Fistuloclysis: A Novel Approach to the Management of Enterocutaneous Fistulae

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Citation

S Cawich, M McFarlane, D Mitchell. *Fistuloclysis: A Novel Approach to the Management of Enterocutaneous Fistulae*. The Internet Journal of Surgery. 2006 Volume 9 Number 2.

Abstract

The majority of enterocutaneous fistulae close spontaneously with supportive care. Nutritional support is an essential prerequisite to successful management and is frequently achieved parenterally. But the expense to sustain parenteral nutrition in these patients is significant and this may limit its availability in Developing Countries.

We present a case of an enterocutaneous fistula that was managed under these difficult circumstances. Nutritional demands in this case were effectively met by fistuloclysis. This is a novel approach to the management of enterocutaneous fistulae that may be applicable to many patients, thereby avoiding the use of central vein parenteral nutrition and its attendant complications.

INTRODUCTION

Nutritional support is an essential prerequisite to successful fistula management since most patients will experience some degree of malnutrition. Parenteral Nutrition (PN) is used liberally, but the expense may limit its availability in Developing Countries.

While managing an enterocutaneous fistula (ECF) under difficult circumstances, we delivered enteral feeds directly into the distal fistula lumen – an uncommon technique called fistuloclysis. It is a novel approach to the management of these fistulae that may be applied to many patients, thereby avoiding the use of PN and its attendant complications.

CASE REPORT

This 34 year old man had previous laparotomy for a gunshot wound to the abdomen ten years earlier. On this presentation, he had a midline laparotomy for perforated appendicitis. Appendectomy was completed despite multiple dense adhesions limiting exposure.

On the sixth post-operative day, there was a faeculent discharge at the incision. He remained afebrile with a leukocyte count of 11×10^{6} /dl. The abdomen remained soft and non-tender. There was exposed small bowel mucosa at the incision extruding through a large serosal defect. There were no peritoneal collections on contrast enhanced Computed Tomographic Scan. Daily fistula output was estimated at over four litres.

The patient was resuscitated, started on antibiotics and kept starved with a nasogastric tube in place. He was 168cm tall and weighed 45Kg compared to a reported pre-morbid weight of 56Kg.

Using American Society for Parenteral and Enteral Nutrition guidelines, daily energy requirements were estimated at 1,950Kcal and 95 grams of protein ([1]). Caloric goals were met parenterally via a central catheter, using 4.25% Aminosyn-II® with electrolytes in 25% Dextrose (136Kcal, 4.25gm proteins and 25gm Dextrose per 100mls: Hospira Inc., USA). Unfortunately, the hospital's stocks were exhausted after two days and the patient was unable to source PN solution privately. Oral nutrition seemed an inappropriate option because of the high volume fistula losses.

Instead the fistula lumens were cannulated with 22Fr Foley catheters and the distal limb was identified using flouroscopy. Distal bowel obstruction was excluded by demonstrating contrast flowing through 120cm of ileum into the caecum. The catheter was secured within the distal ileum using a purse string suture (figure 1) and covered by a stoma appliance to control ECF effluent (figure 2).

Figure 1

Figure 1: A 22Fr Foley Catheter is seen placed within the distal limb of the fistula.

Figure 2

Figure 2: A stoma appliance has been applied to the skin surrounding the fistula, enclosing the Foley catheter and allowing for collection of proximal fistula effluent.

Polymeric feeds (Jevity®, 1Kcal/ml, 300mOsm/Kg, containing medium chain triglycerides: Colombus, Abbott Laboratories, USA) were administered into the catheter at an initial rate of 100mls hourly and gradually increased to meet caloric goals. He eventually tolerated an infusion rate of 120mls hourly over 16 hours, with Omeprazole 40mg twice daily, Codeine Phosphate 60mg eight hourly and Loperamide 4mg twice daily.

After 50 days of fistuloclysis, the patient's nutritional status improved (Table 1).

Figure 3

Table 1: Change in Nutritional Status with Fistuloclysis

Variable	Admission	At Surgery
Weight (Kg)	45	55
Body Mass Index (Kg/m^2)	16	20
Albumin (G/dl)	33	40

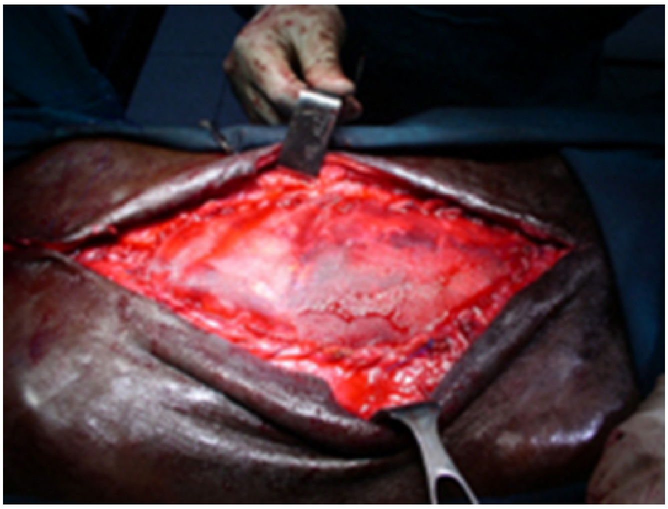
He then had definitive resection of a 12cm segment of ileum with the fistulous skin connection (figure 3) and a primary bowel anastomosis. Fascial closure could not be achieved primarily and necessitated tension free closure with propylprolene mesh prosthesis (figure 4).

Figure 4

Figure 3: Intra-operative isolation of a segment of ileum in continuity with the fistulous track.

Figure 5

Figure 4: Fascial closure could not be achieved primarily and required tension free closure by interposition of a sheet of propylprolene mesh.



The post-operative course was uneventful. Diet was commenced on the third post-operative day and he was discharged without event. Three months after hospital discharge, his weight had increased to 59.5Kg (BMI = 21Kg/M ^{2}). He tolerated a normal diet with an average of one formed bowel motion daily.

DISCUSSION

The ultimate therapeutic goal in fistula management is to achieve closure. Fortunately, the overwhelming majority will close spontaneously with supportive care (2,3). When necessary, operative closure is performed after a three to six month interval to allow resolution of peritonitis, nutritional optimization and preparation for anaesthesia (2,3,4).

During this interval, resuscitation should be expedited, broad spectrum antibiotics commenced and associated abscess cavities drained (2). In an attempt to reduce fistula output, the patients are usually kept starved with nasogastric tubes in place to divert upper gastrointestinal secretions.

Unfortunately these maneouvers also limit nutrient intake. This is undesirable because nutritional depletion can predict post-operative morbidity and mortality independent of age, cardiorespiratory function or operation type (5,6,7). Adequate nutrient delivery will facilitate closure and compensate for the hyper-metabolic state after surgery (2,5). It is usually achieved parenterally, despite the risk of electrolyte derangements, metabolic disturbances, catheter related complications and sepsis (3,5,8). There is also a higher incidence of infectious morbidity and significantly greater cost compared to EN (3,5,8).

To avoid this, some authorities advocate EN using elemental feeds (2,5,9). Enteral feeding has several advantages over PN in critically ill surgical patients, including improved intestinal barrier function, reduced infectious morbidity and preserved immune function (2,5,9).

Because our patient was malnourished with a BMI of 16Kg/M ^{2} , nutritional support was necessary prior to undertaking major resection. Parenteral nutrition was not a viable option since PN solutions were unavailable. The large volume fistula effluent precluded oral feeding. Faced with no alternative but to operate on a malnourished patient, we devised a mechanism to introduce nutrients directly into the efferent limb of the fistula.

Detailed review of the literature, however, revealed that this had been previously described (3,4). Teubner et al was the first to describe this technique and coined the term fistuloclysis (3). They described a similar technique using a balloon retention gastrostomy tube advanced 5cm into the distal lumen of the ECF.

Cannulation of a fistula tract will prevent spontaneous closure. But in this patient the large mural defect strongly predicted that this fistula would not close without surgical intervention. We agree with Teubner et al who have relegated fistuloclysis as an option only in patients with a mean daily fistula output over 500mls or with exposed mucosa at the skin or within granulation tissue (3).

Fistuloclysis has several potential advantages, including cost savings by avoiding long term PN. Semi-elemental feeding solutions can be utilized, avoiding the need for complicated sterile procedures required to prepare PN mixtures. And the solutions can be enriched with glutamine that maintains intestinal barrier function by enhancing enterocyte nitrogen transport, antioxidant defense mechanisms and acid base homeostasis (5,10). From a technical point of view, it may facilitate bowel anastomosis by promoting good tissue quality and preventing size mismatch from disuse atrophy at the distal fistula limb.

A prerequisite to successful fistuloclysis is that there must be enough surface area for nutrient absorption. This is a potential limitation since most ECFs occur after major resections or complicated operations (2,3). Previous data suggest that short bowel syndrome can be avoided in patients with at least 100cm of intact small bowel, an intact ileo-caecal valve and remnant colon (2,3,11). Teubner et al also reported that 50% of patients who had successful fistuloclysis had less than 100cm of intact ileum beyond the distal fistula opening (3). Medium-chain triglycerides can also be added to the enteral solutions because are absorbed in the small intestine independent of pancreatico-biliary secretions (3,12,13).

CONCLUSION

Fistuloclysis is a novel approach that may be applicable to select patients with difficult ECFs. It can effectively meet nutritional demands in these patients, thereby avoiding central vein PN and its attendant complications. It should be reserved for stable patients with ECFs that are unlikely to close spontaneously and at least 100cm of intact ileum distal to the ECF confirmed on contrast radiology.

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