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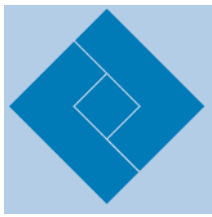
OSTOMY CARE



The Suction Pouch for Management of Simple or Complex Enterocutaneous Fistulae

Christoph Franklin

Containing effluent from an enterocutaneous fistula (ECF) requires expertise, critical thinking skills, and creativity. Using a combination of products readily available to WOC nurses practicing in the United States, I have designed a suction pouch that reliably contains fistula output. A standard ostomy pouch can be converted into a suction pouch by adding a large, single-lumen catheter into the pouch, sealing it, and connecting the assembly to low continuous suction. The resulting pouch can be used by itself to drain effluent from an ECF or it can be used in combination with wound dressings, or a negative pressure wound therapy system. Application of a suction pouch extends the integrity of the appliance and diverts succus away from the wound bed or the newly applied skin graft with increased reliability. This article describes the technique used to create a suction pouch, followed by 4 brief case descriptions that demonstrate feasibility of its use for the management of ECFs.

Background

An enterocutaneous fistula (ECF) is an abnormal passage between the lumen of the gastrointestinal tract and the skin.[1] It can be classified as simple or complex. A simple fistula presents as a short, direct tract connecting bowel and skin. In contrast, complex fistulae are associated with an abscess (type 1), or they occur as an opening into a wound (type 2). An ECF often requires prolonged hospitalization and ongoing management by a multidisciplinary team. The WOC nurse plays a crucial role in selecting and customizing dressings needed to manage an abdominal wound and associated fistula.

Approximately 75% of ECFs are iatrogenic and 25% are spontaneous. Factors associated with iatrogenic ECFs inlude reoperation requiring extensive lysis of adhesions, cancer, inflammatory bowel disease, prior radiation therapy, trauma, and emergency abdominal surgery. Factors associated with spontaneous ECFs include intrinsic intestinal disease and external trauma. The management of an ECF can be taxing for the patient, family, and health care team. Nursing goals for fistula care include protection of the perifistular skin, containment of effluent, control of odor, comfort, maximization of mobility, ease of care, and cost containment.[1]

Patients with a simple ECF can usually be managed with a number of commercially available ostomy or wound management pouches. In contrast, those with complex ECF often require an individualized system for dressing the abdominal wound and evacuating effluent. Designing such a system requires critical thinking by the WOC nurse acting in consultation with other members of the multidisciplinary care team. Methods reported include the use of a modified vacuum-assisted closure dressing,[2,3] closed wound systems using wall suction,[4,5] the "Tube-VAC,"[6] a wound VAC inserted into the fistula,[7] various custom-made, large ostomy pouches, and a compaction chamber with high negative pressure.[8] Each system requires complex wound dressing techniques, and many involve negative pressure wound therapy (NPWT).

For example, the "fistula VAC" is a modified, vacuum-assisted closure dressing[2,3] (VAC; KCI International, San Antonio, Texas). It combines NPWT with ostomy pouches in order to manage an ECF within an open abdominal wound. A standard wound VAC dressing is applied over the wound with a cutout over the fistula. An ostomy pouch is then applied over the cutout on top of the dressing to collect effluent. An alternative method for containing effluent from a fistula in an open abdominal wound is a closed wound system consisting of wet gauze and a Bioclusive dressing (Opsite, Smith and Nephew, Largo, Florida, or Ioban; 3M Cavilon, St Paul, Minnesota) with either a drainage bag to gravity or a catheter to wall suction for longer wear time. The reported frequency of dressing changes is every 12 to 20 hours for the drainage bag and 2 to 3 days for the version using wall suction.[4,5] Potential limitations of this technique include limited patient

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mobility following system placement and dressing failure with interruption of suction.

The "Tube-VAC" uses Malecot catheters inserted into the fistulae to drain effluent via gravity.[6] A polyurethane sponge is applied around the catheters, sealed with an occlusive dressing and connected to continuous negative pressure at –100 mmHg to stabilize the catheters. Potential adverse side effects with this system include bowel trauma with catheter movement and residual leakage sucked through the foam dressing.

Nienhuijs and colleagues[7] reported successful outcomes by inserting VAC foam directly into the fistula tract and applying negative pressure (−125 mmHg). Wainstein and coinvestigators[8] reported spontaneous closure of ECF with negative pressures of −600 mm Hg applied in a compaction chamber with unwoven polyester fibers and a polyethene film. They analyzed results of their 10-year experience with the vacuum compaction device, which to my knowledge is not available in the United States. Ninety-one patients who developed 179 fistulae were treated with the vacuum compaction system and spontaneous closure was achieved in 42 (46.2%). At least one author[9] warns about the possibility of creating a fistula by using NPWT and further research is needed before it is possible to determine the role of these techniques in the management of ECF.

In order to achieve consistent separation of effluent from wound drainage in patients with ECF, I recommend the use of a version of the "fistula VAC " combined with the use of a suction pouch. Four cases are presented that illustrate the application of this system for the management of patients with complex ECF.

Technique

Similar to the "fistula VAC" technique described earlier,[2,3] I apply a wound VAC dressing with a generous cut created over the fistulae, enabling the placement of a dam constructed of petrolatum gauze. I construct the dam using two 3 × 36-in Vaseline-impregnated gauze strips (Kendall Health Care Products, Mansfield, Massachusetts) fashioned into a tube and smoothed on both ends. After applying Stomahesive powder (Convatec, Princeton, New Jersey) to dry the wound bed surrounding the fistula and sealing the powder with a barrier film (No-Sting barrier film, 3M Cavilon), the petrolatum dam is inserted into the cutout in the foam dressing, around the fistulae. Stomahesive paste (Convatec) can be added to the ends for additional sealant, if desired. The clear drape is applied over the completed assembly and connected to NPWT. I typically use a setting of −50 mm Hg for the NPWT portion with this dressing application. Once the desired negative pressure is reached, the drape can be cut away within the dam without losing suction in the remaining dressing over the wound. I then attach an ostomy or wound pouch over the opening to collect effluent without contamination of the wound or dressing (Figure 1). Eakin Cohesive seals (Convatec) are then applied to securely attach the pouch to the clear drape. For additional security, a large 30 French single-lumen catheter is inserted into the ostomy pouch and connected to wall suction or a portable suction device creating a "suction pouch." The suction in the pouch should not exceed −80 mm Hg but should be higher than the negative pressure in the surrounding dressing. The suction keeps the pouch empty of effluent and increases the reliability of the dressing by reducing the weight of the pouch and creating a pressure gradient.

FIGURE 1. The Completed Dressing With a Wound Vac and Suction Bag. The Suction Bag Is Continuously Emptied of Succus and the Pressure Gradient Ensures Complete Diversion Away From the Newly Applied Skin Graft.

The resulting arrangement comprises 2 closed negative pressure systems: a wound VAC and a suction pouch. Negative pressures can be regulated independently in the 2 systems. When managing a high-output ECF, I prefer the application of higher negative pressure in the suction pouch and a lower negative pressure in the wound dressing. For example, I often select a pressure of −50 mm Hg for the VAC dressing and a pressure of −80 mm Hg for the suction pouch. Establishing a pressure gradient away from the wound and toward the suction pouch helps to keep effluent out of the wound bed. I have found that effluent may leak under the dam after a few days, but this system ensures that wound drainage leaks into the suction pouch rather than the onto the wound bed. This is especially helpful when a skin graft is applied to the wound and a dressing is left in place for 7 days or more. In this case, effluent is collected in a 1- or 2-L wall suction container, allowing for convenient and accurate measurement of effluent volume. This system is particularly desirable because it separates drainage collected in the wound VAC canister from fistular effluent, which is collected in the wall suction container. The separated system is also useful when managing a split-thickness skin graft. We are able to collect more than 2 L of effluent per day from the fistula without leakage onto the skin graft.

Any standard drainable ostomy pouch or wound pouch can be converted to a suction pouch by placing a catheter through the tail end of the pouch and sealing it with Eakin Cohesive seal. Additional holes are cut in the sides of the catheter to allow removal of effluent throughout the appliance. To keep the holes from getting plugged and to protect the fistula or exposed wound bed from damage caused by direct suction, I wrap the catheter with Mepitel One (Mölnlycke Health Care US, LLC, Norcross, Georgia). The porous structure of Mepitel One allows exudate to pass into the catheter while preventing suctioning of exposed tissues.

Case 1

Mr A is a 74-year-old man who was referred to our hospital for application of a split-thickness skin graft to an open abdominal wound with ECF. He had suffered a perforated colon during colonoscopy, followed by intra-abdominal sepsis. His wound was initially managed with absorptive pads, and ostomy pouches were applied over the fistula. However, he experienced frequent leakage that rendered his wound care both labor-intensive and uncomfortable. Because of hemodynamic instability, Mr A's surgery was delayed. During this period, his abdominal wound was managed with a wound VAC dressing and an ostomy pouch was adapted for use as a suction pouch. Mr A stabilized after 3 days, and a split-thickness skin graft was applied to the wound. The graft was then protected with a layer of Adaptic, and white VAC foam was applied over the protective layer, followed by a layer of black foam. With the guidance of the WOC nurse, the petrolatum dam was inserted around the fistula and the clear drape was applied over the assembly. The VAC was engaged at a pressure of −50 mm Hg. Next, the drape was cut away within the fistula dam without losing pressure in the remaining dressing and the suction pouch was attached to wall suction at a pressure of −80 mm Hg (Figure 2).

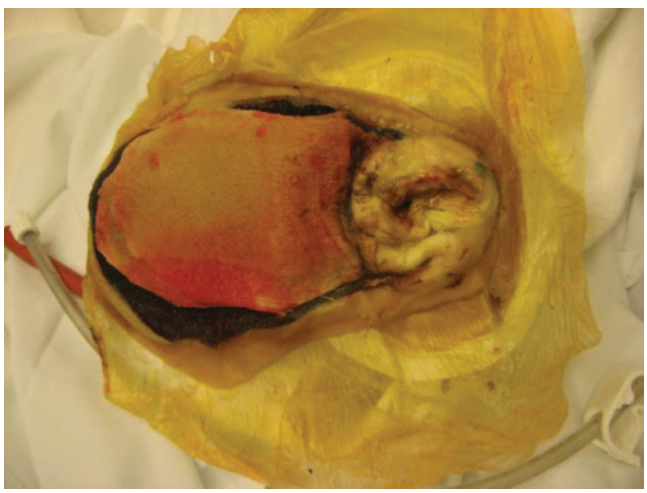

FIGURE 2. Dressing Removal After 8 Days. The Vaseline Dam Stayed Intact Without Leaks. Adaptic and White Foam Were Used to Protect the Graft.

FIGURE 3. A Complex Enterocutaneous Fistula and Abdominal Wound Photographed After the Removal of the Dressing on Day 8 and Before Cleaning the Wound. Note the Absence of Graft Contamination and Approximately 90% Take.

Approximately 10 L of effluent were collected in the suction pouch during the 8-day period that the dressing remained in place. In contrast, the wound VAC canister accumulated no drainage during the first 4 days the system remained in place, and it accumulated only 25 mL of serosanguineous drainage after 8 days (Figure 3). A new dressing was applied using the same technique that functioned well for an additional 4 days. After this point, the ECF was managed with a convex ostomy pouch and the patient was discharged.

Case 2

Mr B is a 42-year-old man with history of HIV and inflammatory bowel disease. He experienced a bowel perforation with sepsis, resulting in creation of a colostomy with Hartmann's pouch in 2006. Leakage from the Hartmann's pouch and abdominal sepsis complicated the healing process, and he eventually required a split-thickness skin graft. In 2008, a takedown of the ostomy with a hernia repair was undertaken at the patient's urging. During surgery, an enterostoma was created and repaired, but the repair broke down and an ileostomy site was created for fecal diversion. Mr B's abdominal wound dehisced and an ECF formed. Initially, the wound was managed with a wound VAC and it was ultimately closed with a split-thickness skin graft. The fistula was surrounded by irregular areas of full-thickness skin loss, the ileostomy site, a patch of transposed mucosa (mucosal cells migrated along a suture line to the skin) and severely scarred skin was troughed (Figure 4). Attempts to pouch this high-output fistula failed because there was not enough room to place a regular pouch within the complex perifistular surfaces and because mucus production from the transposed mucosal tissue further impaired adherence.

FIGURE 4. Abdomen With a High-Output Fistula. The Opening of the Fistula Is a Tiny Hole Barely Visible Above the 5-cm Mark of the Ruler.

After consulting with the physician, a suction pouch was constructed from a neonatal ostomy pouch (Hollister 3778; Hollister, Libertyville, Illinois) and a 30-French catheter. I was able to fit the small wafer of the pouch within the problem areas and secure it with half of an Eakin Cohesive seal. The tail end of the pouch was cut off to enable catheter insertion and sealed with the remaining half of the cohesive seal. Wall suction was applied at a pressure of −80 mm Hg; it kept the pouch empty at all times. The average output from the fistula was 2 L per day, and the suction pouch was changed twice weekly (Figure 5). The patient's fistula was managed with the suction bag for several months after which an attempt was made to repair the ECF. Unfortunately, this procedure resulted in an open abdominal wound with subsequent development of multiple new fistulae. Mr B was again managed with a combination of suction pouches and NPWT for several months. During this time, he was transferred to a long-term acute care hospital where management of his abdomen was continued in the same manner under the care of a wound specialist. A final attempt to repair his bowel was successful. Currently, Mr B lives with a temporary diverting ileostoma, with the goal of reconnection as soon as another procedure is deemed feasible.

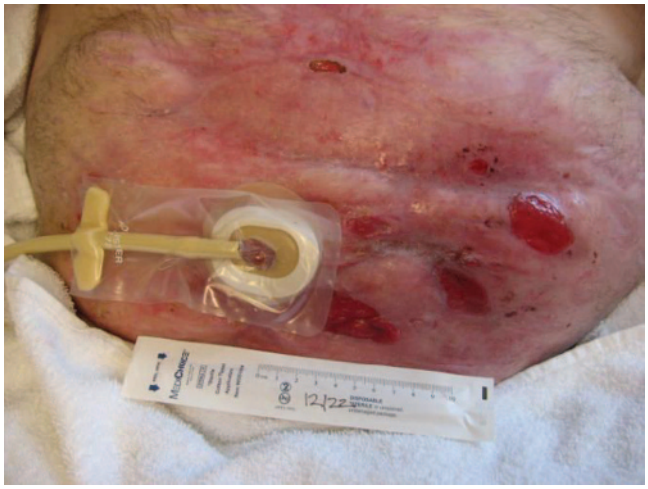

FIGURE 5. High-Output Fistula With a Neonatal Suction Bag.

Case 3

Mr C is a 57-year-old plumber who fell off a ladder and sustained a fracture of his right hip and left upper arm. During his hospital course, he developed Ogilvie's syndrome (an acute intestinal pseudo-obstruction caused by intestinal dilation secondary to severe surgical or medical stress) with ileus and subsequent bowel perforation. A colectomy with ileostomy and mucous fistula was performed. He suffered a stroke during the postoperative period and developed abscesses in the abdomen, which required multiple surgeries. This left him with an open abdominal wound, several ECFs, jejunostomy, and ileostomy. He experienced high-volume output, especially from the 2 ECFs in his abdominal wound. In contrast, the remaining fistulae and the 2 ostomies produced only a modest amount of mucus. Initial management with a wound VAC and a medium-size Eakin Fistula and Wound pouch worked reasonably well, but frequent leaks and dressing changes proved frustrating to both the patient and staff. After consultation with the surgeon, the wound pouch was converted to a suction pouch by adding a 30-French catheter through the tail end and sealing it with 1 Eakin Cohesive seal. The catheter was connected to wall suction. Following the addition of a suction pouch, the frequency of dressing changes was reduced to 3 times weekly and the frequency of leaks declined considerably despite several liters of effluent per day from the 2 ECFs. The patient was placed on total parenteral nutrition to lower the amount of output and to provide nutrition. A split-thickness skin graft was applied to the wound bed with a 90% take. We continued to use the suction pouch in conjunction with the wound VAC to prevent damage from the ECF drainage to the new graft. After 2 weeks, the graft was strong enough to discontinue the wound VAC and the fistulae were managed with the suction pouch alone. With the total parenteral nutrition and only minimal oral intake, output stabilized at 2 L per day, with twice weekly pouch changes. The patient's spouse was taught how to fabricate, apply, and manage the suction pouch. A mobile VAC with a 1-L collection container was ordered and connected to the catheter. The patient was discharged home after a hospital stay of 128 days.

In my experience, patients with similarly complex abdominal wounds with ECF may require hospitalization for up to 1 year before a repair can safely be attempted. However, the use of the suction pouch, along with strong family support and good community resources, allowed this man to be managed as an outpatient, with clinic visits on a monthly basis (Figures 6-8). Mr D successfully

FIGURE 6. Abdomen with 4 Fistulae, Jejunostomy, and Ileostomy. An Abscess Marked by the Cotton-Tip Drained Large Amounts of Pus but Eventually Closed.

underwent surgery to repair his bowel 220 days after discharge home, which was almost a year after the original accident.

■ Case 4

D is a 1-year-old boy who developed an open abdomen and multiple fistulae. He had Denys Drash syndrome, a rare mutation of chromosome 11. The syndrome is characterized by a triad of defects, including congenital nephropathy, Wilms tumor, and sexual development disorder. Initially, his abdomen was managed by surgical staff with a wound VAC, but effluent from the ECF frequently clogged the foam and wet-to-moist gauze dressings were started. D subsequently developed moisture-associated skin damage of the perifistular skin, and a consultation with the WOC service was initiated by the bedside nurse (Figure 9).

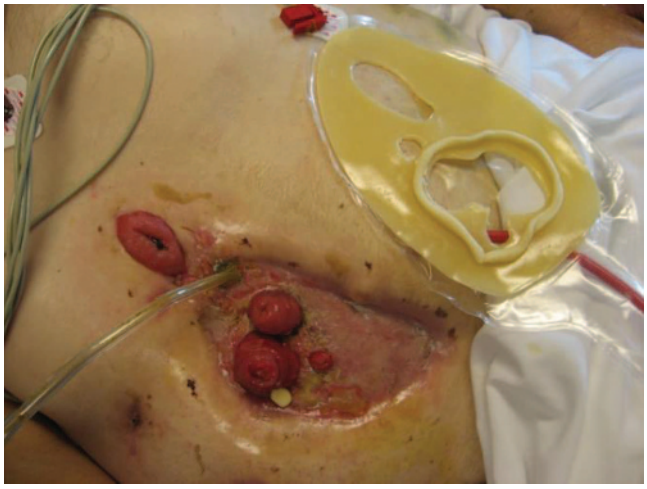

FIGURE 7. The Wound Manager Is Converted Into a Suction Pouch With a Catheter and Eakin Seal. During Dressing Changes, a Yankaur Is Used to Manage the Fistula Output.

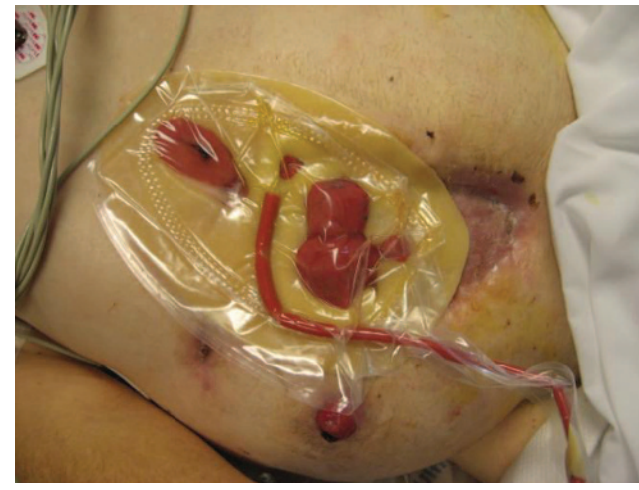

FIGURE 8. The Suction Pouch in Place. The Force of the Suction Helps Seal the Bag to the Abdomen.

The inflamed periwound skin was protected with in addition, Stomahesive powder (Convatec) and No-Sting barrier spray (3M Cavilon) that was applied in several alternating layers by using a crusting technique. In addition, a hydrocolloid was used to cover the irritated skin. Stomahesive paste was applied into the skin fold on the caudal wound border to avoid leaks. A suction pouch was fabricated using a small Eakin Fistula pouch, a 30-French catheter with extra holes was cut into the side, and Eakin Cohesive seals were placed around the perimeter of the cutout. The catheter was placed into the pouch and connected to wall suction at a negative pressure of –50 mm Hg. The pouch opening was sealed with Eakin Cohesive seal around the catheter (Figures 10 and 11).

The family disconnected the wall suction intermittently and plugged the catheter in order to leave the room with the child. Fortunately, this did not compromise the dressing and the bag was emptied upon return by

FIGURE 9. Effluent-Associated Skin Damage in a 1-Year-Old Child With Denys Drash Syndrome.

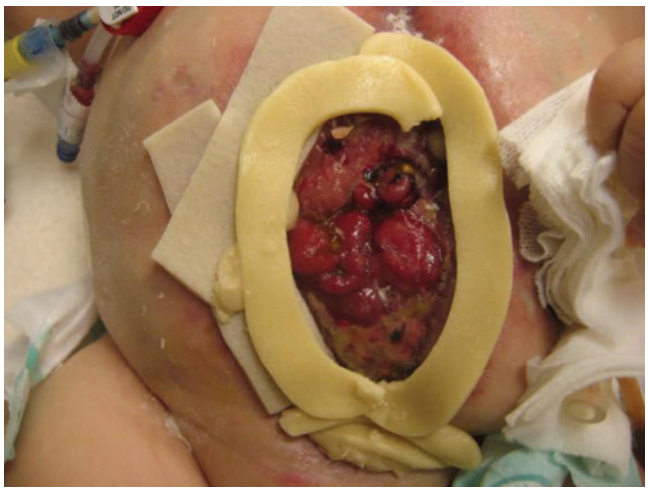

FIGURE 10. Skin Protection With Crusting and Hydrocolloid.

reconnecting to wall suction. The periwound skin recovered within 1 week of management with the suction pouch.

Discussion

In my clinical experience, the addition of a suction pouch extends the wear time of complex abdominal ECF dressing and drainage systems. While application of a suction pouch, especially in combination with NPWT, typically requires the advanced skills of a WOC nurse and considerable time to apply, it greatly reduces the need for unexpected dressing changes. Because WOC nursing services are usually not available around the clock, I have found that the added reliability of the suction pouch is appreciated by both caregivers and patients.

I have also observed that the suction pouch appears to enhance successful take of a split-thickness skin graft and reduce total hospital stay. The suction pouch is also useful for the management of denuded perifistular skin because it diverts effluent from even a high-output ECF.

FIGURE 11. The Suction Pouch in Place.

Conclusion

The suction pouch is one of several options for the treatment of ECF. Similar to other techniques described in the literature, it is a complex dressing requiring the expertise of a wound care specialist to successfully construct and apply. In my experience, the suction pouch adds reliability and durability to the abdominal dressing with an ECF while reducing unscheduled dressing changes. The suction pouch is made of products readily available to WOC nurses. I continue using the suction pouch in my practice with good feedback from patients, families, and caregivers. Further research is needed to more accurately compare various solutions for the management of ECF and the role of the suction pouch.

KEY POINTS

- ✔ A suction pouch adds reliablity and durability to an ECF dressing.
- ✔ A suction pouch reduces unscheduled dressing changes.
- ✔ The suction pouch is made of material readily available to WOC nurses.

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