Case Report

Entero-atmospheric fistula Managed with Kehr's T-Tube; A Case Report.

Abstract

Introduction: A fistula is a communication between two epithelialized surfaces. Entero-atmospheric fistula (EAF) is an enteric fistula occurring in the setting of an open abdomen, thus creating a communication between the GI tract and the external atmosphere. The critical tenets in successful management of gastro intestinal fistulas are recognition of fistula, control of infection and further contamination, restoration of fluid and electrolyte losses, and re-establishment of positive nutritional balance before undertaking major definitive corrective procedures. A case of superficial EAF managed successfully with Kehr's T-tube is presented

Patient information: A 68-year-old gentleman of rectal trauma managed with loop colostomy with subsequent closure, presented with intestinal obstruction. On laparotomy a small leak with localized faecopurulent collection was present. Resection of the infectious anastomosis bearing segment with fashioning of proximal diversion colostomy with distal mucus fistula was done, post-operative period was uneventful. Restoration of bowel continuity after mobilization of colon and intra peritoneal end to end anastomosis was done at an interval of 6 months. In the post-operative period, patient developed grade IV wound sepsis and burst abdomen. Subsequent abdominal examination revealed an EAF in a small bowel loop lying adjacent to anastomotic site with high fistula output. Placement of short limb of Kehr's T-tube in the fistulous bowel loop resulted in reducing the fistula output promoting wound healing and successful management of EAF.

Conclusion: In the superficial high output EAF, negotiation of horizontal limbs of Kehr's T-tube into the fistula bearing bowel loop, helps in reducing the fistula output resulting in better management of fistula, promotion in wound healing and reversion of catabolic state. Subsequently stoma bag/wound manager or effective VAC may be applied to aid the ultimate closure of the fistula.

To conclude management of EAF deserve to be individualized and innovative as per the clinical situation for successful outcome.

Keywords: Entero-atmospheric fistula, High output fistula, Kehr's T-Tube.

Introduction

Entero-atmospheric fistula (EAF) is an enteric fistula occurring in the setting of an open abdomen as communication between the GI tract and the external atmosphere. It is not a true fistula as it lacks fistulous tract and is not covered by well vascularized tissue. EAF occurring in the middle of the burst abdomen is the most challenging and feared complication for a surgeon. This is more so if it occurs in a patient with co-morbidities.

We are presenting a case of an EAF in an elderly patient with COPD, malnutrition and with local sepsis, managed successfully by using Kehr's T-Tube for local control of the fistula. Spontaneous closure of an EAF is a rare entity, which was successfully achieved in this case with a unique technique which holds academic interests.

Case presentation

Timeline -A 68-year-old gentelman had history of rectal injury 1.5 years back for which diversion transverse loop colostomy and subsequent restoration of bowel was done in a peripheral institution. The patient presented with intestinal obstruction to our institution. On exploratory laparotomy there was a small leak from the anastomotic site resulting in localized faecopurulent collection. Resection of the infected anastomotic segment of colon was done and brought out as proximal diversion colostomy with distal mucous fistula. Post-operative period was uneventful. Restoration of bowel continuity was done at an interval of 6 months after appropriate pre-operative evaluation. Mobilization of colonic bowel loops with end to end intraperitoneal anastomosis was done.

Clinical findings-On Post-operative day 3 patient developed grade IV wound sepsis and subsequent burst abdomen, with bile leakage from the main wound. On close examination of the wound there was spontaneous bowel erosion, leading to a 3 cm x 1cm rent in the small bowel loop lying adjacent to the anastomotic site open to the atmosphere forming an EAF. Per abdomen examination of other quadrants of abdomen was normal. **Diagnostic assessment**- Patients vitals were BP- 90/66 mm of Hg, PR -104/min, RR – 30/min, SPO_2 – 86% on room air, BMI - 17.9, TLC-18,500 and serum albumin level of 1.7 mg/dl suggesting clinical sepsis and under nutrition status of the patient. Patient also had COPD. Fistula output initially was around 500 ml per day containing bile and undigested food particles, suggesting a high intestinal EAF. Patient was started on fluid and electrolyte replacement therapy with local wound care. Supplementary TPN and blood transfusion were given to improve the nutrition status of the patient.

Therapeutic intervention-On local examination of the fistula, after initial resuscitation, proximal and distal loop were easily negotiated with the little finger. A Kehr's T-tube of 18F was inserted with its shorter limbs negotiated into the proximal and distal opening of the fistulous bowel loop.

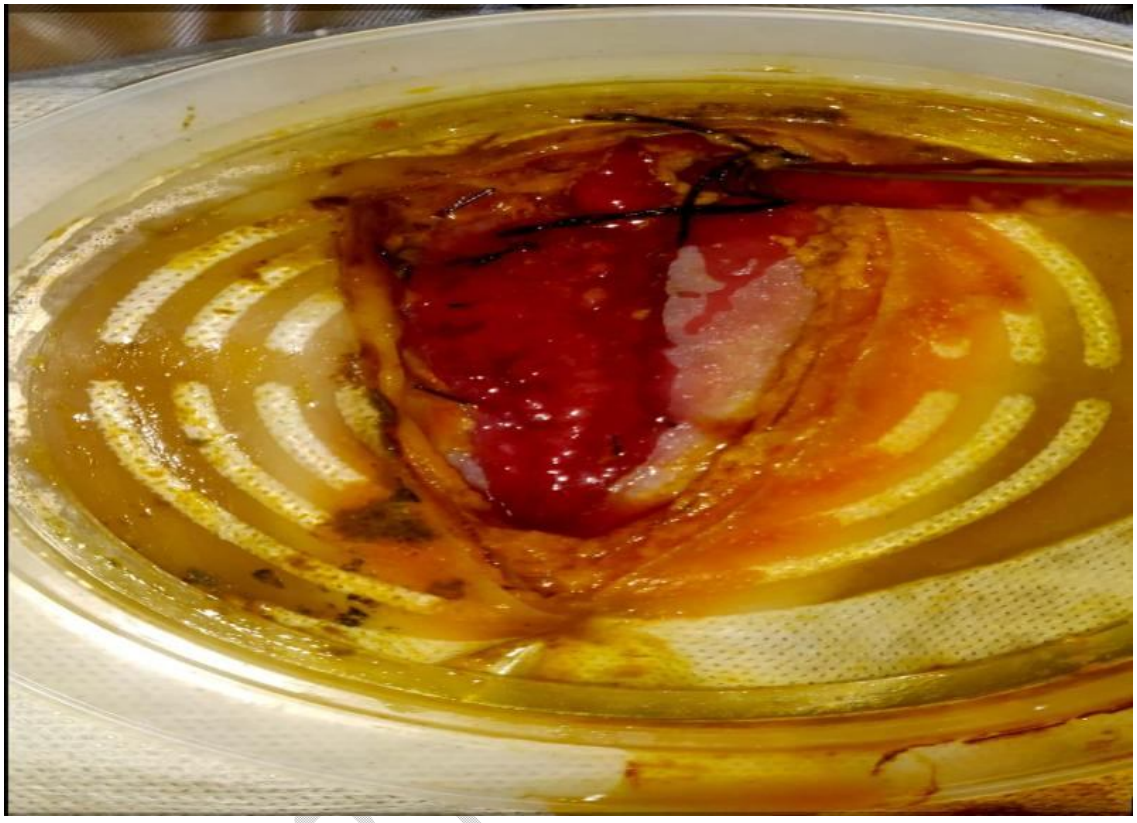
Placement of T-tube into the EAF resulted in dramatic reduction of fistula output, converting it into a low output fistula (<100 ml per day). This reduced the local contamination and fluid loss, wound started granulating and contracting and in 3 weeks' post-operative we were able

to apply stoma appliance. Patient was discharged with stoma appliance and T-tube in situ (Fig.2). The T-tube was removed at 2nd week follow up, and the residual fistula healed in another 2 weeks' time.

Fig 2. Wound manager applied with Kehr's T-tube in situ.

Follow up and outcome

The T-tube was removed at 2nd week follow up, and the residual fistula healed in another 2 weeks' time with contraction of wound(Fig.3) and spontaneous closure of fistula achieved successfully.



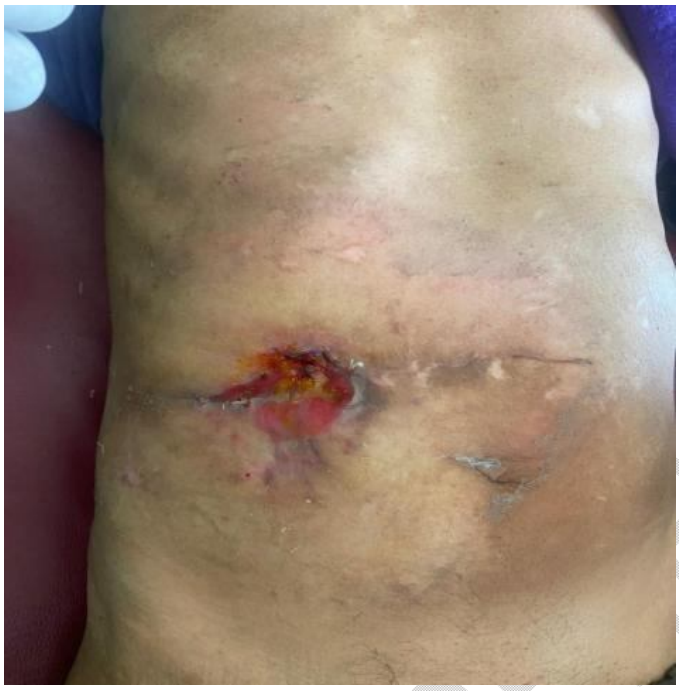


Fig 3. Healed residual fistula.

Discussion

Entero-atmospheric fistula (EAF) is not a true fistula as it lacks the fistulous tract and further is not covered by well vascularized tissue [1]. This lead to delay in wound healing and prolonged morbidity and high mortality in these patients.

EAF tend to occur within the first week of the open abdomen. The incidence of these fistulas depends on the baseline abdominal problem. In trauma patients managed with open abdomen, the incidence of EAF varies between 2% to 25% [2]. The incidence increases to more than 25% in open abdomens with intra-abdominal sepsis, and up to 50% in the setting of infected pancreatic necrosis [3]. The mortality rate remains high upto 40 % despite modern intensive care and improved surgical technique [4].

The majority (75% to 85%) of gastrointestinal fistulas are iatrogenic as a result of technical complications of surgical procedures and trauma. Etiologies include anastomotic dehiscence, intraoperative injury to the bowel or its blood supply, erosion from indwelling tubes, retention sutures or prosthetic mesh or misplacement of a suture through the bowel during abdominal closure.

EAF can either be deep or superficial. A deep EAF is a fistula arising deeply inside the open abdomen and draining into the peritoneal cavity, resulting in peritonitis; whereas a superficial EAF drains on top of a granulating abdominal wound and is relatively easier to approach and manage [4]. Anatomically a fistula arising from stomach, duodenum, jejunum, or proximal ileus is classified as proximal; and the one arising from distal ileus or colon is classified as distal fistula. Depending on the 24-hour fistula output, a fistula can be: low output(<200ml), moderate output (200-500) and high output (>500 ml) fistula [1][5][6].

Patients with EAF always need a multidisciplinary approach for achieving an optimal outcome. The initial step of nutritional management must be the stabilization of the patients with aggressive treatment of sepsis, rapid correction of any fluids, electrolytes and acid–base imbalances and local skin care. Interval nutrition with TPN should be started as soon as possible.

As defined EAF has unique features- lacks fistulous tract and uncovered by well vascularised tissue and for these reasons spontaneous closure is very difficult to achieve. The management of the fistula should be aimed to divert the fistula output, thus allowing a clean granulation of the exposed bowel and promoting the fistula to become a chronic but well-controlled fistula. This result is hard to achieve, because of the extreme frangibility of the tissues surrounding the fistula and many a times due to presence of dense adhesions in a frozen abdomen prohibiting any surgical manoeuvre. Moreover, associated systemic derangements, driven by severe dehydration, hyper catabolic status, and ongoing sepsis caused by the spillage of enteric content directly into the peritoneal cavity are other challenges in the management [4].

A large spectrum of techniques and surgical devices are described in literature to control the EAF and promoting healing. Every surgeon usually develops his own technique, and none of those can perfectly fit well in every kind of clinical situation. Several techniques available

include –Negative pressure wound therapy, Primary suture/fibrin glue or cyanoacrylates/biological dressing, Floating stoma, Fistula vacuum assisted closure (VAC), Tube VAC, Pepe's technique wherein a hole is made in the central part of the VAC foam so as to insert three drains which the drains intestinal effluent toward the aspiration system, Silo VAC, Fistula intubation and conversion to an ECF, Nipple VAC, VAC collapsible fistula isolation device, Fistula plug, Pedicle flap, Suspension/stoma conversion[4] etc. Many of these VAC techniques are more useful in low output fistulas.

The primary aim of all these techniques is to isolate and control the fistula so as to avoid the spillage of contents and resultant insult to the surrounding tissue and skin. This obviously results in promotion of wound healing and ultimate closure of the fistula wound.

Ngian Chye Tan et al [7] extraperitoneal method was composed of fistula isolation and excision, intubation with a T-tube, rerouting of fistula track, and primary closure of skin. The small 10- French T-tube allows drainage and prevents leakage of intestinal contents, which will interfere with healing. This approach is based on the understanding that enterocutaneous fistula tracks that are oblique in nature and in excess of 2 cm tract are considered more favorable for spontaneous closure as they are generally associated with increased flow resistance and reduced output losses. Rerouting of the track with a T-tube changes the fistula from having a short perpendicular course to one having a longer oblique course.

In the present case we used Kehr's T-Tube in an attempt to control the fistula output. Aided by the bowel peristalsis and guided by the presence of short limbs of T-tube in the proximal and distal bowel, much of the fistula output could pass into the distal bowel. This resulted in decreased fistula output and conversion of high output fistula into low output, decreasing the surrounding tissue damage and promotion in healing9(Fig. 1). Later it was feasible for us to apply wound manager to the open wound, further reducing the fluid loss and tissue damage. We were able to even discharge the patient with T-tube in situ and wound manager applied (Fig.2) and called for review at regular interval. Any attempt at surgical intervention in this patient with co-morbidities and multiple recent surgeries could have been detrimental and resulted in catastrophic outcome.

Conclusion

In superficial high output EAF negotiation of horizontal limbs of Kehr's T-tube into the bowel helps in reducing the fistula output resulting in better management of fistula, promotion in wound healing and reversion of catabolic state. Subsequently stoma bag/wound manager or effective VAC may be applied to aid the ultimate closure of the fistula. To conclude management of EAF deserves to be individualized and innovative as per the clinical situation for successful outcome.

DECLARATIONS

Informed Consent – Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request

Ethical approval – not required.

References

1.Intro –ist Marinis A, Gkiokas G, Argyra E, Fragulidis G, Polymeneas G, Voros D. "Enteroatmospheric fistulae"--gastrointestinal openings in the open abdomen: a review and recent proposal of a surgical technique. Scand J Surg. 2013;102(2):61-8.

2.Atema JJ, Gans SL, Boermeester MA (2014) Systematic review and meta-analysis of the open abdomen and temporary abdominal closure techniques in non-trauma patients. In: World J Surg 912–25 9.

3.Kirshtein B, Mizrahi S (2014) Vacuum-assisted management of enteroatmospheric fistula within the open abdomen. Am Surg 80: 209–10

4.Di Saverio S, Tarasconi A, Walczak DA, Cirocchi R, Mandrioli M, Birindelli A, Tugnoli G. Classification, prevention and management of entero-atmospheric fistula: a state-of-the-art review. Langenbecks Arch Surg. 2016 Feb;401(1):1-13. doi: 10.1007/s00423-015-1370-3. Epub 2016 Feb 11. PMID: 26867939.

5.Schecter WP, Hirshberg A, Chang DS, Harris HW, Napolitano LM, Wexner SD, Dudrick SJ (2009) Enteric fistulas: principles of management. ACS 209:484–91 13.

6.Evenson A, Fischer J (2006) Current management of enterocutaneous fistula. J Gastrointest Surg 10:455–64

7.Tan, Ngian Chye; Varkey, Prashanth; Chen, Hung-Chi (2006). Extraperitoneal Approach for Closure of Epithelized Enterocutaneous Fistulas Following Late Removal of Jejunostomy Tube. Annals of Plastic Surgery, 57(5), 585–588.