after the first operation and underwent the same operation for a second time before complete healing. The duration of the initial operation was 35, 40, 45 and 45 min respectively, (mean, 41.25 ± 4.79 min), and that of the second operation was 55 min. The duration of the initial hospital stay was 13, 14, 14 and 15 d respectively, (mean 14.00 ± 0.82 d), and that of the second hospital stay was 14 d. The duration of postoperative follow-up was 2, 7, 8 and 9 months respectively, (mean, 6.50 ± 3.11 months). No recurrence or abnormal sex life was reported.

Discussion

The causes of rectovaginal fistula include intestinal inflammatory disease, birth trauma, iatrogenic injury from hysterectomy, and injury from radiotherapy. Here we focused on rectovaginal fistula following rectal cancer surgery. Due to the low rectal cancer position and difficulty in surgical removal, rectovaginal fistula is likely to occur when the posterior vaginal wall tissue impinges into the staplers during rectal resection and double stapling anastomosis [4, 5]. Rectovaginal fistula is very difficult to treat, and the duration of treatment is long, which tortures the patients and makes their quality of life poor [6]. There are many operative modalities for complex and recurrent rectovaginal fistula [7-13], and their therapeutic effects have been proven satisfactory. With respect to the treatment of rectovaginal fistula after rectal cancer surgery, the widely accepted practice is that proximal colostomy is the first step, followed by a secondary colostomy and reduction after rectovaginal fistula healing [14, 15]. Most rectovaginal fistulas heal spontaneously, without needing repair [16]. In the absence of healing, topical repair may be effective. This practice has many disadvantages, such as risks of two times of anesthesia and operation, long treatment cycles, and heavy economic burdens. Additionally, the patients are unable to resume a normal sex life, which makes the quality of life poor. Moreover, the postoperative care and management of colostomy is a headache for the patient. From July 2009 to October 2013, we performed early transvaginal fistula debridement and repair plus continuous vacuum aspiration via anal tube for rectovaginal fistula following rectal cancer surgery, and the outcomes were satisfactory.

Selection of operative timing

Rectovaginal fistula after rectal cancer surgery is a pathological passage between the rectum and vagina, through which intestinal contents enter the vagina. Due to irritation and contamination by intestinal contents, obvious hyperemia and edema can be observed in the fistula and surrounding tissues, along with serious inflammatory reactions and tissue necrosis on the fistula surface. In the presence of these pathologic changes, topical repair may not be successfully. We think that the patient, once admitted, should undergo intestinal lavage and put on a fluid diet, in order to reduce continuous irritation and contamination of the fistula and surrounding tissues by intestinal contents. Following intestinal lavage, 0.5% metronidazole injection was used for lavage of the vagina and fistula and retention enema and the vagina and fistula were wet compressed with gauze soaked with gentamycin containing saline. The purpose of the preparatory step was to further control and relieves infection of the fistula and surrounding tissues until no feces flew out of the vagina or anus and inflammatory reactions in the fistula and surrounding tissues had been controlled as confirmed by anoscopy and vaginoscopy. The preparation usually lasted 4-5 d. If the step took too long, the fistular tissue would have epithelialized and surrounding tissues would have formed scars. In this case, topical repair would become difficult and be unlikely to succeed. Therefore, for rectovaginal fistula after rectal cancer surgery, the optimal timing for surgery is when inflammation of the fistula and surrounding tissues has been controlled largely and early repair should be stressed.

Prior to repair, the pelvic cavity must be checked thorough by using imaging technology to assess the risks of repair. In our opinion, repair should be postponed in the following circumstances:

(1) Pelvic infection and/or abscess. Pelvic infection and/or abscess are a serious source of infection. Infection may disseminate, and abscess may rupture, aggravating infection of fistula and surrounding tissues. In this case, indiscreet repair usually fails. Repair may not be considered unless pelvic infection and/or abscess have cured. (2) Patients with rectal cancer who undergo R1, especially R2 resection. In these patients, rectovaginal fistula,
even repaired, is unlikely to heal due to macroscopic remnant cancer tissue at the site of anastomosis. (3) Patients who undergo chemotherapy and radio-therapy prior to radical rectal cancer operation.

**Selection of operative approach**

The repair of rectovaginal fistula may be conducted transabdominally, transanally, transvaginally and transperineally. We adopted the transvaginal approach because of the following advantages: (1) the vagina is of large extensibility and space. With the use of a vaginal dilator, the operating field can be exposed satisfactorily for fistula debridement and repair; (2) only this approach allows scratching normal vaginal tissue surrounding the fistular orifice to form fresh artificial wound; (3) transvaginal repair will not interfere with subsequent anal tube insertion.

**Selection of operative modality**

Surgery is the fundamental and effective therapeutic modality for rectovaginal fistula [17], despite reported cases of spontaneous cure [18]. There are many operative modalities, which may be selected according to the etiology, location and size of rectovaginal fistula. Regardless of the operative modality and approach, the widely accepted practice is that proximal colostomy is the first step, followed by a secondary colostomy and reduction after rectovaginal fistula healing [19]. This practice has many disadvantages, such as risks of two times of anesthesia and operation, long treatment cycles, and heavy economic burdens. Additionally, the patients are unable to resume a normal sex life, which makes the quality of life poor. Moreover, the postoperative care and management of colostomy is a headache for the patient. Alternatively, we carried out early fistula debridement and repair plus continuous vacuum aspiration via anal tube for rectovaginal fistula after rectal cancer surgery. In this series of cases, the length of fistula was short (mean, 0.63 ± 0.10 cm), and the diameter of fistular orifice was small (mean, 0.83 ± 0.24 cm). The interior of fistula and surrounding tissues were coated with necrotic tissue. Therefore, thorough debridement must be conducted to create a fresh, bright red wound. Then, the upper and lower margins of fistula were sutured with absorbable suture in full thickness in interrupted stitches to eliminate the lumen of fistula. The normal tissue around the fistular orifice in the posterior vaginal wall was scratched to create a fresh artificial wound and then the posterior vaginal wall was sutured, thus embedding and strengthening the repaired fistula. In order to maintain the tensile strength of suture and protect the tissue from tearing, the stitches must be at least 1 cm away from the fistular orifice, and the stitch interval must be around 0.3 cm.

In our opinion, despite preoperative intestinal lavage, intestinal juice and gas continue to be produced, move toward the anus and accumulate in the rectum, increasing intrarectal pressure. As a result, the tension in the sutured tissue increases, which will affect healing. Through continuous vacuum aspiration, intestinal juice, secretions and gas in the rectum can be emptied, reducing the tension, irritation and impregnation in the sutured tissue and, thus, promoting fistula healing.

Understandably, fistula debridement and repair and continuous vacuum aspiration via anal tube are complementary to each other, and help early healing of rectovaginal fistula after rectal cancer surgery. This is supported by the success of the four patients reported above.

**Analysis of failure of the initial operation and retreatment regimen**

In this series of four cases, the first one failed after the initial operation. The failure may be closely related to a lack of experience of the surgeons and poor inflammation control of fistula and surrounding tissues. In this case, the size of rectovaginal fistula diminished to approximately 1/2 of the original size after the initial operation. In the retreatment regimen, we emphasized controlling inflammation in the fistula and surrounding tissues. In brief, 0.5% metronidazole injection was used for repeated lavage of the vagina and fistula and retention enema of the rectum, and the vagina and fistula were wet compressed with gauze soaked with gentamycin containing saline. Fistula repair and continuous vacuum aspiration via anal tube did not start until inflammation in the fistula and surrounding tissues had been controlled. The case healed without colostomy. The success of retreatment may be attributed to a thorough preoperative preparation, control of inflammation and embedding of posterior vaginal wall tissue.

(3) Patients who undergo chemotherapy and radio-therapy prior to radical rectal cancer operation.
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Disclosure of conflict of interest

None.

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