

Stoma Dermatitis: Prevalent but Often Overlooked

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Peristomal dermatoses commonly afflict the area around stoma openings in ostomy patients. These complications, however, are often unreported by patients and remain untreated for years, thus affecting maintenance and recovery from the surgery. These dermatoses can have chemical, mechanical, irritant, bacterial, immunologic, or disease-related etiologies. Examples of common forms of dermatitis that occur peristomally include fecal or urine irritant contact dermatitis, chronic papillomatous dermatitis, mechanical dermatitis, and allergic contact dermatitis. This article summarizes various skin irritations that can occur after an ostomy and also reviews previously published reports of peristomal allergic contact dermatitis. In addition, the clinical importance of identifying these dermatoses (most important, their effects on the patient's quality of life), risk factors for the skin irritations, the importance of patch testing, treatment of stoma dermatitis, and the importance of patient education and patient-doctor communication are also discussed.

MORE THAN 1 MILLION PERSONS in the United States and Canada are currently living with intestinal stomas, and there are approximately 100,000 new ostomy surgeries every year.¹ Creating an intestinal stoma requires the externalizing of the bowel through a surgically created opening in the anterior abdominal wall. Specifically, an ileostomy connects the ileal part of the small intestine to the anterior abdominal wall, a colostomy connects the colon to the anterior abdominal wall, and a urostomy uses either an ileal or cecal conduit to redirect urine from a diseased or defective bladder via a surgical stoma. Stomas can be either temporary or permanent, and stoma surgery is most often used to combat gastrointestinal conditions such as colorectal cancer, Crohn's disease, and irritable bowel syndrome.

Although ostomies and the related pouching system allow patients to overcome a variety of medical conditions and maintain a normal lifestyle, numerous complications can arise. Of these, peristomal skin problems are the most common.² The skin is slightly acidic (with a pH of 4.0 to 5.5), and because both urine and feces are slightly alkaline, leakage of either can cause skin erosion. Nybaek and colleagues reported that the prevalence of skin complications in ostomy patients ranges from about 6 to 80%.³ Specifically, more than one-third of colostomy patients and more than two-thirds of urostomy and

ileostomy patients are afflicted with peristomal dermatoses.⁴ Because urine is produced more continually than stool and contains a higher concentration of digestive enzymes than stool contains, the likelihood of leakage and skin irritation is much higher with urostomies and ileostomies than with colostomies.⁵ In 2008, Jemec and Nybaek reported that more than one-third (181 of 464) of stoma patients' visits to stoma nurses were for skin-related complications.⁶

Dermatologic Complications

Peristomal dermatologic conditions can have chemical (irritant contact dermatitis, pseudoverrucous lesions), mechanical (mechanical dermatitis, mucocutaneous separation, stripping injury), infectious and bacterial (candidiasis, folliculitis), immunologic (allergic contact dermatitis), or disease-related (pyoderma gangrenosum, malignancy, Crohn's disease) etiologies.⁷ This review focuses on the different types of dermatitis that can occur around stomas.

Irritant contact dermatitis is caused by the contact of substances with the skin or by the improper placement of stoma equipment.⁷ Chemical irritant dermatitis arises from the patient's reactions to substances that come into contact with the peristomal skin; these include gastric secretions, mucus, solvents, or cleansing materials. Fecal or urine irritant contact dermatitis is common with ostomies because of leakage that can occur around the stoma. The majority of irritant dermatitis cases involve the inappropriate placement and sizing of the ostomy equipment, resulting in constant exposure to the irritant.

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Mechanical dermatitis results from the physical abrasion that can occur because of the movement of stoma support belts or the hard plastic components of the ostomy pouch system across the skin.⁷ The affected skin is often characterized by erythema and possible abrasion. Stripping injuries, which occur when adhesives are forcibly removed from the skin, constitute another form of mechanical injury.

Allergic contact dermatitis can be attributed to a patient's sensitivity to the components of the equipment (such as sealing rings or the ostomy pouch itself), topical ointments, deodorizers, adhesives, and skin cleansers (Fig 1). Patch testing is often used to determine the cause of the allergy.⁵ Although several allergens known to cause peristomal allergic contact dermatitis may also be linked to contact urticaria, the literature includes no reports associating contact urticaria with stoma dermatitis.

Other less frequent types of dermatitis are chronic papillomatous dermatitis (CPD) and seborrheic dermatitis.⁵ CPD is thought to be an acanthomatous reaction due to chronic urine exposure. CPD is most frequently found

in urostomies but also occurs (rarely) in ileostomies.⁸ CPD can be due to mechanical or chemical irritation and may be human papillomavirus (HPV) positive. Urologic literature refers to lesions that are descriptively similar to CPD as hypertrophic scarring, hyperkeratotic stenosis, stomal keratinization, and reactive acanthosis. Williams and colleagues described the case of a 63-year-old man who presented with a 4 cm verrucous lesion surrounding his ileostoma. Although the clinical findings and histology resembled those of a verrucous lesion consistent with those seen in manifestations of HPV, immunohistochemistry revealed the lesion as HPV negative. The authors postulated that the patient's medical history, consisting of familial adenomatous polyposis (FAP) and advanced colorectal adenoma, may have predisposed him to CPD. They stated that the feces of FAP patients contain more undegraded cholesterol and bile acids than those of normal patients, which could contribute to CPD.⁸

Wieland and colleagues described the case of a 55-year-old woman who presented with grayish white papillomatous lesions around her ileostoma.⁹ Endoscopic examination revealed minor superficial ulcerations around the terminal ileum. Biopsies of the skin, skin-mucosa transition, and intestines were performed. The skin biopsy specimens showed hyperplasia, hyperorthokeratosis, hyperparakeratosis, hypergranulosis, and papillomatosis. Histologically, the diagnosis was acanthosis without any koilocytosis. Because of the recurrence of the lesions after treatment with podophyllotoxin solution, carbon-dioxide laser removal, neodymium:yttrium-aluminum-garnet laser treatment, and toluidine photodynamic therapy combined with carbon-dioxide laser evaporation, samples of the tissue were taken and further analyzed through polymerase chain reaction. Each sample was analyzed for the presence of genital, mucocutaneous, or epidermodysplasia verruciformis (EV) HPV. Deoxyribonucleic acid sequences of the EV-HPV type were found in all biopsy specimens taken from the irritated site, whereas the genital and mucocutaneous HPV types were not found. The strains of HPV that were detected included HPV 20, HPV 23, HPV 38, and four novel HPV strains that make up different clusters of the group EV-HPV B1. Specifically, HPV 23 was found in both the skin-mucosa transition biopsy specimen and the intestinal mucosa biopsy specimen. Because the patient regularly flushed out her ileostoma, the virus (or cells containing the virus) could have been transferred from the infected stomal area to the intestinal mucosa. This case indicates that it is possible for cutaneous HPV to be transferred to mucosal areas of the intestine; thus, it is important to treat dermatologic stoma



Figure 1. An example of peristomal allergic contact dermatitis.

complications so that they do not result in more serious complications.

Seborrheic dermatitis can be a preexisting condition involving the scalp, neck, and chest, along with the peristomal skin.

A summary of the possible differential diagnoses or peristomal dermatoses is presented in Table 1.

The relative incidence of each type of dermatitis was documented by Lyon and colleagues in a study in which 525 patients received a postal questionnaire about the development of peristomal skin disease following their ostomies⁵; 325 (62%) of the patients responded to the questionnaire, and those who reported skin problems were sent to the hospital's regular stoma care and dermatology clinic for further examination. This clinic was staffed by a dermatologist and a stoma care specialist nurse. One hundred forty-two patients attended the clinic, and a diagnosis of irritant dermatitis (including that secondary to fecal or urine leakage) was most common (50 patients), followed by mechanical dermatitis (15 patients), non-specific dermatitis (22 patients), and seborrheic dermatitis (12 patients). The remainder of the patients were diagnosed with overgranulation, bacterial infections, folliculitis, psoriasis, eczema, cutaneous Crohn's disease, pyoderma gangrenosum, allergic contact dermatitis, or dermatitis artefacta.

Lyon and colleagues also investigated the possible etiologies of the different cases of dermatitis.⁵ They stated that 6 months after a surgery, the abdominal stomas

remodel and become smaller, leaving a portion of skin that is constantly exposed to stoma effluent, thus causing irritation. Lyon and colleagues also noted three cases of irritant dermatitis in which a buried stoma caused by postsurgical weight gain resulted in a large area of skin irritation due to stoma effluent trailing under the stoma bag and pouching equipment. The nonspecific dermatitis cases were defined as recurrent or persistent dermatitis for which patch testing, microbiologic swabs, and usage tests all had negative results. According to the authors, areas of seborrheic dermatitis are often colonized by *Pityrosporum* yeasts in the occluded skin, which could contribute to the disease process. Finally, in this particular study, 65 patients with persistent or recurrent dermatitis underwent patch testing, but only one had a relevant positive reaction. This allergic contact dermatitis case was attributed to sensitivity to a fragranced stoma bag deodorizer.

Allergic Contact Dermatitis Case Reviews

Dermatitis Due to Stoma Equipment

Numerous cases involving different types of peristomal skin dermatitis have been documented in the literature. Stevenson described seven patients who presented with peristomal rashes.¹⁰ Three of the patients had undergone ileostomies, three had undergone cystectomies, and one had undergone a thoracostomy. The patients were all patch-tested, but only three displayed positive reactions—one to lanolin, another to rubber in the stoma bag, and the last to strapping. In each case, the dermatitis cleared after the problematic factor was removed. Two of the patients were diagnosed with psoriasis; treatment of the psoriasis (along with surgical revision of a poorly formed stoma in one case) led to the eventual clearance of the rash. One patient presented with a poorly created surgical stoma that resulted in maceration of the skin; this cleared after surgical revision of the stoma. The last patient was diagnosed with a psychoneurosis that prevented proper treatment of the peristomal rash.

Mann and colleagues described a 41-year-old woman who presented with a 1-month history of erythematous and acute eczematous eruptions around her urostomy stoma, arms, abdomen, and right thigh.¹¹ Patch testing at 48 and 96 hours yielded positive reactions to epoxy resins that were components of the ostomy bag. Mann and colleagues postulated that although frictional irritant dermatitis and "prickly heat" could also have contributed

Table 1. Differential Diagnosis of Stoma Dermatitis

Disease	Distinguishing Features
Irritant dermatitis	Often chemical etiologies (feces, urine), erythema, eroded skin, pain
Mechanical dermatitis	Erythema in area of pressure; abraded skin
Allergic contact dermatitis	Rash only in area of exposure; erythema; pruritus; eroded skin; positive patch-test results
Chronic papillomatous dermatitis	Due to chronic exposure; papillomatous skin lesions; coalescent papules; may be HPV related; histology may show pseudoepitheliomatous hyperplasia
Seborrheic dermatitis	Scaling eczematous rash that can affect many areas like scalp, eyebrows, stomal opening
Psoriasis	Well-defined erythematous plaques typical; psoriasis may be present at other sites (preexisting condition)

HPV = human papillomavirus.

to the dermatologic reaction, the role of the epoxy resins must also be considered.

Fregert and colleagues described the case of a 77-year-old woman who developed dermatitis due to a plastic urostomy pouch.¹² Patch testing showed a strong positive reaction to the epoxy resin that was a known component of the pouch. Fregert and colleagues also used thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) to identify the specific components of stoma bags from different companies. TLC showed the presence of epoxy resin oligomers MW 340, 624, and 908; HPLC revealed the same oligomers. The oligomer with a molecular weight of 340 is a known component of bisphenol A (BPA) epoxy resins and has been shown to be the main allergen in these resins. These specific resins can migrate to the surface of the equipment, causing allergic reactions in patients who undergo prolonged skin exposure. BPA epoxy resins make up about 90% of commercial epoxy resins.¹³

Van Ketel and colleagues also described a very similar case in which a 47-year-old woman developed dermatitis around the ileostomy site for 2 months.¹⁴ Patch testing yielded a positive reaction to an epoxy resin that was a component of the bag. Further analysis showed that BPA was present in the ileostomy bag.

Beck and colleagues described six patients who developed peristomal eczematous reactions around the skin covered by their ostomy bags.¹⁵ Patch testing with a series of known contact allergens (Trolab, Hermal, Reinbek, Germany) and with 1/2-inch squares of the ostomy bags yielded positive reactions to epoxy resin at 48 hours and 96 hours. In addition, five of the patients had positive reactions to the ostomy bags at both the 48- and 96-hour readings. The bags were analyzed with TLC; results indicated the presence of BPA epoxy resins. Five of the patients were using an ostomy bag manufactured by Squibb (Bristol Meyers Squibb, New York) whereas the last patient used one manufactured by Simpla Plastics Limited (Cardiff, England).

Camarasa and Alomar described the case of a 40-year-old woman suffering from an itchy dermatitis around the opening of her colostomy.¹⁶ She was using a polyethylene bag containing a karaya gum seal ring; patch testing yielded positive reactions to the karaya gum ring. Karaya gum, a natural resin obtained from the plant *Sterculia urens*, is often mixed with glycerin and parabenzoin to make the adhesive sealing ring more effective.

Van Hecke and Vossaert reported on a 57-year-old man who had a monthlong history of dermatitis around his colostomy opening.¹⁷ The dermatitis appeared in the areas where the ostomy bag was touching the skin on his right

thigh and right abdomen. Patch testing yielded positive results for 2-benzotriazol (Tinuvin P, Ciba, Ludwigshafen, Germany). Information from the manufacturer of the ostomy bag stated that Tinuvin P was present at a concentration of less than 0.5%. It was also found that Tinuvin P migrated from the inner core of the plastic to the surface, where it could make contact with the skin. The patient was advised to switch to a Tinuvin P-free bag.

In 1992, de Pablo and colleagues reported the case of a 74-year-old man who had had a colostomy for 14 years.¹⁸ After using a new colostomy bag for 3 days, the patient developed an pruritic dermatitis around the stoma. The patient was tested with the Grupo Español de Investigación de la Dermatitis de Contacto standard series and with the plastic and glues series from Chemotechnique (Malmö, Sweden). At 96 hours, he had positive reactions to diaminodiphenylmethane 0.5% (++) and the rubber seal surrounding the bag (++) . Diaminodiphenylmethane is used as a rubber antioxidant, as an epoxy resin hardener, and as an intermediate in germicides, surface-active agents, pharmaceuticals, corrosion inhibitors, and phosphate insecticides. The authors obtained no information about the components of the rubber seal from the manufacturer.

Parslew and colleagues described the case of a 48-year-old woman who had a colectomy and ileostomy following a long history of Crohn's disease.¹⁹ Shortly after she started wearing her ostomy bag, she noticed an eczematous reaction around the stoma. Cutaneous Crohn's disease was excluded, and further skin biopsy results confirmed the diagnosis of allergic contact dermatitis. Patch tests yielded a positive reaction to colophony, benzyl peroxide, and the adhesive ring around the bag. Further testing of the individual components of the adhesive ring resulted in contact urticaria due to polyisobutylene after 10 minutes. The polyisobutylene was then diluted to concentrations of 0.1%, 0.5%, 1.0%, and 5.0%. These were applied to the patient and five controls. Positive reactions occurred with the 5% solution on the patient, but the controls had no reactions. Polyisobutylene, a polymer of isobutylene, is available in various molecular weights. The stabilizer involved during processing is 2,6-di-tert-butyl-4-methylphenol (BHT), but the patient tested negatively to BHT during patch testing. Polyisobutylene is an ingredient in rubber and a component of hydrocolloids and chewing gum. In hydrocolloid dressings, it functions as an adhesive to allow proper placement and attachment on the skin. Parslew and colleagues were surprised by the patient's allergic reaction to polyisobutylene, given its large molecular weight, but considered the possibility that an impurity or additive was the true culprit.

Dermatitis Due to Topical Adhesives

There have also been a few reported cases of allergic contact dermatitis due to topicals that are often applied to improve stoma bag adhesion (Fig 2). In 1987, Heskell described the case of a 48-year-old woman who developed an eczematous reaction after 1 month of using her colostomy bag.²⁰ Patch testing yielded positive reactions to balsam of Peru 25%, cinnamic aldehyde 2%, geraniol 5%, benzyl alcohol 5%, and isoeugenol 4%. Further testing resulted in positive reactions to Gantrez ES-225 (International Specialty Products, Wayne, NJ) 5%, Stomahesive wafer (Bristol Meyers Squibb), and Stomahesive paste (ConvaTec, Skillman, NJ). Discontinuation of the Stomahesive wafer and paste led to the resolution of the dermatitis reaction.

Gantrez (N-butyl monoester of polymethyl vinyl ether maleic acid in an ethanol solution) is described as a series of copolymers with altering chemical structures.²⁰ Besides being a component of the Stomahesive paste, Gantrez is found in hair sprays, shoe polishes, spray bandages, and textile dyes and finishes. The function of Gantrez is to

improve the “wet grab” and adhesion of the stoma equipment by creating a highly polar film. The specific polymer of Gantrez that is present in Stomahesive paste is Gantrez ES-225.

In 2000, Scalf and Fowler Jr described the case of a 14-year-old girl who had undergone a total colectomy for an ulcerative colitis.²¹ She had been experiencing a severe peristomal dermatitis since she began using an ostomy bag. The bag she used was secured to the stoma site with Stomahesive paste (ConvaTec). Patch testing yielded positive results at 48 hours for Stomahesive paste (++) and Gantrez (+). At 96 hours, positive results for *Myroxylon pereirae* (balsam of Peru) 25% in petrolatum and propylene glycol 30% aqueous were also seen. The most relevant allergen was determined to be Gantrez.

In 2002, Gallo and colleagues also reported a patient who had a peristomal allergic contact dermatitis reaction to Stomahesive paste.²² A 76-year-old man with a colectomy underwent patch testing and had positive reactions (+) to Stomahesive paste and rosin. There was no reaction to Gantrez in this case, and further testing of Stomahesive paste in 20 control subjects yielded negative results. Shortly after stopping the patient's use of Stomahesive paste, the erythematous excoriated papules and scaling disappeared. Stomahesive paste is composed of pectin, gelatin, sodium carboxymethylcellulose, ethyl alcohol, Triacetin FFC, glyceryl tris(12-hydroxystearate), and Gantrez ES-425. The specific component of Stomahesive paste that caused this second case could not be determined due to the manufacturer's noncompliance. It is important to note that Stomahesive paste manufactured by ConvaTec contains Gantrez ES-425, whereas Stomahesive paste manufactured by Bristol Meyers Squibb contains Gantrez ES-225, a different form.

In 2005, Martin and colleagues described the case of a 63-year-old woman who had undergone a total colectomy with an ileostomy several years prior to developing a peristomal blistering reaction over a period of 12 months.²³ The patient had used both Dansac Soft Paste (Dansac A/S, Fredensborg, Denmark) and Stomahesive paste to improve the adhesion of her appliance. Patch testing yielded positive reactions to both the Dansac Soft Paste and the Stomahesive paste. The components of Dansac Soft Paste include Gantrez ES, silica, allantoin, butylparaben, methylparaben, gelatin, pectin, polysorbate, and polyacrylamide. When the patient was patch-tested with the components of the Dansac paste, she had positive reactions to Gantrez ES. These studies imply that the components of Stomahesive paste and Dansac Soft Paste, particularly Gantrez, can be potential allergens in ostomy patients.

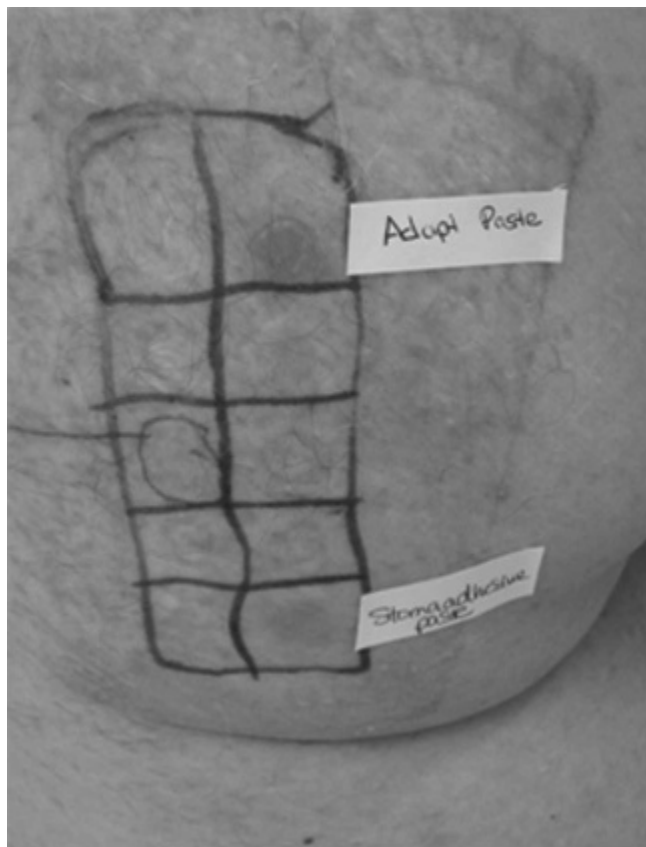


Figure 2. Patch tests for allergic contact dermatitis: positive reactions to Adapt Paste (Hollister, Inc., Libertyville, IL) and Stomahesive paste.

Dermatitis Due to Other Ostomy Products

Peristomal allergic contact dermatitis has also been shown to result from various cleansers and anesthetics that are frequently used on the affected area. Davies and colleagues presented the case of a patient who was experiencing allergic contact dermatitis due to an ostomy deodorant.²⁴ The patient was a 69-year-old male presenting with dermatitis primarily on his right thumb and fingertips. He was using DOR ostomy deodorant (Simpla Plastics Ltd., Cardiff, England) around his colostomy, and patch tests yielded positive reactions to the deodorant and to balsam of Peru. Davies and colleagues found that the main component of DOR deodorant was citronella oil; however, the patient refused any further testing. The authors also patch-tested 10 volunteers with DOR deodorant as is and saw that all subjects had positive reactions, thus indicating primary irritant properties of DOR deodorant. Also, the product's instructions specifically recommend avoiding contact with the skin. This indicates that to avoid stomal complications with this product, patients should be properly educated on its use.

In 1998, Lazarov and Trattner presented the case of a 58-year-old psoriatic woman who had undergone a colostomy after resection of colon cancer.²⁵ Two weeks after she started using the ostomy equipment, the patient developed an erythematous papular eruption around the stoma. Patch testing yielded positive reactions to the adhesive remover wipe after 2 and 4 days. Additional patch testing was refused, but after usage of the wipes was terminated, the peristomal irritation resolved. In a second case, a 57-year-old woman with a urostomy due to carcinoma of the bladder developed an acute dermatitis around the stoma. Patch testing resulted in positive reactions to nickel sulfate 5% and to the adhesive cleanser wipes (ConvaCare, ConvaTec). The components of the wipes were C12-C15 benzoate alcohol, d-limonene, high-purity hydrocarbons, ethoxylated alkylaryl alcohol, coconut diethanolamide, 2,4-dichlorobenzyl alcohol, and butylated hydroxytoluene. Further testing of this second patient yielded a positive reaction to d-limonene.

Fernandez-Redondo and colleagues reported the case of a 58-year-old man with a urostomy who presented with a 2-month history of severe pruritus, erythema, and scaly exudative plaques.²⁶ He noticed these reactions after he used Braum Monodose ointment (Braum Medical, Barcelona, Spain). The ointment contains tetracaine hydrochloride (.045 g) and glycerin (5.955 g). Patch testing resulted in positive reactions to the ointment, caine mix (+++), and fragrance mix (++). Further tests

resulted in positive reactions to tetracaine, cinchocaine (also known as dibucaine), and lavender oil absolute 2%. These case reports indicate that certain cleansers, ointments, and wipes can pose as allergens for ostomy patients.

Table 2 summarizes the allergic contact dermatitis (ACD) cases that have been reported in the literature.

Clinical Importance

The high incidence of peristomal skin disorders eventually affects the patient's quality of life and recovery from surgery and can even result in a higher cost of care due to misuse of medical resources. The most significant problem that occurs with peristomal skin irritations is that the loss of skin integrity affects the adhesion of ostomy equipment.⁴ Constant irritation prevents proper sealing of the ostomy pouching system, which inevitably leads to leakage of stoma effluent. The continuation of the fluid leakage and the skin erosion cycle can lead to poor adaptation to the ostomy equipment and even infection. In addition to causing general pain and discomfort, stoma dermatoses can have psychosocial effects on the patient as repeated leaks and persistent odor can lower the ostomy patient's self-esteem, cause embarrassment, or even lead to social isolation or depression.² These complications also increase the cost of care and the usage of valuable materials because the patient's constant discomfort will lead to more frequent changes of ostomy equipment in an effort to create a better seal.²⁷

In addition, a few studies found that many patients did not even realize they were living with a peristomal skin condition. Of 202 patients who were given questionnaires and clinical examinations in a study conducted in 2006 by Herlufsen and colleagues, 45% were diagnosed with a peristomal skin disorder by dermatologists.²⁸ Only 38% of those patients diagnosed with the disorder had indicated on the questionnaire that they had a peristomal skin issue. Furthermore, this study classified skin issues as mild, moderate, or severe, based on the extent of skin involvement. Of the patients who were diagnosed with a mild skin condition, 67% did not indicate having any skin irritation on the questionnaire; 41% of patients diagnosed with a moderate skin condition and 56% of patients diagnosed with a severe skin condition also failed to recognize any dermatologic complications. Without proper knowledge or regular examinations, many patients do not even realize they are living with a peristomal dermatitis, placing them at risk for infection and an increased potential for leakage issues.

Table 2. Review of Allergic Contact Dermatitis Cases

Age (yr)	Sex	Type of Stoma	Positive Patch-Test Results	Reference
70	Female	Urostomy	Fragranced stoma bag deodorizer	5
41	Female	Urostomy	Epoxy resin; urostomy pouch (Bristol Meyers Squibb)	11
77	Female	Urostomy	Epoxy resin; ileostomy pouch (Bristol Meyers Squibb)	12
47	Female	Ileostomy	Epoxy resin	14
40	Female	Colostomy	Karaya seal ring	16
57	Male	Colostomy	2-Benzotriazol (Tinuvin P)	17
74	Male	Colostomy	Diaminodiphenylmethane 0.5%; rubber seal ring of stoma bag (Colodress, ConvaTec)	18
48	Female	Colectomy Ileostomy	Polyisobutylene (adhesive ring of ostomy bag)	19
48	Female	Colostomy	Balsam of Peru 25%, cinnamic aldehyde 2%, geraniol 5%, benzyl alcohol 5%, isoeugenol 4%, Gantrez ES-225 5%, Stomahesive paste (Bristol Meyers Squibb)	20
14	Female	Colectomy	Gantrez ES, Stomahesive paste (ConvaTec), balsam of Peru, propylene glycol	21
76	Male	Colectomy	Stomahesive paste (ConvaTec), rosin	22
63	Female	Colectomy Ileostomy	Dansac soft paste, Stomahesive paste (ConvaTec), Gantrez ES	23
69	Male	Colostomy	DOR ostomy deodorant, balsam of Peru	24
58	Female	Colostomy	Adhesive remover wipe (ConvaCare, ConvaTec)	25
57	Female	Urostomy	Nickel sulfate 5%, adhesive remover wipe (ConvaCare, ConvaTec), d-limonene	25
58	Male	Urostomy	Braum Monodose ointment, tetracaine, cinchocaine, lavender oil absolute 2%	26

Likewise, a case-control study conducted by Nybaek and colleagues in 2009 observed that of 199 ostomy patients, 90 (44.8%) were found to have peristomal skin complications.³ Only 43% of the patients who were diagnosed with a skin complication had noticed it before coming to the clinic, and only 16% had sought medical attention for the complication in the past. The authors concluded that patients seem to have a high threshold for identifying the presence of skin irritations, and their constant peristomal skin problems may become normal to them. Due to a lack of medical education, ostomy patients often come to terms with the appearance and texture of their postoperative peristomal skin and thus dismiss the possibility of a true medical complication.

Risk Factors for Dermatologic Complications

Because of the high incidence of peristomal skin conditions in the ostomy patient population, it is also important to consider certain risk factors that may predispose the patient to developing these complications. If certain risk factors are determined to be positively correlated with

peristomal dermatitis, then preventive vigilance can prevail and action can be taken. The previously mentioned case-control study conducted by Nybaek and colleagues in 2009 involved the examination of 199 ostomy patients.³ The types of ostomies involved were ileostomies, urostomies, and colostomies. One of the main findings was the presence of a relationship between the type of ostomy procedure and the frequency of skin complications: ileostomy patients displayed more peristomal skin problems than urostomy patients, followed by colostomy patients. Of the 82 ileostomy patients, 56% had skin problems, whereas 47% of the 19 urostomy patients and 35% of the 100 colostomy patients had skin problems. Another independent risk factor determined by the authors was the amount of leakage around the stoma. Leakage and resultant skin erosion caused both physical and psychosocial problems for the patients. Finally, patients with a body mass index greater than 30 displayed a positive correlation for developing dermatologic issues around the stoma site. Although tobacco smoking and herniation were mentioned as potential risk factors, no conclusive results from the study validated these possibilities. Eczema and atopic dermatitis were not discussed as

possible risk factors for the development of peristomal dermatoses.

Another study conducted in 2006 by Herlufsen and colleagues also had similar results. A total of 202 patients were given questionnaires and clinical examinations.²⁸ Peristomal dermatoses were found in 57% of the patients with ileostomies, 48% of those with urostomies, and 35% of those with colostomies. The four main skin disorders or problems that were identified were feces-induced erosions, maceration, erythema, and contact dermatitis; these accounted for 77% of all diagnoses, and the disorders were all caused by peristomal leakage of feces or urine.

A study conducted by Hellman and Lago found a trend suggesting that increasing age may also be a risk factor for developing peristomal skin irritations.²⁹ Ninety-three ostomy patients participated; as in previously mentioned studies, most skin problems were found in ileostomy patients rather than in colostomy patients. The majority of skin problems were found in the age group of 30 to 59 years. Although the results for the age groupings were not statistically significant, a trend was noticed. The authors noted that previous literature suggested that increasing age results in thinner layers of keratin, a thinner epidermis, and less perspiration. This ultimately results in an increased likelihood of sensitivity to occlusive material, solvents, and abrasion.

McNamara and Farber conducted a study involving 597 patients who had undergone ileostomies.³⁰ In most cases, the dermatitis occurred in areas directly surrounding the ileac stump. This area is often left uncovered because the stoma must be given some room to move without causing any damage. The amount of skin exposed depends on the size of the stump and the size of the opening of the equipment. Loosening of the appliance and the resultant fluid that seeped out from the stoma were the most common causes of irritation. Causes of loose equipment included defects in the abdominal wall, warm weather, sickness (diarrhea), perspiration, and diet that causes loose stools.

Treatment of Peristomal Dermatitis

To prevent further complications, it is important to address skin disorders that occur around stomas. Peristomal skin problems create a unique challenge because certain topical ointments and creams can be very oily, often due to the presence of coconut oil, liquid paraffin, or glycerine.⁴ The application of these products affects the adhesion of the stoma equipment. One way to avoid this problem is to apply a topical steroid cream under occlusion by a hydrocolloid or other vapor-

permeable membrane before placing the ostomy equipment on the patient. However, this was found to be effective only when the irritation was at least 3 cm from the stoma equipment.

In another study conducted by Lyon and colleagues, proprietary scalp lotions were applied to the affected areas.⁴ These lotions contained about 50% isopropyl alcohol, which has antibacterial properties. Because the alcohol would sting when applied to the irritated area, the lotion was placed on the ostomy equipment and allowed to evaporate for about 15 minutes before being placed back onto the patient. The majority (87 of 174) of the ostomy patients in this study were diagnosed with irritant dermatitis. Approximately two-thirds of the patients responded to changes in the ostomy equipment. Those who did not respond well to the application of the topical corticosteroid betamethasone valerate 0.1% lotion. Five patients experienced prolonged clearing of dermatitis, but the rest were able to sufficiently control it with applications of lotion every 2 to 4 weeks. Data also indicated that lotions containing propylene glycol impaired bag adhesion even after they were allowed to evaporate. Topical aqueous prednisolone acetate 1% eye drops were also used to treat irritant dermatitis, but this treatment was discontinued owing to long evaporation periods and a lack of efficacy. Overall, it was found that topical corticosteroids based in aqueous or alcohol lotions or in carmellose sodium paste were effective in treating the inflammation without affecting the adhesion of the equipment.

However, it is also important to note that some topical corticosteroids with an aqueous or alcohol base may be less potent than oil-based creams or ointments with identical active ingredients.⁴ This drop in efficacy can be offset by the presence of skin inflammation; peristomal skin irritation decreases the natural barrier that is present, so there is enhanced penetration of the corticosteroid into the skin. This may result in aqueous- or alcohol-based topical agents being as effective as their oil-based counterparts.

Another method used to relieve peristomal skin irritations is the use of sucralfate powder, which works as a physical barrier when applied to the skin.³¹ Sucralfate is a basic aluminum salt that polymerizes in moist and acidic conditions.³² This viscous substance can then bind to mucosal surfaces and also promote mucous and bicarbonate secretion due to an increase in the production of prostaglandins. A study conducted by Lyon and colleagues involved 19 patients with varying dermatoses that were treated with sucralfate powder; 9 patients were diagnosed with erosive, fecal, or urine irritant dermatitis, 4

patients were diagnosed with excoriated dermatitis, 3 patients presented with pyoderma gangrenosum, and 2 patients presented with traumatic ulceration. All the patients with irritant dermatitis cleared with the use of sucralfate powder once daily with stoma bag changes. One patient with excoriated dermatitis responded to the treatment, whereas the rest of the patients did not respond. The authors concluded that the efficacy of sucralfate powder for treating cases of irritant contact dermatitis mainly derives from its ability to protect the skin from any further chemical irritation.

Discussion

The results of the aforementioned ACD cases indicate the need to patch-test ostomy patients to help prevent the onset of further peristomal dermatologic complications. In addition to testing with the patient's specific products, one should consider testing with more than a simple standard series (Table 3). Important supplemental test materials to consider including are the patient's stoma bag and sealing ring, adhesive removers, cleansers, anesthetics, deodorants, and other topical products.

Other types of dermatitis can be avoided by practicing certain management techniques. Irritant dermatitis and mechanical dermatitis cases can often be resolved by resizing the opening on the stoma pouches, creating a flat peristomal skin surface using topical skin barriers, or properly managing eroded skin and loosened stoma belts associated with the pouching system.⁷ Surgical revision of poorly created stomas is also important in treating

peristomal dermatoses, particularly irritant dermatitis or CPD surrounding the stoma opening. This would reduce the amount of leakage and subsequent irritation. In cases of CPD, it is also important to perform a biopsy of the affected area and to use immunohistochemical analysis to determine whether the site is HPV positive or negative.

Additional ways to treat the different types of dermatitis include (1) resizing and changing the equipment and (2) patch-testing for ACD and altering the equipment or products accordingly. Possible allergens for patch-testing ostomy patients are presented in Table 3. Treating preexisting skin conditions, such as psoriasis or seborrheic dermatitis, is also integral in caring for peristomal dermatoses. In terms of pharmacologic approaches to treatment, corticosteroid lotions and pastes formed with oily bases should be avoided because of their propensity to interfere with the adhesion of stoma equipment. In addition, the possibility of systemic corticosteroid absorption and cutaneous atrophy should always be considered when using these agents. Better alternatives include topical steroids with an aqueous or alcohol base, steroids in combination with hydrocolloid dressings, or topical treatments with preparations (such as sucralfate powder) that can create a physical barrier. Furthermore, when choosing a topical steroid for patients with stoma dermatitis, it is prudent to avoid agents with vehicles that contain many potential allergens.

Conclusion

Peristomal skin complications are quite common among ostomy patients, and both prevention and proper management of these dermatologic issues are important to the patient's well-being. Preventing cases of peristomal dermatitis can make postoperative recovery and the subsequent lifestyle more bearable for the patient. Fewer peristomal skin problems ultimately create a better surface for the ostomy equipment to bind to, which helps prevent complications due to leakage. Further research on the potential allergens in ostomy equipment and products is also necessary to create more options for patients. Proper postoperative follow-ups are needed to address any complications that do arise. It is also important to educate patients about the types of dermatologic issues that are normal with an ostomy as well as those that are abnormal. In addition, it is essential that surgeons, wound care and ostomy nurses, and dermatologists cooperate and communicate to ensure proper care of the patient.

Table 3. Potential Allergens to Consider for Patch Testing

<i>Patch Testing for Stoma Allergy</i>	<i>Specific Allergens</i>
Standard tray	Caines
Plastic, glues series	Epoxy resins, including bisphenol A
Cosmetics	Karaya powder
Fragrances	Diaminodiphenylmethane
	Polyisobutylene
	Balsam of Peru
	Ostomy equipment, including ostomy bag and rubber sealing ring
	Ostomy equipment accessories: deodorant, adhesives, adhesive cleansers
	2-Benzotriazol (Tinuvin P)
	BHT
	Gantrez
	Colophony

BHT = 2,6-di-tert-Butyl-4-methylphenol.

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