Cleansing damaged peristomal skin with an octenidine-based solution

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Foreword

Andrew Bird

Maintaining peristomal skin health and integrity is arguably the most important aspect of stoma care for both stoma care nurses and their patients. Whether mild, moderate or severe, caused by disease, stoma output or stoma care products, the impact of peristomal skin complications (PSCs), especially if left untreated, can be felt by the patient, the stoma care nurse (SCN), the wider healthcare system and the economy.

The effects of PSCs have the potential to negatively influence all dimensions of a person's wellbeing. Physically, the impact of PSCs often includes itching, discomfort and pain, as the body's protective barrier is damaged. Transepidermal water loss can make it more challenging to apply and maintain adhesion of the appliance, increasing the risk of leaking and further exacerbation of the damage done to the skin. The psychological impact of the discomfort and increased leaking can lead to social isolation; withdrawal from social activities, intimacy and sexual activity; and absence from work or school, resulting in financial difficulties and a drastic reduction in quality of life. In a recent cost-of-illness analysis, Frontier Economics estimated £11.7 million in non-financial quality-of-life losses to people in England with a PSC.[1]

With a reported prevalence of over one in three of people living with a colostomy and two in three living with a urostomy or ileostomy experiencing PSCs, it is unlikely than any SCN has escaped the challenge. PSCs are probably the most frequently reported stoma-related complication, accounting for a high proportion of the clinical activity undertaken within the specialty. This can cause a strain on clinic capacity and SCN time that could be better used in other ways, such as preoperative counselling, prehabilitation or postoperative education, as well as service development or research and innovation.

Typically, the longer the PSC is left untreated, the more difficult it becomes to manage and rectify. Frequent appliance changes and multiple additional ancillary products increase both the complexity of care and the financial burden associated with it. Frontier Economics estimated an annual PSC-related healthcare cost to the NHS in England of around £16.4 million, giving an overall yearly cost of £28.1 million. This huge figure excludes a further £5.6 million cost related to avoidable treatment delays, as well as the uncalculated costs of lost working hours for the individuals as a result of sickness or clinical appointments, and it does not consider the wastage of stockpiled products that become inappropriate to use due to the PSC experienced.

While SCNs have an excellent range of skin-friendly stoma care products to choose from, as well as guidance from expert bodies such as the Association of Stoma Care Nurses UK (ASCN UK), the right solution is sometimes difficult to find. As a specialty, we should be searching for, open to and sharing findings regarding additional and novel approaches that may help us to minimise and resolve PSCs, thus improving the health and wellbeing of our patient cohort and reducing the financial burden of our specialty.

Around the world, stoma care is often practised alongside wound care, including advanced-practice roles in wound, ostomy and continence nursing. However, in the UK, the two fields of care are generally practised in isolation of each other. In some areas of the UK, individuals living with a stoma are benefitting from the collaborative work of stoma care nurses and dermatologists or tissue viability nurses. Fostering relationships between the specialities, creating a collaborative, interdisciplinary approach to PSCs, offers the opportunity to share best practice, new ways of working and innovative troubleshooting ideas. This greater shared understanding should improve patient outcomes and reduce the financial impact of PSCs on the individual, the healthcare system and the wider economy.

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Enhancing patient outcomes: the role of octenidine-based irrigation solutions in managing sore and irritated peristomal skin

Luxmi Dhoonmoon and Nermina Malanovic

This article explores the potential benefits of cleansing damaged peristomal skin with an octenidine-based antimicrobial irrigation solution.

Peristomal skin complications (PSCs) are highly prevalent, impactful and challenging to manage. PSCs can make the peristomal skin vulnerable to bacterial and fungal infections, which in turn make the PSC more difficult to resolve. Consequently, antimicrobial cleansing with octenidine-based products, such as Octenilin and Octenisept, could be a valuable tool in helping resolve PSCs.

Peristomal skin complications

Impact

PSCs have a profound effect on a patient's physical, emotional and social wellbeing. Physically, these complications often manifest as discolouration (erythema) of the skin with itching, discomfort and pain, as well as functional limitations that can make stoma management challenging.[1,2] Psychologically, PSCs can exacerbate feelings of insecurity, social isolation and diminished self-esteem, with patients commonly reporting heightened anxiety about leakage and odour, as well as disruptions to sleep and social activities.[1,3] Over time, these factors can severely diminish quality of life, leading to reduced productivity and difficulties in adapting to life with an ostomy.[2,4]

PSCs impose a considerable financial and operational burden on healthcare systems and resources.[2,3]

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Management of PSCs requires frequent consultations and increased specialist nursing time, as well as advanced stoma and wound care products and, in severe cases, systemic treatments like antibiotics or steroids.[5] In addition to the direct costs of treatment, PSCs contribute to more outpatient visits, more readmissions and longer hospital stays.[6] These resource demands highlight the critical need for preventive measures and efficient management strategies.[1]

Prevalence

In the UK, it is estimated that around one in every 365 individuals lives with a stoma,[7] with about 21 000 new stomas created annually.[3] Within the first month post-surgery, nearly 63% of individuals experience at least one complication related to their stoma or the surrounding peristomal skin.[8] PSCs are among the most frequently reported issues in individuals with an ostomy, with prevalence rates ranging from 36% to 73% depending on the population and methodology used.[9] Hence, preventing stoma-related skin complications is a far better strategy than only treating problems after they arise.[7]

Common causes

PSCs are typically caused and exacerbated by one or a combination of the following factors:

- Moisture-associated skin damage (MASD), caused by leakage of stoma effluent, where prolonged exposure to moisture weakens the skin barrier, leading to maceration and inflammation.[10] Peristomal MASD is particularly damaging because the contents of stoma effluent are enzymatically active and irritate the skin (contact dermatitis).[11]
- Medical adhesive-related skin injuries (MARSI), caused by traumatic removal of the stoma appliance, where the epidermis is stripped away, exacerbating existing

irritation and creating sites for bacterial or fungal colonisation.[6,12]

Microbial infections, which can proliferate in the favourable environment created by compromised skin integrity caused by MASD and MARSI. Common opportunistic pathogens include *Candida albicans*, which thrives in moist environments, and various bacteria of human skin or intestinal flora (such as *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Enterococcus* spp) that exacerbate inflammation and delay healing.[9] Infections can further deteriorate the peristomal skin, leading to secondary complications such as cellulitis or systemic infections.[4]

The primary risk factor for both MASD and MARSI is poor fitting or incorrect use of stoma appliances.[13] Hence, avoiding leakage and ensuring atraumatic removal of appliances are critical to preventing PSCs.[12] , The occurrence of these complications can be significantly reduced with education on proper use of stoma applainces (potentially including convexity) and stoma accessories, including barrier films and gentle adhesive removers.

Preventing infections involves addressing underlying skin damage, maintaining skin barrier function and using antimicrobial interventions when indicated.[7] Regular assessment of the peristomal area by healthcare professionals can facilitate early detection and management of infections.[4]

Overcoming management challenges

PSCs present a significant burden and remain complex to address.[9] Therefore, innovation is required to improve patient outcomes and reduce the risk of PSCs.[2,4,9]

Limited adoption of standardised skin assessment tools, such as the Ostomy Skin Tool (OST), can hamper early detection, leading to inconsistent assessment and delayed interventions. More widespread, consistent and integrated use of such tools could prevent minor irritations from progressing into severe complications.[14,15] Meanwhile, patients should be educated on early detection and encouraged not to accept PSCs as normal.

Evidence-based innovation in adhesive technologies and skin barriers could provide novel cost-effective treatment options to effectively resolve PSCs.[2,7]

Professional clinical guidelines and training, as well as patient and caregiver education, may be limited to advice on managing symptoms. It is also important to emphasise how to address root causes, such as improper stoma appliance use or secondary infections.[16]

Variability in patient needs and responses to treatment can be a challenge for managing PSCs.[11] Therefore, tools and interventions should be patient-centric and tailored to account for individual patient variability, such as differences in stoma placement, body morphology and underlying health conditions.[17]

Effective management of PSCs often necessitates interdisciplinary collaboration between stoma care and tissue viability nurses.[4,7] This partnership, combining expertise in stoma management with advanced wound-care techniques, can ensure holistic patient care.[11] Interdisciplinary teams can work together to develop individualised care plans, conduct regular skin assessments and implement preventive measures.[18] Promoting such collaboration is vital to optimising patient outcomes, reducing healthcare costs and enhancing overall quality of care.[9]

By prioritising innovation, education and collaboration, healthcare systems can better address the multifaceted challenges posed by PSCs, ultimately improving the lives of people living with ostomies.[6]

Rationale for antimicrobial cleansing

The use of antimicrobial solutions to cleanse broken (peristomal) skin for treatment and prevent infection has a strong scientific basis, as it reduces the microbial load, impedes microbial attachment and therefore supports healing.[19] This is particularly important for skin at risk of infection or already affected by PSCs. Antimicrobial solutions play a crucial role in wound care, particularly in managing areas like the peristomal region, where biofilms pose significant challenges and biofilm prevention is vital. Biofilms consist of microbial communities embedded in a highly immunogenic protective matrix. This matrix, known as extracellular polymeric substance (EPS), is composed of polysaccharides, proteins, metal (calcium, magnesium, iron) ions and extracellular DNA, and it can constitute over 80% of the biofilm.[20] Both the microbes and the EPS that make up the biofilm are major barriers to healing.[21] Biofilms are very recalcitrant to antimicrobials, as the microbes within them are protected from the host immune response and conventional antimicrobial treatments, leading to hard-to-heal status and increased risk of systemic infections.[21]

In vitro studies have found that many antimicrobial solutions have limited efficacy in penetrating the biofilm matrix and reaching the therapeutic levels required to kill the microbes, break down the EPS and disrupt biofilm.[22–26] Several in vitro studies have shown the effectiveness of octenidine inhibiting bacterial adhesion and proliferation.[22–25] This demonstrates significant promise in helping, in conjunction with other interventions, to inhibit biofilm formation and enhance wound healing by promoting a balanced microenvironment.[26] This is particularly valuable in environments where multidrug-resistant organisms are prevalent, as biofilm formation exacerbates antibiotic tolerance and reduces immunological clearance of problematic microbes.

The antiseptic molecule octenidine works by interacting with microbial membranes, disrupting their integrity, and helping to reduce the microbial load within a wound.[27,28] It also exhibits protease-inhibiting properties,[87] which are crucial in hard-to-heal wounds, where elevated protease levels – including the matrix metalloproteinases (MMPs) MMP-1, MMP-2 and MMP-9 – degrade essential growth factors and extracellular matrix components, hindering tissue repair.[30,31] In vitro and in vivo studies have demonstrated that octenidine is effective at low concentrations and has a good safety profile,[32] making it a valuable option in different wound-care strategies.

Using antimicrobial-containing solutions based on octenidine in peristomal skin care provides targeted action against infections and helps to reduce biofilm formation, which is especially important for managing compromised skin integrity in stoma patients.[30] Research on biofilm in peristomal skin infection is limited but, hypothetically, could be beneficial, considering its benefits in wound care. These solutions, in conjunction with standard protocols of care, support the biologics of wound closure, and they will help minimise infection risks and improve overall patient outcomes. Their incorporation into care protocols for PSCs can alleviate the burden on healthcare resources by reducing the need for prolonged treatment or hospitalisations.

The use of such solutions also reduces the risk of secondary systemic infections, as compromised skin integrity in peristomal areas can act as a gateway for pathogens to enter the bloodstream. By effectively managing biofilms and reducing microbial loads, antimicrobial solutions not only help support and promote healing but also reduce the likelihood of severe infections and complications, thereby improving patient outcomes and lessening the burden on healthcare systems.[6]

These findings underscore the importance of incorporating evidence-based antimicrobial protocols into the management of peristomal skin complications to address both the immediate risks of infection and the long-term barriers to wound healing. Such approaches are pivotal in enhancing patient care while reducing costs and resource use associated with prolonged wound management.[9]

Benefits for patients, clinicians and services

The integration of antimicrobial solutions in PSC management offers multiple benefits. For patients, these solutions can reduce pain, enhance healing and minimise complications, improving overall quality of life.[33] For clinicians, antimicrobial solutions simplify wound-care protocols, enabling effective management with fewer resources.[26] From a service perspective, these interventions can decrease the frequency of consultations and hospital admissions, lowering healthcare costs and freeing up resources for other patients.[4]

Octenidine

Octenidine is a bipyridine-based antimicrobial and antiseptic agent, available in ready-to-use colourless liquid- or hydrogel-based formulations. In general, antiseptics are commonly applied, either prophylactically or therapeutically, directly onto the skin, mucous membranes and wounds, where they generally show a very fast onset of antimicrobial activity. Octenidine has been widely used for antisepsis of the skin, mucous membrane and wounds, as well as microbial decolonisation of patients, in various clinical and outpatient settings in Europe, Asia and Australia for more than 35 years.[33–45]

Octenidine has gained attention for its efficacy in managing compromised skin and wounds. Its mode of action involves disrupting bacterial membranes,[27,28,46] inhibiting biofilm formation and even disrupting biofilm structures.[22–24] Unlike other antiseptics, octenidine is reported to be well tolerated, with minimal cytotoxicity,[48] associated with good tissue compatibility,[32,41] and it is known to prevent bacterial growth.[48] It is active in as little as 60 seconds, and its biocidal activity lasts at least 48 hours, a potential advantage when managing a stoma.[43] Octenidine dihydrochloride is an antimicrobial with a broad-spectrum efficacy against an array of different microbes (including multi-resistant strains). To date, there is no known microbial resistance or cross resistance to antibiotics evident.[49,50]

Although octenidine has been shown to be effective and well tolerated, without a propensity to cause cytotoxicity or hinder wound healing, further studies are needed to determine whether commonly used wound-care products differ in cytotoxic potential, as well as the clinical significance of in vitro and experimental wound healing models.[47]

Clinical evidence in wound care supports the use of octenidine in cleansing peristomal skin at risk of or affected by PSCs, since it can reduce microbial colonisation without damaging healthy tissue, facilitating faster recovery and better patient outcomes.[51] Additionally, its long-lasting antimicrobial effect can reduce the need for frequent applications, further enhancing its practicality in clinical settings.[52] There are no reported cases of octenidine affecting the adhesion of stoma appliances.

Non-specific action and antimicrobial resistance

In contrast to antibiotics and antifungals, antiseptics such as octenidine have a non-specific action, meaning that they are effective against a broad spectrum of microorganisms. This non-specific and non-selective action makes the development of resistant microbes less likely. Given the global burden of antimicrobial resistance (AMR), this makes topical antiseptics particularly important for effective infection prevention measures, as well as local therapy.[53]

With ongoing rapid emergence and global spread of (multi)drug-resistant pathogens, the inappropriate and indiscriminate use of antibiotic and antifungal agents must be restricted. This constitutes an enormous threat, not only within healthcare facilities, but also for public health worldwide. According to recent data, the most comprehensive and reliable estimates of the AMR burden indicate that an estimated 5 million deaths were associated with antimicrobial resistance in 2021. As such, it is already one of the leading causes of death for people of all ages worldwide. If no action is taken, its impact is likely to worsen, and (multi)drug-resistant pathogens could kill over 39 million people by 2050.[54–56]

Antimicrobial activity and safety profile

The antiseptic octenidine exerts a broad spectrum of antimicrobial activity that covers a wide range of (multi) drug-resistant bacterial and fungal species (*Table 1*). Octenidine has a rapid onset of action, even in conditions of high organic load such as blood, wound exudate or mucin.[57–66] Beyond that, in vitro, octenidine is also able to penetrate (poly)microbial biofilms; the efficient killing of all microorganisms contained within a biofilm is an enormous challenge, especially in hard-to-heal wounds.[22,23,67–69] In addition, octenidine is not absorbed but instead remains on the body surface, where it is effective against a broad spectrum of microbes for at least 48 hours.[43] Consequently, it kills not only bacteria and fungi already present in the wound, but also exogenous microorganisms, as well as the patient's own skin microflora/microbiota, thus minimising the risk of secondary infection. Moreover, octenidine is stable and remains antimicrobial active at an extremely broad pH range (1.6–12.2), which is crucial in wound care, as the pH changes during the healing process.[40] Octenidine's overall high tolerability and low allergic potential[32] make it suitable for use during pregnancy and breastfeeding,[42,70] as well as in preterm neonates, newborns and children (*Figure 1*).[71–73]

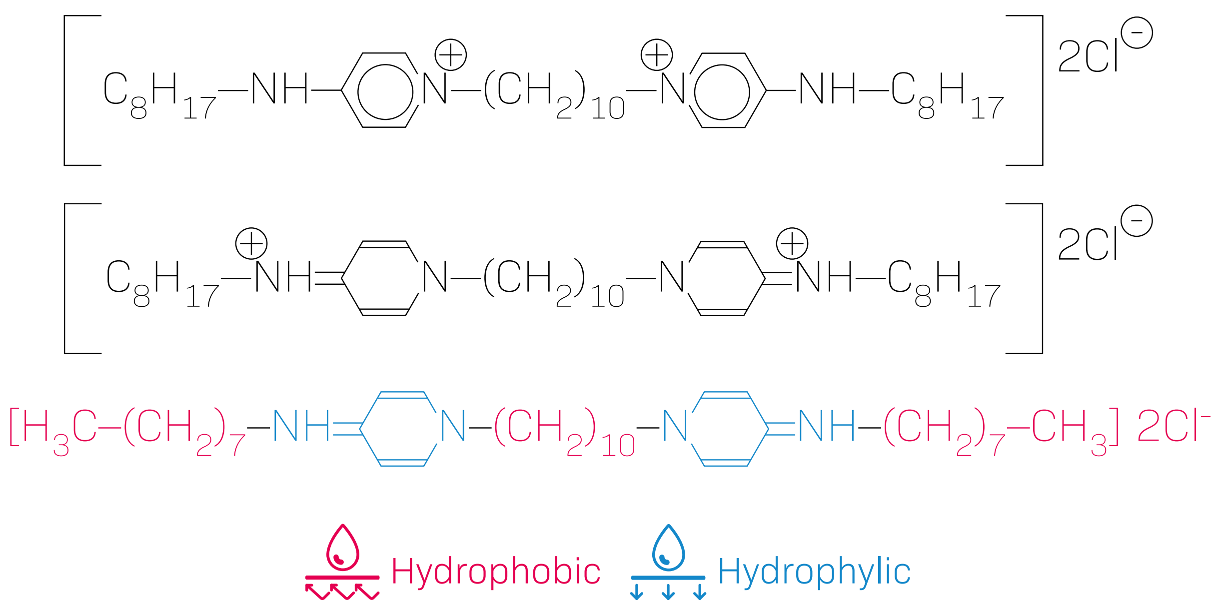
Table 1. Bacterial and fungal species affected by octenidine

Category	Example species
Gram-positive bacteria	▪ *Staphylococcus aureus*, including mupirocin-resistant *S. aureus* ▪ Extended spectrum beta-lactamase-producing *Enterobacteriaceae* ▪ Vancomycin-resistant *Enterococcus* ▪ *Enterococcus spp*
Gram-negative pathogens	▪ *Escherichia coli* ▪ *Pseudomonas aeruginosa* ▪ *Acinetobacter baumannii* ▪ *Klebsiella pneumoniae*
Fungal species	▪ *Candida albicans* ▪ *Candida auris* ▪ *Nakaseomyces glabratus* (formerly *Candida glabrata*)

Figure 1. Main advantages of octenidine

- **Stable and antimicrobially active at an extremely broad pH range (pH 1.6–12.2):** suitable for all wounds with different pH values during the healing phase
- **Colourless:** any changes on the skin, wounds and mucous membranes can be easily detected
- **Rapid onset of action:** From 1 minute, even under a high organic load
- **Long-term residual effect:** 48 hours remanence
- **Highly effective against (poly)microbial biofilms**
- **Very good tissue tolerability and high safety profile:** suitable during pregnancy and breastfeeding as well as for (preterm) neonates and children
- **No development of reduced susceptibility, resistance or cross-resistance to other antimicrobials:** unspecific mode of action due to purely physical interactions with microbial membranes
- **Painless treatment, extremely low allergic potential**
- **Broad spectrum of antimicrobial activity:** including (multi)drug resistant pathogens

Figure 2. Chemical and physical characteristics of octenidine



Chemical characteristics and unspecific mode of action

Octenidine – N,N'-(1,10-decanediyldi-1(4H)-pyridinyl-4-ylidene)bis-1-octanamine, dihydrochloride – is a small, synthetic antimicrobial compound of the bipyridine family exerting a mesomeric distribution of the cationic charge via an amino-pyridine structure (*Figure 2*).[74] The molecule differs from simple quaternary ammonium compounds by the lack of an amide and ester structure, which results in lower toxicity due to possible byproducts. Its amphipathic character, representing hydrophobic (water-repellent) and hydrophilic (water-soluble) domains, as well as its cationic (positively charged) nature, are ideal features for the interaction with microbial membrane components.[27,28,46,75]

Biophysical studies using clinical relevant Gram-negative (*Escherichia coli*) and Gram-positive bacteria (*Enterococcus hirae*, *Bacillus subtilis*) as well as their respective model membranes (models to mimic cell behaviour), reveal a rapid and unspecific killing mechanism of octenidine based on purely physical interactions with lipid membranes.[27,28,46] Many antiseptics and antimicrobials have demonstrated lower efficacy against Gram-negative bacteria, as their complex membrane structure increases their tolerance to external treatments, which is enhanced within a biofilm. Moreover, the increasing occurrence of antibiotic multiresistant Gram-negative species, associated with limited therapeutical options, makes them so-called high-priority pathogens for the World Health Organization (WHO).

For the effective killing of Gram-negative bacteria, octenidine relies on its most powerful assets, which enable both electrostatic and hydrophobic interactions. Initially, octenidine attaches to the outer membrane of Gram-negative bacteria via electrostatic interactions, leading to a neutralisation of the cell-surface charge. Hydrophobic interactions cause octenidine's hydrocarbon chains to rapidly interfere with the fatty acyl chain region of the outer membrane core, triggering a strong lipid disorder based on the differences in their respective hydrophobic thicknesses. As a consequence, further octenidine molecules are able to penetrate the periplasmatic space to the inner membrane, affecting its integrity. On a cellular level, octenidine depolarises and changes the fluidity of the membrane. On a molecular level, it induces a complete loss of the packing order of bacterial phospholipids.[27,28,46] One after another, the outer and inner bacterial membranes become leaky, leading to the cell's death within a very short time frame.[27,28,46] Even though the membrane structures of Gram-positive bacteria differ, octenidine rapidly breaks down the membrane, proving an almost identical killing mechanism to that of Gram-negative bacteria.[28]

The insertion of octenidine's hydrophobic part into membranes of eukaryotic cells is restricted due to the presence of rigid lipids, such as cholesterol, beneath the phospholipid group.[76] Because of its rigid ring structure, cholesterol plays a distinct role in membrane structure; cholesterol will not form a membrane by itself, but inserts into a bilayer of phospholipids with its polar hydroxyl group close to the phospholipid head groups.[76] Additionally, higher eukaryotic cells, like human cells, are organised into complex multicellular networks that prevent the penetration of octenidine into the tissue. Unlike other antiseptics, such as povidone-iodine, octenidine is not absorbed into the body but stays on the site of application.

Moreover, the octenidine-induced membrane disorder is not dependent on the magnitude of bacterial surface charge or the presence of different lipid head groups, as mutant strains of *B. subtilis* and *E. coli* defective in major membrane constituents (e.g., lipopolysaccharide, phosphatidylglycerol, cardiolipin) are as susceptible to octenidine as wild-type strains.[28,46] Comprehensive binding studies in *E. coli* revealed an estimated number of 10^7–10^8 octenidine molecules per single bacterial cell are needed to saturate the surface to initiate the killing cascade. Consequently, together with the remarkable influence of different applied materials and methods for antimicrobial susceptibility testing, bacterial growth in vitro, especially in the presence of octenidine concentrations far below those applied in clinical settings, could be easily misinterpreted as bacterial tolerance or adaption towards the antiseptic molecule.

Notably, this unspecific mode of action of octenidine compromising the integrity of the cell membrane is not only described in bacterial species, but also very recently in the fungus *C. albicans*.[77] Most probably due to this immediate attack on critical, evolutionary highly conserved membrane components of different clinical relevant bacterial and fungal pathogens, any development of reduced susceptibility towards octenidine or even (cross)resistance to other antimicrobials (such as antibiotics, antifungals, antiseptics) has not yet been observed and is very unlikely.[49,64,78–83]

Beyond antisepsis

Data from clinical studies indicate that octenidine has potent antimicrobial activity against various microorganisms frequently associated with wound infections, as well as that patients tend to have positive perceptions of therapy.[40,41,84] Octenidine-containing products have shown further beneficial effects on wound healing, such as cost-effectiveness and improved healing rates.[40,41,84] Moreover, immediate postoperative application of an octenidine-based hydrogel optimises the functional and aesthetic outcome of scar formation in comparison with conventional wound care.[85] Furthermore, the octenidine-based hydrogel possesses strong anti-inflammatory and protease-inhibiting capacities, which trigger a series of immunomodulatory events that may advance the healing process from the inflammatory to the proliferative phase.[29,86] These effects are particular to octenidine, as, according to a comparative analysis, other hydrogels used in wound care containing antiseptic molecules may not exert these properties.[87]

Octenidine-based products in wound care

Based on the evidence presented above, octenidine is widely used in a large field of clinical applications for both acute and hard-to-heal wounds in the form of aqueous liquid preparations or hydrogels. Since all octenidine-containing products are colourless, every change in the wound situation can be easily detected and documented. All octenidine-based formulations available for cleansing, disinfection and promoting of wound healing share the same active ingredient and so can be ideally combined with each other without risk of adverse interactions.

Conclusions

The use of octenidine on irritated and sore peristomal skin has the potential to resolve bacterial and fungal infections that can proliferate in and exacerbate PSCs. This must be part of a holistic stoma care strategy centred on minimising the risk of MASD and MARSI as the primary drivers of PSCs.

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Case series 1: routine use of Octenisept to cleanse damaged peristomal skin

Vesna Konjevoda and Zeljka Mihovilic

These five case studies describe the use of octenidine-based Octenisept irrigation solution to cleanse damaged peristomal skin at a university hospital in Zagreb, Croatia.

Case study 1.1

Background

A 91-year-old female patient had had a colostomy for 15 years as a result of rectal adenocarcinoma. The colostomy output was formed in consistency. The patient's comorbidities included rheumatoid arthritis and osteoporosis. Her stoma-care routine involved hygienic showering, washing with wipes and drying the peristomal skin, followed by applying a flat two-piece ostomy system.

For the past 10 years, the patient has experienced hypergranulation and bleeding, without signs of infection. Previous treatments included the application of silver nitrate.

Presentation

The patient presented to the enterostomal clinic with extensive and bleeding-prone hypergranulation in two quadrants around the stoma (*Figure 1*). She expressed extreme dissatisfaction with her quality of life, which was significantly impacted.

Intervention

The patient's granulomas were treated with silver nitrate according to the standard protocol – once a week for 3–4 weeks, depending on the size.

As part of the clinic's protocol for treating peristomal skin complications (PSCs), the antiseptic Octenisept was applied to provide antisepsis of pathogens from stomal output, cleanse damaged peristomal skin and prevent infection. Octenisept was used because of its broad spectrum of action and effectiveness, as well as its rapid action.

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Octenisept was left in contact with the skin for 1 minute (contact time), after which the hypergranulation was cauterised with silver nitrate, and an appropriately sized appliance baseplate was applied. The patient was educated and advised to continue using Octenisept at home when changing the baseplate every 3–4 days, as well as to regularly wash and dry the peristomal skin and to remove the baseplates gently to avoid causing microtrauma. The same procedure was repeated in clinic after 5 and 10 days.

Results

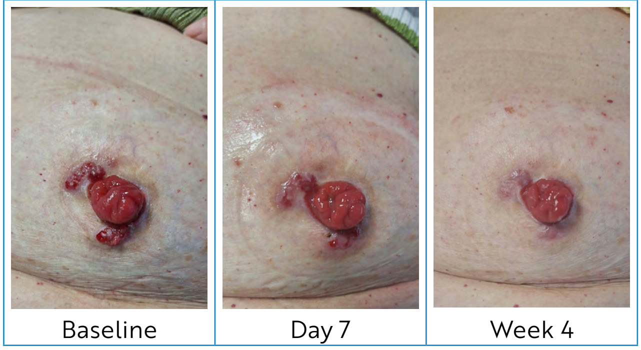
Octenisept application was simple, with no pain or burning sensation. Following the intervention, there was a gradual reduction in hypergranulation and an improvement in the condition of the peristomal skin. After 4 weeks, the peristomal skin had fully healed, with minimal scarring. The patient was very satisfied with her quality of life, as well as the treatment applied. This positive outcome can be largely attributed to the gold-standard treatment of silver nitrate, but there was also a likely contribution from the supportive use of octenidine, which has known anti-inflammatory properties.[1]

Case study 1.2

Background

A 72-year-old female patient had had a colostomy for 20 months following resection of rectal adenocarcinoma. She

Figure 1. Case study 1.1



also had a history of arterial hypertension. Her stomal output was formed, and her routine included stoma powder and a two-piece ostomy system.

Presentation
The patient presented with several granulomas on the stoma mucosa, which occasionally bled and led to her not being fully satisfied with her quality of life. She had had granulomas for 1 year, and previous treatments had included application of silver nitrate once a year (*Figure 2*). Otherwise, the peristomal skin appeared normal, and there were no signs of infection.

Intervention
Octenisept was applied to the peristomal skin for 1 minute for the purpose of disinfecting, cleansing and infection prevention, as part of local protocol. After drying, the granulomas were cauterised with silver nitrate, and stoma powder and a properly sized baseplate were applied. The patient was advised to continue applying Octenisept when changing the baseplate at home every 3–4 days. The same procedure was repeated in clinic after 7 and 14 days.

Results
After 2 weeks of treatment, the granulomas began to regress. By week 4, they had subsided, and the peristomal skin remained healthy and the ostomy appliance was adhering correctly. The patient was very satisfied with her quality of life.

Case study 1.3

Background
A 42-year-old female patient had been living with an ileostomy for 30 days as a result of perforation of the small intestine. The ileostomy's output was liquid. She had a history of chronic gastritis, cervical cancer and hyperthyroidism. Her stoma-care routine involved regular hygienic showering and drying of the peristomal skin, as well as use of a flat two-piece ostomy system. She had been advised to use stoma paste and stoma powder to aid baseplate adhesion if her peristomal skin became damaged or moist.

Presentation
The patient presented at the enterostomal clinic with a PSC that had been present for 7 days (*Figure 3*). The PSC exhibited erosion, ulceration and redness, and it caused bleeding, pain and a burning sensation. She was worried, under significant psychological stress and unable to function normally, leaving her extremely dissatisfied with her quality of life. Her baseplate was too large for her stoma.

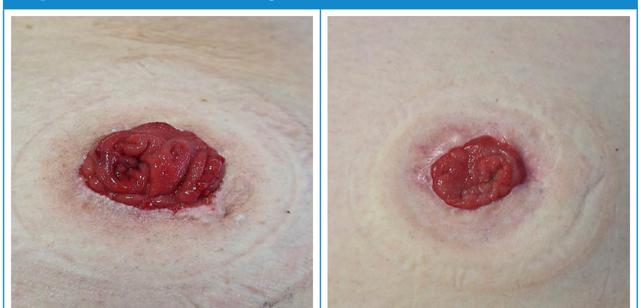
Intervention
Local protocol for damaged peristomal skin during ostomy- appliance changes was to cleanse the damaged peristomal skin with the antiseptic Octenisept, to disinfect the skin from pathogens from stomal output. Octenisept was left in contact for 1 minute before the skin was dried. This was followed by application of stoma paste, a moisture-retentive hydrocolloid wound dressing and an appliance baseplate with an appropriate opening. The hydrocolloid wound dressing was applied around the stoma to protect the damaged area and minimise the risk stomal output leaking under the baseplate.

Results
At a follow-up assessment only 3 days after the intervention, the peristomal skin had already mostly healed. After 4 weeks of treatment and monitoring, the patient's clinical condition had significantly improved, as did her satisfaction with her quality of life. The peristomal skin appeared normal, without damage or bleeding. The ostomy appliances were applied smoothly without any difficulties. The patient was very satisfied with the treatment.

These outcomes could have resulted from a combination of the hydrocolloid wound dressing, use of an appropriately sized baseplate and cleansing with Octenisept.

The patient was advised to continue the protocol with Octenisept at home when changing the baseplate every 2–3 days, as well as regular hygienic showering and drying of the peristomal skin. Use of the hydrocolloid wound dressing was not necessary at home.

Figure 2. Case study 1.2



Baseline | Week 4

Figure 3. Case study 1.3

Baseline | Week 4

The clinician found that application of Octenisept was quick and simple, and it did not cause pain or a burning sensation. This allowed for a quick sequence of procedures in the outpatient setting.

Case study 1.4

Background

A 33-year-old male patient had had an anastomosis of the ileum to the transverse colon with a bitubular (double-barreled) stoma for 34 days following emergency surgery because of perforation of the colon and pneumoperitoneum. The absorbable surgical sutures had remained longer than expected and thus had required physical removal. The patient's medical history included Crohn's disease, gastroesophageal reflux disease, chronic gastritis and coeliac disease. The output of the ileostomy was relatively thick, and the patient had been using adhesive-remover wipes and a flat two-piece appliance, alongside stoma powder when necessary to aid adhesion in damaged skin.

Presentation

The patient presented at the enterostomal outpatient clinic with a PSC characterised by erosion, pain and a burning sensation (*Figure 4*). The PSC had been present for 10 days and was having a significant impact on the patient's quality of life (extremely dissatisfied) and ability to function normally. Previous treatments had included regular hygienic showering and drying of the peristomal skin, as well as the application of stoma powder.

Intervention

As part of the clinic's standard care protocol for damaged skin, the peristomal skin was cleansed and disinfected with the antiseptic Octenisept, which was applied with 1 minute of contact, followed by drying. This was subsequently followed by application of stoma powder and a barrier spray to protect the skin, then stoma paste to help form an effective seal, and finally a one-piece ostomy appliance, which adapted well to the abdominal irregularities and was soft on the skin, making it suitable for a younger patient. The patient was advised to change their ostomy appliance every day following the same protocol.

Results

Follow-ups at 7 days and 4 weeks both showed significant improvement in the patient's clinical condition. After 4 weeks, the peristomal skin appeared normal, without damage, and the appliance was adhering without difficulty. The patient reported improved quality of life and was very satisfied with the treatment applied.

The positive outcomes likely resulted from the change in routine, with potential contribution from the anti-inflammatory and antimicrobial properties of Octenisept. The clinician found that Octenisept was simple and quick to use.

Case study 1.5

Background

A 79-year-old female patient had had a colostomy for 6 months, formed following an acute ileus that was later confirmed to be caused by rectosigmoid cancer. She also had a history of hypothyroidism, arterial hypertension and chronic renal insufficiency. She used a convex two-piece ostomy system with no accessories, and the output was formed in consistency.

Presentation

The patient presented with significant PSCs that had been present for the past month (*Figure 5*). These were peristomal hypergranulation in two areas and a 2 cm-wide ring of damaged peristomal skin around the stoma. This was significantly affecting the patient's quality of life.

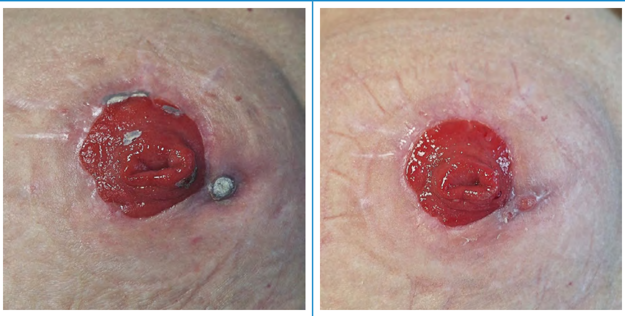
Intervention

The patient was treated in the enterostomal clinic every 7 days for 4 weeks. As part of local protocol for damaged perisotmal skin, the antiseptic Octenisept was applied for 1 minute to disinfect and cleanse the skin during stoma-appliance changes in the clinic. After drying, the hypergranulations were cauterised with silver nitrate, applied once a week for 4 weeks. Stoma powder and

Figure 4. Case study 1.4

Baseline | Day 7 | Week 4

Figure 5. Case study 1.5



Baseline | Week 4

stoma paste were used to aid adhesion and protect the skin from leaks. A hydrocolloid dressing was applied around the stoma and the surrounding skin to further protect the area from leakage of stoma contents and to promote skin health. A new, more suitable baseplate was placed over the dressing. The patient was advised to continue the same protocol at home, changing the baseplate every 3–4 days, and to maintain regular hygienic showering and drying of the peristomal skin. The dressing was changed by the community nurse during the stoma-appliance change.

Results

After 4 weeks of treatment and monitoring, there was a significant improvement in clinical status and peristomal skin. After 4 weeks, only one of the two hypergranulations was still present (and smaller), while the ring of damaged skin had shrunk to a maximum width of 1 cm. The ostomy appliance was adhering correctly. The patient was very satisfied with her quality of life and the applied treatment, which she found to be simple and painless to apply at home. The positive outcomes were likely multifactorial. The patient continued with the same stoma care routine. Further research on the use of Octinisept in stoma-related complications would be beneficial in establishing evidence-based protocols and guidelines.

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Case series 2: emergent use of Octenilin to cleanse damaged peristomal skin

Lorraine Milton and Jill Wild

These three case studies describe emergent uses of octenidine-based Octenilin irrigation solution to cleanse damaged peristomal skin at a medical centre in the UK.

Case study 2.1

Background

A 50-year-old man had been living with an ileostomy for 15 months, formed after resection of a tumour in the proximal transverse colon. He had a parastomal hernia, and his stomal output was of a high volume and loose consistency. He also had been diagnosed with Lynch syndrome, autism, learning disabilities and obsessive-compulsive disorder, with minimal capacity for communication.

The patient was unhappy with his stoma and would not participate in his stoma care, so his family and carers had to assist with changing his appliance. Changes would ideally be carried out every 2–3 days, but this was dependent on whether he was willing to let his family or carers change the pouch.

He had intermittent peristomal skin complications (PSCs), which were uncomfortable or painful and would cause him to become withdrawn. However, he would not inform family or carers when his peristomal skin was sore, and he was unable to self-report his own pain level. Attempts had been made to resolve these PSCs with barrier wipes and spray, as well as hydrocolloid dressings, a manuka-honey appliance and manuka-honey tape. An antimicrobial emollient skin wash was being used around the stoma.

Presentation

The patient presented with a PSC that had been present for 3 days and extended for 5 cm from the stoma (*Figure 1*). The PSC showed erythema, excoriation, inflammation and weeping. The clinician assessed that the patient was experiencing a moderate-to-severe degree of pain, based on their behaviour and expression. There were both signs of moisture-associated skin damage (MASD), such as leakage of stomal output onto peristomal skin, and signs of medical-adhesive related skin injury (MARSI), such as pain or skin stripping. At the time, his established stoma-care routine involved a high-output appliance,

Figure 1. Case study 2.1

Baseline; Day 3; Day 5; Day 14; Day 18

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along with an adhesive remover, stoma seals, elastic tape and flange extenders.

Intervention

It was decided to try applying Octenilin wound irrigation solution at each appliance change (usually every other day) to improve the patient's recurrent issues with sore skin. Octenilin was applied onto sterile gauze, which was then wiped onto the affected peristomal skin. After this, the appliance was reapplied. Octenilin was chosen because it could be used on peristomal skin, while most other skin-healing products can prevent the appliance from adhering to the skin.

Results

The skin healed quickly over the following 3 weeks. By week 3, the red, warm and excoriated area of skin had shrunk to just 1 cm around the stoma. The patient was no longer showing signs of discomfort or pain. He demonstrated less anxiety and improved overall wellbeing, alongside improved skin integrity.

The nurse and the patient's carers were very satisfied with the outcome, finding Octenilin easy to use and cost-effective, as well as noting that it did not impede adherence of the appliance to the peristomal skin. Since introducing Octenilin, there have been fewer home visits from the stoma team, and the patient's family and carers have not called on the stoma team to review red or sore peristomal skin. The patient's carers have since acquired a supply of Octeniln and use it as and when inflammation occurs.

Case study 2.2

Background

A 34-year-old female patient had been living with a colostomy and an extensive abdominal wound for over 3 years. Her present stoma had been formed 3 months previously after the attempted reversal of a previous stoma, which had formed secondary to colonic perforation during a colonoscopy.

The patient changed her wound dressings and stoma appliance once or twice daily, and the combination of wound and stoma management made this a complex routine that took around 45 minutes each time.

The patient had difficulty in adjusting to the stoma and wound, which left her with significant mental-health issues. Her ongoing wound and stoma management issues were negatively affecting her work and social activities, and she was considering postponing her planned wedding. However, she had become very independent with her care, and the stoma care team had had little involvement in her care for the past 3 years. She was very much focussed on a proposed reversal, but this was dependent on wound healing and significant weight loss.

Presentation

The patient presented with a PSC, present for 11 weeks, which involved hypergranulation, as well as erythema, weeping (exuding), inflammation and excoriation, extending in a 2.5 cm radius around the stoma (*Figure 2*). The PSC was causing her severe pain during appliance changes (9/10). The peristomal skin showed potential signs of MASD as a result of leakage of stomal output onto peristomal skin. This may have been because the stoma itself was poorly spouted and lay flush with the surrounding skin.

The patient had previously trialled a convex stoma appliance to help the normally flush stoma protrude into the bag and so minimise leakage, but she was unable to tolerate the pressure and therefore refused to trial one again. She also consistently declined to cut the aperture of her baseplate to the recommended size, stating that this increased the frequency of her leakages. Previous attempts had been made to treat the PSC with manuka honey and alcohol-free stoma paste, but these had been unsuccessful. She had also been attempting to treat the

Figure 2. Case study 2.2

Day 1 before using Octenilin

Day 7 after using Octenilin

damaged skin with a hydrocolloid dressing and was also using sucralfate powder. The patient had been offered silver nitrate to treat the hypergranulation, but she refused as her skin was too painful to touch. She was taking morphine, paracetamol, codeine and ibuprofen to control the pain. Her stomal output was typically soft, but she was taking a laxative to counteract the side-effects of the opioids.

The patient's abdominal wound was producing moderate serous exudate. Moreover, the abdominal wound had dehisced, with separate edges. She had been provided with Octenilin wound irrigation solution to cleanse the wound.

Intervention

The patient suggested trialling Octenilin wound irrigation solution on both her peristomal skin and wound, to which her stoma care nurse agreed. At each pouch change, gauze was soaked with wound irrigation solution and then dabbed over the peristomal skin for 5 minutes. Once the area had dried, the appliance was applied. Otherwise, her stoma-care routine remained the same. This treatment continued at every stoma change for 2 weeks.

Results

After 7 days, the peristomal skin was no longer red, weeping, inflamed or excoriated, and the area affected by the PSC had reduced by around 80%. The patient's self-reported pain level had reduced considerably, from 9/10 to 2/10. However, the peristomal skin remained slightly pink, and there was some hypergranulation. There was still some leakage from the appliance, probably due to continued non-adherence to recommendations on optimal product use.

Both the patient and the treating clinician were very satisfied with the progress since using Octenilin wound irrigation solution. The significant visible improvement in the patient's skin integrity is evidence of the potential value of patient-led change. It is possible that the PSC and associated pain had been exacerbated by microbial contamination, and that this had been reduced by the antimicrobial action of Octenilin, as there had been no other changes in routine. However, skin swabs had not been taken to test this.

Case study 2.3

Background

A 56-year-old woman had an ileostomy formed 6 years previously to alleviate the symptoms of Crohn's disease. Her stoma had a high output volume, with a loose, porridge-like consistency, and her two-piece ileostomy appliance needed to be emptied six times daily.

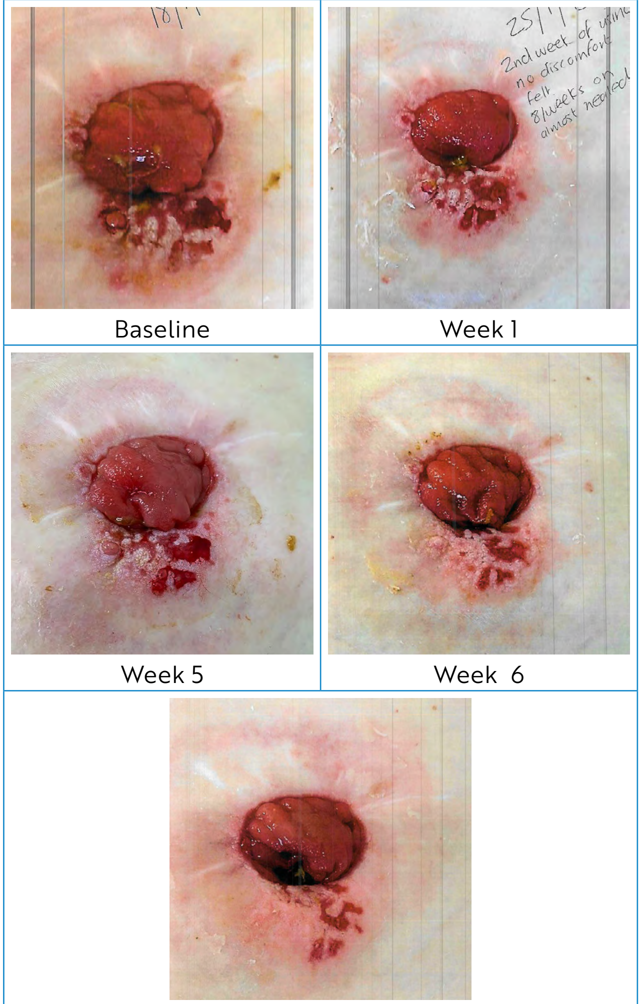
The patient had previously been treated for cellulitis. She had a history of anxiety and depression, and stoma formation had adversely affected her quality of life, discouraging her from socialising with friends, so she spent most of her time at home. She was taking vitamin B12, the Crohn's medication mesalazine, the proton-pump inhibitor lansoprazole and the antidepressant amitriptyline.

Her appliance was changed on alternate days, and her stoma routine included several accessories, including an adhesive remover, stoma paste, tape and a seal.

Presentation

The patient had been living with a PSC for 10 weeks (*Figure 3*). A raised, red patch of skin extended for 3 cm from 4–8 o'clock around the stoma. This area was prone to bleeding and weeping, and it was very sore, causing a patient-reported pain level of 7/10. On examination, there was evident hypergranulation. The patient reported that their appliance had been leaking, and there was evidence of MASD caused by stomal output. Previous

Figure 3. Case study 2.3



Baseline | Week 1 | Week 5 | Week 6 | Week 18 attempts had been made to resolve the PSC with stoma powder, an antimicrobial emollient skin wash and hydrocolloid dressings, as well as silver nitrate treatment, but none of these had been effective. The PSC was exacerbating the patient's episodes of anxiety and depression.

Intervention

It was decided to trial Octenilin wound irrigation solution to reduce the hypergranulation and improve the patient's skin integrity. Octenilin solution was applied directly on the affected areas at each appliance change (every 2–3 days). Stoma powder was removed from her stoma-care routine. The patient felt no discomfort when the solution was applied.

Results

Over the following weeks, hypergranulation gradually reduced in size and stopped bleeding and causing constant pain, and there was an evident improvement in the affected tissue. The patient reported that her appliance was able to form a better seal and so was no longer leaking, and her quality of life had greatly improved.

Both the patient and nurse were extremely satisfied with the impact of Octenilin. The nurse found it to be cost effective and easy to use, with straightforward instructions. It was decided to continue using Octenilin until the PSC was fully resolved. Stoma care would benefit from further research into the use of Octenidine in the treatment of PSCs involving granulomas, MASD and MARSI.

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