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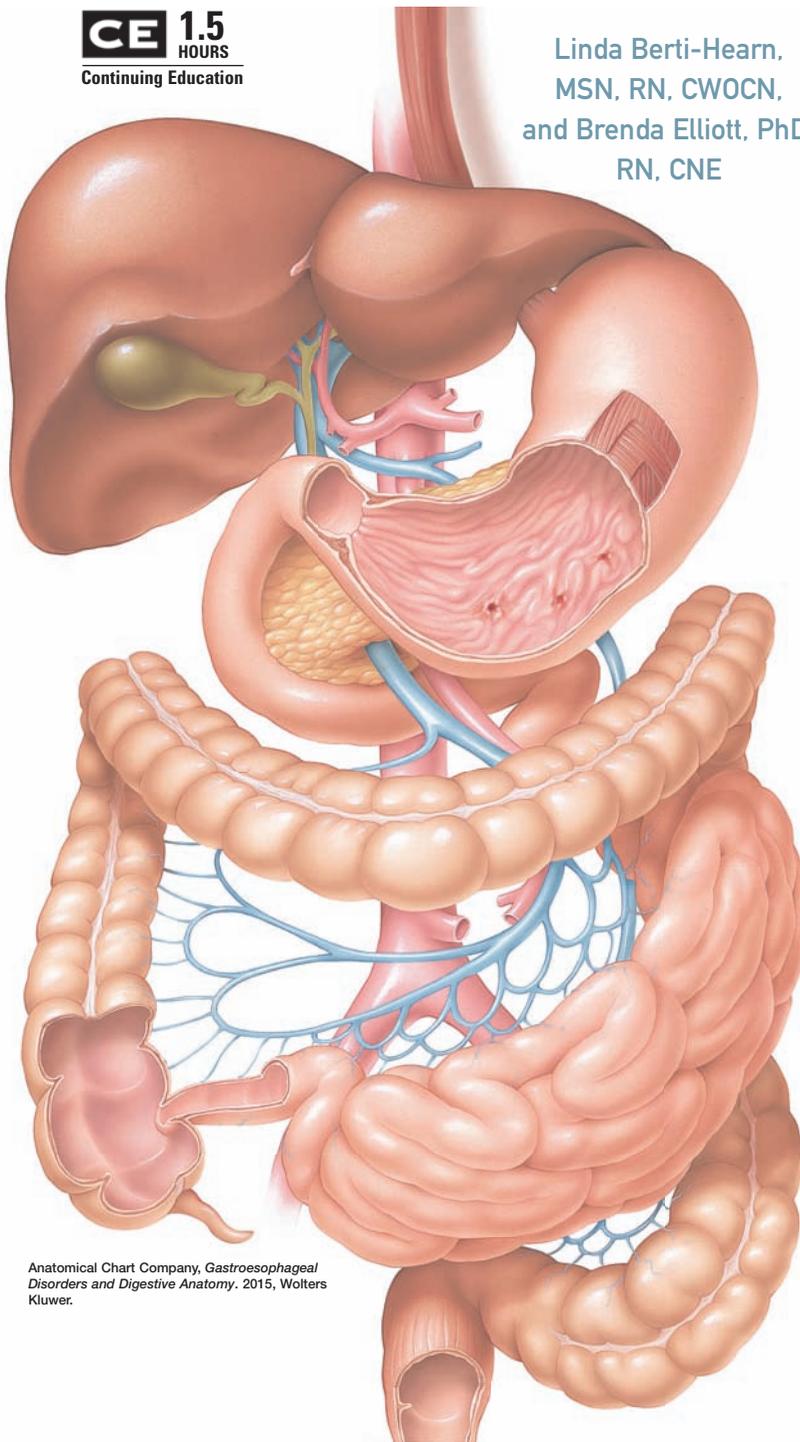
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This article focuses on the care and management of patients living with an ileostomy. Due to shortened hospital stays, patient teaching related to self-care of ostomies has shifted from the hospital to the home setting. It is important for home care clinicians to be knowledgeable about all aspects of ostomy care. Patients with ileostomies are particularly prone to peristomal skin problems, as well as fluid and electrolyte and nutritional imbalances. This article reviews the anatomy and physiology of the gastrointestinal tract, indications for the creation of an ileostomy, and prevention and treatment of early and late complications. Practical advice on ileostomy care and patient teaching is provided.

Varying physical, emotional, and social reactions can result from the creation of an ostomy, especially if it is sudden and unexpected. For some people, an ostomy provides new hope in life, and for others it represents illness and altered body image. Due to shortened hospital stays, patient teaching related to self-care of an ostomy has shifted to the home setting. With the exception of Wound, Ostomy, Continence (WOC) nurses, many home care clinicians may not have the knowledge or confidence to manage complications for this patient population (Bare et al., 2017). This article focuses on the care and education of patients with ileostomies.

Anatomy and Physiology

The gastrointestinal tract is comprised of several segments: stomach, small intestine, large intestine,



Anatomical Chart Company, *Gastroesophageal Disorders and Digestive Anatomy*, 2015, Wolters Kluwer.

ILEOSTOMY CARE

A Guide for Home Care Clinicians

rectum, and anus (Netsch, 2016) and has four main layers. The inner most layer is the mucosa and is made of up three layers: epithelium, lamina propria, and muscularis mucosa. Next is the submucosa, which is a thick layer of connective tissue that contains glands, blood vessels, and nerves. The third layer is the muscularis externa and it consists of two different smooth muscle layers that work together to create peristalsis. Lastly, the outer layer is called the serosa or perineum (visceral and parietal). It is a layer of connective tissue that covers the digestive organs and abdominal wall and prevents friction by releasing a thin serous fluid during peristaltic movement (Johnstone et al., 2014).

The small intestine is the longest portion of the digestive system measuring approximately 22-feet long, and is composed of three different sections, the duodenum, jejunum, and ileum, beginning at the pylorus and extending to the ileocecal valve (Netsch, 2016). Its functions include motility, secretion, and absorption. These functions assist in the digestive process, absorption of nutrients, and fluid and electrolyte balance. The circular folds of the mucosa and submucosa of the small intestine have intestinal villi that increase the absorptive surface for digestion and absorption. Because these villi have the ability to elongate or hypertrophy, some absorption can be increased as it takes on the function of the colon when the colon is surgically removed (Netsch).

An ileostomy is created when the end or loop of the small intestine (ileum) is pulled through the abdomen by a surgical procedure for drainage of fecal matter. A patient with an ileostomy thus has partially lost the function of absorption due to diversion, or partial or complete removal of the large intestine or colon (Black, 2015). Patients who have an ileostomy may also have had the rectum and anus removed depending on the reason for surgery.

Indications for an Ileostomy

There are several indications for the surgical creation of an ileostomy. Familial adenomatous polyposis and severe inflammatory bowel disease, such as Crohn and ulcerative colitis, as well as colorectal cancer are common indications for an ileostomy (WOC Nurse Society, 2010). Approximately

140,000 people were diagnosed with colorectal cancer in the United States in 2014 (Centers for Disease Control and Prevention, 2018).

Familial adenomatous polyposis is a genetic disease that causes hundreds to thousands of adenomatous polyps in the colon and rectum with nearly 100% lifetime risk of colorectal cancer in untreated persons (Beitz, 2016). It begins to develop in the late teens and if not treated, colorectal cancer can develop anywhere from 5 to 30 years later. A total colectomy with the removal of rectal mucosa is the treatment.

Complications that develop in the immediate peristomal area may be caused by chemical, mechanical, or bacterial threats.

Crohn disease is a pan-intestinal disease often found in the terminal ileum. Inflammation can extend into the mucosa resulting in abscess formation. Crohn disease is treated with steroids and immunosuppressant agents to

relieve symptoms and manage the disease. When treatment fails or complications arise, surgical intervention is required. Ulcerative colitis is chronic inflammation and ulceration of the bowel and affects a continuous portion of the large intestine. Surgery to remove the entire colon is often curative.

Anatomy of the Stoma

For patients with an ileostomy, an end stoma is created by resecting the small intestine and bringing the end through a surgically created opening in the rectus abdominal muscle and through the skin (Stricker et al., 2016). It is inverted like a turtleneck and sewn into place. A loop stoma is created by bringing a loop of the small intestine through a surgical opening in the rectus abdominal muscle and through the skin. When the loop stoma is constructed, the bowel is not completely divided but is opened along the anterior surface. The open edges are then everted and sutured to the skin. This stoma has a proximal and distal opening. The proximal functions for stool and the distal functions for mucous. The two distinct openings remain connected by the posterior section of the bowel wall.

Postoperatively, loop stomas are supported in position by a bridge/rod of plastic or rubber (Figure 1). The bridge/rod prevents the stoma from retracting and usually remains in place for 2 to 7 days (Stricker et al., 2016), but some patients will return home with the bridge still in place. Most loop stomas are temporary but can become permanent depending on the patient's medical

condition. A loop ileostomy has a lower incidence of prolapse, retraction, necrosis, and hernia around a stoma, but has a higher risk of bowel obstruction and dehydration when compared with a loop colostomy.

Stoma Complications

Stoma complications are reported by a significant number of patients with an ostomy, but due to inconsistent definitions, it is challenging to accurately measure the incidence (Pittman, 2016). One way of classifying stomal complications is to categorize them as early (or within 30 days of surgery), and late (or 30 days after surgery). Early complications include mucocutaneous separation, stoma necrosis, and stoma retraction. Late complications include stomal stenosis, stomal prolapsed, stomal trauma, and parastomal hernia. Goals to prevent or decrease the incidence of stoma complications include weight reduction, promoting a healthy lifestyle, and proper ostomy management pre- and postoperatively (Pittman).

Peristomal Skin

Peristomal skin care is essential in the management of an ileostomy because the enzymes in the



Figure 1. Loop stoma.



Figure 2. Moisture-related injury.

stool can damage the skin (Salvadaleña, 2016). Normal peristomal skin should be clean, dry, and intact and look like the skin on the rest of the abdomen. It is worth noting that peristomal complications can occur in any age-group but older adults are at higher risk due to skin changes associated with aging. Older adults may also experience increased difficulty due to weight loss, dexterity problems such as arthritis, memory loss, and visual changes (Whiteley, 2013).

Peristomal Complications

Up to 80% of patients experience complications, predominately peristomal skin issues (Colwell et al., 2018). Complications that develop in the immediate peristomal area may be caused by chemical, mechanical, or bacterial threats. Management of peristomal skin problems depends on the contributing factors. A mechanical threat results from skin stripping, abrasions or pressure injury due to the removal of skin barrier, tape or ostomy accessories. A chemical threat is the most common cause resulting in moisture-related injury from exposure to stoma effluent or stool leakage (Figure 2). This constant moisture results in inflammation and peristomal skin damage. Moist skin is more prone to overgrowth of fungi and bacteria. The overall goal with any peristomal complications is to treat the skin and promote healing while maintaining an adequate wear time of the pouching system (Salvadaleña, 2016).

Skin damage due to contact with enzymatic stool (effluent) can be a problem. The digestive enzymes in the small intestine are irritants and if not treated or resolved, peristomal skin can become so damaged that the skin barrier will not adhere. The skin will need to be cleansed with warm water and lightly dusted with stoma powder, which will help absorb the moisture from the weepy skin. It is then dabbed with a nonsting barrier wipe to lock in the powder and form a crust. The crust will give the new skin barrier something to latch onto. Some of the more common peristomal skin conditions, causes, and treatments are reviewed in Table 1.

Pouching Options

The ideal stoma is one that protrudes above skin level. A flush stoma is at skin level and a retracted stoma is below skin level (and the most difficult to pouch). Choosing a pouching system depends on the characteristic of the stoma, the location, the contour of the abdomen, the presence of any skin

Table 1. Common Peristomal Complications and Treatments

Complication	Cause	Treatment
Peristomal moisture-associated skin damage	Inflammation and erosion of the skin adjacent to the stoma associated with exposure to stool	Reevaluate pouching system. Selecting accessories such as barrier rings that can improve seal. Crusting: Pectin-based stoma powder and skin barrier wipe
Maceration	Moist skin around stoma that appears waterlogged	Remeasure stoma and refit pouching system <1/8 in. skin between stoma and skin barrier
Mechanical damage	Skin loss or skin discoloration due to medical adhesive-related skin injuries and pressure ulcers	Reeducate on removal of adhesive skin barrier to stop skin stripping Adhesive remover wipe to aid in removal of skin barrier Pectin-based stoma powder
Chemical damage	Stool draining from stoma onto peristomal skin or accessories that contain ingredients the patient may be sensitive to	Reeducate on proper fit of skin barrier and use of accessory products for intended use only
Fungal/candidacies infection	Erythema with a maculopapular rash accompanied by satellite lesions	Change pouching system every 2–3 days Gentle cleansing and thorough drying and applying antifungal powder

Note. Adapted from Salvadalena (2016).

creases, and the patient's ability and preferences. Postoperatively, a patient with an ostomy is usually placed in a flat skin barrier, either a one-piece or two-piece system. If problems develop such as leakage due to stoma retraction or abdominal creases, a convex skin barrier or a soft flexible skin barrier can be used.

The adhesive part of the pouching system is called a skin barrier or wafer and it is essential that it adheres to the abdominal skin to prevent leakage and to maintain healthy peristomal skin. Pouches come in a variety of types and sizes and are open ended with either velcro or clip closure. An ileostomy will produce approximately 350 to 800 cm³ of liquid stool every 24 hours and must be emptied every 4 to 6 hours; therefore, a drainable pouch is needed (Black, 2015). A closed pouch/disposable pouch system is covered by insurance only for colostomy patients who have regular bowel patterns; however, they can be purchased and used by patients with an ileostomy for swimming or intimacy. A pouching system can be either a one-piece system where the adhesive skin barrier and pouch are attached, or a two-piece system in which the skin barrier is separate from the pouch, where the pouch can either snap or click on to the adhesive skin barrier (Figure 3).

To achieve an even abdominal wall if abdominal creases are present, a number of accessories can be used. A barrier ring or seal is circular and manufactured from a hydrocolloid similar to that of the back of the skin barrier. The barrier ring can be used to increase the adherence of the skin



Figure 3. Pouching system.

barrier to the abdominal wall by enhancing the seal around the stoma with a second layer of skin barrier, as well as providing a soft convexity (Cowell, 2016). The barrier ring fills in the creases and provides a caulking around the stoma to prevent liquid stool from seeping under the skin barrier. Pieces of the barrier ring and stoma paste can also be used to fill in the abdominal creases to create a flat abdominal wall and increase adherence. Stoma paste may contain alcohol and will burn if there is peristomal skin irritation. It is recommended that it be applied to the back of the skin barrier and allowed to sit for a few minutes prior to applying to skin so that the alcohol will evaporate. An ostomy belt, attached to a convex skin barrier, can also assist with the adherence of the skin barrier against the abdominal wall by pushing the convex barrier into the abdominal wall around the stoma thus preventing leakage. The belt attaches to loops at 3 and 9 o'clock to give support and increase the patient's confidence.

Role of Home Healthcare Clinicians

Patients with an ileostomy are usually discharged 5 to 7 days after surgery. Table 2 lists factors that place patients at higher risk for postoperative complications. Clinicians should assess incisions for any drainage and signs of infection. If the patient has an abdominal drain, note the site, amount of drainage, and be sure it is secured. Pain assessment should include the frequency, duration and intensity of pain, as well as the amount of pain medication taken. Assess for bowel sounds as well as gas at every visit to ensure bowel activity. The patient should ambulate several times a day to prevent pulmonary complications and deep vein thrombosis. Review patient log of daily fluid intake and stool output, looking for signs of dehydration. When changing the pouching system, assess the stoma for color, protrusion, edema, and size. Note its anatomical proximity to the incision and assess for signs of infection, especially if the pouching system has been leaking. An ileostomy is usually located in the right lower quadrant of the abdomen. The fecal output will range from liquid to a mushy consistency. Optimal consistency should be applesauce or oatmeal consistency.

Post-Op Changes of the Stoma

As the stoma matures, it will change size and at times, shape. An ileostomy stoma is usually smaller than a colostomy stoma. At each pouch change, instruct the patient to measure the stoma and adjust the opening in the skin barrier (Figure 4). Otherwise if skin is exposed around the stoma, peristomal stoma skin damage will occur. As the stoma matures, and the stoma and abdo-



Figure 4. Measuring stoma.

men return to a normal softer contour, the stoma may either protrude slightly above skin level or can retract and become flush with the skin. If either of these occurs, the pouching system may need to be reevaluated.

If the patient is experiencing leaking and having issues with the peristomal skin, assess the current pouching system, how it is applied, and if there are any abdominal creases in this area. After removing the skin barrier, look at the adhesive side for signs of erosion and location of leakage. Patients with an ileostomy have increased leakage when the stool is watery and as the stool thickens, the risk decreases.

An ileostomy is more difficult to manage than a colostomy because it needs to be emptied more frequently. Initially, patients can expect to empty every 2 to 3 hours and then every 4 to 6 hours depending on the consistency. A patient with an ileostomy should be assessed at every visit for dehydration by monitoring blood pressure and heart rate (Shaffer et al., 2017). Patients treated for high blood pressure may need their medications modified due to changes in fluid volume after ileostomy surgery. A patient should also be monitored for electrolyte imbalances.

Psychosocial Status

For a patient with an ileostomy, a psychosocial assessment can be just as important as the physical assessment. Living with a stoma presents many challenges including alterations in body image, changes in bodily functions, and many learning needs (Whiteley, 2013). Patients with an ileostomy may find it hard to adjust to emptying their pouch every few hours. They will likely fear leakage, the pouch making noises or soiling their clothes, returning to work, and having an odor (Claessens et al., 2015). Help them understand that feelings of anger and sadness are normal at this time. Patients also

Table 2. Factors That Increase Risk of Complications

Higher body mass index
Older age
Emergent need for surgery
Diverting loop procedure
Having an ileostomy
Experience of the surgeon
Poor bowel quality
Ischemic colitis
Inflammatory bowel disease
Stoma retraction
Lack of WOC nurse involvement

Note. Adapted from Ratliff (2014).

need to be reminded that pouching systems are like a bathing suit or a pair of shoes, you may need to try on a few before you are comfortable with the fit.

Education

Patients should be taught to change the pouching system in the bathroom standing in front of a mirror or using a stand-up mirror on the vanity, or where ever they are most comfortable. Teach them to gather and prepare all their supplies before removing the old pouching system. Soft disposable washcloths or soft paper towels and warm water are used to cleanse skin, but if the patient chooses to use a washcloth, instruct them to wash it in hot water separately after use. Changing the pouch first thing in the morning before they eat or drink can decrease the tendency of the stoma to produce stool while changing. When it is time to change the pouching system, patients may shower while the pouching system is off, but it can be more challenging with an ileostomy than a colostomy. They may shower daily with their pouching system in place, but should be instructed to pat dry the cloth pouch and tape border if there is one. Barrier strips or waterproof tape can be used to protect the skin barrier. If the patient is using a pouch with a filter, instruct them to follow manufacturer's instructions because they may need to cover the filters with a filter cover when showering. If a patient experiences complications they cannot self-manage, referral to a WOC nurse is appropriate. Provide information on how to contact a WOC nurse prior to discharge. In addition, instruct on resources available to the patient so they can continue to manage after home care services end (Berti-Hearn & Elliott, 2018).

Nutritional Considerations

Patients with an ileostomy experience the most dietary challenges of all patients with stomas. In a study by Richbourg (2012), 95 out of 174 patients with ileostomies said their ileostomy was affected by what they ate. In the same study, 22 out of the 174 patients said their stoma was not affected by what they ate, but they still listed foods they avoided. Initially, patients should avoid raw fruit and vegetables, then slowly add fiber, cooked vegetables, and fruit to their diet. Instruct patients to introduce new foods one at a time and to monitor which foods cause gas, odor, or a looser stool. High-fiber, stringy, or nondi-

Table 3. Assessing for Dehydration

Objective & Subjective Measures	Interventions
Dry mouth or lips	Increase fluids
Poor fluid intake	
Dizziness	
Decreased urine output	
HR>100 or orthostatic hypotension	Phone call to MD
Muscle cramps	Draw BMP (basic metabolic panel)
Lethargy or nausea	
Major weight changes	
Confusion or irritability	
Stoma output >1,200 mL/day	Use of antidiarrheal

Note. Adapted from Shaffer et al. (2017).

gestible foods such as nuts, corn, celery, asparagus, popcorn, coconut, or mushrooms should be avoided or risk a food blockage (Prinz et al., 2015; Schub & Pilgrim, 2016). Ileostomy patients are at higher risk for deficiencies in B-12, iron, magnesium, fat, and folic acid due to altered absorption capability and should be monitored for needed supplementation (Minkes et al., 2017). Patients with ileostomies typically have lost their terminal ileum where B-12 is absorbed. It is imperative they are taught to follow up with their primary physician so B-12 levels can be monitored accordingly. According to Minkes et al., ileostomy patients also have a higher incidence of renal calculi and gallstones than the general population. They should be instructed to eat every 3 to 4 hours to keep stool thick and avoid "noises." Foods such as yogurt, cheese, peanut butter, and starchy foods may help to keep stool thick (Prinz et al.).

Dehydration

Patients with an ileostomy can dehydrate quickly due to the loss of the absorptive function of the large colon, and electrolyte deficiency can also occur (Carmel, 2016). Patients should be taught signs and symptoms of dehydration (Table 3). Instruct them to drink if their mouth feels dry. Patients with an ileostomy should drink up to 2 L of fluids a day, more if they are outside in the hot weather or participating in an outdoor activity. Patients may also need to increase foods high in sodium (canned vegetables, broth, and tomatoes) and potassium (bananas, potatoes, and spinach).

Due to fluid and electrolyte losses, patients with an ileostomy return to the hospital within 30 days after discharge twice as frequently as patients with no stoma or a colostomy following colon or rectal surgery (Tyler et al., 2014). A study by Paquette et al. (2013) observed a 17% readmission rate for dehydration and renal failure, with an age greater than 50 years being a predictor of readmission for renal failure. The researchers also reported postoperative day 13 was the average day of readmission. For most patients with an ileostomy, this occurs during the first week they are home. Visits and follow-up calls should be more frequent in these first 2 weeks to assess for dehydration.

A stoma output of more than 1,200 cm³ in 24 hours (high output) can result in dehydration and electrolyte imbalance, especially if the patient is not taking in enough oral fluids (Prinz et al., 2015). Remind patients to monitor their stool output and fluid intake. Many patients will be instructed to measure the output and will have instructions to notify the surgeon if output is less than 500 mL or greater than 1,200 mL in 24 hours and may have medication orders to administer antidiarrheal medication if over this amount (Nagle et al., 2012). Monitor blood pressure, sitting and standing, and report if the systolic pressure decreases by 20 mmHg when the patient stands (Ignatavicius & Workman, 2016). High output liquid stool can cause leakage and peristomal skin irritation, so monitor food intake and encourage foods that will thicken the stool and instruct on antimotility medications that can be ordered to slow down transit time through the intestine.

Food Blockage

Food blockage can occur with an ileostomy due to the narrow lumen of the intestine and stoma size (Carmel, 2016). Blockage, whether partial or complete, occurs when a bolus of undigested food cannot pass through the stoma. Signs and symptoms include constant liquid or watery stool, with feelings of abdominal bloating or cramping. Other signs that may occur are an edematous or swollen stoma, nausea or vomiting, and eventually absence of stomal output. Foods that can contribute to blockage include raw vegetables such as celery, cabbage, coconut, corn, or nuts (Prinz et al., 2015). Always instruct a patient with an ileostomy to chew food well, cook

foods on the softer side, and drink plenty of fluids (Goldberg, 2016).

If a patient suspects a food blockage, instruct them to change their pouching system and cut an opening for the stoma slightly larger to accommodate edema, take a warm bath or shower to relax abdominal muscles, and then lie on right side (Carmel, 2016). While lying down, instruct patients to gently massage the peristomal area. Patients should avoid eating, but may drink fluids as long as there is still output. If a complete obstruction develops, indicated by no stool output and the presence of nausea and vomiting, instruct the patient to not eat or drink and to go to the emergency department where a catheter may be inserted into the stoma to instill fluid to lavage and open up the passage way.

Medications

Patients with an ileostomy should not take laxatives or any types of bowel prep because it can lead to dehydration (Carmel, 2016). They need to be taught to always question their physician if a laxative is ordered as prep for testing, and should inform their pharmacist about their ileostomy (Prinz et al., 2015). Patients with an ileostomy should not take extended-release medications because these medications may pass through too fast to be absorbed or effective (Goldberg, 2016). These medications will need to be switched to a liquid form or regular-release form.

Initially, when a patient with an ileostomy is discharged home, they may have watery loose stool due to lack of appetite or eating small portions. If a patient cannot bulk their stool with food, antimotility drugs can be used (Chandler, 2013). Loperamide (Imodium) is the most common medication used and can be purchased over the counter. Loperamide inhibits the release of prostaglandins and acetylcholine; as a result, it will take longer for intestinal matter to pass through the intestine, resulting in decreased sodium and water output and increased absorption of nutrients (Chandler). The usual dose of Loperamide is 2 to 4 mg up to four times a day for a total of 8 mg in 24 hours. Instruct the patient to take it 15 to 30 minutes prior to meals and at bedtime, making adjustments according to the consistency of the stool and under the direction of the surgeon. Patients need to be aware that Loperamide is used in conjunction with diet modification and fluid intake. If the output does not thicken, referral for further medical management is indicated.

Practical Tips for Transitioning Patients to Self-Care

Check at each visit if the pouching system is properly fitted and intact when the patient sits, stands, and lies down. If there are issues that you cannot handle, search for resources that can assist the patient. Upon discharge, the patient should be independent with changing the pouching system, recognizing early signs of stomal and peristomal complications and managing ostomy supplies (Berti-Hearn & Elliott, 2018). If the ileostomy is permanent, provide the patient with phone numbers of the manufacturer customer service representative. They will be able to assist the patient in ordering a precut skin barrier, if appropriate, at the right time. A precut skin barrier should not be ordered until at least 6 to 8 weeks after surgery when the stoma is matured.

Intimacy is always a difficult subject to broach with any population but especially for patients with a stoma. Encourage conversation about disturbances in body image and sexual dysfunction concerns (Schreiber, 2016; Schub & Pilgrim, 2016). Practical tips for patients include emptying the pouch before sexual relations, use of underwear or cummerbunds that will hide the pouching system, and open communication between their partners which may help alleviate some of the fear (Schreiber). Ostomy support groups and the United Ostomy Associations of America website (<http://www.ostomy.org/Home.html>) also offer helpful information about this subject.

Conclusion

Shortened hospital lengths of stay result in patients with ostomies being discharged without the knowledge and skills needed to manage their new ostomies. Patients with ileostomies are particularly at risk for peristomal skin complications, fluid and electrolyte imbalance, and nutritional deficiencies. It is important for home care clinicians to be educated on, and comfortable with, care and management of ileostomies, including prevention and treatment of early and late complications. ■

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