Caring for acutely or critically ill patients with fecal incontinence is a daunting task that consumes substantial caregiver time and erodes patient comfort, self-image, and strength. Families and significant others often also are distressed by the evident patient discomfort, odor, and stigma associated with lack of bowel control. To avoid or minimize complications, the cause of diarrhea should be addressed, fecal leakage prevented, stool contained, and skin integrity preserved. Management options addressing these goals include diet, pharmacological therapy, and the use of containment products. Management options and their respective advantages and disadvantages are presented with a special focus on safety issues. Diverse approaches are safe only if they are knowledgeably selected, carefully instituted, and constantly monitored for their effects on patient outcomes. Research to identify which options work best in selected clinical situations and which combinations of therapies are most effective is needed.

KEYWORDS: fecal incontinence, diarrhea, critical illness

Fecal Incontinence and Diarrhea

Prevalence of fecal incontinence. Fecal incontinence can be one of the most physiologically, psychologically, and socially debilitating conditions affecting patients. Hundreds of millions of dollars are spent each year for controlling urinary and fecal incontinence; According to Seymour,¹ fecal incontinence is the second leading cause of admission to long-term care facilities in the US. Exact data on the prevalence of fecal incontinence in acute care and community settings are difficult to obtain, in part because people are reluctant to reveal the embarrassing problem. However, a secondary analysis of data collected during a prospective cohort investigation of 152 hospitalized...
patients showed that 33% of the acutely or critically ill participants had fecal incontinence.2 A significantly greater (P <.04) percentage of patients with diarrhea had fecal incontinence (23 out of 53, 43%) than patients without diarrhea (27 out of 99, 27%). Bliss et al3 surveyed 1,352 community-dwelling respondents >65 years of age via a health maintenance organization (HMO) in Minnesota. Approximately 18% reported experiencing fecal incontinence several times per year or more. When the severity of fecal incontinence was examined, data from the same study showed that people who soiled their outer clothing were significantly (P <.01) more likely to use multiple self-care strategies (eg, diapers, altered diet) than those with less severe fecal incontinence.4

Melville et al5 surveyed 6,000 community-dwelling US women in a large HMO in the northwestern US. Fecal incontinence was defined as the loss of liquid or solid stool at least monthly. Among those who responded (N = 3,536, a 64% response rate), the prevalence was 7.2%. The respondents tended to be older and heavier by body mass index (BMI), have had more pregnancies, and more likely to have current urinary incontinence.

**Risk factors/pathophysiological conditions associated with fecal incontinence.** Fecal incontinence has many etiologies and risk factors. Bliss et al categorize the etiologies of fecal incontinence in five ways: 1) neuro-sensory-motor dysfunction of the anal sphincter or pelvic floor as occurs with anorectal trauma, 2) abnormal colonic transit, 3) loose or liquid stool, 4) decreased intestinal capacity with overflow, such as around a tumor or fecal impaction, and 5) idiopathy. Functional limitations in mobility and cognitive ability also contribute substantially to the risk of fecal incontinence.

Alternatively Rao,7 based on a literature review and his own research, suggests that fecal incontinence is due to conditions that interrupt or disrupt the structure and/or function of the anorectal unit (see Table 1).

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<thead>
<tr>
<th>Structural changes to:</th>
<th>Possible causes</th>
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<tr>
<td>Anal sphincter</td>
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<td>Rectum</td>
<td>Hemorrhoidectomy</td>
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<td>Pudendal nerve</td>
<td>Inflammation</td>
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<td>Puborectalis muscle</td>
<td>Inflammatory bowel disease</td>
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<td>Central and autonomic nervous system</td>
<td>Radiation therapy</td>
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<th>Functional changes to:</th>
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<tr>
<td>Anorectal sensation</td>
<td>Childbirth injury</td>
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<tr>
<td>Stool characteristics</td>
<td>Impaction, diarrhea</td>
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<td>Situational factors</td>
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<td>· Impaction</td>
<td>Drugs</td>
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<td>· Mobility/cognition</td>
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<td>· Psychoses</td>
<td>Dementia</td>
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<td>· Drugs</td>
<td>Mental illness</td>
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<td>· Food allergies</td>
<td>Anticholinergics</td>
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Medical conditions that can result in fecal incontinence include diabetes mellitus, stroke, spinal cord trauma, and degenerative neurological disease. Abnormal delivery of feces to the rectum, behavioral and developmental dysfunction, and reduced rectal compliance also may be causes.1,4
Rao also divides fecal incontinence into three subtypes: 1) passive incontinence (involuntary stool discharge), 2) urge incontinence (discharge of stool despite active attempts to retain), and 3) fecal seepage (stool leakage following normal evacuation). The three subtypes represent another perspective for organizing and conceptualizing the clinical presentations of fecal incontinence.

The various conceptual schemas of fecal incontinence address the multiple challenges to normal anorectal anatomy and physiology. Fecal continence is dependent on structurally intact internal and external anal sphincters and a physiologically sound neuromuscular unit (no nerve or muscle pathology). Diarrhea overwhelms these continence-preserving mechanisms because it alters stool consistency and transit times and challenges the efficacy of the sphincter mechanisms.

A secondary analysis of data collected during a prospective cohort investigation of 152 hospitalized acutely and critically ill patients found that transient fecal incontinence is often associated with diarrhea. Diarrhea results when the colon is unable to manage the intestinal effluent it receives, overwhelming the anal sphincters. Stool volume is increased and frequency of stool loss is altered, creating a change in bowel habits.

Researchers have suggested the need for more specific definitional criteria for diarrhea given the plethora of operational diarrhea definitions that exist in the literature (involving, for example, number of stools, nature of effluent, number of stooling events, stool frequency, consistency, quantity, or diarrhea rating scales or scoring systems). In their study of hospitalized patients, Bliss et al defined diarrhea as three or more unformed or liquid stools per day or at least 250 mL of liquid effluent collected in a rectal bag.

Two well-acknowledged nosocomial or iatrogenic causes of diarrhea in hospitalized patients are *Clostridium difficile* intestinal infection and tube feedings. *C. difficile* infection is particularly worrisome because sources suggest that up to 20% of hospital patients may be colonized (creating a large reservoir for new infections). According to the National Hospital Discharge Survey (NHDS) conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention (CDC), and analyzed by McDonald et al, the percentage of patients discharged from acute care short stay hospitals with *C. difficile*-associated disease (CDAD) doubled from 82,000 in 1996 (31 out of 100,000) to 178,000 in 2003 (61 out of 100,000). Moreover, the overall rate was several-fold higher in persons >65 years of age (228 out of 100,000). However, these two causes represent only a few of the categories of diarrhea-related pathophysiology. Many more previously mentioned conditions causing fecal incontinence can affect the hospitalized patient.

**Etiology/Pathophysiology of Diarrhea**

In the acute or critical care setting, diarrhea usually is related to transient altered water and electrolyte transport in the intestinal tract. Specifically, diarrhea can be caused by abnormal osmotic and secretory processes though inflammation, motility changes, functional diseases, and iatrogenesis. Based on a review of the literature, Camilleri submits that no single case of diarrhea is truly unifactorial from a pathophysiological perspective.

Osmotic diarrhea is the retention of excess fluid in the gastrointestinal tract caused by the absorption of non-absorbable solutes. Some examples of causative agents are hyperosmolar medications (magnesium antacids, sorbitol) and enteral feedings.

In secretory diarrhea, increased liquid stool results from increased intestinal secretions related to enterotoxins such as *C. difficile*, cryptosporidium infection, or hormone release. Inflammation and motility changes also contribute to *C. difficile* diarrhea. Other causative factors include opportunistic infections such as those occurring with AIDS, short bowel syndrome, severe hypoproteinemia, atrophy of the intestinal epithelium, inflammatory bowel disease, small-bowel bacterial overgrowth, and celiac disease.

In an article on post-transplantation diarrhea, Sellin discusses a broader perspective on pathophysiology of diarrhea that incorporates the previously described abnormal osmotic and secretory processes, and the inflammatory, iatrogenic, motility, and functional causes described by Camilleri. Sellin submits that diarrhea is caused by events correlating within the paracrine-immuno-neuro-endocrine system (PINES). Signals from these four components are the underlying mechanisms generating diarrhea. Individual stimuli feed back to the paracellular pathway (affecting
intestinal permeability), the epithelium (affecting transport), smooth muscle (affecting motility), and blood flow (affecting metabolic events). The interconnectedness of the PINES model and the systems it represents explain the well-known causes of diarrhea.18

Acute care staff members may treat transient or acute diarrhea and chronic forms as well. But acutely and critically ill patients are particularly vulnerable to the ravages of both transient and longer-term diarrhea because their effects are often compounded by functional issues such as impaired cognition, hindered mobility, altered communication abilities, and sedation for pain control.

Consequences of Unmanaged Incontinent Diarrhea

The patient with severe diarrhea may experience substantive physiological and psychological effects. The literature suggests that the physiological effects include pain and discomfort, fluid and electrolyte imbalances, skin breakdown ranging from superficial irritation to deeper tissue and muscle damage (pressure ulcers), skin infection that can become systemic, sepsis, and ultimately death. Psychological effects are manifested by depression, altered body image, and extremely poor self-image.19,20 Studying the impact of hospitalization-related medical injuries on length of stay, charges, and mortality, researchers analyzed hospital discharge abstracts from 7.45 million patients from 994 acute care general hospitals across 28 states. They found that pressure ulcers can increase the mean hospital stay by 4 days and the impact of hospital-acquired sepsis was nearly three times greater (approximately 11 days),21 making it imperative to address factors such as severe diarrhea. Perineal dermatitis, an adverse outcome of fecal and urinary incontinence, also has great influence on patients’ quality of life.22,23

When Bliss et al24 analyzed 59,558 Minimum Data Set (MDS) nursing home records, 3,405 residents (5.7%) were found to have perineal dermatitis and 77% were incontinent.

The effects of poor diarrhea management on healthcare institutions can be enormous and include increased costs for absorbent and containment products, increased use of already limited resources (eg, nursing time), and a decrease in performance indicators that can affect state and federal funding (eg, altered skin integrity and urinary and fecal incontinence rates).19,25 Given the profound impact unmanaged diarrhea has on patients, their caregivers, and associated institutions, optimum management is compulsory for best outcomes.

Options in Management

Management of incontinent diarrhea can be divided into three general types: 1) methods that contain incontinence, 2) approaches in which a tube is used to drain the fecal effluent, and 3) medical (pharmacological) management of diarrhea often combined with one or more products from the other two groups17 (see Table 2).

Research on the clinical uses and patient outcomes for most of these options is limited; product selection often is based on other factors such as personal opinion, manufacturers’ claims, and cost of the product.26 Dietary
measures and complementary therapies (eg, probiotics) are beyond the scope of this manuscript.

**Containment methods.**

**Absorbent products.** Absorbents, such as diapers, have been used for years. They absorb effluent from the skin and if well-fitted can prevent leakage to the outside. Caregivers must clean the skin after each incontinence episode because diapers can trap irritating fecal output against the skin. This is especially true for persons incontinent of both urine and stool where the altered pH of effluent is highly caustic. The pH is raised to basic level as urea in urine is converted to ammonia in the presence of stool bacteria. If caregivers fail to change absorbent products when indicated, diapers can be a causative factor in promoting perineal dermatitis. Diapers also do not control odor. In today’s technology-improved environment, diapers are not usually a recommended approach for prolonged fecal incontinence management given the risk of perineal dermatitis and newer technologies that are available.

Perineal skin cleansers and skin protection products can provide excellent protection to diapered skin in the short term, although research is lacking on how best to combine them with absorbent product usage. If they are used, absorbent products must be combined with state-of-the-art skin protection products like moisture barrier creams or ointments, perineal cleansers, and skin barrier products designed to prevent and/or treat irritated skin. Depending on the amount of moisture present, ointments and creams may trap moisture, leading to maceration. Clinicians must use their clinical judgment whether it is better to use a barrier powder in certain situations.

**Fecal collectors.** A better option to control and contain frequent liquid feces in most acutely or critically ill patients is the fecal collector (eg, Hollister Fecal Collector [Libertyville, Ill], Flexi-Seal Fecal Collector [ConvaTec, a Bristol-Myers Squibb Company, Skillman, NJ], and Bard Fecal Containment Device [Murray Hill, NJ]). These external collection systems consist of a self-adhering skin barrier and attached pouch that can be connected to a bedside drainage collector. The fecal collector provides a closed system that helps minimize the spread of infectious organisms. The pouch is entirely external and non-invasive. Patients using fecal collectors do not encounter the same risks to the internal anal continence mechanisms and rectal mucosa that can accompany use of devices that traverse the anal sphincter and dwell in the rectal vault.

When used effectively and appropriately, fecal collectors can prevent skin breakdown, minimize odor, track output accurately, decrease exposure to excreta, conserve patient care supplies and caregiver time, minimize expense, and enhance patient acceptability and comfort. In addition, as diarrhea resolves, the pouch does not present the risk of gastrointestinal blockage of indwelling retention catheters. Because of their status as Class I medical devices (considered as presenting minimal potential for harm), fecal collectors can be used indefinitely as needed to manage diarrhea.

Fecal collectors have disadvantages. Typically, they are not used for patients who are ambulatory, agitated, or slide up and down in bed because the apparatus may be dislodged. If this displacement is undetected, the skin may become denuded and further applications may be ineffective. Skin breakdown may impair adhesive ability; so can skin moisture, residue from soaps, and cleansers and products used to treat skin breakdown such as moisture barriers, lotions, and ointments. Users must be trained to attain proficiency in successful application of the fecal collector. It is important to attach the fecal collector at the first sign of diarrhea before skin breakdown and resultant difficulty maintaining a tight seal can occur. Other disadvantages include difficulty in instilling medications, performing rectal exams with the pouch in place, or using a cooling blanket with a rectal probe. Patients with severely denuded skin as a result of mismanaged diarrhea, perianal burns, deep surgical cavity wounds, or severe blistering skin infections may not be good candidates for a fecal pouch because obtaining a secure seal may not be possible; hence, fecal pouches should not be used in these situations.

In many instances, special techniques can help overcome these problems. While training and careful application take time, a well-positioned and adhered fecal collector can produce up to several days of wear time. Expert clinicians suggest that successful application of the fecal collector is best achieved when the skin is properly prepared and step-by-step techniques are followed (see Table 3). Overall, the fecal collector is a user-friendly, cost-effective, efficient tool to confine and contain patient stool.
Tube (indwelling retention) drainage devices. In selected circumstances (eg, the fecal collector has failed or cannot be used due to problems such as severe burns, distorted anatomy, or lack of potential adherent surface), a device that traverses the anal sphincter and dwells in the rectum is another option. Invasive devices should be used judiciously because of their limitations, contraindications, precautions, and unanswered questions about long-term effects.27,34,35

Balloon rectal tube (rectal catheter). The traditional approach, and in today’s technological environment the least safe, is the use of a rectal catheter. These indwelling catheters (20 to 30 French) are connected to a bedside drainage bag. Stool is drained through the lumen of the tube and the catheter is held in place by the inflated balloon. The advantages of a rectal catheter are similar to those of containment systems and include a closed system of stool containment, decreased exposure of healthcare practitioners to possibly infectious body substances and most critically, protection of perineal skin (avoiding contact with irritating stool).23,29

Disadvantages of rectal catheters with balloons are substantial. Fecal drainage must be liquid or it will not drain. The tubes may leak, resulting in odor and skin irritation. Expert opinion has noted that as diarrhea resolves, the catheter and balloon can act as a blockade and potentially cause bowel obstruction and perforation.31,32 Additionally, determining whether normal bowel control has returned without tube removal is difficult. More critically, the balloon requires a strict periodic inflation and deflation schedule to help prevent injury to the rectal mucosa.26 Given the demands of a critically or acutely ill patient, questionable compliance from caregivers can result.

Rectal catheters are contraindicated in several patient populations including those with recent rectal or prostate surgery, recent myocardial infarction, rectal mucosal disease, clotting disorders, and impaired immune status.27,31,33 Rectal balloon catheter use usually requires a physician’s order. The safety of longer-term rectal catheter use has not been supported by well-designed prospective controlled clinical trials.16,33 In a case series of nine patients who experienced barotrauma from rectal balloons during barium enema examinations, rectal perforation has been reported secondary to pressure or barotrauma.27 Because expert opinion support and consensus for safe use are lacking and because of the potential for anorectal necrosis, newer literature states that use of these systems is now generally contraindicated.32

Fecal or bowel management systems. The Flexi-Seal Fecal Management System (ConvaTec) and the Zassi Bowel Management System (Zassi Medical Evolutions, Fernandina Beach, Fla) are newer medical device systems designed to direct, collect, and contain liquid stool from bedbound, immobilized ill patients. Both systems may be irrigated; one also provides access for medication administration.

The devices consist of a soft, latex-free catheter and a collection bag. Following a digital rectal exam and removal of any impacted stool, the tube is inserted and a
low-pressure balloon is filled with saline or water. The balloon is thought to conform to the rectal vault, reducing the risk of anorectal barotrauma. When the collection bag is filled, it may be disconnected and replaced with a new bag or emptied, depending on the brand. User training is required. Maintenance may include device irrigation and confirmation of placement and status of the retention cuff depending on the device in use. The reader is cautioned to review and follow manufacturer’s instructions for use (not all features, required maintenance activities, and precautions are presented in this article). 

The advantages of fecal or bowel management systems are similar to those of rectal balloon catheters (closed system of stool containment, decreased exposure of healthcare practitioners to possibly infectious body substances, and protection of perineal skin). Testing of both systems reported no evidence of anorectal barotrauma; both manufacturers performed clinical studies in which endoscopic studies pre- and post-device usage were conducted — they were open label non-randomized design. No rectal mucosa changes were detected (the reader is referred to the manufacturers’ websites for further description). Both devices have received FDA-clearance for marketing.

Long-term consequences of newer systems have not yet been studied. Echols et al. reported no evidence of anorectal barotrauma; both manufacturers performed clinical studies in which endoscopic studies pre- and post-device usage were conducted — they were open label non-randomized design. No rectal mucosa changes were detected (the reader is referred to the manufacturers’ websites for further description). Both devices have received FDA-clearance for marketing.

Rectal trumpet. A recently discussed alternative is the offlabel use of a nasopharyngeal airway: the rectal trumpet. A variation of the rectal tube, the rectal trumpet (32 French nasopharyngeal airway) involves introduction of the flange of the airway past the anal sphincter so the shaft can be connected to a bedside drainage collector. The flange anchors the tube inside the rectum.

In a single subject, clinical series design study by Grogan and Kramer, critically ill liver transplant patients with incontinent diarrhea were managed using a rectal trumpet after other attempts at containment failed. The rectal trumpet was rated easy to use by 84% of the nurses and the subjects’ skin improved over the course of the study. Study limitations include: 1) small study sample size, 2) relatively short-term use and lack of a control group, 3) offlabel use of a medical device, and 4) lack of internal sphincter appearance assessment via endoscopy for signs of pressure damage. The researchers acknowledged that the rectal trumpet device would not be effective or usable if severe colon or abdominal distention were present, if excessive straining were to occur, or if the weight of the collection device persistently pulled the rectal trumpet out of the rectum. Given the availability of newer fecal management systems with safety data, rectal trumpet use is not recommended.

Pharmacologic therapy. Medical management of fecal incontinence usually complements both containment and prevention approaches. Research has shown that diarrhea exacerbates fecal incontinence. Therefore, medical approaches to control diarrhea may be instituted to decrease its detrimental effects.

The etiology of diarrhea must be ascertained before certain treatments are initiated and the patient’s medical conditions and current medication use must be considered. For example, persons with C. difficile infection should not receive drugs to slow
intestinal transit. However, if issues like intestinal infections are ruled out, several approaches to diarrhea management are available. According to a review of the literature, conservative treatments like bulking agents (e.g., bismuth subsalicylate, psyllium) can be added to the diet or tube feeding. These help modify stool consistency and may help decrease fecal incontinence without further intervention.

Reviews in the literature also suggest the use of antidiarrheal agents. Loperamide, a synthetic opioid, acts directly on the intestine to inhibit peristalsis, lengthen intestinal transit time, improve sphincter tone, reduce urgency, and decrease frequency of bowel movements. Notably, loperamide has no addiction potential. For adults, initial dosing is 4 mg with 2 mg each successive dose up to 16 mg day.

Another agent, diphenoxylate, is also an opioid derivative to which atropine is added to decrease the potential for overdose and abuse. This agent is not as attractive as loperamide because of its potential for addiction and because it is weaker than loperamide. The preparation contains 25 mcg of atropine sulfate per tablet with 2.5 mg diphenoxylate. Dosage is two tablets initially and one tablet every 3 to 4 hours thereafter. Overdosage may produce constipation, megacolon, and central nervous system effects.

For patients who are acutely or critically ill, caregivers should first thoroughly analyze the cause of the diarrhea and enact dietary alterations before instituting appropriate pharmacotherapy. The use of containment or tube devices is adjunctive to the primary management of the diarrhea and incontinence.

Conclusion

This overview of fecal incontinence, especially as manifested in diarrhea, addresses underlying pathophysiological mechanisms and potential management consequences for patients, caregivers, and institutions. Methods to manage diarrhea include collection/containment, drainage by tube, and medicinally treating the diarrhea. A variety of approaches is available to manage incontinent diarrhea in the acutely ill adult. Consideration of patient risks and needs, staff knowledge and skills, financial impact, and available resources must be included when management methods are selected. Health professionals must be aware of the advantages, disadvantages, indications, and contraindications regarding use of the various management methods. Future research needs to target which therapies are best in selected care situations and what combinations can promote optimal patient outcomes most swiftly. Diverse approaches are safe only if they are knowledgeably selected, carefully instituted, and constantly monitored for their effects on patient outcomes.

References