

# Management of a Pelvic Abscess and Abdominal Fistula after Palliative Total Pelvic Exenteration with Intraoperative Radiotherapy in Recurrent Rectal Cancer Without NPWT: A Case Report

Hui Yang, MM; Yuanyi Rui, MD; and Hong Chen, MD

## ABSTRACT

A 59-year-old man with recurrent rectal cancer and type 2 diabetes mellitus underwent palliative total pelvic exenteration and intraoperative radiotherapy. After surgery, he experienced a pelvic abscess and abdominal-perineal fistula. Profuse exudate contaminated the midline abdominal incision through the abdominal-perineal fistula and delayed healing. Because of a residual tumor and the high cost, negative-pressure wound therapy was not performed. After 76 days of local treatment that involved removing necrotic tissue, controlling inflammation with an antimicrobial silver dressing, absorbing and draining exudate with a hypertonic saline dressing, promoting granulation and preventing infection with a silver alginate dressing, and promoting re-epithelialization with recombinant human epidermal growth factor gel, the abdominal wound and abdominal-perineal fistula healed successfully.

**KEYWORDS:** fistula, intraoperative radiotherapy, negative-pressure wound therapy, pelvic abscess, pelvic exenteration, rectal cancer, wound care, wound dressing

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## INTRODUCTION

This report highlights the experience of and challenges in the management of a patient with a pelvic abscess combined with abdomen-perineal fistula after palliative total pelvic exenteration (TPE) with intraoperative radiotherapy in recurrent rectal cancer without negative-pressure wound therapy (NPWT). Complex and traumatic, TPE is surgery for locally advanced or recurrent rectal cancer, involving resection of the rectum and all organs within the pelvis such as the bladder, internal genital organs, and/or sacrum.<sup>1</sup> This surgery destroys the continuity of the peritoneum and is likely to result in pelvic infection. A prospective study indicated the respective morbidities of perineal wound infection, pelvic abscess, and abdominal wound infection after TPE were 40%, 20%, and 18%, respectively.<sup>2</sup>

R0 resection is complete resection of the tumor with negative margin, and R2 resection is incomplete resection with macroscopic residual tumor, that is, cancer that is incurable via surgery.<sup>3</sup> When a tumor infiltrates pelvic bone (usually the lateral and posterior pelvic wall) or main pelvic vessels, it is difficult to achieve an R0 resection despite preoperative radiochemotherapy.<sup>1</sup> In that case, intraoperative radiotherapy can be used for local disease control, which may lead to pelvic abscess or fistula.<sup>4</sup> However, it is rare that a pelvic abscess combined with abdomen-perineal fistula occurs after TPE after intraoperative radiotherapy.

Because of its advantages in reducing wound exudate, improving local microcirculation, and promoting the growth of granulation tissue,<sup>5</sup> NPWT is an effective treatment for postoperative fistula.<sup>6–8</sup> However, when tumor residual is identified, NPWT is not recommended.<sup>9</sup> Further, the cost of NPWT is not affordable for all patients.<sup>10</sup>

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## CASE REPORT

A 59-year-old man with recurrent rectal cancer, type 2 diabetes mellitus, and malnutrition underwent palliative TPE on October 6, 2019. In this case, the interprofessional colorectal cancer treatment team determined that the patient could achieve an R2 resection according to the preoperative MRI examination and the surgeon's intraoperative judgment. As a result, the patient received 15-Gy intraoperative radiotherapy, which was delivered to the residual tumor bed in the presacral area (irradiation depth: 2.7 cm). The family and patient were educated about the severity of the surgery and risks of complications, and they chose to proceed. Because of peritoneal deflection, the intestines were at risk of falling into the pelvic cavity and causing adhesion and obstruction. Accordingly, an absorbable mesh prosthesis was placed to reconstruct the pelvic floor to avoid pelvic hernia. Because the patient's albumin was 31.9 g/L (reference value, 40–55 g/L), human serum albumin and therapeutic parenteral nutrition were prescribed to improve the patient's nutrition status.

On postoperative day (POD) 5, the patient reported severe perianal pain and the drainage from the pelvis changed from light bloody fluid to yellow-white sticky pus. A blood test showed the patient's white blood cell count was  $10.72 \times 10^9/L$  (reference value,  $4-10 \times 10^9/L$ ), and his C-reactive protein was 111.19 mg/L (reference value,  $<10 \text{ mg/L}$ ). Given the indications of pelvic abscess, the authors removed the sutures from the perineal wound to enhance drainage, instructed the patient to sit in a bidet with 4 L of 1:5,000 potassium permanganate of 38°C

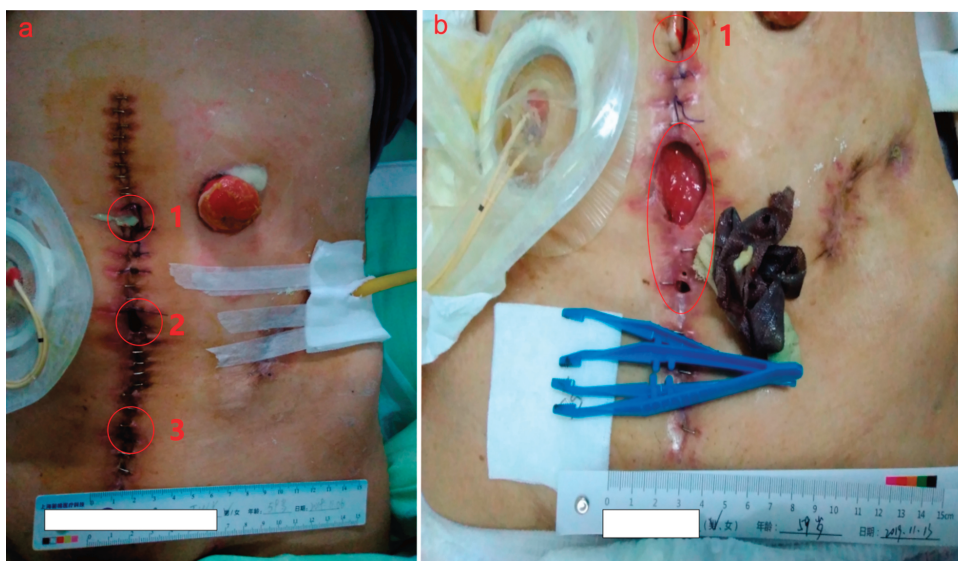
for about 15 minutes twice a day. After a drug susceptibility test, IV cefoperazone sulbactam was prescribed every 8 hours to control infection.

On POD 20, the authors observed that the patient's stapled midline abdominal incision had divided into three parts, so antimicrobial silver dressings (size  $10 \times 10 \text{ cm}$ ) were applied on the wound bed. On POD 28, the wound ostomy continence (WOC) nurse removed all of the midline abdominal incision staples and continued to use antimicrobial silver dressings without any antibiotics (Figure 1). After 5 days of treatment, wound 1 healed, whereas wounds 2 and 3 merged into a  $9 \times 2\text{-cm}$  wound, and a fistula with a 1-cm-diameter orifice developed. The fistula connected the pelvic and abdominal wounds without bowel involvement. The pelvic wounds had a fetid odor and profuse exudate with Gram-negative bacilli mixed growth confirmed by bacterial culture and identification.

Because of the pain caused by the pelvic abscess, the patient could not continuously remain in a semirecumbent position. When he changed into a lateral or supine position, pelvic exudate would accumulate, increasing the risk of contamination. To alleviate this, the WOC nurse used gauze to plug the abdominal-perineal fistula and a silver alginate dressing instead of antimicrobial silver dressings to promote granulation growth and control inflammation (Figure 2). However, the gauze stuffed in the fistula was quickly contaminated and needed to be changed at least twice a day. After an additional 15 days of such treatment, the patient reported feeling more and more depressed, and limited wound granulation was noted.

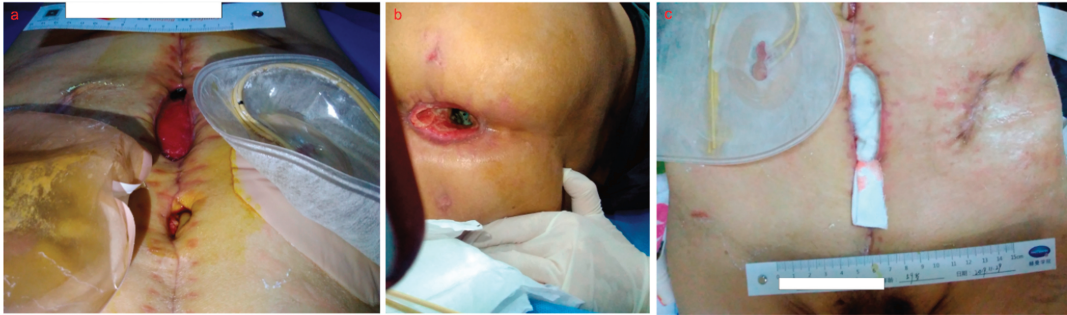
### Figure 1. DISTENDED INITIAL MIDLINE ABDOMINAL INCISION

A, The stapled midline abdominal incision distended into three parts on postoperative day 20. B, Wound 1 healed, whereas wounds 2 and 3 merged into a larger defect (covered by antimicrobial silver dressings) on postoperative day 28.



## Figure 2. ABDOMINAL-PERINEAL FISTULA DEVELOPED POSTOPERATIVE DAY 33

A, Abdominal incision wound (wound size: 9 × 2 cm) and abdomen-perineal fistula (diameter, 1 cm). B, Pelvic abscess. C, Abdominal incision wound was padded with gauze and silver alginate dressing.



On POD 48, the authors changed the dressing from gauze to a hypertonic saline dressing (size 2 × 100 cm) to plug the abdominal fistula and probed into the abscess cavity. To avoid the hypertonic saline dressing falling into the pelvic cavity and ensure it could be taken out easily, the physician sutured the dressing and used strapping to attach the sutures on the peripheral skin (Figure 3). The authors changed the hypertonic saline dressing when it could not absorb any more exudate. This was completed every 2 to 3 days. On POD 57, the size of abdominal wound and the diameter of fistula orifice decreased, and the exudate and odor of the pelvic wound were reduced.

On POD 60, a large amount of uncoagulated blood emerged from the pelvic cavity (Figure 4). Urgent interventional angiography indicated that a progression of the pelvic residual tumor and erosion of adjacent vessels caused diffused bleeding. A 1-day ICU stay was required to monitor the patient's vital signs for early warnings of further bleeding.

The patient's family believed the local treatment of the pelvic wound caused the bleeding and refused further wound therapy. However, the patient insisted on wound care after hemostasis because he did not want to live with the wound unhealed until death. His providers

discussed the probable treatment-related risks and benefits with the patient and his family members and reached consensus on a treatment strategy with potassium permanganate sitz baths instead of hypertonic saline dressing padding and continued abdominal wound and fistula treatment.

On POD 68, the size of the abdominal wound decreased to 5.5 × 1 cm, and the diameter of the fistula orifice decreased to 0.3 cm. The authors switched to recombinant human epidermal growth factor gel to promote epithelialization (Figure 5). The patient was discharged from the hospital and continued to receive care at home. On POD 76, he sent a photograph to providers that showed the epithelialization of the abdominal wound and healing of the fistula (Figure 5). The patient died in June 2020 at home.

This case report was approved by the ethics committee of Sichuan Cancer Hospital, and informed consent was obtained from the patient for the publication of this report and accompanying photographs for scientific use.

## DISCUSSION

This case report describes the management of a patient with recurrent rectal cancer who developed a pelvic abscess and fistula after palliative TPE with intraoperative radiation. The authors searched PubMed from 1980 to February 2021 combining the MeSH terms “pelvic

## Figure 3. USE OF HYPERTONIC SALINE DRESSING ON POSTOPERATIVE DAYS 48-59

A, Hypertonic saline dressing was used to plug into the abdomen-perineal fistula. B, Hypertonic saline dressing was sutured. C, Hypertonic saline dressing was placed into the pelvic cavity. D, The sutures were attached on the peripheral skin.





### Figure 4. PELVIC HEMORRHAGE ON POSTOPERATIVE DAY 60

A and B, Blood from the pelvic cavity contaminated the abdominal wound dressing through the fistula. C, Blood retrograded to the abdominal wound through the fistula. D, Hypertonic saline dressing was soaked with blood.



exenteration” and “intraoperative radiotherapy” and “fistula” and found no other case reports using these terms. Although intraoperative radiotherapy can kill cancer cells, it may also alter the composition and biologic activity of surgical wound fluid via radiation-induced bystander effect.<sup>11</sup> Accordingly, these patients are at high risk of abscess and/or fistula as a result of radiation-induced damage after pelvic radiotherapy.<sup>4</sup> In addition, diabetes can interrupt normal wound healing via prolonged inflammation, impaired angiogenesis, and compromised epithelialization.<sup>12</sup> In this case, the patient had type 2 diabetes mellitus and received intraoperative radiotherapy. Consequently, he experienced a pelvic abscess on POD 5 and abdominal fistula on POD 33. It was necessary to focus on the treatment of pelvic abscess to stop wound development.

The management of patients with pelvic abscess with or without abdominal-perineal fistula involves topical therapies to control extensive exudate and odor, prevent contamination, and promote wound healing. A recent review of potassium permanganate for wound care describes its antiseptic and astringent properties.<sup>13</sup> In this case, the patient received conventional potassium permanganate sitz baths to alleviate the pelvic abscess. To prevent infection and reduce bacterial burden in the wound environment, antimicrobial wound dressings were used.<sup>14</sup> At the beginning of treatment for the abdomen wound, the authors used antimicrobial silver dressings to reduce bacterial burden. Next, the authors chose highly absorbent silver alginate dressings to prevent infections and maintain moisture balance in the wound composed of 85% alginate and 15% carboxymethyl cellulose with ionic silver.<sup>14</sup> Compared with antimicrobial silver dressings, silver alginate dressings have good antimicrobial properties and high absorptivity of wound exudate by incorporating silver ions into alginate fibers.<sup>15</sup>

In the early treatment of this case, because of the failure to manage pelvic exudate, granulation ceased, placing the patient in a negative emotional state. Depression, anxiety, and frustration are the most common

psychological reactions to chronic wounds.<sup>16,17</sup> Meanwhile, odor leads to social embarrassment that can have a destructive psychological impact.<sup>18</sup> The patient’s psychological state impacts wound healing by directly influencing endocrine and immune function.<sup>16</sup> Accordingly, providers must pay attention to the patient’s psychological state, consult with a psychotherapist if needed, and enhance family support and nursing care.

Hypertonic saline dressings were used starting on POD 48. A hypertonic saline dressing is an absorbent nontissue material with hypertonic effect, containing sodium chloride and absorbent polyester fiber. It can absorb secretions without obstructing wound drainage and is convenient to replace with no residue and wound bleeding.<sup>19</sup> It is also recommended to control the odor of malignant fungating wounds.<sup>18</sup> Compared with NPWT, wound

### Figure 5. EPITHELIALIZATION

A, Recombinant human epidermal growth factor gel was used on postoperative day 68. B, Surveillance of abdominal incision wound and abdomen-perineal fistula on postoperative day 76.



**Table. TREATMENT STRATEGY**

Postoperative Day	Key Points	Treatment Goals	Wound Care	Effect
5	Pelvic abscess	Control pelvic infection	Systematic antibiotic, potassium permanganate sitz bath	No systemic infection
20	Stapled midline abdominal incision distended	Control abdominal wound infection	Debridement, antimicrobial silver dressings	Partial abdominal wound healed
33	Fistula developed	Avoid the abdominal wound contamination of pelvic exudate through fistula	Gauze, silver alginate dressing	Increased frequency of dressing changes and no granulation growth
48	Risk of festering abdominal wound infection	Avoid the contamination of abdominal wound and promote granulation growth	Hypertonic saline dressing, silver alginate dressing, strapping	Decreased frequency of dressing changes, promoted granulation growth, and reduced exudation and odor of pelvic wound
60	Pelvic hemorrhage	Hemostasis	/	/
62	Avoid pelvic hemorrhage	Avoid treatment-related risks	Potassium permanganate sitz bath, hypertonic saline dressing, silver alginate dressing	No more pelvic hemorrhage
68	Support granulation growth	Promote epithelialization	Recombinant human epidermal growth factor gel	Size of abdominal wound and fistula decreased
76	Promote epithelialization	Promote abdominal wound healing	Recombinant human epidermal growth factor gel continued	Abdominal incision wound healing well

dressings in this case were much more affordable and appropriate for residual tumor wound treatment. However, because of pelvic hemorrhage, the patient's family mistrusted the wound therapies. This was in accordance with a study that showed patients and caregivers are often more concerned with avoiding treatment-related risks rather than extending benefits.<sup>20</sup> Understanding patients' expectations and good communication are necessary for effective clinical treatment decision-making.

## CONCLUSIONS

Because the treatment of pelvic abscess combined with abdominal fistula after palliative TPE with intraoperative radiotherapy in recurrent rectal cancer is rarely reported, there was limited treatment experience for providers to draw on. This case demonstrates the importance of a comprehensive wound care strategy (Table) with flexibility in adapting appropriate dressings to patient needs. The authors recommend considering hypertonic saline dressings as drainage/plug materials in pelvic abscess combined with abdominal-perineal fistula. ●

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