

Laparoscopic approach to surgical management of enterocutaneous fistula

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Introduction

Surgical interventions are required for Enterocutaneous fistula (ECF) which fails to resolve after a period of conservative management. However, surgery in this situation is usually difficult and hazardous as most of these patients have already undergone multiple surgical procedures. Furthermore, it may lead to inadvertent bowel injury during the mobilization. Possibility of laparoscopic-assisted surgery for ECF had been explored and reported in the literature as an alternative to overcome the above complications. In this study, we describe our initial experience with laparoscopic-assisted ECF repair surgery.

Case presentation

A 40-year-old male was referred from a local hospital for further management of a high output enterocutaneous fistula (ECF). The patient has undergone emergency laparotomy for a penetrating injury to the abdomen with repair of a distal ileal perforation. Subsequently, a low output ECF has developed on 16 days post-op.

A second laparotomy had been performed and a fistula tract was identified proximal to the previous anastomosis. The fistulous segment had been resected with an ileo-ileal anastomosis. On post-op day 08 patient has developed a high output ECF through the laparotomy incision and was referred for further management [Figure 1a]. On admission, the patient was moderately dehydrated and the fistula output was 800-1000 ml per day. He was febrile and inflammatory markers were elevated.

Patient was resuscitated and empirical antibiotics administered. Intra-abdominal collections were excluded by an ultrasound scan. The patient kept nil oral with total parenteral nutrition and stoma care provided to minimize skin related complications. Fistula output gradually reduced to 400ml/day over the next six weeks and remained static



Figure 1a. ECF through the laparotomy incision

Figure 1b. Completely healed ECF

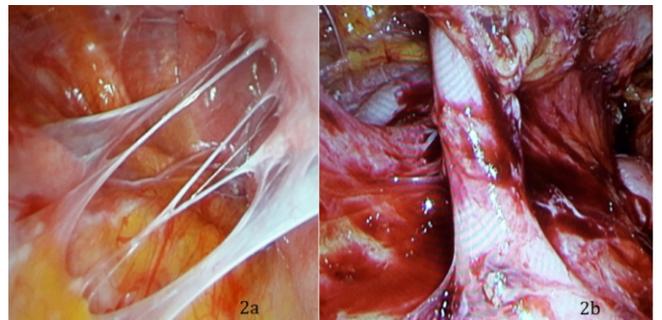


Figure 2a. Multiple adhesions seen during laparoscopic exploration

Figure 2b. Ileal segment adhering to the surgical scar thereafter. Laparoscopic exploration and repair were performed eight weeks after the onset of fistula.

Surgical technique

The camera port was inserted by open technique at Palmer's point and pneumoperitoneum created. The adhesions were separated by using the camera to create space for the insertion of the working ports [Figure 2a]. Ileum and transverse colon were identified adherent to the site of previous scar [Figure 2b]. Bowel loops were mobilized with sharp and blunt dissection and fistulous bowel loop was isolated. Thereafter, a skin incision was made around the fistula opening and the bowel along with the fistulous tract was delivered. The bowel segment containing the fistula was excised and an end to end single layer hand-sawn anastomosis performed. Total

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duration was 3.5 hours with blood loss less than 50ml. The patient developed a low output (200ml/day) enterocutaneous fistula through the abdominal wound which was managed conservatively. Fistula completely healed within another week. Finally, the patient was discharged after three and a half months from initial injury [Figure 1b].

Discussion

ECF is defined as an abnormal communication between the gastrointestinal tract and the skin. It is considered primary when it occurs in diseased bowel such as Crohn's disease or malignancy which accounts for 25% of ECF. In contrast, secondary ECF occurs in healthy bowel following trauma or surgery. Anastomotic leaks account for 50% of the ECF following abdominal surgery and the rest is associated with inadvertent bowel injuries [1]. High output ECF (fistula output >500ml/Day) are associated with high morbidity and mortality despite advances in medical care with a reported mortality of 5-20% [2]. With the supportive measures alone one-third of the ECF will heal within five to six weeks [1].

Timing of the exploration is perhaps the most important factor in successful ECF surgery. Delaying definitive surgery more than 6 weeks found to reduce morbidity from 20% to 11% [2]. This is because; dense vascular adhesions formed during the initial inflammatory phase take at least 6 weeks to mature enough for a safer dissection. The main aim of the surgery is resection of the involved segment and re-establishment of gut continuity and releases of all possible adhesions which may give rise to intestinal obstruction. Following surgery, ECF has a recurrence rate of 14 to 34% [2]. Over-sewing of the fistula site reported a higher recurrence of 36% when compared with 17% recurrence in resection and anastomosis [3]. Our patient also developed a recurrence following final repair which was probably due to anastomotic dehiscence.

The traditional open approach in fistula surgery required a re-laparotomy which is difficult due to multiple adhesions, especially to the previous abdominal scar. Inadvertent injury to these bowel segments during mobilization may lead to formation of new fistulae. On the other hand, extending the previous incision to a virgin area of the abdomen in the intention of safe entry increases the risk of short and long term scar related complications, such as wound dehiscence, incisional hernia and increased post-op pain. Laparoscopic approach in this background has several important advantages such as avoiding large incisions and provision of

magnification for a better view. Additionally, pneumoperitoneum itself contributes to adhesiolysis by penetration of gas along tissue planes. Few studies have been published on laparoscopic surgery in ECF repair. Firstly, Kazantsev GB, et al in 2000 published a case of ECF successfully managed laparoscopically with early recovery and early return to work [4]. In 2004 Gracia GD et al published 2 cases of successfully managed, ECF with laparoscopic-assisted surgery with follow up at 1 year without major complications [5]. However, the laparoscopic approach is not without limitations. It demands expertise in advanced laparoscopic surgery. Furthermore, initial port entry related injury can be minimized by adopting port insertion under direct vision at the left subcostal region. According to our experience, converting to a mini-laparotomy to perform resection and anastomosis is suggested following laparoscopic adhesiolysis and mobilization of the fistulous loop.

Conclusion

Laparoscopic surgery has several advantages when compared to conventional surgery in the surgical repair of ECF. Delaying definitive surgery for 6-8 weeks, especially in low output ECF may improve the outcome.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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Learning Points:

- Laparoscopic-assisted fistula surgery is an alternative to conventional open surgery.
- Laparoscopic surgery may ensure safe entry into the peritoneum.
- A better view may make the adhesiolysis and the dissection of the affected bowel segments easier during laparoscopic surgery.