Moisture-associated skin damage: causes and an overview of assessment, classification and management

ABSTRACT

Moisture-associated skin damage (MASD) can result when the skin has prolonged or continuous exposure to excessive moisture. If the skin experiences too much moisture, it becomes overhydrated and is prone to maceration. This makes it easier for irritants and microorganisms to penetrate the skin, reduce its integrity to mechanical forces and disrupt its protective acid mantle. The condition can greatly affect patient wellbeing. MASD is a collective definition and it has four main causes: incontinence-associated dermatitis, periwound skin damage, intertriginous dermatitis and peristomal moisture-associated dermatitis. Practitioners can use tools such as the Skin Moisture Alert Reporting Tool (*S.M.A.R.T.*) to identify its aetiology, which informs its management. Management of MASD involves assessment, addressing the underlying cause, and implementing a structured skin care regimen to treat it and prevent its recurrence. Case studies illustrate the use of a structured treatment strategy using Medi Derma barrier products and the principles of Total Barrier Protection to provide a cost-effective solution for the prevention and management of skin compromised by MASD.

Key words: Moisture-associated skin damage ■ MASD ■ Tissue viability ■ Tissue viability nursing

Over the past few years, the term moisture-associated skin damage (MASD) has been adopted by healthcare practitioners as a collective definition for the damage of various aetiologies associated with prolonged or continuous exposure of the skin to excessive moisture (Dowsett and Allen, 2013;Young, 2017).

Terminology used to classify skin damage has changed numerous times in recent years, undoubtedly leading to confusion, inconsistencies in clinical practice and ineffective record keeping. Seminal work by Defloor (2005) was among the earliest to recognise the importance of differentiating between pressure ulcers and moisture lesions and, while this was principally valid, it failed to address other moisture-related aetiologies, such as periwound moisture-associated damage or intertrigo.

Moisture lesions became the accepted terminology a few years ago because they were closely associated with prolonged incontinence, mainly via contact with urine and/or faeces (Guy, 2012;Wounds UK, 2014), which meant other causes were not recognised. At the same time, evidence in the literature was emphasising the importance of prevention and management of incontinence-associated dermatitis (IAD) (Bardsley, 2013; Beeckman et al, 2015).

Clinicians must continue to differentiate between MASD and pressure ulceration but, equally, they must be clear on the various causes of MASD to ensure effective preventive and management strategies are applied.

The skin

It is well documented that the skin is the largest organ of the body. It is made up of three layers (epidermis, dermis and subcutaneous layer) (*Figures 1* and *2*) and performs several important functions (*Box 1*).

One of those functions is protection to prevent damage to internal tissues from mechanical trauma, harmful ultraviolet radiation, temperature, toxins, pathogenic microbes and chemical irritants. The outer layer, the epidermis, adapts to the external environment and traps moisture to prevent the skin from drying out (Flanagan, 2013). The outermost layer of the epidermis, the stratum corneum, provides the skin's main protective barrier (Collier, 2016).

The stratum corneum can be described as the 'bricks and mortar' of the skin. The 'bricks' are the flattened, protein-rich, corneocytes (formed by keratinocytes in the epidermis), which attract and accommodate water; these are held together by the 'mortar', a lipid-rich matrix containing desmosomes (protein rivets), which maintain the stratum corneum's structure and stability, creating a protective layer that supports epidermal permeability (Voegeli, 2016).

The whole structure is important in regulating water movement in and out of the stratum corneum, preventing dehydration and overhydration (Del Rosso and Levin, 2011). Corneocytes also contain proteins, sugars and other compounds that provide natural moisturising factors, which enhance flexibility and elasticity (Bardsley, 2013), preserving the skin's barrier function (Beeckman et al, 2015).

Impact of excessive moisture on the skin

Water is regulated within the epidermis through a process known as transepidermal water loss (TEWL) (Lumbers, 2019). Preventing excessive fluid gain or loss ensures an effective barrier function (Voegeli, 2016). If the skin is exposed to too much moisture, it becomes overhydrated and is prone to

Alison Parnham, Teaching Associate/Clinical Nurse Specialist–Tissue Viability, University of Nottingham and Nottingham City Care

Dale Copson, National Clinical Services Manager UK, Medicareplus International, London, dale.copson@medicareplus.co.uk

Tanya Loban, Clinical Nurse Advisor, Medicareplus International, London

Accepted for publication: May 2020

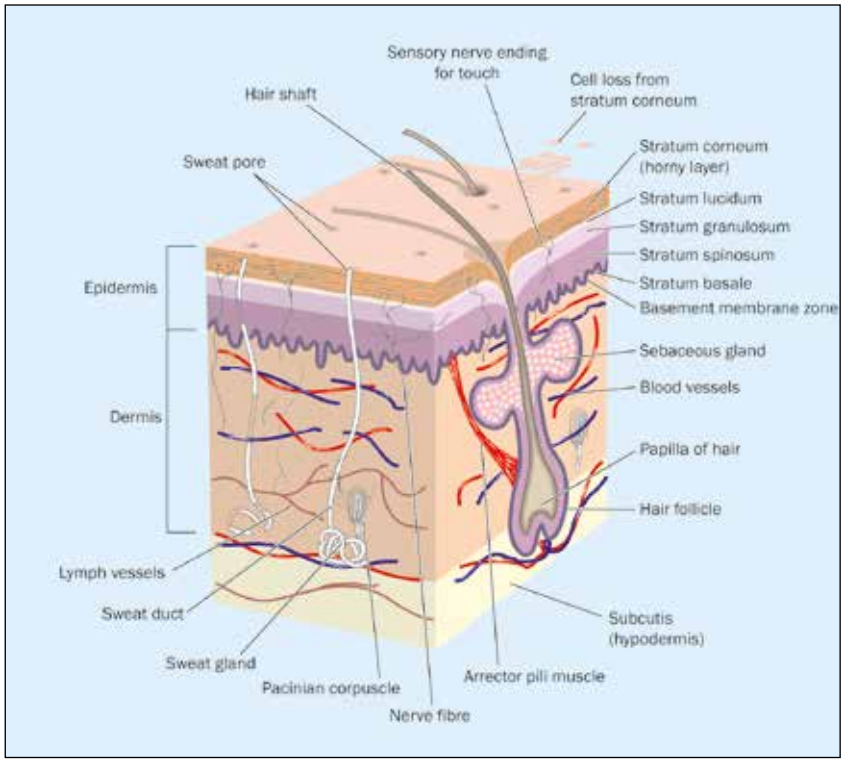

Figure 1. Cross-section of the skin

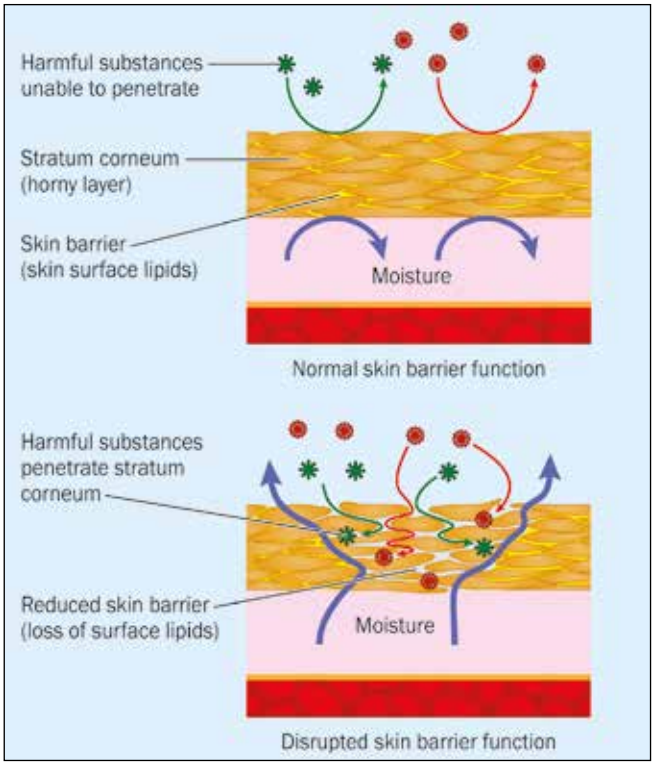

Figure 2. Normal and disrupted skin barrier

maceration, resulting in a high TEWL. A high TEWL can result in the following:

- Easier access for irritants and microorganisms to penetrate the skin, impairing its barrier function and increasing the risk of cutaneous infection (Beeckman, 2016)
- Reduce the skin's integrity to mechanical forces (friction and shear), which can exacerbate the risk of pressure ulceration (Beeckman et al, 2015)
- Disruption of the skin's acid mantle; the ideal pH of the skin is around 5.5 (slightly acidic). This acidic environment supports the resident commensal bacteria on the surface of the skin and helps lower the risk of opportunistic infection while also minimising the possibility of bacterial colonisation (Flanagan, 2013).

Box 1. Functions of the skin

- Protection
- Temperature regulation
- Sensation
- Endocrine production
- Absorption
- Excretion

Source: Tortora and Derrickson (2011)

Causes of MASD

MASD is the umbrella term used to describe the different manifestations of skin damage (Dowsett and Allen, 2013). Simply put, it is an irritant contact dermatitis commonly caused by IAD, periwound skin damage, intertriginous dermatitis (ITD) (also known as intertrigo) and peristomal moisture-associated dermatitis (*Figure 3*).

Incontinence-associated dermatitis

An estimated 14 million adults experience incontinence in England alone, and this population is at a very high risk of developing IAD (Lumbers, 2019). IAD is the most common and widely recognised form of MASD, which is caused by prolonged or chronic exposure of urine and/or stool, particularly liquid stool, on the skin (Ousey and O'Connor, 2017). It can appear on the peri-anal area, scrotum, groin, buttocks, gluteal cleft and extend down to the inner and posterior thighs (Beeckman et al, 2015).

Urea in urine is converted to ammonia, resulting in a more alkaline environment; similarly, liquid faeces have higher levels of protein- and lipid-digesting enzymes, which can raise the pH further (making the enzymes even more active), increasing the risk of infection (Beeckman et al, 2015). Where both urine and faeces are in contact with the skin, skin damage can be expedited, causing maceration, microbial invasion and potential denudement or epidermal skin stripping (Browning et al, 2018). This manifestation not only causes pain but also predisposes the skin to prolonged erosion and the patient to subsequent infection. The impact of IAD on patients' wellbeing cannot be overestimated.

Periwound skin damage

In comparison with acute wound exudate during the process of normal wound healing, where it is deemed to be healthy and nurturing, chronic wound exudate is considered corrosive and has been proven to be destructive to the wound bed and surrounding skin because of the high levels of harmful proteolytic enzymes present (Voegli, 2012). If the volume of wound exudate cannot be contained within a wound dressing, there is a high likelihood of it leaking out on to the periwound skin (within 4 cm of the wound edges), causing the skin to become macerated and excoriated (Dowsett and Allen, 2013).

This type of damage may be aggravated by vigorous removal of adhesive wound dressings.

Intertriginous dermatitis

Beeckman et al (2015) highlighted that ITD occurs when sweat is trapped in skin folds with minimal air circulation. Simply put, it is a perspiration rash, commonly occurring under the breasts, in the groin, on the inner thighs, in abdominal creases and in the armpits.

When sweat cannot evaporate, the stratum corneum becomes overhydrated and macerated. This facilitates friction damage, which, in turn, leads to localised inflammation and denudation of the skin, making the area more prone to bacterial and fungal infection. The damage often observed is typically mirrored on both sides of the fold (Dowsett and Allen, 2013).

Obesity raises the risk of ITD because of excessive skin folds, increased perspiration to regulate body temperature and a higher skin surface pH because of a decrease in sebum production (Man et al, 2009), a thinner dermal layer and decreased collagen content (Tobin, 2017). These make the acid mantle a less effective natural barrier against microbial invasion on the skin surface.

Peristomal moisture-associated dermatitis

This type of damage is a known complication of ostomies and is most commonly seen with colostomies and ileostomies (Ratliff, 2010; Gray et al, 2013). It is described as 'inflammation and erosion of skin that begins at the stoma/skin junction and can extend outward in a 10 cm radius' (Colwell et al, 2011). Damage occurs when alkaline output from the stoma comes into contact with the surrounding skin; it may occur soon after stoma formation surgery and reduces as patients become more competent at caring for their stoma. Alternatively, it may develop later if body shape changes because of weight loss or gain (Beeckman et al, 2015).

This form of dermatitis can happen rapidly, causing distress for the patient, resulting in pain, difficulty in obtaining a satisfactory seal from the appliance and huge embarrassment from leakages (Rae and Pridham, 2018). Management depends upon the correct choice and application of the containment device, along with a structured skin care routine (Gray et al, 2013).

Assessment and classification of skin damage

Identifying the most effective management strategy for MASD depends on several processes, including:

- Assessment of the underlying aetiology
- A comprehensive skin assessment to identify the extent of the tissue damage
- Treatment
- Elimination of the cause through preventive protocols.

Following accurate assessment, management strategies must focus on cleansing, treatment and prevention. Beeckman (2017) reported significant gaps in knowledge relating to clinical observation of MASD, differentiation of aetiology and effective clinical decision making, supporting the implementation of classification tools to improve practice.

In a prospective comparative study of 89 patients, Montague et al (2019) analysed the accuracy of nurses' assessment and documentation of IAD before and after the implementation of an IAD severity instrument, which included a severity score, anatomical locations and a range of photographs. The results were statistically significant showing an increase in inter-rater reliability from 34% to 84%, and led to increased awareness, more accurate reporting and more effective clinical decision-making.

Figure 3. Types of moisture-associated skin damage

Evidence relating to MASD classification is limited. The recently published Ghent Global IAD Categorisation Tool provides alphanumeric categories and subcategories to describe the extent of skin damage (Beeckman et al, 2017). However, it was specific to one type of MASD, namely IAD. Although it was validated by 823 clinicians from 30 countries, the authors have observed that practitioners in the UK have frequently suggested that its similarity to the classification system issued by the European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance (2019) causes confusion when documenting the extent of skin damage.

This confusion may become more apparent following recent recommendations from NHS Improvement (NSI) (2018a) that clinicians should report MASD as well as pressure ulcers of category 2 and above. Interestingly, the aetiology or the severity of the MASD is not specified.

Skin Moisture Alert Reporting Tool (*S.M.A.R.T.*)

In December 2019, the National Institute of Health and Care Excellence (2019) endorsed a new Skin Moisture Alert Reporting Tool (*S.M.A.R.T.*) (*Figure 4*).

This resource summarises and illustrates all four types of MASD. It also offers simple categorisation terminology regarding the extent of moisture damage, using the terms 'mild',

Box 2. Risk factors for impaired skin integrity

- Limited mobility
- Obesity
- Pain
- Pyrexia
- Cognitive impairment
- Antibiotics
- Immunosuppressants
- Urinary or faecal incontinence
- Profuse sweating
- Excessive wound exudate
- Leaking stoma effluent
- Poor skin hygiene
- Use of alkaline soaps and antibacterial skin cleansers
- Inappropriate continence devices
- Use of pad-blocking barrier creams
- Drying skin with abrasive cloths

Adapted from: Beeckman (2017) and Wounds UK (2018)

'moderate' or 'severe'. Each category offers a clear definition as to what constitutes that level of damage and is supplemented with a general management plan. Feedback to the author and other practitioners has been encouraging, with a consensus that the tool is clear, concise and easily understood by any level of user. Further work is to be undertaken to quantify user feedback and measure its reliability and validity.

Prevention and management strategies

Early recognition of patients at risk of MASD is an essential component of prevention, along with good skin hygiene (Wounds UK, 2018). The NHSI (2018b) pressure ulcer curriculum states that risk factors associated with impaired skin integrity should be identified to optimise timely and effective interventions (*Box 2*).

Early recognition could be promoted through the implementation of a valid assessment tool and electronic core care plans for the prevention and management of MASD.

Beeckman et al (2015) have stated that fundamental aspects of MASD management must be based on skin cleansing to remove contaminants and microorganisms with the application of a skin moisturiser and an impermeable barrier that provides total skin protection. There has been a plethora of comparable evidence in the literature over a number of years supporting the necessity for a structured skin care regime (Hoggarth et al, 2005; Cooper et al, 2008; Flynn and Williams, 2011; Bianchi, 2012; Holroyd and Graham, 2014; Ousey and O'Connor, 2017). However, such practice is not implemented in all healthcare settings, with evidence suggesting soap and water are still being used, which is considered to be suboptimal care (Beeckman et al, 2011).

Skin cleansing

Skin cleansing is based on routine personal hygiene (Wounds

S.M.A.R.T. SKIN MOISTURE ALERT REPORTING TOOL

RECOGNISED & ENDORSED BY NICE

Medicareplus INTERNATIONAL Est. 2008
www.medicareplus.co.uk

CATEGORISATION†	DESCRIPTION†	TREATMENT	INCONTINENCE-ASSOCIATED DERMATITIS*	INTERTRIGO**	PERIWOUND DERMATITIS***	PERISTOMAL DERMATITIS	OTHER CAUSES OF MASD
MILD SKIN DAMAGE	• Erythema (redness) of skin only • Dry and intact but irritated and at risk of breakdown	Apply barrier cream every third wash/twice a day		Barrier cream not indicated for use	Barrier cream not indicated for use	Barrier cream not indicated for use	**Skin Care** Use pH balanced cleanser or emollient Pat dry
MODERATE SKIN DAMAGE	• Erythema with less than 50% damaged skin • Oozing and/or bleeding may be present	Apply barrier film once a day					• Tracheostomy • PEG sites • Vascular Access sites • Hypersalivation
SEVERE SKIN DAMAGE	• Erythema with more than 50% damaged skin • Oozing and/or bleeding usually present	Use pH balanced skin cleanser to cleanse, pat dry and apply barrier ointment at every cleanse		 ◊If using anti-fungal cream for infected area, wait for cream to dry and apply barrier ointment	NOT INDICATED FOR USE Exclude wound infection If a limb, support and elevate	NOT INDICATED FOR USE	**Infection** Barrier products are not indicated if infection is present **Except for Intertrigo**◊ Treat infection as per guidance before commencing use of barrier product

Figure 4. Skin Moisture Alert Reporting Tool (S.M.A.R.T.)

UK, 2018) and failure to maintain this for patients could be considered clinically negligent (Nursing and Midwifery Council, 2018). Furthermore, a lack of effective skin cleansing increases the risk of fungal infection caused by *Candida albicans* with the potential for a secondary infection caused by *Staphylococcus aureus* (Flynn and Williams, 2011). Skin cleansing is an integral component of maintaining skin integrity (Wounds UK, 2018) and should be carried out after every episode of skin contamination from urinary or faecal incontinence (Ousey and O'Connor, 2017), peristomal effluent leakage and periwound exudate, and following episodes of profuse sweating (Dowsett and Allen, 2013).

Soap and water solution is alkaline, which alters the protective acidic mantle of skin and removes the natural sebum, resulting in drier skin, less protection from skin commensals and a greater risk of MASD (Beldon, 2008). Furthermore, cloths or towels used to wash and dry skin can be abrasive, and rubbing the skin dry can make the skin more susceptible to damage from shear forces (Beeckman et al, 2011). After washing, skin should be gently patted dry or allowed to air dry.

Non-rinse cleansers are advocated to effectively remove skin contaminants; they are pH-balanced soap substitutes, containing mild surfactants and provided in a spray foam for single patient use (Beldon, 2012). They are indicated because they not only maintain the skin's protective acidic mantle but also avoid the astringent effect soaps have on the skin (Payne, 2017). They also omit the need to dry the skin, so reduce the risks of shear damage and pain (Cooper et al, 2008).

In a recent comparative trial on tissue viability, Harries and Begg (2016) examined the effect of non-rinse cleansers on the incidence of IAD. Data were collated before and after the cleansing regime was introduced at five hospital wards over a period of 13 weeks by the lead continence advisor. Although patients were regularly assessed, which strengthens the reliability of the findings, a severity assessment tool was not used, which brings the validity of the study into question. Statistical significance was not tested but, nonetheless, the overall results show IAD fell by an average of 74% after the non-rinse cleansers were introduced, with a 91% inter-rater agreement. Therefore, the findings could be transferable to all types of MASD.

Barrier protection

Protective barrier products include creams, films and ointments. They are water repellent and commonly contain petrolatum, zinc oxide or dimethicone (Bardsley, 2013), and each product should be single patient use only to avoid cross-contamination (Payne, 2017).

Dimethicone products are silicone based and provide a protective film across a surface (Voegeli, 2016), without interfering with pad absorbency for patients with urinary or faecal incontinence (Southgate and Bradbury, 2016). They should be considered for all types of MASD where skin protection is required.

Films have the advantage of drying quickly on the skin surface and reducing the risk of skin stripping on dressing removal, creams are water based and are more likely to moisturise as well as act as a barrier, and ointments are thicker and therefore more occlusive (Fletcher, 2015). Protective films in the form of applicators, sprays and wipes for peristomal MASD are less likely to inhibit adherence of the stoma appliance than barrier creams (Metcalf, 2018).

7 October 2019: initial presentation | 30 December: regimen started | 31 January: resolved

Alison Parnham

Figure 5. Case study 1

25 September 2019: initial presentation | 24 October: regimen started | 7 January: resolved

Alison Parnham

Figure 6. Case study 2

4 March 2020: regimen started | 19 March 2020: week 2 | 31 March 2020: week 4

Alison Parnham

Figure 7. Case study 3

Acton et al (2020) evaluated the effect of a topical film barrier on IAD using both a classification tool and a validated assessment tool. Eighteen patients were recruited with varying levels of IAD severity and five patients were excluded during the trial period because of adverse events. Most of the remaining patients (11 out of 13) had category 2 IAD (defined as skin loss or denudement); 85% were reported to have healed at the end of the evaluation period, which was an average of 13 days. However, two patients with category 2 IAD and infection did not heal, and it was not considered in the study whether this was as a result of fungal infection, which is a common complication of IAD. Although the sample size was relatively small and included only patients with IAD, the results are transferable to other types of MASD. It must be remembered that, although case series are relatively low in the nursing research hierarchy of evidence (Broomfield, 2011), they can provide invaluable real-life evidence towards advancing clinical practice. The findings support the efficacy of using skin protectants for patients with IAD. These findings are supported in the literature (Holroyd and

KEY POINTS

- The skin is the largest organ of the body. It has several important physiological functions and is the body's main protective barrier
- Moisture-associated skin damage (MASD) can reduce the integrity of the skin, leading to infection and pain as well as distress for patients
- Incontinence-associated dermatitis, intertriginous dermatitis/intertrigo, periwound moisture-associated dermatitis and peristomal moisture-associated dermatitis are the four most common types of MASD
- Practitioners can find it difficult to categorise MASD types and their extent; the Skin Moisture Alert Reporting Tool (*S.M.A.R.T.*) is a useful resource to support with categorising the extent of MASD
- Adopting a structured skin care regimen can have a significant effect on patient outcomes

Graham, 2014; Holroyd, 2015; Southgate and Bradbury, 2016; Callaghan et al, 2018).

An earlier study also highlighted the benefits of using protective barriers in 95 patients with MASD of differential aetiologies, including IAD, peristomal and periwound moisture damage and skin rashes from sweating (Stephen-Haynes and Stephens, 2013). What was less clear from the study was when it was appropriate to use either a barrier cream or a film.

Fundamental to effective MASD prevention and management are patient assessment, management of the underlying cause and implementation of a structured skin care regimen (Voegeli, 2016). Ongoing monitoring and assessment of progress provides the opportunity to step up or step down skin care regimens according to individual patient need to establish a cost-effective goal.

Case studies

The following case studies reflect on the clinical outcomes of patients with MASD using a skin care regimen based on the principles of Total Barrier Protection (TBP) (Medicareplus International). TBP is an integrated MASD treatment strategy that focuses on prevention, protection, and repairing and restoring the integrity of compromised or damaged skin (Bradbury et al, 2017). It provides a clear, cost-effective rationale, ensuring that patients receive the most appropriate product at the right time. Following these principles can reduce product misuse, save money, and improve and simplify treatment choices (Hughes, 2016).

Case study 1

A 75-year-old patient lived at home with her husband and received support from carers. She was diagnosed with multiple sclerosis 50 years ago and was confined to a hospital bed on the ground floor. She had been known to the district nursing team since 2008 and was recently referred to the tissue viability team.

She developed IAD in July 2019, which was treated with a barrier film but did not resolve the skin problem. She refused to have a continence assessment or change the type of pads her husband was buying and, as a result, the IAD spread into the groins and creases in her lower abdomen. The MASD did not resolve with conventional products. Medi Derma-Pro Skin Protectant Ointment and Medi Derma-Pro Foam and Spray Incontinence Cleanser (Medicareplus) were started using the following regimen:

- The Medi Derma-Pro Foam and Spray Incontinence Cleanser was applied directly to the skin, which was gently cleansed with a soft, disposable wipe (no rinse required)
- The area was allowed to air dry
- A thin coating Medi Derma-Pro Skin Protectant Ointment was applied over the affected area
- This was repeated after every episode of incontinence.

Healing was complete by week 7 and a clinical decision was made to step down to Medi Derma-S Total Barrier Cream to prevent recurrence in the long term.

Case study 2

The patient was a 71-year-old woman living in a residential care home, who was referred to the tissue viability service because the current treatment regimen of washing with warm wet flannels and a barrier cream was proving ineffective. Using the *S.M.A.R.T.* resource, the damage was classified as severe IAD. The skin care regimen began on 24 December as below and the *S.M.A.R.T.* tool was used to monitor progress:

- The Medi Derma-Pro Foam and Spray Incontinence Cleanser was applied directly to the skin, which was gently cleansed with a soft, disposable wipe (no rinse required), not flannels
- It was patted dry with a soft disposable wipe
- A thin coating of Medi Derma-Pro Skin Protectant Ointment was applied over the affected area without rubbing the skin
- This was repeated after every episode of incontinence.

By 7 January, the IAD had resolved.

Case study 3

The patient was an 83-year-old woman with a past history of cerebrovascular accident, myocardial infarction and type 2 diabetes. She was confined to bed and lived with her daughter, with support from carers. Recurrent UTIs were a problem, as well as burning pain associated with IAD to the groins and vulval region, with evidence of vulvular folliculitis. Previous treatments had been prescribed with little effect.

On 4 March, Medi Derma-Pro Skin Protectant Ointment and Foam and Spray Incontinence Cleanser was recommended after every episode of incontinence. There were significant reductions in erythema and pain by 31 March. The patient was stepped down to Medi Derma-S Total Barrier Cream.

Summary

For these patients, the principles of Total Barrier Protection demonstrated how this structured skin care regimen alleviated complications associated with non-infected IAD. It also implies that these strategies may also be adopted for patients experiencing other forms of MASD.

Conclusion

Moisture-associated skin damage (MASD), caused when the skin has prolonged or continuous exposure to excessive moisture, can greatly affect patient wellbeing so it needs to be identified, its cause addressed, treated and prevented.

The *S.M.A.R.T.* resource offers a simple, consistent approach to recognising the four main manifestations of MASD. It provides clear definition regarding the extent of the damage and reaffirms the importance of incorporating a structured skin care regime, ultimately benefiting patients.

As specialist practitioners, nurses have a responsibility to reduce the impact of MASD by raising awareness that this condition can affect anyone during their lifetime. Practitioners need to be able to recognise the risk factors for MASD and acquire the knowledge and understanding to start effective prevention and treatment strategies. **BJN**

Conflict of interest: Dale Copson and Tanya Loban are employees of Medicareplus International. All products were provided free of charge for the case studies used in this article

Acton C, Ivins N, Bainbridge P, Browning P. Management of incontinence-associated dermatitis patients using a skin protectant in acute care: a case series. J Wound Care. 2020;29(1):18–26. https://doi.org/10.12968/jowc.2020.29.1.18

Bardsley A. Prevention and management of incontinence-associated dermatitis. Nurs Stand. 2013;27(44):41–46. https://doi.org/10.7748/ns2013.07.27.44.41.e7618

Beeckman D. The PuClas3 project. Presentation. 2016. https://tinyurl.com/y96lc7ws (accessed 14 May 2020)

Beeckman D. A decade of research on incontinence-associated dermatitis (IAD): Evidence, knowledge gaps and next steps. J Tissue Viability. 2017;26(1):47–56. https://doi.org/10.1016/j.jtv.2016.02.004

Beeckman D, Woodward S, Gray M. Incontinence-associated dermatitis: step-by-step prevention and treatment. Br J Community Nurs. 2011;16(8):382–389. https://doi.org/10.12968/bjcn.2011.16.8.382

Beeckman D, Campbell J, Campbell K et al. Incontinence associated dermatitis: moving prevention forward. Proceedings of the Global IAD Expert Panel. Wounds International. 2015. https://tinyurl.com/ycmyfv2d (accessed 8 June 2020)

Beeckman D, Van den Bussche K, Alves P et al. The Ghent Global IAD Categorisation Tool. Skin Integrity Research Group, Ghent University, Ghent. 2017. https://tinyurl.com/y8y3zq8x (accessed 15 May 2020)

Beldon P. Moisture lesions: the effect of urine and faeces on the skin. Wound Essentials. 2008;3:82–87

Beldon P. The latest advances in skin protection. Wounds UK; 2012;8(2): S17–19

Bianchi J. Top tips on avoidance of incontinence associated dermatitis. Wounds UK. 2012;8(2): S6–S8

Bradbury S, Price J, Gaffing J, Yoro E. Evaluating an incontinence cleanser and skin protectant ointment for managing incontinence-associated dermatitis. Wounds UK. 2017;13(1):79–85.

Broomfield, B. (2011) A nurse's guide to the hierarchy of research designs and evidence. Journal of Advanced Nursing. 2011;33(3): 38–43

Browning P, Beeckman D, White R, Connolly R, Rodgers A, Maclean G, Fumarola S, Harker J, Murray V, Foster S. Report of the proceedings of a UK skin safety advisory group. Br J Nurs. 2018;27(20):S34–S40. https://doi.org/10.12968/bjon.2018.27.Sup20.S34

Callaghan R, Hunt, S., Mohamud, S, Small B. Case study series: Medi-Derma S Total Barrier Cream for the prevention of mild incontinence associated dermatitis. Wounds UK 2018;14(1):76–82

Collier M, Simon D. Protecting vulnerable skin from moisture-associated skin damage. Br J Nurs. 2016;25(20):S26–S32. https://doi.org/10.12968/bjon.2016.25.20.S26

Colwell JC, Ratliff CR, Goldberg M et al. MASD Part 3. J Wound Ostomy Continence Nurs. 2011;38(5):541–553. https://doi.org/10.1097/WON.0b013e31822acd95

Cooper P, Gray D, Russell F. Comparing Tena Wash Mousse with Clinisan Foam Cleanser: the results of a comparative study. Wounds UK, 2008;4(3):12–21

Defloor T, Schoonhoven L, Fletcher J, et al. Statement of the European Pressure Ulcer Advisory Panel—pressure ulcer classification: differentiation between pressure ulcers and moisture lesions. J Wound Ostomy Continence Nurs. 2005;32(5):302–306. https://doi.org/10.1097/00152192-200509000-00006

Del Rosso JQ, Levin J. The clinical relevance of maintaining the functional integrity of the stratum corneum in both healthy and disease-affected skin. J Clin Aesthet Dermatol. 2011;4(9):22–42

Dowsett C, Allen L. Moisture associated skin damage made easy. Wounds UK 2013; 9(4):1–4

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: quick reference guide 2019. EPUAP, NPIAP, PPPIA; 2019. www.epuap.org/download/11182 (accessed 15 May 2020)

Flanagan M. Wound healing and skin integrity: principles and practice. Chichester?]: John Wiley and Sons; 2013

Fletcher J. Appropriate selection and use of barrier creams and films. Wound Essentials. 2015;10(2): 64–68

Flynn D, Williams S. Barrier creams for skin breakdown. Nursing and Residential Care. 2011;13(11):553–558. https://doi.org/10.12968/nrec.2011.13.11.553

Gray M, Colwell JC, Doughty D et al. Peristomal moisture-associated skin damage in adults with fecal ostomies: a comprehensive review and consensus. J Wound Ostomy Continence Nurs. 2013;40(4):389–399. https://doi.org/10.1097/WON.0b013e3182944340

Guy H. The difference between moisture lesions and pressure ulcers. Wound Essentials. 2012;1:36–44

Harries FJ, Begg PA. Non-rinse skin cleansers: the way forward in preventing incontinence related moisture lesions? J Wound Care. 2016;25(5):268–276. https://doi.org/10.12968/jowc.2016.25.5.268

Hoggarth A, Waring M, Alexander J, Greenwood A, Callaghan T. A controlled, three-part trial to investigate the skin pharmacology and physiological barrier function of the skin hydration properties of six skin protectants. Ostomy Wound Manage. 2005;51(12):30–42

Holroyd S. Incontinence-associated dermatitis: identification, prevention and care. Br J Nurs. 2015;24 Sup 9:S37–S43. https://doi.org/10.12968/bjon.2015.24.Sup9.S37

Holroyd S, Graham K. Prevention and management of incontinence-associated dermatitis using a barrier cream. Br J Community Nurs. 2014;suppl wound care:S32-S38. https://doi.org/10.12968/bjcn.2014.19.Sup12.S32

Hughes M. Total Barrier Protection: protecting skin and budgets using a structured moisture damage treatment strategy. Wounds UK. 2016;12(4): 96–101

Lumbers M. How to manage incontinence-associated dermatitis in older adults. Br J Community Nurs. 2019;24(7):332–337. https://doi.org/10.12968/bjcn.2019.24.7.332

Man MQ, Xin SJ, Song SP, Cho SY, Zhang XJ, Tu CX, Feingold KR, Elias PM. Variation of skin surface pH, sebum content and stratum corneum hydration with age and gender in a large Chinese population. Skin Pharmacol Physiol. 2009;22(4):190–199. https://doi.org/10.1159/000231524

Metcalf C. Managing moisture-associated skin damage in stoma care. Br J Nurs. 2018;27(22):S6–S14. https://doi.org/10.12968/bjon.2018.27.22.S6

Montague M, Karafa M, Albert N. Assessment and documentation on incontinence-associated dermatitis after completion of a standardised instrument: a comparative study. J Wound Care. 2019;28(sup 9):S4–S11. https://doi.org/10.12968/jowc.2019.28.Sup9.S4

National Institute of Health and Care Excellence. Endorsed resource – S.M.A.R.T (Skin Moisture Alert Reporting Tool). 2019. https://tinyurl.com/y9dajdlb

NHS Improvement. Pressure ulcers: revised definition and measurement framework. 2018a. https://tinyurl.com/y2l7qqta (accessed 8 June 2020)

NHS Improvement. Pressure ulcer core curriculum. 2018b. https://improvement.nhs.uk/resources/pressure-ulcer-core-curriculum/

Nursing and Midwifery Council. Standards of proficiency for nursing associates. 2018: 24. https://tinyurl.com/y4kuqprl (accessed 8 June 2020)

Ousey K, O'Connor L. IAD made easy. Wounds UK 2017;13(1):1–6.

Payne D. Stop the rash: managing incontinence-associated dermatitis in the community. Br J Community Nurs. 2017;22 Suppl 3(Sup3):S20–S26. https://doi.org/10.12968/bjcn.2017.22.Sup3.S20

Rae W, Pridham S. Peristomal moisture-associated skin damage and the significant role of pH. WCET Journal. 2018;38(1 Suppl): S4–S7

Ratliff CR. Early peristomal skin complications reported by WOC nurses. J Wound Ostomy Continence Nurs. 2010;37(5):505–510. https://doi.org/10.1097/WON.0b013e3181edac57

Southgate G, Bradbury S. Management of incontinence-associated dermatitis with a skin barrier protectant. Br J Nurs. 2016;25(9):S20–S29. https://doi.org/10.12968/bjon.2016.25.9.S20

Stephen-Haynes J, Stephens C. Evaluation of clinical and financial outcomes of a new no-sting barrier film and barrier cream in a large UK primary care organisation. Int Wound J. 2013;10(6):689–696. https://doi.org/10.1111/j.1742-481X.2012.01045.x

Tobin DJ. Introduction to skin aging. J Tissue Viability. 2017;26(1):37–46. https://doi.org/10.1016/j.jtv.2016.03.002

Tortora GJ, Derrickson BH. Principles of anatomy and physiology. 13th edn. Chichester: John Wiley & Sons; 2011

Voegeli D. Moisture-associated skin damage: aetiology, prevention and treatment. Br J Nurs. 2012;21(9):517–521, 520–521. https://doi.org/10.12968/bjon.2012.21.9.517

Voegeli D. Incontinence-associated dermatitis: new insights into an old problem. Br J Nurs. 2016;25(5):256–262. https://doi.org/10.12968/bjon.2012.21.9.517

Wounds UK. All Wales best practice statement on the prevention and management of moisture lesions. 2014. www.wounds-uk.com/resources/details/awtvnf-prevention-and-management-of-moisture-lesions (accessed 8 June 2020)

Wounds UK. Best practice statement. Maintaining skin integrity. London: Wounds UK. 2018. www.wounds-uk.com/resources/details/maintaining-skin-integrity (accessed 8 June 2020)

Young T. Back to basics: understanding moisture-associated skin damage. Wounds UK. 2017;13(4):56–65.

CPD reflective questions

- Considering the four main types of Moisture-associated skin damage (MASD), how can the risks be minimised?
- Why is it important to differentiate between MASD and pressure ulceration?
- Having gained an insight into MASD, how do you intend to change or improve your current practice?
- What are the four key components of the Total Barrier Protection strategy?