Endoluminal Vacuum-assisted Wound Closure Therapy For Anastomotic Leak Following Robotic-assisted Colorectal Cancer Surgery

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Introduction

Anastomotic leak is one of the most feared and potentially life-threatening complications of colorectal surgery, with leak rates ranging from 3% to 10% (1). Although the precise mechanism is unclear, poor perfusion, tension, unhealthy tissue, and technical error are contributing factors (1). Endoluminal vacuum-assisted wound closure (EVAC) therapy is well known for treating esophageal perforations (2, 3). However, there are few reports of its use in treating colonic perforations (4, 5). We present the case of a 60 years old lady who had an anastomotic leak following robotic-assisted colorectal cancer surgery and underwent endoluminal vacuum therapy with complete closure of the anastomotic dehiscence.

Case description

A 60 years old woman presented to the emergency department with a one-week history of severe rectal pain worsening with defecation. She had undergone left anterior resection of the colon with robotic-assisted surgery one month prior for colonic adenocarcinoma and had an unremarkable postoperative course. She was hemodynamically stable. Lower abdomen tenderness was appreciated on examination.

Laboratory workup at the time of presentation was unremarkable. Computed tomography (CT) scan of the abdomen revealed a pre-sacral ill-defined collection measuring up to 3.6 centimeters (cm) of fat-stranding extraluminal gas and fluid posterior to the rectal surgical suture line concerning for anastomotic leak. Colonoscopy demonstrated a 4 cm long disruption of the anastomosis posteriorly, leading into a large cavity lined with granulation tissue without any purulence, 4 cm from the anal verge. The perianastomotic mucosa was edematous and erythematous. Due to the friability of the tissue, the leak could not be closed with endoscopic sutures.

An endoluminal vacuum suction system was built using a GranuFoam sponge of approximately 5 cm x 3 cm, sutured to an NG tube, and placed partially into the cavity under endoscopic guidance. The other end of the tubing was attached to the vacuum system with standard wound VAC settings. The system was renewed every 72 hours three times. Total parenteral nutrition was provided to ensure bowel rest. Colonoscopy repeated one month after the therapy revealed complete closure of the anastomosis dehiscence. The patient reported no difficulty with oral intake or passing stool.

Discussion

Anastomotic leak following colorectal surgery can be challenging to manage with a surgical approach. Endoscopic treatments have been introduced with varying degrees of success, such as over-the-scope clip (OTSC), fibrin glue injection, and self-expanding metal/plastic stents (SEMS/SEPS) (6).

The vacuum-assisted closure system (VAC) has been utilized for several indications since its introduction in the 1990s. It is based on the negative pressure applied to the wound with a sponge, leading to continuous drainage, arteriolar dilation, enhanced granulation tissue formation, and resultant wound closure. Wedemeyer, J et al. introduced the endoscopic use of this system for the closure of upper intestinal anastomotic leaks in 2008 (7). They described two cases of anastomotic leak after intrathoracic esophagogastrostomy and esophagojejunostomy due to esophageal carcinoma.

EVAC provides negative pressure to the leak site through a tube ending with a polyurethane sponge, commonly known as endo-SPONGE. Since this system is not commercially available in the United States, users need to improvise and build the system. This may be done using a 16 French (Fr) nasogastric tube and a piece of GranuFoam sponge, which is available in the VAC dressing kit (8). The sponge is changed every 48 to 72 hours (9). For our patient, the sponge was trimmed to the appropriate size and sutured to the nasogastric tube, then inserted transanally under direct visualization with colonoscopy. After the sponge was deployed at the target site, the tail end of the tube was connected to the VAC therapy unit, which delivered continuous standard negative pressure (125 to 127 mmHg). In addition, total parenteral nutrition was provided for the duration of the therapy to ensure bowel rest for wound healing.

The timing of commencement of EVAC therapy plays an essential role in determining the success rate. Sharp et al. conducted a systematic review studying 264 patients over 17 studies. The consensus is to start negative pressure therapy early (5). Arezzo et al. reported that their success rate decreased from 89% in acute leaks (less than 60 days) to 60% in chronic leaks (more than 60 days) (9). Koperen et al. reported better abscess closure rates (75%) among patients receiving endoluminal negative pressure therapy within six weeks postoperatively (10). Our patient had EVAC therapy commenced five weeks after the surgery.

When treating patients with anastomotic leak after colorectal cancer surgery, the treatment strategy should be aimed at: 1) treating the perianastomotic abscess and fluid collection, 2) complete healing of anastomotic dehiscence, and 3) minimizing the risk of long-term anastomotic dysfunction (11). Abdalla et al studied short and long term outcomes of endoluminal vacuum therapy (EVT) for colorectal anastomotic leak among 47 patients. They reported complete healing of perianastomotic sepsis and preservation of a functional anastomosis in 55.3% patients after a median 35.3 month follow-up starting from the initiaiton of EVT (11).

While the EVAC therapy offers the benefit of direct visualization of the perforation, the need for repeated endoscopic interventions could be a limitation to its use. Placement of the device is uncomfortable and may require sedation (5). Continuous suction is needed, and close monitoring is necessary to ensure the intact seal.

Conclusion

Endoluminal vacuum-assisted wound closure therapy is a useful intervention for anastomotic leaks. Early commencement of the therapy is associated with better success rates. While individual studies may suggest that this method is helpful, some critical questions are yet to be answered, such as optimal interval of device change and ideal negative pressure to promote healing. In addition, the long-term outcomes and cost-effectiveness compared to other existing management strategies need to be studied as well.

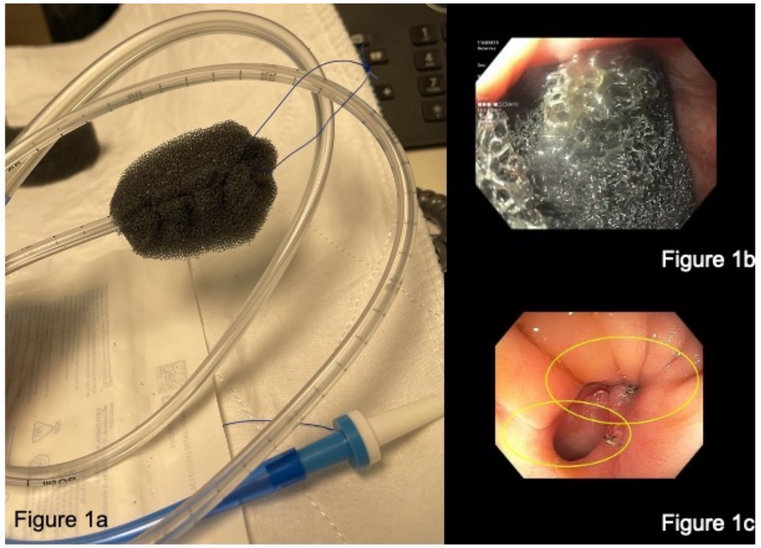

Figure 1a: Endoluminal vacuum device put together using nasogastric tube and granufoam. Figure 1b: Endoluminal vacuum set up at the anastomotic leak site via colonoscopy. Figure 1c: Follow-up colposcopy demonstrating healing of the anastomotic leak site

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