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Ousey, Karen and Wasek, Stephanie

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## Clinician perspectives on medical adhesive-related skin injuries

### Abstract

Medical adhesive-related skin injury (MARSIs) is a prevalent, under-recognised and preventable complication that occurs across all care settings, age groups and patient types. Use of medical adhesives may affect skin integrity, cause pain, increase risk of infection, potentially increase wound size and delay healing, all of which reduce patient quality of life unnecessarily. In addition, MARSIs is costly in terms of nursing time and costs. A new survey of UK wound care clinicians sought to understand clinician experiences of and perspectives on MARSIs and found that incidence of MARSIs is high, yet education around assessment of risk and prevention are low. The results of the survey show that clinicians both need and want improved educational efforts around MARSIs awareness, identification of patients at risk of MARSIs and strategies for preventing MARSIs. Broadly, more research on the exact pathophysiology of MARSIs is needed, in order to deepen understanding and aid the development of formal MARSIs education programmes.

### Suggested key words

Medical adhesive-related skin injury

Fragile skin

Prevention and education

Author(s)

Karen Ousey

Professor of Skin Integrity, School of Human and Health Sciences, and Director, Institute of Skin Integrity and Infection Prevention, University of Huddersfield, UK; Clinical Associate Professor, Australian Catholic University; Adjunct Clinical Professor, Queensland University of Technology

Stephanie Wasek

Independent medical writer, London, UK

Medical adhesive-related skin injury (MARSIs) is a prevalent, under-recognised and preventable complication that occurs across all care settings, age groups and patient types, from healthy patients in ambulatory care, to patients with multiple comorbidities in critical care (McNichol et al, 2013). MARSIs has been defined as “an occurrence in which erythema and/or other manifestation of *cutaneous abnormality* (including, but not limited to, vesicle, bulla, erosion, or tear) persists 30 minutes or more after removal of the adhesive” (McNichol et al, 2013).

When superficial layers of skin are removed by medical adhesive, the process may affect skin integrity, cause pain, increase risk of infection, potentially increase wound size and delay healing, all of which reduce patient quality of life unnecessarily (Cutting, 2008). In some cases, adhesives can also cause deeper tissue injuries beyond the loss of superficial skin layers (Denyer, 2011). Although

the injuries caused by medical adhesives may look minor, care and management of MARSIs has a deleterious effect on nursing resources. One recent survey that specifically explored injuries caused by medical tapes found that nurses treated these injuries approximately five times a week, an average of 7.8 times per patient, at a cost of approximately €1.23 (£1.1) per treatment application — or ~€8.86 (£7.99) per patient through to healing (Maene, 2013).

### **Gaps in understanding of MARSIs prevalence**

For example, these injuries have been reported as the most common source of skin breakdown in Neo Natal Intensive Care Units (Kuller McManus, 2001). Furthermore, incidence in the nursing home setting has been recorded as 15.5% (Konya et al, 2010). One survey identified that 98.6% of registered nurses working in the nursing home setting said skin tears were common to extremely common among their patients (White, 2001). A more recent survey of hospital-based nurses found that nearly all (n=41) respondents had treated skin injury due to adhesive use in the 12 months leading up to the survey, with a MARSIs incidence rate of 7.1% and an average of 2.8 injuries per patient who suffered skin damage (Maene, 2013).

Although there is a body of knowledge surrounding skin tears, these injuries can be caused by factors other than MARSIs (LeBlanc and Baranoski, 2011). Furthermore, much of the existing research on skin injuries in general has focused on the use of medical tapes, and does not account for the more recent, broader definition of MARSIs, which factors in appropriateness of tape selection, appropriateness of dressing selection, adequacy of skin preparation and whether adhesive removal was carried out correctly. The lack of specific and well-defined research into MARSIs perhaps attests to a gap in the knowledge of wound care professionals, as well as under-reporting across settings. To deepen understanding around the prevalence and issues surrounding the full breadth of MARSIs, a survey was commissioned.

### **Methodology**

In August and September 2016, a web-based survey was distributed to UK-based wound care clinicians via SurveyMonkey by Wounds UK (Wounds UK, 2016). Overall, 918 clinicians responded to the survey. Specialities included wound care (37%), GPs (11%) and geriatric clinicians (8%). Nearly one-third (296 respondents) classed their specialism as "other," which included podiatrists (n=61), community nurses (n=71) and district nurses (n=19) as well as vascular, care of the elderly and neonatal clinicians. The split of settings (n=907) respondents work in was 35.4% in the hospital, 28% in community nursing, 7.8% in nursing homes and 12.9% in GP practice. Other settings (15.9%) responses included hospice, clinic and those who worked in a mix of setting types. The survey sought to understand the incidence and causes of MARSIs, as well as levels of awareness and education regarding MARSIs and its prevention. Statistical analysis was carried out by an independent medical writer after completion of the survey.

### **Results**

In order to establish the extent to which there is potential for MARSIs, the survey explored weekly patient caseloads and the percentage of these patients seen who present with fragile skin. The most frequently given response for number of patients seen each week was 10–20 (35.9%), with 60.6% of

these respondents saying that more than half their patients have fragile skin. Overall, more than half of respondents reported that at least 60% of the patients they see have fragile skin (Figures 1a and 1b). The majority of participants recognise that a wide variety of injury types and skin damage can occur as a result of medical adhesives; only folliculitis lagged in terms of awareness (Figure 2). Folliculitis is an inflammation of the hair follicle.

### *Frequency and aetiology of MARS*

This discrepancy in awareness may be explained by the infrequency with which folliculitis occurs -- it is much more rare than other types of MARS (Figure 3). The results show that there is strong understanding of the causes of skin stripping, tension injury and maceration in particular (Figure 4). Although most research into skin injury has focused on medical tape, two of the top three clinical applications associated with MARS are non-surgical wound care dressings (67%) and surgical wound care dressings (43%) (Figure 5).

### *Clinician knowledge of MARS*

Despite these results, 70.5% of respondents say that MARS are not recorded in their facility. And just 31.3% of respondents have heard of MARS as a collective way to describe forms of skin damage caused by medical adhesives. Although only 37% of respondents expressed concern about the incidence MARS in their area of work, 72% reported that the prevention and management of MARS should be an integral part of skin and wound care training (based on a score of 8, 9 or 10 out of 10). Encouragingly, 78% of respondents said they have used a barrier film to protect the skin before applying medical adhesives, and 11.7% reported that they use barrier film routinely on all patients (91–100%) — indicating that there is a level of familiarity with and understanding of the types of steps that can be taken to prevent MARS.

## **Discussion**

Perhaps due to the frequency with which MARS occurs, there is a low level of clinician concern. However, this may be better explained by correspondingly low levels of MARS-related education: Over 80% of respondents described the level of training in the area of prevention and treatment of MARS as either inadequate or unavailable. Furthermore, an overwhelming 97% of respondents said they would recommend that the prevention of MARS and the identification of patients at risk of MARS should be integral components of skin assessment.

The results of the survey demonstrate there is a clear and present need for improvement of educational efforts around MARS awareness, identification of patients at risk of MARS and strategies for preventing MARS. Not only does the need exist, but wound care clinicians desire more MARS-related education. Current research in the field of MARS has shown that there are several causal factors: composition of the adhesive, length of time the adhesive is left in place, intrinsic patient factors (e.g. very young or very old age, underlying medical conditions), condition and environment of the skin, and extrinsic and/or treatment factors (e.g. certain medications, repeated use of adhesives over a prolonged period) (McNichol et al, 2013; Zeng et al, 2016). More research is needed to pinpoint the precise pathophysiology of MARS, and more efforts are needed to develop formal MARS education and prevention programmes (McNichol et al, 2013).

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