Managing the Challenges of Enterocutaneous

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AND
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Enterocutaneous fistulas (ECF) present as devastating complications following postoperative abdominal surgery and as secondary manifestations due to primary intra-abdominal pathologic processes. Management challenges focus on fluid resuscitation, nutritional supplementation, electrolyte replenishment, control of sepsis, containment of effluent, skin integrity and surgery. Patient and family remain integral to the plan of care, as their physical and psychological challenges will be many. A review of ECF etiology and classifications will be presented, augmented by a four-phase approach to management.

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Incidence and Etiology

A fistula is an abnormal epithelialized tract between two or more structures or spaces. It may involve a communication tract from one body cavity or hollow organ to another hollow organ or to the skin. It is estimated that 90% of ECF arise after surgical procedures. Schein and Decker[1] cite a 37% mortality rate in post-operative high output ECF. The majority of these deaths are attributed to electrolyte imbalance, malnutrition and sepsis. Gynecologic patients are extremely vulnerable to fistula development (5% to 30%) because of malignancy and aggressive treatment regimes. Radiation-induced endarteritis affects the vascular supply, causing vasculitis, fibrosis and impaired collagen synthesis[2]. Fistulas may develop immediately or years later in conjunction with other processes such as diabetes mellitus, pelvic inflammatory disease, pelvic surgery, hypertension and atherosclerosis.

Fistulas are either iatrogenic or spontaneous in development. Postoperative complications include unintentional enterotomy and anastomotic breakdown (85%–90%) as a result of a foreign body close to the suture line, tension on the suture line, complicated suture techniques, distal obstruction, hematoma, abscess formation at the anastomotic site, or tumor. Emergent/urgent surgical procedures involving unprepped bowel, underresucitation, malnourishment or previously radiated tissue are other causes for fistula development. Spontaneous fistula development (10%–15%) is attributed to intestinal diseases such as Crohn's disease, malignancy and infectious processes, as in tuberculosis, diverticulitis, vascular insufficiency, radiation exposure and mesenteric ischemia.

Classification

Fistulas may be classified according to complexity, anatomic location or physiology. Simple fistulas are described as short with a direct tract. There is no organ involvement or associated abscess. Type I complex fistulas are associated with an abscess or multiple organs. Type II complex fistulas find the distal end

The Canadian Association for Enterostomal Therapy (CAET) is a professional, non-profit organization whose members are dedicated to the representation and advancement of the specialty of Enterostomal Therapy Nursing. The Enterostomal Therapy (ET) nurse is an advanced practitioner whose role includes consultation, direct care, education, research and administration. The ET nurse offers comprehensive services for people of all ages with select disorders of the gastro-intestinal, genito-urinary, and integumentary systems, including ostomies, fistulas, tubes, dermal wounds and incontinence. The development of innovative, creative and individualized care plans for people with complex problems results in accelerated outcomes for the patient.

Fistulas

within the base of a disrupted wound. Anatomically, the location of the fistula is identified according to site of origin *(see Table 1 – Fistula Classification)*. Type I ECF originate from esophageal, gastric and duodenal sources; Type II from small bowel; Type III from large bowel; and Type IV from large abdominal wall defects greater than 20cm^2. Physiologic classification quantifies fistula output over a 24-hour period: low volume fistula <200 ml/24-hour, moderate volume between 200 and 500 ml/24 hours, and high volume >500 ml/24 hours. High volume fistulas are generally associated with high morbidity, high mortality and less chance of spontaneous closure.

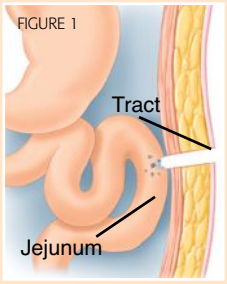
Manifestations

Excess fluid exudating from a wound or cutaneously is the usual first indication of an external fistula. Examination of the fluid will assist in determining the source *(See Table 2 – Type of Fluid Loss from Various Fistula Sites* on next page*)*. Skin excoriation rapidly occurs secondary to the high concentration of digestive enzymes in the chyme. Internal fistulas are fissuring tracts inside the body, which erode directly into adjacent viscus. These are basically asymptomatic unless the distal portion of the fistula enters a structure such as the bladder, rectum or vagina. Reported symptoms such as recurrent diarrhea, mucus, blood, cystitis, pneumaturia, flatus or stool from the vagina, perianal/perineal skin excoriation, pressure and discomfort may direct investigations toward a probable external fistula.

Facilitating Closure

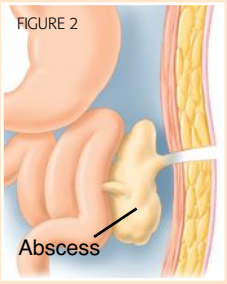
Closure of a fistula either spontaneously or surgically is the ultimate goal. Rolstad and Bryant[2] identify five objectives toward caring for the fistula: fluid and electrolyte replacement, adequate nutrition, perifistular skin protection, infection control and measures to facilitate closure. A goal not to be overlooked throughout a challenging and prolonged course of treatment is the maintenance of a trusting partnership between the patient, the family and the health-care team.

FIGURE 1



Simple enterocutaneous fistula.

FIGURE 2



Complex Type I fistula with associated abscess.

Both figures adapted from Rolstad BS, Bryant R. Management of drain sites and fistulas. In Bryant R (ed.), *Acute and Chronic Wounds*. St. Louis: Mosby. 2000:318.

Management

Wong and Buie[3] have organized the approach to fistula management into four phases: stabilization, investigation, conservative treatment and surgery.

TABLE 1

Fistula Classification

Location	Internal	Tract contained within body
	External	Tract exits through skin
Involved structures	Colon	Colon
	Entero-	Small bowel
	Vesico-	Bladder
	Vaginal	Vagina
	Cutaneous	Skin
	Recto-	Rectum
Volume	High output	Over 200 ml per 24 hours
	Low output	Under 200 ml per 24 hours

Adapted from Rolstad BS, Bryant R. Management of drain sites and fistulas. In Bryant R (ed.), *Acute and Chronic Wounds*. St. Louis: Mosby. 2000:317–341.

TABLE 2

Type of Fistula Loss from Various Fistula Sites

Fluid Type	Origin Of Fistula
Watery	Gastric
Bile	Gastric, biliary, duodenum
Yellow/orange	Small bowel
Colourless	Pancreas
Brown fecal	Large bowel

Modified from Metcalf C. Enterocutaneous fistulae. *Journal of Wound Care*. 1999(3):142.

Phase 1 Stabilization: The gastrointestinal tract secretes five to nine litres of sodium, potassium, chloride and bicarbonate daily. The loss of these essential electrolytes and fluid volume threatens the overall circulatory system. Hypovolemia, inadequate tissue perfusion, renal failure and circulatory collapse can occur in the presence of a high output fistula. Sepsis, hemorrhage and evisceration call for immediate surgical intervention. Local and systemic sepsis must be treated with appropriate drainage and antibiotics. Placing the patient on a 'nothing by mouth' regimen minimizes intestinal output. This decreases content within the intestinal lumen, intraintestinal stimulation and pancreaticobiliary secretions, which ordinarily would activate the fistula. H2 antagonists to prevent stress ulcers and to decrease gastric secretions, and somatostatin to inhibit stomach, pancreas, biliary tract and small intestinal secretions are effective in 'resting the gut.'

Phase 2 Investigation: Assessment of the anatomical features of the fistula is accomplished through radiography. Maturation of the fistula track occurs postoperatively on day seven to 10. It is believed that this time period is acceptable to introduce contrast dye for investigation. Fistulogram assists in the determination of the origin of the fistula, the length of the tract, the continuity of the bowel and other manifestations such as an abscess or distal obstruction. Computed tomography, cystoscopy, intravenous pyelogram and ultrasound can also be used to identify impediments to fistula closure.

Phase 3 Conservative Treatment: The conventional approach to fistula management encompasses aspects of nutritional provision, effluent containment, attention to facilitating ease of care, efficacious utilization of patient-care dollars and an overall goal of promoting the patient's physical and psychological well-being. In addition, a comprehensive, systematic assessment of the fistula presentation with concise documentation of findings is instrumental in the selection and guidance of care options *(See – Fistula Assessment and Documentation)*.

Reported throughout the literature as contributing to improved spontaneous closure rates for ECF is adequate nutritional support, a positive nitrogen balance, adequate trace minerals, vitamin replacement and caloric and protein requirements contingent with the patient's pre-existing status. Thirty-seven to 45 calories/kg per 24 hours is an acceptable range for caloric needs, whereas acceptable protein requirements between 1.5 to 1.75 g/kg in a 24-hour period are quoted[4]. The route of nutritional support will take the form of oral, enteral or parenteral nutrition dependent upon patient tolerance, ability to ingest sufficient quantities, the fistula tract location and the bowel mucosa's absorptive capacity. Moran and Green[5] describe the maintenance of a normal intestinal structure as being directly related to the sustained use of the gastroin-

Odour Assessment Scoring Tool

1. Strong odour evident upon entering room (2–3 metres away from patient); dressing is intact.

2. Moderate odour evident upon entering room (2–3 metres) and dressing is removed.

3. Slight odour evident at close proximity when dressing is removed.

4. No odour evident even when at patient's bedside with dressing removed.

Adapted from Baker and Haig scale, adapted from Poteet[6]

testinal tract. The initiation of enteral feeds is suggested for this population when at all feasible. Obvious contraindications to this route exist if increased fistula output is manifested. The oral route of nutrition is reasonable for patients with colonic fistulas, whereas patients with esophageal and distal ileum fistulas are better supported via the enteral route. Ultimately, total parenteral nutrition (TPN) is the route of choice for those with high output proximal small bowel fistulas. The early initiation of a registered dietitian consult is essential in guiding the nutritional assessment, route of delivery and ongoing nutritional follow-up.

Containment of fistula effluent is a complex challenge for the health-care provider. Advanced assessment skills, knowledge of appropriate product selection, competence in product application and teaching of same are components of developing an individualized plan of care. An effective containment protocol will protect perifistular skin, measure effluent supporting electrolyte resuscitation and nutritional supplementation and control odour. Practitioners may choose to follow an algorithm for selecting a fistula containment system to assist in the decision-making process.

The ease with which care can be provided for this patient population should not be underestimated (See *Figure 3 – Algorithm for Selecting a Fistula Containment System*). Failure to achieve adequate containment can result in a cascade of events that compromise patient comfort and condition. Repeated failure in replication of a containment protocol can be demoralizing for the patient. The health-care practitioner must be cognizant of the psychosocial implications of isolation, withdrawal and depression inherent in such prolonged treatment courses. The practitioner is also accountable for monitoring the product's effectiveness over time. In addition, labour intensiveness of the application and maintenance must be factored in to the overall cost containment equation.

Finally, the patient and family's physical and psychological health is of pivotal concern for the health-care team. As the plan of care evolves, education and re-education of the family unit are required. The unpredictable outcome and longevity of living with a fistula cannot be minimized. Diversional therapy and consultation with team members from social work and psychology are beneficial. Long-term pain issues must be addressed, and colleagues in both acute and palliative care can provide expert guidance in this area.

Phase 4 Surgical Intervention: Spontaneous closure of a colonic fistula can take 30–40 days; an ileal fistula 40–60 days. Ninety per cent of enteric fistulas that do close will do so within 50 days[7,8]. Impediments to spontaneous closure can influence the decision to proceed with surgery. The surgeon will choose to

Fistula Assessment and Documentation[2]

1. Source
(e.g. small bowel, large bowel, bladder)

2. Characteristics of effluent:
(a) volume
low < 200 ml/24h
high > 200 ml/24h
(b) odour (if yes, describe)
(c) consistency
(e.g., liquid, semi-formed, formed, gas)
(d) composition – colour
(e.g., clear, yellow, green, brown)
– active enzymes
– extremes in pH

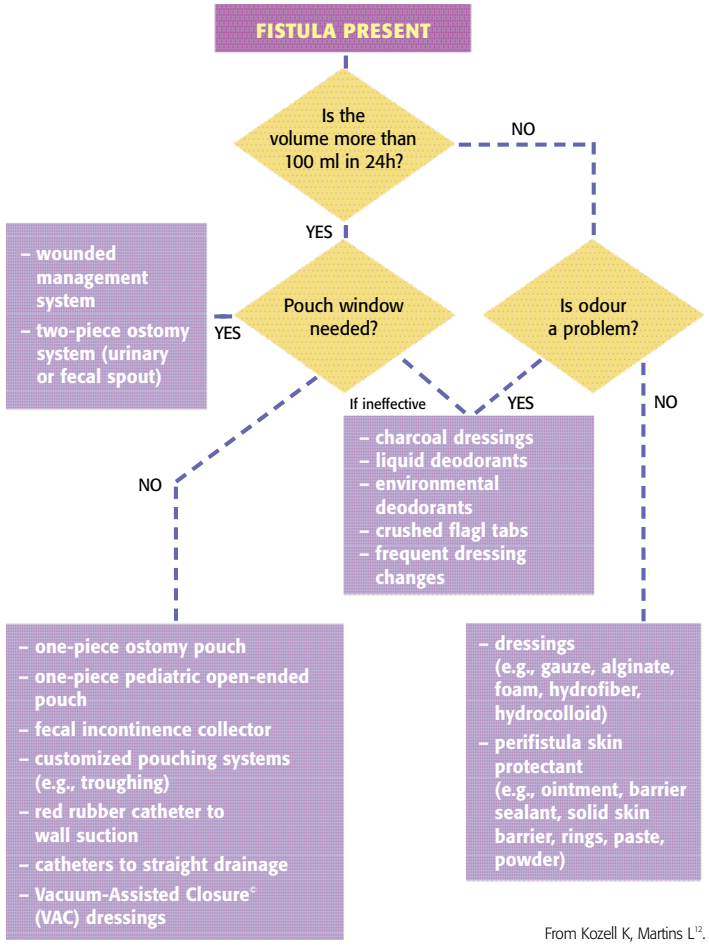
3. Topography and size:
(a) number of sites
(b) location(s)
(c) length and width of each
(include patterns)
(d) openings
(e.g., below, at or above skin level)
(e) proximity to bony prominences, scars, abdominal creases, incision, drain(s), stoma
(f) muscle tone surrounding opening
(e.g., firm, soft, flaccid)
(g) contours at fistula opening (e.g., flat, shallow, moderate or deep depths)

4. Perifistular skin integrity at each location
(e.g., intact, macerated, erythematous, denuded or eroded, ulcerated, infected).

operate in the presence of bowel necrosis or abscess. The patient's condition must be optimized: positive nitrogen balance, sepsis-free for six to eight weeks and the abdominal wall and surrounding tissues should be soft and supple[3,9]. Premature attempts at operative closure with inflamed, erythematous or necrotic tissue increases the risk of peritoneal contamination, the formation of dense adhesions and recurrent fistula formation. Delaying laparotomy reduces the risk of peritonitis, minimizes blood loss between anatomical planes at the time of dissection and improves wound closure and healing[10]. Closure of a Type II complex fistula is invariably a surgical closure. The timing of closure varies between 10 weeks to 13 months[11]. The surgical approach will be either resection of the fistula or diversion of the fecal stream proximal to the fistula, creating an ostomy or end-to-end/side-to-side anastomosis.

FIGURE 3

Algorithm for Selecting a Fistula Containment System



From Kozell K, Martins L[12].

Conclusion

Medical and nursing care demand a complementary, interdisciplinary approach if successful closure of an enterocutaneous fistula is to be achieved. The patient and family are challenged by physical and psychological stressors, which often result in weeks and even months of hospitalization. As health-care practitioners, we must remember to treat the patient as a whole person and not just 'as a hole.' The fistula should not become the only focus of care, but rather an element of the overall treatment plan.

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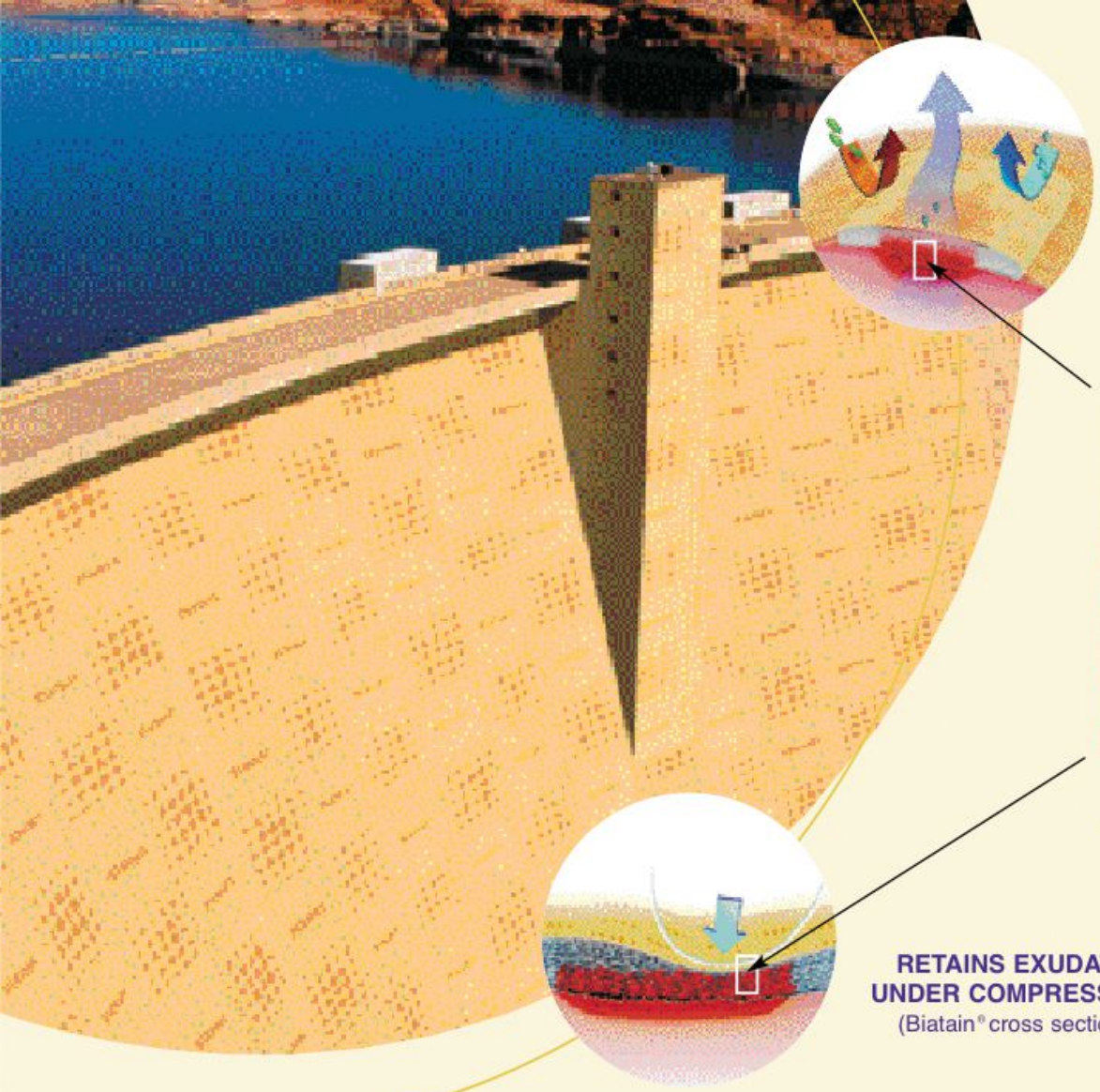

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