

Robotic right hemicolectomy for persistent colocutaneous fistula following laparoscopic appendectomy: A case report

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Abstract

The article presents a case report of a patient who was referred to our hospital after laparoscopic appendectomy with several revisions, resulting in a persistent colocutaneous fistula to the hepatic flexure. After preoperative planning, a robotic right hemicolectomy was performed. The patient was discharged on postoperative day 7 with no postoperative complications. We concluded that robot-assisted colectomy after preoperative patient management can be performed as an effective technique for colocutaneous fistula treatment with the benefits of minimal invasive surgery, including reduced postoperative pain, early patient mobilization, and shorter hospital stay.

Keywords

colocutaneous fistula, robotic surgery, colorectal surgery, robotic colectomy

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Introduction

Enterocutaneous fistula (ECF) is an abnormal communication between the bowel and skin, in 75%–80% arising as a complication from gastrointestinal surgery; however, it can be found in abdominal trauma, inflammatory bowel disease, malignancies, or previous irradiation.¹ Although spontaneous closure of fistula is possible with conservative treatment, it is likely that the patient will require surgical treatment if the fistula persists after 4 weeks.¹ Surgery in colocutaneous fistula treatment should take place after control of septic foci, optimization of nutritional status, and wound care to minimize postoperative complications.^{1,2} Preoperative imaging, determining the anatomy of the fistula and timing of surgery, are important factors in surgical planning.^{1,2}

Case presentation

A 70-year-old male with a history of chronic obstructive pulmonary disease, previous laparoscopic cholecystectomy, and laparoscopic bilateral inguinal hernia repair was referred to our institution for evaluation and management of a suspected colocutaneous fistula.

The patient had initially undergone a laparoscopic appendectomy at an outside facility for confirmed acute appendicitis.

The pathology report confirmed a phlegmonous appendix with no perforation. The postoperative course was complicated by the development of a perityphlitic abscess. Computed tomography (CT) described a retrocecal collection measuring 12 × 4.5 cm, extending to the iliopsoas muscle. As conservative treatment with piperacillin/tazobactam in a duration of 12 days was unsuccessful, a diagnostic laparoscopy was performed, revealing an abscess in the right paracolic gutter, indicating intra-abdominal lavage and drainage.

Subsequently, the following day, the patient developed a high-grade fever. CT imaging identified a retroperitoneal abscess that was not being drained properly. An exploratory laparotomy was performed through an extended McBurney incision. The right hemicolon was mobilized, and intraoperative findings included a large retroperitoneal abscess, which was managed with debridement, lavage, and drainage after

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Figure 1. CT fistulography with contrast entering the hepatic flexure and transverse colon.

collecting specimens for microbiologic testing. Empirical antibiotic therapy was continued and later tailored to cefuroxime and vancomycin based on microbiologic culture revealing clindamycin-resistant *Streptococcus agalactiae*.

During the postoperative period, enteric contents were observed in the abdominal drain. Although methylene blue testing failed to identify a bowel leak, clinical suspicion for colocolutaneous fistula remained high.

The patient was referred to our center for further evaluation ~6 weeks after the initial appendectomy. Upon admission, CT imaging revealed a 6 cm fluid collection lateral to the ascending colon, with the abdominal drain tip located within the collection. Although no direct colonic wall defect was visualized, a small extraluminal air pocket was identified and could be an indirect sign of perforation. Laboratory findings included a leukocyte count of $6.1 \times 10^9/L$, C-reactive protein of 6 mg/L, and negative procalcitonin. The surgical wounds were clean, without signs of local infection. Antibiotic therapy with amoxicillin/clavulanic acid and vancomycin was initiated based on previous microbiological findings. Culture of the abdominal drain fluid upon admission yielded no microbial growth.

CT fistulography with water-soluble contrast applied through the abdominal drain confirmed contrast entering the hepatic flexure and transverse colon, indicating communication between the right hemicolon and the postoperative wound, where the drain was inserted. (Figure 1) Surgical management was indicated. A ureteral stent was placed preoperatively to avoid ureteral injury during surgery.

A robotic right hemicolectomy was subsequently performed. Intraoperatively, dense adhesions of the right colon to the abdominal wall were encountered. Upon adhesiolysis, a fistulous defect in the ascending colon, just inferior to the hepatic flexure, was identified. There were no signs of diffuse peritonitis or additional collections. A right hemicolectomy with resection of the fistulous tract and a side-to-side anastomosis was completed without intraoperative complications.

Postoperative recovery was uneventful, and the patient was fully ambulatory on postoperative day (POD) 2 and discharged home on POD 7. Prolonged perioperative prophylaxis with Garamycin/metronidazole was discontinued on POD 5. On 3-month follow-up after surgery, the patient had no complaints of pain, discomfort, or irregular bowel movements. Wounds healed with no signs of inflammation, and he had no clinical signs of infection. In 1 year follow-up, we recorded no complaints related to the previous surgery. Colonoscopy exam revealed no abnormalities at the anastomotic site or elsewhere in the colon.

Discussion

ECFs present a significant surgical challenge due to the complexity of their management. A retrospective study investigating 135 consecutive patients with ECFs, treated according to the SOWATS guidelines, found that spontaneous closure occurred in 15.6% of cases, while surgical closure was achieved in 71.9%. The median time for spontaneous closure was 18 days, with no recorded instances of spontaneous closure beyond 7 weeks. In addition, the median time from fistula formation to surgery was 53 days. Spontaneous closure was more frequent in cases where there was no abdominal wall defect.² In current literature, a minimum interval of 6 weeks is recommended before restoration surgery due to the peritonitis and difficult abdominal dissection. However, the timing of surgical intervention should be individualized, taking into account factors such as the degree of sepsis, prior abdominal surgeries, and nutritional optimization of the patient.^{3,4} Furthermore, surgical resection of the fistulous segment, followed by anastomosis of healthy bowel, is preferred over bowel defect over-sewing, as the latter has been associated with a higher recurrence rate of fistula formation (36% vs 16%).⁴ The closure of the abdominal wall remains an additional challenge in the surgical treatment of ECFs, as it is often complicated by preexisting skin defects and an increased risk of wound infection.⁴

Our patient presented with a rare complication of a colocolutaneous fistula following laparoscopic appendectomy for phlegmonous appendicitis. Despite an initial uncomplicated appendectomy, the patient developed a large retrocecal abscess, refractory to empirical intravenous antibiotic treatment, which indicated a sequence of surgical interventions for abscess drainage. Subsequent clinical signs and imaging suggested persistent infection and



Figure 2. Scars following previous abdominal surgeries. The enterocutaneous fistula is located in the wound, where the drain is placed.

potential bowel involvement. CT fistulography definitively confirmed a colocutaneous fistula in the right hemicolon. Surgical intervention was warranted, and a robotic right hemicolectomy with resection of the fistula and a side-to-side anastomosis was performed. Intraoperatively, the fistula was confirmed at the ascending colon adherent to the abdominal wall. The patient had an uneventful postoperative course, with full recovery and no postoperative complications at 3 months and 1-year follow-up.

This case report presents a case of colocutaneous fistula resulting from previous surgical procedures with unsuccessful spontaneous closure. Prior to surgery, we treated septic foci, which we confirmed by negative microbial cultures and normal values of inflammation markers. We optimized the patient's nutritional status and did preoperative surgical planning. The decision for robotic-assisted surgical treatment resulted from the patient's individual traits. Due to the previous elongated McBurney incision, we were cautious to avoid midline laparotomy to avoid ischemia of the abdominal wall in the area between the two incisions. (Figure 2) In regard to that, the minimally invasive approach of robot-assisted surgery presented an advantage compared to open surgery. The incorporation of minimally invasive techniques in colorectal surgery has

been shown to reduce postoperative complications, including bowel paresis, wound infection, and the need for analgesia. In addition, the use of minimally invasive surgery is associated with shorter hospital stays.⁵ As adhesions and fibrosis were expected due to inflammation and several surgical interventions, the robotic approach seemed to present technical advantages when compared to laparoscopic. In cases such as complicated diverticular disease, which can lead to fistula formation and anatomical distortion due to previous inflammation, with pericolic and mesenteric adhesions, fibrotic changes in the fistulous segment, concealed perforations, laparoscopic surgery is often unsuccessful due to its technical limitations.⁵ Robotic-assisted surgery has emerged as a promising alternative to traditional laparoscopic approaches, offering several advantages, including enhanced precision, greater range of motion, and a stable camera platform. These improvements are particularly valuable when addressing the technical difficulties encountered in complex abdominal surgeries. A retrospective analysis of 12,652 sigmoidectomies for complicated diverticular disease demonstrated that robotic surgery was associated with fewer conversions to open surgery compared to laparoscopy (7.9% vs 12.5%). Furthermore, patients undergoing robotic surgery had a significantly shorter hospital stay, by an average of 2 days, when compared to those who underwent open surgery.⁶ Another comparative retrospective study of 472 robotic and 8392 laparoscopic colorectal resections for various indications found that the robotic group had a significantly lower conversion rate to open surgery (9.5% vs 13.7%). However, no significant differences were observed in postoperative outcomes between the two groups.⁷

Conclusion

In current literature, there are not many articles on the role of robotic surgery in the treatment of colocutaneous fistulas. Our case report highlights the successful surgical management of a persisting colocutaneous fistula using robot-assisted surgery. The evolving evidence supporting robotic-assisted techniques holds promise in enhancing patient outcomes in ECF treatment.

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Ethical considerations

Our institution does not require ethical approval for reporting individual cases or case series.

Consent to participate

The authors obtained signed informed consent from the patient before reporting the case.

Consent for publication

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

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