Controversies in classifying and assessing grade 1 pressure ulcers

Disagreement on how to assess grade 1 pressure ulcers has partly come about because there is no national grading system. There is debate about whether grade 1 ulcers are characterised by blanching or non-blanching erythema, whether damage starts at the epidermis or deeper at the interface of soft tissue and bone, and whether grade 1 ulcers are reversible. Purple ulcers are sometimes considered grade 1 tissue damage when, in fact, they signify full thickness skin loss. A review of the evidence can help to clarify the matter.

The aetiology of grade 1 ulcers

No universally accepted pressure ulcer classification system exists although there are different versions (NHS Centre for Reviews and Dissemination, 1995; Lyder 1991) with varying numbers of categories and descriptions. (Lowthian, 1987; Torrance, 1983). The first system was developed in 1975 (Shea, 1975) and has been modified (Agency for Health Care Policy and Practice, 1992) but not always reliably validated (Yarkony et al, 1990).

There have been numerous attempts to classify the aetiology of grade 1 pressure ulcers. It is agreed that a grade 1 ulcer has an intact epidermis (Hitch, 1995; Lyder, 1991) and that ulcers with a higher grade denote more severe tissue damage (Lyder, 1991). However, this implies a progression in ulcer severity based on a misconception that pressure ulcers start at the skin and extend down towards bone (Alterescu and Alterescu, 1988). However, true deep pressure ulcers begin upwards, finally becoming visible at the epidermis (Alterescu and Alterescu, 1988). Thus, by the time necrosis is observed at the epidermis, damage will have occurred in the subcutaneous and muscle layers (Barton and Barton, 1981). Therefore, grading systems based on depth, where the score relates to the state of the epidermis, illustrate a misunderstanding of aetiology (Box 1).

The Agency for Health Care Policy and Practice (AHCPP, 1992) recommended that pressure ulcers should not be graded until they have been debrided, and size and depth can be determined.

Inter-rater reliability of grading systems

Research indicates that poor inter-rater reliability means the incidence of grade 1 pressure ulcers is often under-reported or over-reported (James, 1998). Some researchers (O’Dea, 1999; Meehan et al, 1998) have not included these ulcers in incidence or prevalence studies for this reason. Better training on the use of classification systems is also needed.

Temperature

Lyder (1991) suggests grade 1 ulcers have skin areas that are either warm or cool to the touch. Increased local blood flow and oedema, followed by the engorgement of surrounding vessels and tissues, results in warmth and redness in the area. In contrast, the skin may feel cooler in areas of non-blanching erythema. (Parish et al, 1988).

Blanching versus non-blanching erythema

Some practitioners believe that blanching erythema indicates a grade 1 ulcer (Hitch, 1995) whereas others believe that a grade 1 ulcer is present when there is non-blanching erythema (Maklebust and Margolis, 1995; Yarkony et al, 1990).

The increase in skin colour and temperature is due to the inflammatory process responding to tissue insult and injury. This erythema is an indicator of the body’s natural response to ischaemia caused by pressure and is deemed proportional to the duration of occlusion, lasting about half to three-quarters of the time of occlusion.

Most clinicians agree that colour and temperature play a major role in the identification of grade 1 pressure ulcers (European Pressure Ulcer Advisory Panel, 1999; Parish et al, 1997) and almost all classifications include erythema as a category (Lyder, 1991). However, erythema is not only difficult to detect in darker skin, but is also characteristic of many skin conditions other than pressure ulceration.

Bliss (2000) stated that a grade 1 pressure injury is more likely to have a bluish tinge than reactive hyperaemia, and that this is evidence of irreversible tissue damage. Non-blanching erythema, therefore, must be considered a true criterion of the grade 1 pressure ulcer (Lyder, 1991).

Similarly, Torrance (1983) stated that blanching erythema is a good indicator of the body’s natural response to pressure ischaemia, and it does not indicate that injury has occurred. Blanching erythema, therefore, must be considered a precursor to a grade 1 pressure ulcer (Lyder, 1991).

Purple ulcers

Purple ulcers are often classified as grade 1 ulcers (Lowthian, 1987; Shea, 1975). A grade 1 categorisation makes no allowance for the ischaemic damage beneath the skin. A key problem is lack of awareness of the seriousness of these ulcers (Dialey, 1992). The purple patch is the end stage of non-blanching erythema and signifies full-thickness skin loss. Biopsy specimens have demonstrated that haemorrhage and early gangrenous changes occur in the underlying tissue.

REFERENCES

The National Pressure Ulcer Advisory Panel and the European Pressure Ulcer Advisory Panel (EPUAP 1999) have recognised that erythema and grade 1 pressure ulcers are difficult to measure in patients with darkly pigmented skin, a difficulty also highlighted by Meehan et al (1999).

NPUAP (1998) has approved a more specific definition which incorporates skin temperature, pigmentation and purple hues. This states that a grade 1 ulcer is an observable pressure-related alteration of intact skin whose indicators, when compared with an adjacent or opposite area on the body, may include changes in one or more of the following:

- Skin temperature (warmth or coolness);
- Tissue consistency (firm or boggy feel);
- Sensation (pain and itching).

It states that in lightly pigmented skin the ulcer appears as a defined area of persistent redness, whereas in darker skin tones it may have persistent red, blue or purple hues.

The National Institute for Clinical Excellence (2001) also highlighted the importance of discolouration, but only in regard to purplish/bluish areas and pressure damage in relation to people with dark skin.

Reversibility Bliss (2000) argued that most grade I ulcers heal without breaking down if pressure is relieved immediately and any further ischaemia is not too severe. However, the author’s experience in a clinical setting supports observations that non-blanching erythema results in irreversible damage (James, 1998; Dailey, 1992).

Conclusion The wound care literature is moving towards a consensus on the characteristics of a grade 1 pressure ulcer (Box 2). These include:

- Skin area is pale pink to bright red;
- Skin area will blanch or not blanch when digital pressure is released;
- Skin area is warmer to the touch;
- Erythema or possible erythema has not resolved within two hours;
- Epidermis is intact.

However, there is a clinical need to include coolness as a category for grade 1 ulcers and for purple ulcers to be included in the grading system.

Tissue viability practitioners must continue to provide constant evidence-based education and training on the assessment and prevention of pressure ulcers because the inaccurate staging of wounds may have far reaching effects.

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**BOX 1. AETIOLOGICAL CLASSIFICATION OF PRESSURE ULCERS**

There is debate about using an aetiological basis for dividing pressure ulcers into different grades. It may be simpler to use the type I and type II classification (Barton and Barton, 1981).

A type 1 ulcer is caused by direct external pressure that results in occlusion of the blood vessels, for example, catheter tubing pressing on an inner thigh. The microscopic changes that occur in the blood vessels are caused by the occlusion of the vascular lumen by the red blood cells, leucocytes and blebs of cytoplasm derived from swollen endothelial cells. There is no separation of the endothelial cells as occurs after disruptive damage to the microcirculation and no occlusion of the lumen by platelets.

As progressive tissue loss occurs after exposure to the applied pressure, the wound extends from the surface, where the pressure is most intense, towards the underlying bone. However, where skin is atrophic or lacks subcutaneous tissue – for example, over the greater trochanters, heels or ankles – there may be little scope for pressure dissipation and the ulcers will be full-thickness from the start, or will develop in subcutaneous tissues and extend to the surface.

A type II ulcer is caused by the application of intense local forces of a disruptive and shearing nature to the skin and subcutaneous tissues in areas such as the greater trochanters and ischial tuberosities that have not been modified to accept this form of trauma. The result is endothelial damage to the arteries. The superficial layers of the skin remain intact and necrosis appears to arise in deep tissues.

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**BOX 2. SUMMARY OF THE MAIN FINDINGS**

- Some grading systems are based on the misconception that pressure ulcers start at the skin and extend down towards the bone. However, severe pressure ulceration begins at the interface of soft tissue and bone.
- Almost all grading systems include erythema as a category. But this is not only difficult to detect in darkly pigmented skin, but is also a characteristic of other skin conditions.
- There is considerable controversy on whether or not blanching erythema should be considered characteristic of a grade 1 pressure ulcer.
- Purple ulcers, which signify full-thickness damage, are often classified as grade 1 ulcers.
- The above disagreements suggests that current pressure ulcer grades can be misleading.