

Acute Colocutaneous Fistula Management by Endoscopic Placement of Double Pigtail Stent

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Background	A 59-year-old female patient with a remote surgical history of prior duodenal switch bariatric surgery and pancreaticoduodenectomy for pancreas adenocarcinoma who developed an acute intestinal volvulus requiring multiple small bowel resections and right hemicolectomy for extensive bowel ischemia developed a postoperative ischemic colocutaneous fistula of the sigmoid colon.
Summary	This patient presented with perforation from a closed loop bowel obstruction that required damage control laparotomies with resection of ischemic small and large bowel and delayed abdominal closure. The patient's postoperative course was complicated by an ischemic sigmoid colocutaneous fistula at the inferior aspect of the surgical wound two weeks after her initial procedure. Definitive fistula diagnosis, skin infection control, surgical wound care, and control of fistula drainage were achieved using an endoscopically placed double pigtail catheter.
Conclusion	Colocutaneous fistulae are most commonly observed as a consequence of abdominal surgery. These fistulae bestow a significant burden on the postoperative patient, complicating surgical recovery, increasing the risk for sepsis, and making surgical revision difficult. The initial stabilization of this patient's surgical complication was achieved using an endoscopic approach that reduced the risk of infectious, metabolic, and surgical complications associated with her colocutaneous fistula. This approach represents a relatively safe strategy for both diagnosing and managing colocutaneous fistulae.
Key Words	enterocutaneous fistula; colocutaneous fistula; small bowel obstruction; endoscopic intervention

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Case Description

A 59-year-old female with a history of a pylorus-preserving pancreaticoduodenectomy and duodenal switch procedure performed two and three years prior, respectively, was admitted with acute peritonitis due to intestinal perforation secondary to a small intestine volvulus. The patient was in septic shock requiring vasopressors with a profound metabolic acidosis (pH 7.1, lactate 6.4) for which a damage control laparotomy was performed with extensive lysis of adhesions and resection of involved ischemic small bowel secondary to midgut intestinal volvulus related to an adhesive band, leaving the patient in discontinuity with an open abdomen. The following day, the abdomen was reexplored, and a portion of ischemic ascending colon was resected. For this patient's third and final operation, an additional portion of ischemic ileum was resected with jejunojenunostomy and jejunocolonic anastomoses, restoring gut continuity.

On postoperative day (POD) 11, the patient developed a thick bilious discharge from the inferior edge of her midline incision. A CT scan of her abdomen (Figure 1) revealed fluid and gas collections adjacent to edematous colon, concerning for an enterocutaneous fistula. EGD and colonoscopy performed to rule out recurrent ischemia revealed a 1 cm perforation in the sigmoid colon draining into the patient's surgical wound. The anastomoses were well visualized and found to be intact and widely patent. Through the colonoscope, a guidewire was navigated through the sigmoid defect and colocutaneous fistula to exit the inferior aspect of the surgical wound. A 10 Fr × 7 cm double pigtail stent (Advanix, BSCI) was advanced over the wire and placed with one pigtail in the sigmoid lumen and the other externally (Figure 2). An ostomy appliance was placed over the external end of the stent to capture drainage. The patient tolerated the procedure well. Her stented fistula put out about 800 mL of stool the day following the procedure. She tolerated a full liquid diet and received full-calorie total parenteral nutrition (TPN) before being discharged home in stable condition. The patient was seen in the office two weeks later. Her surgical wound was well granulated with no surrounding erythema or purulent discharge. At that time, she reported 200–400 mL of stool from her fistula per day. A week later, in the office, her wound was seen to be well granulated, and the ostomy had matured well. She was advanced to a regular diet, and her pigtail catheter was removed.

Figure 1. Postoperative CT Scan. Published with Permission



Arrow shows focal fluid and air locules communicating with the anterior midline surgical wound superficial to focally thickened and hyperemic colon.

Figure 2. External End of Pigtail Catheter Endoscopically Placed during Diagnostic Colonoscopy. Published with Permission



Stent traverses the colocutaneous fistula and internal end interfaces with the lumen of the sigmoid colon, draining into ostomy appliance.

Discussion

Enterocutaneous fistulae (ECF) are defined as abnormal connections between bowel epithelium and cutaneous epithelium. Seventy-five to eighty-five percent of these fistulae occur as complications after abdominal surgery, increasing postoperative patients' risk for sepsis, malnutrition, and electrolyte disturbances.¹⁻³ The stabilization phase of ECF includes controlling fistula drainage, controlling sepsis, and beginning skin care/protection.² The present case highlights how these three management principles were achieved through endoscopic pigtail catheter placement.

Maintenance of a patent fistula tract reduces the chances of intraabdominal accumulation of enteric contents allowing for not only the prevention of infection but also for accurately quantified fistula output. This becomes particularly relevant in cases of high-output fistulae (defined as >500 mL/day) due to the risk of electrolyte imbalance, as demonstrated with this patient.⁴ The stent placed through the fistulous tract prevented superficial wound closure and, in turn, decreased the risk for intraabdominal abscess. This early control of fistula output in a critically ill patient decreased the potential for infection-related morbidity and mortality.⁵

Stent placement also allowed for more accessible skin care and wound healing as the fistula output drained directly into an ostomy bag. This approach promoted proper abdominal wall closure from the surgical wound. Wounds left open heal by secondary intention, forming granulation tissue that slowly contracts and builds scar tissue from deep to superficial.⁶ These types of wounds are more susceptible to infection. Special care should be taken to the environment surrounding the wound. The collection system described previously can potentially decrease the risk of long-term wound complications such as incisional hernia, which is increased by surgical site infections.

This collection system is a temporizing measure that decreases the risk of sepsis. At the same time, the patient's nutrition status was optimized, allowing the fistula to mature while giving this patient a chance to recover from surgery. The pigtail catheter can be removed in a few weeks as an outpatient, keeping the colostomy appliance in place to capture output. Time will tell whether the fistula will close on its own or whether she will need surgical intervention.

Endoscopic interventions for the definitive treatment of enterocutaneous fistulae have been described in several small case series. These endoscopic approaches include fibrin glue application,⁷ self-expanding silicone stent in the setting of colostomy-related fistulae,⁸ and over-the-scope clipping.⁹ These techniques have been used to close fistulae after they have matured and are generally indicated for low-output fistulae. The literature has not evaluated these techniques for treating an acute, unmatured, high-output fistula, as seen in this patient. To our knowledge, this is the first case describing the use of an endoscopically placed double pigtail stent for the initial management and control of fistula output for a colocutaneous fistula. Similar techniques have been described for the management of sleeve gastrectomy leaks, suggesting the described endoscopic technique's versatility in treating the pathology of the gastrointestinal tract.¹⁰

Conclusion

Postoperative fistulae after abdominal surgery carry significant mortality and morbidity. They can be exceedingly difficult to manage and require a multidisciplinary approach to overcome. This case illustrates an endoscopic technique that can optimize the initial management of patients with colocutaneous fistulae.

Lessons Learned

Endoscopic stent placement during colocutaneous fistulae may improve surgical wound healing, lower infection burden, and aid in definitive treatment.

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