



Management of Enteroatmospheric Fistulae Developing Post Sitoreductive Surgery

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ABSTRACT

If an open abdominal patient develops enteric fistulae, the condition will be defined as enteroatmospheric fistulae (EAF). As it is not covered with tissue and does not have a fistula tract, it cannot be considered a real fistula. In total, 25% of open abdominal patients develop EAF and have a mortality rate of approximately 42%–75%. In this article, we present the case of a patient with EAF developing post sitoreductive surgery. As the recovery time of grade 4 open abdominal patients can be 6 months or longer, it was our aim to convert the fistula mouth to a stoma. (*JAREM* 2016; 6: 122-5)

Keywords: Open abdomen, enteroatmospheric fistulae, vacuum-assisted wound therapy

INTRODUCTION

In cytoreductive surgery, intraabdominal bleeding, anastomotic leakage, or diffuse infection in the postoperative abdomen can be followed as an open abdomen without closing the abdomen in the case of abscess development. If an enteric fistula occurs in the open abdomen, it is called an enteroatmospheric fistula (EAF). It is not a real fistula because it is not covered with tissue and does not have a fistula tract. Therefore, the spontaneous closure of EAF is quite difficult (1). In 25% of patients with an open abdomen, EAF develops. Mortality rates varying from 42% to 75% are reported (2).

The presence of a foreign body, an epithelized fistula tract, distal obstruction, or sepsis; the use of steroids; previous exposure to radiation; or the presence of inflammatory bowel disease or neoplasia can hinder spontaneous closure of a fistula (3). EAF is often associated with fluid-electrolyte disturbances, nutritional deficiency, and life-threatening sepsis (4).

In general, while low-output distal fistulas without distal obstruction or a foreign body can heal through conservative treatment, high-output proximal fistulas can rarely heal without surgery (5). In this case report, the management of EAF in a patient with a grade 4 open abdomen is presented after receiving informed consent of the patient (Table 1).

CASE PRESENTATION

The patient, who had undergone right hemicolectomy due to colon cancer in another center 7 years ago and whose pathology result had been reported as moderately differentiated adenocarcinoma, had been given eight cycles of chemotherapy (CT). Because of the development of incisional hernia after operation, the hernia had been repaired with a dual mesh. One year ago, 24 cycles of CT had been given because of liver metastasis and the formation of a pelvic mass. Liver metastasis had regressed.

However, the patient was consulted to our clinic of gynecological oncology for the evaluation of a second primary (ovarian) tumor because the pelvic mass had not responded to chemotherapy. Physical examination and imaging techniques revealed a 110×125×150-mm complex cystic mass extending into the suprapubic region in the midline of the pelvis, including solid areas, covering both adnexal regions, and having margins not differentiated from the bladder and uterus. The patient's condition was discussed in the council of the tumor, and it was decided to perform laparotomy. Laparotomy revealed a 4–5-cm metastatic tumor infiltration in the ileocolic region. This tumor was attached to the bowels and the mesh that had been inserted in the previous incisional hernia operation. Moreover, a 25-cm multilobular mass was found in the left ovary. No tumor was observed in the abdomen, peritoneal surface, or other organs. Left oophorectomy was performed, and frozen section assessment was made. The result of frozen section assessment was indicative of ovarian adenocarcinoma. Total abdominal hysterectomy+bilateral salpingo-oophorectomy, pelvic paraaortic lymph node dissection, colectomy until the sigmoid colon, and side-to-side ileosigmoid anastomosis were performed, and no residual tumor was left. A new dual mesh was inserted in place of the mesh removed from the anterior abdominal wall. The precise pathological result of the patient was indicative of recurrent colon cancer. Because of drainage with intestinal content and 350 cc bile juice from the drain in the Douglas pouch on the postoperative 5th day, laparotomy was decided to be performed due to the pre-diagnosis of an anastomotic leakage. The mesh in the anterior abdominal wall was removed in the surgery and plenty of green intestinal content was observed in the abdomen. This was washed using physiological saline solution. There was a 1-cm leakage from the linear stapler line inserted in the free ileal stump in the side-to-side ileosigmoid anastomosis. This part was resected and primarily closed. It was decided to perform open abdomen surgery and vacuum-assisted closure (VAC) was applied. Once every two



Table 1. Open abdomen classification of the World Society of the Abdominal Compartment Society

Grade 1a: Clean open abdomen without adhesion on the bowel and abdomen wall
Grade 1b: No adhesion, but contaminated open abdomen
Grade 2a: Clean open abdomen with developed adhesion
Grade 2b: Contaminated open abdomen with developed adhesion
Grade 3: Open abdomen complicated with fistula formation
Grade 4: Frozen open abdomen with bowel adhesion, unsuitable for surgical closure, with or without fistula

days, the VAC system was removed under general anesthesia and the abdomen was washed with physiological saline solution. Because intraabdominal infection continued, the VAC system was set up again. The VAC system was removed under general anesthesia on the postoperative 14th day. Because the intraabdominal region and anastomosis line were observed to be clean, the skin was closed by suturing. The fascia was left open. Due to a yellow-green discharge in the 1/3 region of the incisional line on the postoperative 35th day, exploration was performed with the pre-diagnosis of fistula. An approximately 5-mm-diametered EAF was observed in the distal ileum outside of the anastomosis line (Figure 1). A 30×20-cm-diameter tissue defect was found under the skin around the fistula and a debridement was performed. Proximal diversion and surgical exteriorization could not be applied because of the edematous bowels, short mesenterium, and diffuse adhesions. The fistula was primarily sutured (Figure 1) and fibrin glue was applied on it (Figure 2). The skin was narrowed by leaving the mouth of the fistula outside and a 4–5-cm gap. Oral intake was stopped and total parenteral nutrition (TPN) was initiated. Because the intestinal content leaked from the skin that was left open on the postoperative 37th day, the primary suture and fibrin glue application were evaluated to be unsuccessful. Thereupon, we aimed to make the 30×20-cm-diameter tissue defect at 10-cm depth smaller and to convert it into a stoma mouth with a controlled enterocutaneous fistula. The daily output of the existent fistula was 150 cc/day. Subcutaneous tissue was washed with physiological saline solution under general anesthesia. The VAC system was applied and the fistula tract was taken under control. The VAC was operated with low pressure (75 mmHg). The VAC system was removed and re-established every 2 days. Because it was observed that the intestinal content leaked under the skin from the fistula track on the postoperative 45th day, the VAC system was changed under general anesthesia. A 6F Foley catheter was inserted into the fistula (Figure 3). The other part of the catheter was passed through a pacifier, the tip of which was cut. The pacifier was isolated by applying colostomy paste around it and a VAC sponge was inserted. The catheter was drained into the colostomy bag. Because the intestinal content leaked under the skin on the postoperative 55th day, the VAC system and pacifier system were removed with the Foley catheter. Considering the closed subcutaneous tissue, three sutures were put on the skin and the gap was narrowed to have a 20×10-cm diameter. The subcutaneous tissue that was not closed was applied hydrocolloid paste and



Figure 1. Enteroatmospheric fistula and primary suture



Figure 2. Application of fibrin glue

granulation and debridement were tried to be accelerated. For reducing the passage of intestinal content to the surrounding tissues, colostomy paste was applied and a colostomy bag was inserted (Figure 4). On the postoperative 75th day, three sutures were applied on the skin considering the recovered subcutaneous tissue, and the space was narrowed to have an 8×5-cm diameter. On the postoperative 80th day, the fistula tract that was



Figure 3. Application of Foley catheter and baby pacifier



Figure 4. Application of hydrocolloid and colostomy paste



Figure 5. Formation of stoma

converted into a stoma and taken under control was observed. Therefore, the goal was reached and the patient was directed to CT with a colostomy bag (Figure 5).

During follow-up, daily urea, creatinine, electrolyte, albumin, and CRP were evaluated. When the CRP values were increased, consultation for infection was requested and antibiotherapy was arranged. During this period, the general health status of the patient did not impair. When the albumin value decreased below 2.5, albumin was given intravenously (iv). In the occurrence of decreased potassium values, iv potassium support was provided. The daily fluid balance was maintained at +500. Once every 2 days, hydrocolloid paste was applied under the skin for accelerating granulation and debridement.

DISCUSSION

EAF is the formation of enteric fistula in the open abdomen. It often develops after trauma or any surgical process (4). Non-surgical methods must be tried before planning a final therapy. In this way, spontaneous closure can be obtained and operation-related risks can be avoided. In low-output distal fistulas, spontaneous closure rate vary between 40% and 50% (4).

EAF can be a cause of peritonitis. Therefore, emergent laparotomy is usually required for controlling the source. If possible, the best thing to do is the exteriorization of the bowel or proximal diversion. However, as in our case, it may not be so easy due to bowel edema, short mesentery, and dense adhesions. For this reason, isolation of the intestinal content becomes the only choice so that the intestinal content does not leak into the peritoneal cavity continuously. An abdominal wound will granulate around the fistula in a relatively short time and provide natural protection (6). In rare situations, it is possible to close small holes with acellular human dermal matrix or autogenous split-thickness skin grafts (7). Fibrin glue can help the closure of the hole on the bowel. However, as in our case, the rate of success is low (6).

Vacuum-assisted closure helps the recovery of tissue and helps carrying the intestinal content outside the abdomen. Moreover, it protects the surrounding skin and organs under the skin (6). In our case, partial closure was obtained in subcutaneous tissue through the VAC system, but the leakage of intestinal content under the tissue could not be prevented completely.

In floating stoma, a plastic bag is sutured between the edges of the fistula and skin. A stoma-like controlled fistula is formed. The

stoma bag controls the source and until the tissue granulation allows skin graft, the peritoneal cavity is protected (8).

Verhaalen et al. (9) reported that they successfully isolated the wound bed from the intestinal content by using an impermeable ring. Fistula isolation (ring) was provided by cutting VAC foam into a circular shape. Then, the isolated fistula was coated with adhesive film for obtaining an impermeable barrier. The ring was protected by applying stoma paste on the wound bed.

The controlling technique for other sources in EAF is the baby bottle nipple method defined by Layton et al. (10). Here after removal of contamination on the wound, a soft-based standard latex or silicon baby bottle nipple is placed over the fistula. A Foley catheter is attached on the tip of the nipple and drainage is provided.

Generally, final surgical intervention is delayed for 6–12 months for reducing the risk of the formation of soft abdomen and injury of the bowels (11). It must be kept in mind that a too-early surgical repair decision can cause serious results, including bowel injury, fistula recurrence, sepsis, and mortality. The procedure of the final surgery essentially includes resection of the bowel segment associated with fistula, restoration of the intestinal continuity, and coating the bowel with soft tissue that is well blood-supplied (12).

D'Hondt et al. (13) reported their experiences on VAC in the management of EAF in the open abdomen. The success in the closure of an open abdomen was obtained in approximately 51 days in five patients with EAFs. VAC accelerates the healing of a wound and decreases the need for TPN for a long time.

Rasilainen et al. (14) performed facial traction through VAC and MESH and they presented their experiences on temporary abdominal closure. Compared to the control group, they concluded that the rate of primary closure was significantly higher with VAC and MESH-mediated facial traction (78% and 44%, respectively).

CONCLUSION

The management of fistulas is a highly difficult process and it requires long-lasting treatment strategies. The prevention of fistulas is the basis in abdominal management. If a fistula has developed, it must be recognized as early as possible. In EAF, only specialized surgeons must decide on resection or closure versus conservative treatment. The final surgical treatment must be performed after complete recovery of the tissue. This generally occurs 6–12 months later. However, this duration can be shortened with VAC in selected patients. In conclusion, because the recovery from a fistula in patients with a grade 3–4 open abdomen generally occurs in a time longer than 6 months, it is more proper to convert the mouth of the fistula to a stoma. In this case, we

converted the fistula mouth to a stoma in 50 days and enabled the patient to begin chemotherapy.

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