Review Article

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Control of Drainage and Skin Integrity in Enterocutaneous Fistula – An Update for Clinicians

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Abstract

Background: A fistula is an abnormal tract between two or more epithelialized structures or spaces. When it involves the gastrointestinal tract and the skin, it is then classically called an enterocutaneous fistula.
Methods: Publications from local and international journals were reviewed.
Results: Management challenges focus on fluid resuscitation, nutritional supplementation, electrolyte replenishment, control of sepsis, particularly containment of effluent, and skin integrity.
Conclusion: A review of the various methods of control of drainage and maintenance of skin integrity in ECF will be presented, augmented by a three-phase approach to management.

Key words: *Enterocutaneous fistula, stoma, drainage, skin integrity*

Introduction

A fistula is an abnormal tract between two or more epithelialized structures or spaces. It may involve a communication tract from one body cavity or hollow organ to another hollow organ or to the skin. When it involves the gastrointestinal tract and the skin, it is then classically called an enterocutaneous fistula. Enterocutaneous fistulas (ECF) are present as devastating complications following postoperative abdominal surgery and as secondary manifestations due to numerous intra-abdominal pathologic processes [1,2]. Management challenges focus on fluid resuscitation, nutritional supplementation, electrolyte replenishment, control of sepsis, containment of effluent and skin integrity [1]. A review of control of drainage and skin integrity in ECF will be presented, augmented by a three-phase approach to management.

Cephalic phase

Fluid intake: When the fistula output is very high, greater than 500ml/day, discontinuation of oral intake is recommended, because oral intake stimulates further losses of fluids, electrolytes, and protein via the fistula [1]. If total discontinuation of feeding could not be feasible, fluid intake could be allowed. This was the basis, in addition to nutritional rehabilitation, for advocating total parenteral nutrition (TPN) in patients with an enterocutaneous fistula. However, it is important to note that the use of TPN is not without problems; hence, it should be used cautiously.

These in addition to others include high cost, non-availability, particularly in low-income countries, and complications, such as hyperglycemia, septicemia, phlebitis, etc. A decrease in fistula output frequently occurs with initiation of TPN [1].

Elemental diet: This diet consisted of basic definable constituents in a digested ultra compact form, which will normally overcome the problem of the disposal of fecal solid or semi-solid waste products. Prescribing an elemental diet to patients with an enterocutaneous fistula has shown a remarkable reduction in the effluent that normally comes out of the fistula [3]. This has been thought to be possible probably because an elemental diet chemical constitution does not stimulate digestive enzyme secretion. It is readily available for intestinal absorption. It also contains no residue, and such can easily undergo complete digestion fast and absorption. Continuous presence of dietary residue in the gastrointestinal tract has shown a continuous stimulation of secretion and propagation of intestinal motility, thereby increasing the output of effluent of an enterocutaneous fistula [4]. Based on this mechanism, the output or effluent and skin integrity of patients' enterocutaneous fistulas could be controlled simply by placing the patient on an elemental diet, provided there is a minimum healthy intestinal length of about 30cm above the fistulous opening [3,4,6].

Nasogastric tube: A passage of a nasogastric tube in a patient with a high-output enterocutaneous fistula will mechanically remove all gastric content and secretions above the fistulous opening [1,7]. This is particularly important in patients with a high-output, proximal enterocutaneous fistula, where feeding the patient orally may also be counterproductive. Therefore, the passage of a nasogastric tube in these patients could safely be used to control the final effluent that will eventually come out, including the enzymes that will digest the skin around the stoma [7].

Somatostatin analogue: Volume depletion from a proximal, high-output fistula can be controlled by the use of a long-acting somatostatin analogue, octreotide, which acts by inhibiting gastrointestinal secretions/ hormones [1-3]. The administration of octreotide reportedly diminishes fistula output; however, whether it shortens the time for fistula closure remains to be proven.

Fistulous phase

Grading the fistulous opening is very important because that is what would determine the choice of drainage procedure (Table 1). It is also important to relate the type of appliance to the amount of effluent and anatomical location of the fistula.

Pouches: When the fistula output is high, it is desirable to use a pouch for collecting the enteric effluents [8]. Ostomy pouches in 1- or 2-piece designs with either a drainable clip or a urostomy-type closure can be cut and fit to perifistular skin. If the area of the fistula is on an irregular body contour, such as close to bony prominences, a 1-piece pouch is then more suitable, since it can adhere better.

Table 1. The grading of fistulous opening and suitability of drainage procedures.

Grade	Description	Suggested drainage procedures
I	Fistulous opening is located in normal skin not close to the umbilicus, bony prominence, previous scar	pouches, devices, barriers creams
II	Fistulous opening is close to Umbilicus, previous scar, bony prominence	Tube drain, barrier cream, positional methods
III	Fistulous opening is located at either of the angle (upper and lower) of the abdominal wound	Negative pressure wound therapy (NPWT), Positional method
IV	Fistulous opening is the entire abdominal wound	Positional method

Devices: It has been reported that the use of a vacuum-assisted closure (VAC) system for wounds, which consisted of an evacuation tube embedded in a polyurethane foam dressing, helped to improve the condition of the wound, prevented skin excoriation, and promoted wound contracture and healing [8,9].

Skin barriers and creams: Powder, paste, solids wafers, spray, and creams are used as skin barriers for the protection of skin from the enteric effluents [1,2,4].

Pectin-based wafers that melt and seal with the skin provide a good barrier and offer protection for a variable period. In low-output fistulas, absorbent dressings can be put on top of the skin-barrier wafer to absorb any effluent overflow. The skin wafer protects the adjoining skin from erythema and maceration [1,2,4].

Pectin- or karaya-based powders and *paste* are used. Powders are preferred over a paste in wet, weepy, perifistular skin when severe skin maceration is present. A generous amount of powder should be used and continuously added for good results. In patients with weepy skin and a high-output fistula, management becomes difficult. A spray provides a protective film and is helpful for pouching, but it might not be beneficial if used alone [1,2,4].

Zinc oxide creams are used to waterproof and protect the skin. Again, a generous amount with continuous replacement is necessary, because it is washed away with discharging enteric effluents [1,2,4].

Tube drain: Effective sump drainage of high enterocutaneous fistulae, together with alimentary rest and total parenteral nutrition, is now an integral part of the modern management of patients with this condition. Several reports[1,2,8,9] have indicated that a tube drain inserted in the fistulous tract of an enterocutaneous fistula does not only lead to the controlled exit of the effluent with no or minimal skin contact and excoriation, but can further be augmented by slow negative pressure suction. Alternatively, the tube can be used to irrigate and even feed the patient, a condition that has been known as fistuloclysis.

Negative Pressure Wound Therapy (NPWT): A standard ostomy pouch can be converted into a suction pouch by adding a large, single-lumen catheter into the pouch, sealing it, and connecting the assembly to low continuous suction [4,8,9] . The resulting pouch can be used by itself to drain effluent from an enterocutaneous fistula (ECF) or it can be used in combination with wound dressings, or a negative pressure wound therapy system. Application of a suction pouch extends the integrity of the appliance and diverts succus away from the wound bed with increased reliability.

Positional method: In some instances, the fistulous tract may be located near a bony structure or previous scar, or a very wide abdominal wound 1. In these situations, putting in a bag may not contain the effluent of the enterocutaneous fistula, but simply assuming a prone position will allow effluent out directly into a receptacle without contacting the skin around the fistulous opening [1,2].

Distal Phase

Fecal impaction: Distal obstruction is one of the major factors that increases the output of an enterocutaneous fistula [1]. It is important to note also that distal obstruction would not only maintain a high output but would also prevent the fistula from healing. Therefore, effort must be maintained to ensure that, in these patients, there is no fecal impaction or any distal obstruction. This is the most efficient distal phase in the control of effluent and skin integrity of a patient with an enterocutaneous fistula. A patient should be encouraged to ambulate as soon as possible and as many times as possible. This will enhance complete evacuation of distal intestinal content in most instances [1,2,4].

Conclusion

One of the greatest challenges, in the management of patients with an enterocutaneous fistula, is the continuous loss of effluent, which does not only include valuable body fluid and electrolytes but also enzymes that are not just being lost but which are causing horrible skin excoriation. Focus on fluid resuscitation, nutritional supplementation, electrolyte replenishment, control of

sepsis, and particularly containment of effluent and skin integrity is paramount. Therefore, the use of a combination of methods will suffice in most cases.

Conflict of interest statement

The authors do not declare any conflict of interest or financial support in this study.

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