INTERNATIONAL **BEST PRACTICE RECOMMENDATIONS**

PREVENTION AND MANAGEMENT OF **MOISTURE-ASSOCIATED SKIN DAMAGE (MASD)**

RECOMMENDATIONS FROM AN EXPERT WORKING GROUP

Wounds International

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FOREWORD

Moisture-associated skin damage (MASD) represents a significant problem and can have a negative effect on patient wellbeing and quality of life.

A group of international experts met online via Zoom in June 2020 to discuss the key issues and knowledge gaps in MASD, and to formulate Best Practice Statements to guide the prevention and management of MASD.

For the purposes of this document, the wider term of MASD has been subdivided into key areas, with specific Best Practice Statements around prevention and management for each area. These are:

- Incontinence-associated dermatitis (IAD)
- Peristomal dermatitis
- Intertriginous dermatitis (intertrigo)
- Periwound maceration.

During the meeting, we agreed to keep the umbrella term 'MASD', in order not to overload busy clinicians with differing terminology. However, it is important to note that 'moisture' is not the only relevant factor in these areas of skin damage, as explained in the document. This type of skin damage is now included under ICD-11 coding (WHO, 2020) as 'irritant contact dermatitis due to friction, sweating or contact with body fluids'.

The aim of this document is to provide clinicians with guidance for best practice in these areas of MASD, thereby contributing to improving patient outcomes and reducing the incidence of these and related skin conditions, through skin-focused prevention and management plans.

Jacqui Fletcher and Dimitri Beeckman (Co-chairs)

Overview: Key issues in MASD

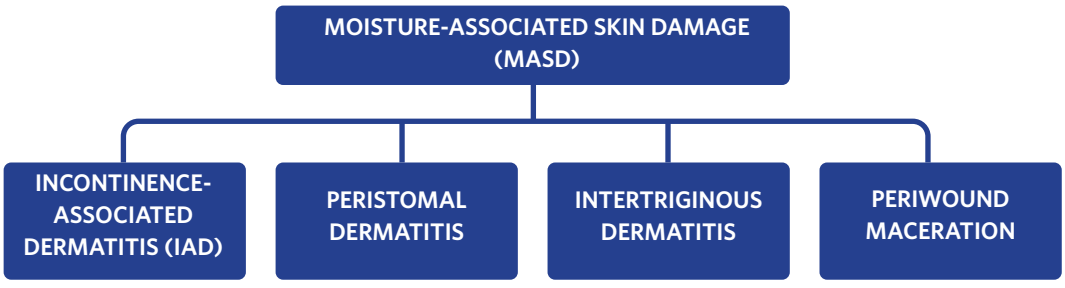
MASD is a complex and increasingly commonly recognised condition. Overexposure of the skin to bodily fluids can compromise its integrity and barrier function, making it more permeable and susceptible to damage (Gray et al, 2001; Woo et al, 2017). Individuals with MASD experience persistent symptoms that affect quality of life, including pain, burning and pruritis (Gray et al, 2011; Woo et al, 2017).

MASD is classified as an irritant-contact dermatitis; see Table 1 (WHO, 2020). Common irritants can include urine, stool, perspiration, saliva, intestinal liquids from stomas and exudate from wounds. As such, MASD is an umbrella term and forms of MASD may be subdivided into four types (see Figure 1):

- IAD
- Peristomal dermatitis (relating to colostomy, ileostomy/ ileal conduit, urostomy, suprapubic catheter, or tracheostomy)
- Intertriginous dermatitis (intertrigo: where two skin areas may touch or rub together)
- Periwound maceration.

Table 1. Types of irritant contact dermatitis according to WHO ICD-11 coding
EK02.2 Irritant contact dermatitis due to friction, sweating or contact with body fluids
EK02.20 Intertriginous dermatitis due to friction, sweating or contact with body fluids
EK02.21 Irritant contact dermatitis due to saliva
EK02.22 Irritant contact dermatitis due to incontinence
EK02.23 Irritant contact dermatitis related to stoma or fistula
EK02.24 Irritant contact dermatitis related to skin contact with protheses or sugical appliances

FIGURE 1 | Types of MASD (Gray et al, 2011)



The development of MASD involves more than bodily fluids alone. Rather, skin damage is attributable to multiple factors, including chemical irritants within the moisture source (e.g. proteases and lipases in faeces, drug metabolites), its pH, associated microorganisms on the skin surface (e.g. commensal skin flora), and mechanical factors such as friction (Gray et al, 2011).

Risk assessment and prevention strategies are of key importance in MASD. Interventions can be taken to protect the skin and prevent MASD, including the use of skin protection products, such as barrier creams, liquid polymers, and cyanoacrylates to create a protective layer on the skin surface that simultaneously maintains hydration levels while blocking external moisture and irritants (Gray et al, 2011; McNichol et al, 2018).

Emerging evidence now highlights the links between MASD and other skin conditions such as cutaneous infection and pressure ulcers (Jones et al, 2008; Beeckman et al, 2014). Adopting a holistic, integrated approach, focused on prevention strategies and the importance of skin integrity, can have overall beneficial results and help to break down barriers to effective care in practice (Beeckman et al, 2020).

Clinicians must be vigilant, both in maintaining optimal skin conditions and in diagnosing and treating early stages of MASD to prevent progression and skin breakdown (Gray et al, 2011).

Incontinence-associated dermatitis (IAD)

The term incontinence-associated dermatitis (IAD) describes the skin damage associated with exposure to urine, stool or a combination of these in adults (ICD 11 EK02.22). In babies or small children, it is also known as diaper or nappy rash (ICD 11 EH40.10), among other terms. The term IAD is preferred, as it distinguishes skin problems arising directly from contact with urine and/or faeces due to incontinence from other conditions. Further, IAD acknowledges that the condition may affect more than the perineal area and people of any age (Beeckman et al, 2015).

IAD can have a significantly detrimental effect on patients' quality of life, causing considerable discomfort and in some cases both physical and mental distress (Van den Bussche et al, 2018). From a clinician point of view, it can be difficult, time-consuming and expensive to manage in practice (Doughty et al, 2012; Beeckman et al, 2014).

When identifying risk, consider causal, indirect and contextual factors

Best Practice Statement

Identifying and managing risk

Identifying those at risk, and implementing prevention care, are key in IAD (Beeckman et al, 2015). When considering risk factors and assessing patient risk, it is important to consider causal, indirect and contextual factors (see Table 2). A causal, or direct, risk factor means that one of these risk factors must be present for the diagnosis of IAD to be made.

Table 2. Examples of causal and indirect risk factors for IAD (adapted from Beeckman et al, 2015)

Causal	■ Type of incontinence - Urine, faeces or both - Solid or liquid (liquid stool poses greater risk)
Indirect	■ Use/non-use of diapers ■ Exposure time ■ Frequency and volume ■ Some foods/drugs in urine or stool ■ Mechanical force (e.g. based on positioning) ■ Poor skin condition ■ Type and frequency of washing ■ Use of occlusive containment products/cleansing ■ Compromised mobility ■ Diabetes ■ Increased age ■ Psychosocial factors ■ Diminished cognitive awareness ■ Inadequate personal hygiene ■ Medication (e.g. antibiotics, immunosuppressants) ■ Malnutrition or infrequent/inadequate intake of food or fluids ■ Smoking ■ Critical illness ■ Fever ■ Low oxygen saturation

Identifying patients at increased risk

In assessing potential risk factors, an observational study in critically ill patients with faecal incontinence (Van Damme et al, 2018) found that factors including liquid stool, diabetes, advanced age, smoking, non-use of diapers, fever, and low oxygen saturation were independently associated with IAD. However, accurate risk assessment and classification tools are required (Beeckman et al, 2015).

It is vital to recognise patients at increased risk of developing IAD (e.g. liquid stool or diarrhoea) and implement appropriate prevention strategies

Best Practice Statement

In the critical care setting, data suggest that faecal incontinence may be an underestimated problem (with surveyed prevalence between 9 to 37% of patients), which is associated with a high use of nursing time (Bayón Garcia et al, 2011). Patients with faecal incontinence in this setting commonly had compromised skin integrity: perineal dermatitis, moisture lesions or sacral pressure ulcers. However, staff reported moderately low awareness levels of the clinical challenges involved in management and use of faecal management systems was low.

Among staff where awareness was higher, key reported benefits of faecal management systems included: reduced risk of cross-contamination and infection, reduced risk of skin breakdown, and improved patient comfort and dignity (Bayón Garcia et al, 2011).

Managing continence

As a priority, wherever possible, the cause of incontinence should be identified and eliminated, and treatment options examined if possible – although this may be due to a range of factors including health conditions and mobility issues (Wishin et al, 2008; Beeckman et al, 2020). This should include evaluation of bladder and kidney function regarding urinary incontinence, and that of the intestine and colon in the case of faecal incontinence (Beele et al, 2017).

If continence enhancement is not possible, suitable incontinence products should be used and non-invasive behavioural interventions implemented (Beeckman et al, 2018). Behavioural interventions may include nutritional and fluid management, mobility enhancement, and use of different toileting techniques (Wishin et al, 2008; Beeckman et al, 2020).

The cause of incontinence should be identified and managed

Best Practice Statement

While IAD does not only affect elderly people, evidence from studies involving elderly nursing home residents suggests that structured toileting and exercise interventions can improve incontinence (Bates-Jensen et al, 2003; Beeckman et al, 2020). The type and frequency of incontinence should be re-assessed on regular basis, in order to tailor incontinence management strategies to the individual and assess the risk of skin-related damage (Beeckman et al, 2018).

Wherever possible, indirect risk factors should be mitigated. This may involve addressing comorbidities or any psychosocial issues that can be optimised (Beeckman et al, 2020).

Skin cleansing

It is recommended to limit exposure to cleansing agents and to use soap substitutes and leave-on products with physical protective properties. Mild, low-irritating surfactants and low pH-cleansers

Use a cleanser with a mild surfactant and consider cleansing techniques; soap and water should be avoided to maintain the skin's normal pH

Best Practice Statement

For patients with IAD, use a skin protectant that can alleviate pain or improve comfort; for patients at risk for IAD, use a skin protectant to repell moisture and irritants

Best Practice Statement

should be used, in conjunction with lukewarm water and soft cloths (Lichterfeld-Kottner et al, 2020).

The skin of patients who are incontinent should be cleansed at least once daily and after each episode of faecal incontinence (Beeckman et al, 2015).

Skin protection

It is important to note the difference between moisturisers and moisture barriers: moisturisers are intended to hydrate the skin, whereas moisture barriers should repel moisture and irritants (All Wales Tissue Viability Forum and All Wales Continence Forum, 2014). Moisture barriers can be delivered as polymeric films, creams, ointments or pastes. However, limited evidence is available comparing the efficacy of moisture barriers (Beeckman et al, 2016). Polymer-based barriers have the advantage of being both waterproof and breathable; in contrast to pastes and ointments, which are occlusive.

The performance of the principal ingredients will vary according to the overall formulation and usage. All products should be used according to manufacturers' instructions.

In patients with IAD and mobility issues, there may be a need to use dressings on fragile areas or wounds that are in contact with surfaces while sitting or lying down (e.g. wheelchair cushions or beds), due to friction and shear in connection with transfers and changes of position. Acrylate terpolymer and elastomeric barrier film products can help to protect against friction, which might be a consideration for use in these patients.

Classification and documentation

Accurate diagnosis should differentiate IAD from other potential conditions or causes. It should be noted that there is an association between IAD, its most important aetiological factors (incontinence and moisture), and PUs (Beeckman et al, 2014). Studies on this have noted that there may be confusion, with IAD being classified as a PU (Beeckman et al, 2014). See Table 3 for further information on differentiating IAD and PUs.

Various classification tools are in use for IAD, and the lack of consistency in language and terminology can cause issues with classification. The Ghent Global IAD Classification Tool (GLOBIAD) may be used to aid consistency (Beeckman et al, 2018). See Table 4 for classification using the GLOBIAD tool.

Table 3. Differentiation between IAD and pressure ulcer (adapted from Back et al, 2011 and Beeckman et al, 2011; published by Wounds International, 2015)

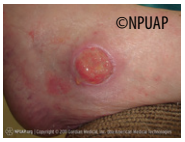
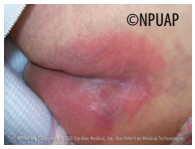
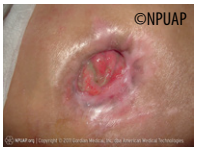
Parameter	IAD	Pressure ulcer
History	Urinary and/or faecal incontinence	Exposure to pressure/shear
Symptoms	Pain, burning, itching, tingling	Pain
Location	Affects perineum, perigenital, peristomal area; buttocks; gluteal fold; medial and posterior aspects of upper thighs; lower back; may extend over bony prominence	Usually over bony prominence or associated with location of a medical device
Shape/edges	Affected area is diffuse with poorly defined edges/ may be blotchy	Distinct edges or margins 
Presentation/depth	Intact skin with erythema (blanchable/non-blanchable), with/without superficial/ partial-thickness skin loss 	1. Presentation varies from intact skin with non-blanchable erythema to full-thickness skin loss 2. Base of wound may contain non-viable tissue 
Other	Secondary superficial skin infection (e.g. candidiasis) may be present	Secondary soft tissue infection may be present

Table 4. Ghent Global IAD Categorisation Tool (Beeckman et al, 2018)

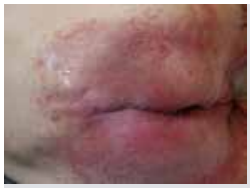
Category 1: Persistent redness

A - Persistent redness without clinical signs of infection

Critical criterion
- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.

Additional criteria
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

1B - Persistent redness with clinical signs of infection



Critical criteria
- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection).

Additional criteria
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- The skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Category 2: Skin loss

2A - Skin loss without clinical signs of infection

Critical criterion
- Skin loss
  Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.

Additional criteria
- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

2B - Skin loss with clinical signs of infection

Critical criteria
- Skin loss
  Skin loss may present as skin erosion (may result from damaged/ eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection), slough visible in the wound bed (yellow/brown/greyish), green appearance within the wound bed (suggesting a bacterial infection with Pseudomonas aeruginosa), excessive exudate levels, purulent exudate (pus) or a shiny appearance of the wound bed.

Additional criteria
- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Peristomal dermatitis

There is a need to standardise and promote better understanding of language and terminology relating to peristomal dermatitis. The term 'stoma' refers to any surgically created opening made into a hollow organ, especially one on the surface of the body leading to the gut or trachea. An abdominal stoma is formed by exteriorising part of the bowel onto the abdominal wall to allow waste to be diverted into a pouch worn on the abdomen. Stomas can arise from any part of the GI tract, and urinary stomas are formed by connecting the ureters to a section of ileum that is resected from GI continuity and used as a conduit; a tracheostomy is a stoma in the true sense of the word but is created in order to maintain the airway.

Peristomal dermatitis refers to skin damage where there is a clear interaction between the skin and the stoma effluent/fluids/secretion/output. Peristomal dermatitis results in inflammation or erosion of the skin due to moisture from faecal, urinary, and chemical irritants beginning at the mucocutaneous junction, which can then spread outwards to affect the surrounding skin. More than 50% of individuals with ostomies experience leakage (Woo et al, 2017). A further study identified that approximately one-third of patients with a stoma who were followed up over a 5-year study period had evidence of skin complications within 90 days of surgery (Taneja et al, 2017). Patients living with an ileostomy are more likely to experience peristomal MASD than were patients living with a colostomy (Colwell et al, 2017; Nagano, 2019).

Risk factors

The following factors increase the risk of developing peristomal dermatitis (Hoeflok et al, 2017):

- Abdominal anatomy: creasing of the skin when changing positions (standing, sitting, supine)
- Location of stoma (e.g. in the GI tract)
- Stoma construction, including degree of protrusion and position of the lumen on the abdomen
- Incorrect pouch, changing technique and/or wear time
- Increased perspiration or exposure to external moisture, which may disrupt the ability of the stoma base plate to fix to the skin, allowing effluent to come into contact with skin (e.g. showering, swimming)
- Incorrect values for how much different types of stoma should be spouted for effective management.

Skin protection and management

The pouching system should be regularly re-evaluated to ensure proper fitting, with the skin barrier suited to the type of output. For abdominal stomas, the first line of protection should be to ensure skin is clean and dry prior to application of the pouch and the focus on ensuring a good fit and seal (i.e. sizing the aperture and fitting with body contours).

Skin protection should be considered in patients prone to skin damage and those who have risk of developing MARSI

Best Practice Statement

When skin damage/dermatitis has occurred, topical products (e.g. skin barrier powders, pastes, rings) may be used to absorb moisture, provide an additional physical barrier, reduce existing irritation, and allow for proper adhesion of the solid hydrocolloid skin adhesive.

Skin protection should be considered in patients prone to skin damage and those who are at risk of developing MARSI (medical adhesive-related skin injury). In patients where the peristomal area is denuded, applying stoma appliances can be very challenging and cause discomfort to the patient. Therefore, advanced polymer-based protectants should be applied to protect skin to allow healing and alleviate discomfort. Acrylate terpolymer-based barrier films act as a sacrificial substrate between the skin and the hydrocolloid skin adhesive, and can be considered to prevent MARSI.

Peri-tube skin protection may be required, for example in the care of individuals with a tracheostomy, gastrostomy or jejunostomy

Best Practice Statement

Where necessary, take steps to identify any additional underlying cause of peristomal dermatitis

Best Practice Statement

Where necessary, use barrier films and adhesive removers to prevent PMARSI

Best Practice Statement

Describe and document the signs and symptoms that are observed in all peristomal dermatitis

Best Practice Statement

If exudate from a wound is the source of moisture, this should be managed with an appropriate absorbent dressing. It is also important to identify the underlying cause in any deeper wounds, which may be related to diseases (e.g. pyoderma gangrenosum), and to exclude pressure damage (e.g. if a belt has been worn too tightly).

Peristomal adhesive-related damage

Skin damage due to MARSI can occur in stoma care. The term 'peristomal medical adhesive-related skin injury' (PMARSI) has been defined as 'an alteration in skin integrity with erythema and/or other skin alterations such as skin tears, erosion, bulla, or vesicle that is apparent after removal of an adhesive ostomy pouching system' (Le Blanc et al, 2019). This definition does not include the 30-minute assessment period usually recommended for MARSI (McNichol et al, 2013), because many individuals with an ostomy cannot leave their ostomy pouching system off for such a prolonged period of time. Le Blanc et al (2019) also state that skin stripping (defined as removing or tearing of the epidermis with removal of the adhesive faceplate) is a particularly prevalent form of PMARSI. Though evidence is lacking, it has been observed that these injuries are frequently associated with unintentional traumatic removal of adhesive products.

Prevention and management strategies in PMARSI are closely linked, including assessment of the individual's technique when applying or removing the ostomy skin barrier. Management is based on identification of the type of PMARSI – i.e. epidermal stripping, skin tears and tension injuries (Le Blanc et al, 2019). Acrylate terpolymer barrier films can be used to provide a sacrificial layer between the skin and the adhesive stoma device. Adhesive removal products have also proven to be useful.

Classification and documentation

Although there are several in use - e.g. Ostomy Skin Tool (Martins et al, 2010), Ostomy Algorithm (Beitz et al, 2010), Peristomal Lesion Scale (Menin et al, 2018) - there is currently no standardised classification system for peristomal dermatitis or for PMARSI; some classifications do exist, but these are not currently considered fit for purpose. In order to improve care, standardisation is required, therefore documentation of peristomal dermatitis is important.

The purpose of this is to:

- Standardise record-keeping in peristomal skin care
- Guide future care and improve outcomes
- Facilitate incident reporting
- Facilitate research.

Further research is needed into prevalence of peristomal dermatitis and PMARSI, and the effect on the individual, therefore documentation is of key importance in this area (Le Blanc et al, 2019; Yates et al, 2017). Working in consultation with specialised ostomy care nurses (SCN, ET or WOC) may also be necessary if issues are not resolved (Colwell et al, 2011).

Intertriginous dermatitis

Intertriginous dermatitis (also known as intertrigo) is a clinical inflammatory condition that develops in opposing skin surfaces in response to friction, humidity, and reduced air circulation (occlusion) – i.e. inflammation resulting from bodily fluids trapped in skin folds subjected to friction (Metin et al, 2018; Sibbald et al, 2013). In the ICD-11, it is described as 'irritant contact dermatitis of the skin folds (axillary, submammary, genitocrural, abdominal apron) caused by repetitive shearing forces of skin on skin. Sweat, other body fluids, occlusion and obesity all contribute to its development (EK02.2)' (WHO, 2020).

Intertriginous dermatitis can occur in any area of the body where there are two skin surfaces in close contact with each other, such as the interdigital regions of the feet or hands. However, intertriginous dermatitis is more common in the natural large skin folds of the body such as the axillary, inframammary, umbilical, perianal and inguinal areas (Kalra et al, 2014; Metin et al, 2018).

Intertriginous dermatitis tends to be a neglected area of MASD in the literature. A German population-based study indicated that every sixth aged nursing home resident is affected by intertriginous dermatitis (Gabriel et al, 2019). In the Netherlands, overall prevalence is highest in home care, at approximately 10%, followed by nursing homes at approximately 7% (Kottner et al, 2020). Well-designed clinical trials available to support therapies commonly used to treat or prevent intertriginous dermatitis are lacking (Mistiaen and van Halm-Walters, 2010; Sibbald et al, 2013). Further, despite the plethora of treatments, there is a lack of evidence about their efficacy (Black et al, 2011; Mistiaen and van Halm-Walters, 2010).

Identifying risk factors

A number of risk factors have been considered, including hyperhidrosis, immunodeficiency, diabetes mellitus, immobility, large skin folds, and obesity (Woo et al, 2017); all intertriginous dermatitis risk factors are exacerbated by hot and humid environments (Sibbald et al, 2013). While intertriginous dermatitis can affect a variety of patient groups, it is strongly associated with obesity and skin care dependency (Gabriel et al, 2019; Kottner et al, 2020), and there is a relationship between the degree of obesity and incidence of intertriginous dermatitis (Shareef et al, 2018).

A newer group at high risk of developing intertriginous dermatitis are post-bariatric patients, who have undergone significant weight loss but have been left with large amounts of excess skin and extreme skin folds, which may require skin reduction surgery (Acartuk et al, 2004).

Identification and classification

No formal standardised risk assessment tool for intertriginous dermatitis is currently in use. A prevention programme for individuals at risk can include weight loss, a skin-fold hygiene program, and early detection and treatment of recurrences (Sibbald et al, 2013).

Diagnosing the presence of intertriginous dermatitis depends upon the intersection of risk factors being present. Intertriginous dermatitis starts as redness and inflammation on the skin and then is also likely to develop infection. The classic clinical signs of intertriginous dermatitis include mirror-image erythema in the skin folds, accompanied by sensations of itching, stinging and burning.

Keep the skin areas at risk clean and dry and inspect regularly

Best Practice Statement

In the majority of cases, intertriginous dermatitis is associated with fungal or bacterial overgrowth, therefore it is vital to keep the area clean and dry, and to minimise friction. In at-risk patients – particularly those with skin folds (e.g. lymphoedema, bariatric patients, those with significant weight loss and excess skin) – it is important to inspect the skin regularly for signs of intertriginous dermatitis developing.

Bacterial load and secondary infection

Patients with secondary infection due to Candida often complain of intense itching and the inflamed area has clear margins accompanied by satellite lesions (NICE, 2018), while bacterial infection often presents with 'fiery' red lesions, exudate and odour. If any secondary infection is not resolved, intertriginous dermatitis can progress into more serious soft tissue infections, such as cellulitis, or even lead to sepsis, particularly in diabetic patients with interdigital intertriginous dermatitis in the feet (Black et al, 2011; Kalra et al, 2014).

Emphasise the importance of maintaining good principles of hygiene for individuals at risk

Best Practice Statement

It is important to assess and monitor whether the bacterial load is high. This may be evident in the skin (i.e. intensive or demarcated redness, which may indicate bacterial infection). It is also recommended to monitor odour, as presence of this may indicate a high bacterial load.
The importance of following good basic hygiene principles for individuals at risk should be emphasised. If necessary, a swab may be taken to ascertain bacterial load and potential infection (Voegeli, 2020).

Management of intertriginous dermatitis

Proposed principles of management for intertriginous dermatitis (Sibbald et al, 2013) suggest that prevention and treatment of intertriginous dermatitis should maximise the intrinsic moisture barrier function of the skin by focusing on at least one of the following goals:

- Minimise skin-on-skin contact and friction
- Remove irritants from the skin and protect the skin from additional exposure to irritants
- Wick moisture away from affected and at-risk skin (consider wicking products)
- Control or divert the moisture source
- Prevent secondary infection.

Treatments such as drying agents (talc, corn starch), astringents and absorptive materials have been used for intertriginous dermatitis. However, more recent work shows that these agents may not be suitable for use, and may cause further irritation (Janniger et al, 2015). Textiles, such as gauze, fabric or paper towels placed in the skin folds should also be avoided, as although they absorb moisture, they do not allow it to evaporate, thereby retain the moisture and increase the risk of damage (Sibbald et al, 2013; Cunliffe, 2018). Newer moisture-wicking fabrics draw moisture away from the skin towards the outer layer of the fabric to keep the wearer dry and comfortable; these fabrics have an increased surface area, allowing for a larger absorption of water away from the skin and a quicker rate of evaporation. Wicking fabrics are generally used between skin folds and must be properly sited to allow any moisture to evaporate. If no signs of increased bacterial load are present, acyrlate terpolymer barrier films can also be used, as they help to reduce the friction between skin folds.

Before applying skin care products, rule out infection

Best Practice Statement

Intertriginous dermatitis can cause significant discomfort and adversely affect patient quality of life. Itch may be a problem, particularly in the presence of fungal infection. Scratching of uncontrolled itch can cause significant skin damage and may result in the transfer of infection to other areas of the body – particularly the eyes. If unmanaged, infection may progress to more severe inflammation, with erosion, oozing, exudation, odour and maceration of the skin, which can significantly decrease quality of life (Metin et al, 2018).

While skincare products are not generally recommended, topical antifungal and corticosteroid creams (often combined) may be applied, as can skin barrier films to protect the skin from moisture and reduce friction (Sibbald et al, 2013; Cunliffe, 2018). A structured skincare regimen is recommended in at-risk individuals (Gabriel et al, 2019), and moisture-wicking textiles, specifically developed for skin fold management, are now recommended for the prevention and treatment of intertriginous dermatitis. Further research is required in the possible role of barrier products and films to reduce friction.

Consider the use of moisture-wicking textiles specifically indicated for skin fold management

Best Practice Statement

It is important that patients are educated about skin fold management and advised to wear supportive garments, in combination with loose-fitting, lightweight clothing of natural fabrics that wick moisture away from the skin and minimise skin-on-skin contact (Sibbald et al, 2013). These natural fabrics should also be used for bed linen, to promote air circulation and absorb moisture vapour. Intertriginous dermatitis of the toes may be prevented by wearing open-toed shoes, although care should be taken to protect the feet of those with diabetes (Janniger et al, 2015).

Periwound maceration

An acrylate terpolymer barrier is effective in preventing peri-wound skin damage in patients with exuding VLUs

Best Practice Statement

The condition of the surrounding skin should be included in any formal wound assessment

Best Practice Statement

While the production of exudate is vital to the wound healing process, if not managed effectively, exudate can cause damage to the periwound (surrounding) skin (WUWHS, 2019). Periwound skin is particularly vulnerable to MASD when drainage volume exceeds the fluid-handling capacity of the dressing. In addition, repetitive application and removal of adhesive tapes and dressings may strip away the periwound stratum corneum, precipitating further skin damage (Colwell et al, 2011; Woo et al, 2017).

The prevalence of periwound maceration is not well documented, but it is acknowledged that its impact is 'substantial', both on individuals and healthcare systems (Woo et al, 2017). One large-scale international survey involving 2,018 patients with chronic wounds found that 25% of respondents experienced pain around the wound, likely from periwound maceration and local inflammatory responses (Price et al, 2008).

Periwound maceration delays overall wound healing, and is also correlated with higher pain levels prior to and during dressing changes (Woo et al, 2017).

Use of an acrylate terpolymer barrier film has been found to facilitate the healing of larger wounds without increasing costs; hence, use of an acyrlate terpolymer barrier film for peri-wound skin protection in patients with exuding venous leg ulcers (VLUs) is the preferred treatment strategy (Guest et al, 2012).

Identifying the cause

In order to manage periwound maceration, the cause of excess exudate should be identified. Any management strategy must then address the factors that are contributing to high exudate levels (and potential periwound damage), as well as physically handling the volume of exudate.

Any underlying causes for excess exudate should be identified and addressed

Best Practice Statement

Heightened and ongoing inflammation is a potential cause that may be overlooked and should be considered and managed if necessary. In wounds that are not healing, heightened and ongoing inflammation is a likely contributor to increased exudate production. This may also be related to wound infection and/or the presence of biofilm (Schultz et al, 2011; Percival, 2017). It is important to differentiate infection from inflammation. The presence of local oedema will also result in a higher output of exudate, where appropriate compression should be used.

Any patient comorbidities, medications or psychosocial factors that may be contributing should also be addressed.

Dressing selection

In exuding wounds that may cause periwound maceration, dressing selection is the mainstay of management. In general, dressings manage fluid by absorbing it and/or allowing it to evaporate from the dressing surface (Wounds UK, 2013).

The dressing should be selected to handle the exudate and draw moisture away from the

surrounding skin in order to prevent damage where possible. Consideration should be given to the type of exudate (e.g. viscosity) as well as the volume.

Dressing selection should take into account exudate and skin issues and be individualised to the patient and their wound

Best Practice Statement

Dressing selection should be individual to the patient, taking into account the management factors required – it may be beneficial to try different dressings to find the correct one for the individual needs of the patient and the clinical scenario (WUWHS, 2019).

In highly exuding lower limb wounds such as VLUs, it is important that dressings are used that can handle exudate when used under compression. Consider the effects of gravity when applying the dressing.

Box 8: Properties of the ideal dressing (adapted from WUWHS, 2007; Dowsett, 2011; Vowden et al, 2011)

- Available in a range of shapes and sizes across care settings
- Easy to apply
- Does not require a secondary dressing
- Comfortable/reduces pain/does not cause pain on application
- Conformable
- Prevents leakage and strikethrough
- Absorbs odour
- Stays intact and remains in place during wear
- Suitable for extended wear
- Suitable fluid-handling capacity as per level of exudate
- Retains fluid-handling capacity under compression therapy or when used with an offloading device
- Atraumatic and retains integrity on removal
- Unlikely to cause sensitisation or to provoke an allergic reaction
- Cosmetically acceptable and available in a range of colours to match the patient's request
- Does not impede physical activity
- Patient can shower with the dressing in situ
- Incorporates sensors/alerts to feedback on dressing performance, need for change and wound condition
- Inactivates factors that enhance inflammation (i.e. MMPs)
- Cost-effective – considering factors such as the unit cost of dressing versus time taken to change, the potential impact on healing by use of cheaper dressings, how to make the case to procurement

Consider gravitational and pressure aspects of exudate flow when applying the dressing

Best Practice Statement

Dressing application

When using dressings, it is important to consider the issue of exudate and potential periwound maceration in terms of application technique. For instance, consider gravitational and pressure aspects of exudate flow (e.g. at the bottom of a leg wound, or at the sacrum in some patients with mobility issues) when applying the dressing.

Minimise risk of skin trauma through appropriate dressing selection, application/removal and use of skin protectant products

Best Practice Statement

The risk of skin trauma during dressing/device removal should be minimised (WUWHS, 2019). Use of low-adherent or silicone dressings, tapes or securement devices, and application of periwound skin protectant ointments, creams or barrier films may help to protect the skin and reduce the risk of damaging the skin further (Bianchi, 2012). If the periwound skin is inflamed due to the irritant effects of exudate, a topical corticosteroid may be indicated (Woo et al, 2017).

Any cavity dressing products (e.g. rope, ribbon or strip materials) should be confined to the wound and kept away from the surrounding skin; the dressing material should be in contact with the wound bed and should eliminate dead space. However, overpacking of the cavity should be avoided (WUWHS, 2019).

Even if waterproof dressings are used, it is worth considering whether the increased moisture may be due to the patient showering/bathing, or any other lifestyle issues that may impact on the dressing's efficacy.

Skin protection

Skin protection products should be used to protect the periwound skin. Advanced polymer based barriers can be used where exudate levels are very high (e.g. in VLUs), or where dressing wear time may be extended beyond your control (i.e. individuals who do not attend their follow-up dressing appointments regularly). Film-forming barriers may also be considered as part of a treatment regimen where large expanses of adhesive are used and replaced frequently, such as with negative pressure wound therapy (NPWT).

Skin protection products should be used to prevent damage to the periwound skin

Best Practice Statement

Skin protection products should always be used according to the manufacturer's instructions and should be based on suitability for the patient and their wound. For instance, some skin protection products may interfere with dressing adherence and absorption and should be used only in suitable wounds (WUWHS, 2019).

Conclusions

While MASD can be divided into four main categories, there are common contributing factors. Importantly, it is not the moisture that matters, but the chemical composition of the bodily fluids, friction and occlusion. Basic care strategies should focus on risk assessment, prevention of mitigating factors, employing an appropriate and structured care pathway to maintain skin integrity.

In all patients, supported self-care should be encouraged wherever possible, with the individual encouraged to engage with their treatment and be educated about the importance of skin integrity and protection. Individual capacity will need to be considered so that the appropriate level of ability and willingness to be involved can be ascertained. All self-care should be encouraged within a support system and the patient must know how to obtain further advice when needed.

While MASD is increasingly recognised as a significant problem, it is apparent that there are still gaps in knowledge and practice. Further research is needed into the efficacy of products in protecting skin from moisture and irritants, and reducing friction. In many areas of MASD, standardised documentation is not carried out. Standardisation and documentation are of key importance for data collection and guiding future care and research.

In many cases, all forms of MASD can have a significant effect on patient wellbeing and quality of life, so it is vital that all care is delivered using best practice and with a patient-centred approach.

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