Managing pressure sores

Iain A Hunter

Kimberley J Edwards

Abstract

Management of pressure ulcers accounts for a significant proportion of healthcare resources. Pressure ulcers are caused by pressure-induced necrosis of soft tissue and therefore should be entirely preventable. Although pressure can be considered as the initiating insult, multiple factors also contribute to progression and development. Prevention and treatment of pressure ulcers requires a multidisciplinary approach. Recognition of at risk patients and the introduction of preventative measures are crucial. Multiple adjuncts to pressure ulcer resolution such as pressure relief systems, nutritional supplementation, debridement, antimicrobials, negative wound pressure therapy and surgery can be employed. Category I and II ulcers are treated conservatively with dressings and the removal of precipitating factors. Although the majority of pressure ulcers are managed by nursing staff without medical intervention, deeper lesions with significant tissue necrosis and secondary infection may require surgical debridement and possibly reconstructive closure. The development of a pressure ulcer is often a reflection of significant co-morbidity and treatment should be applied in the context of the patient's overall prognosis.

Keywords Debridement; nutrition; osteomyelitis; pressure sores; pressure ulcers; risk assessment; surgical flaps; wound healing

Introduction

A pressure ulcer is a localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear.[1] Weight bearing bony prominences are most commonly affected, such as the sacrum, ischial tuberosities, greater trochanters and the calcaneum (Figure 1). Necrosis commences in the deeper layers of tissue over the bone. Evident skin changes are usually unrepresentative of the extent of necrosis as they are often only the apex of the underlying pathology. The European Pressure Ulcer Advisory Panel classifies pressure ulcer severity according to the degree of tissue loss (Table 1).[1]

Epidemiology

Pressure ulcer management represents a significant demand on healthcare resources. The treatment of a single Grade IV pressure ulcer is estimated to be up to £14,108.[2] Therefore, in 2012, pressure ulcers were identified as a key target area within the NHS Safety Thermometer: an improvement tool aimed at delivering 'harm free care'. At launch the prevalence of pressure ulcers within the UK was 7%, however recent data have demonstrated a reduction to 4.3% between January 2016 and 2017.[3]

Patients most at risk tend to be those with pre-existing medical conditions. Surgical intervention in pressure ulcer care must be considered in the context of the patient's overall situation and likely prognosis. In palliative care settings care is focused towards reducing pain, odour and infection, promoting healing and improving quality of life.[4]

Prevention

Pressure ulcers should be considered a preventable pathology. Recognition of "at risk" patients and the introduction of preventative measures is the mainstay of treatment.[5] Increased pressure stresses are a particular problem in immobile and insensate patients. Extrinsic factors are those that have a detrimental effect on the skin's tolerance to pressure: including moisture, shear and friction. Intrinsic factors result in impairment of the skin's supporting structures, blood supply and lymphatic drainage.[6–8] These combined risk factors are illustrated in Table 2. Risk assessment tools such as the Waterlow score[7] (Figure 2) have been developed in order to facilitate risk stratification and management after initial assessment of skin integrity by nursing and medical staff.

Management

Current guidelines on pressure ulcer management are based on limited randomised controlled evidence with reliance on non-controlled retrospective data sources[4,6,9,10]; however, more meta-analyses and systematic reviews are being attempted. In 2014/2015, The National Institute of Clinical Excellence (NICE), The American College of Physicians and The Wound Healing Society all published updated guidance on pressure ulcer management.[6,11,12]

The multifactorial aetiology of pressure ulcers guides treatment. In order to promote healing, remediable causative factors must be attended to, whilst contributory metabolic and physiologic abnormalities should be optimised. Such an approach requires a multidisciplinary team of nursing staff, physicians, surgeons, physiotherapists, dieticians, wound care specialists and carers. Complex surgical interventions will be doomed to failure if underlying initiating and potentiating factors are not addressed.

Pain

Pressure ulcers can be exceedingly painful. Dressing changes can also induce severe discomfort. Good analgesia, especially pre-emptively before dressing changes, should be instituted as routine. Furthermore, appropriate dressings should be selected to provide acceptable periods of time between dressing changes.[4]

Pressure relief

Pressure is the main initiator of ulcer formation. The effects of pressure can be reduced by regular repositioning, at least every 4 hours in high-risk patients.[6] Other basic interventions include

Iain A Hunter ***BMBS FRCS PhD*** *is a Consultant Surgeon at Castle Hill Hospital and Hull Royal Infirmary, UK. Conflict of Interest: none declared.*

Kimberley J Edwards ***MBBS MRCS*** *is a Specialist Registrar in Surgery at Castle Hill Hospital and Hull Royal Infirmary, UK. Conflict of interest: none declared.*

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Figure 1 Multiple Category III and IV pressure ulcers in a paraplegic patient.

EPUAP grading system for pressure ulcer classification

Category I	Intact skin with non-blanchable erythema of a localized area usually over a bony prominence. Discolouration of the skin, warmth, oedema, hardness or pain may also be present. Darkly pigmented skin may not have visible blanching
Category II	Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum- filled or sero-sanguineous filled blister
Category III	Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are *not* exposed. *May* include undermining and tunnelling
Category IV	Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often include undermining and tunnelling

Table 1

Risk factors for the development of pressure ulcers

Intrinsic factors	Extrinsic factors
Age > 65	Urinary incontinence
Male gender	Faecal incontinence
Caucasian	Uncontrolled fistula
Diabetes	Perspiration
Metastatic carcinoma	Shear and friction forces
Malnutrition	
Anaemia	
Hypotension and use of inotropes	
Smoking	

Table 2

patient mobilization, the use of profiling beds to minimize the effect of shear and the use of visco-elastic foam mattresses and cushions. Low air loss beds alternate the inflation of separate air compartments, whereas air-fluidized bead beds effectively float the patient on a bed of glass beads in an attempt to eliminate shear, friction and pressure. They also have the advantage of absorbing and filtering exudates, reducing the adverse effects of moisture and incontinence. A 2015 Cochrane review concluded that higher specification foam mattresses reduce the risk of developing pressure ulcers, when compared to standard foam mattresses; however, no significant benefit has yet been shown between constant low pressure, alternating pressure mattresses and air-fluidized beds to recommend a specific type of higher specification mattress.[13] Additionally, medical grade sheepskin overlays have shown an association with decreased pressure ulcer development.[13]

There is weak evidence that limiting elevation of the head of the bed to 30° may reduce shear forces, but this is usually poorly tolerated.[1,12] When the patient is out of bed, the use of appropriate cushions, seating and wheelchairs is regarded as important to redistribute pressure and reduce shear forces. Some experts advise against the use of ring cushions, as they may increase venous congestion and oedema.[12]

General optimization

Correction of physiological abnormalities such as anaemia and diabetes should improve tissue oxygenation and resistance to secondary infection. Local arterial and venous disease may also contribute to the recalcitrant nature of ulcers, especially in the case of heel sores. Procedures to improve arterial inflow should be considered when peripheral vascular disease is a contributing factor.

Nutrition

Many patients with pressure ulcers are in a state of chronic malnutrition. Failure to correct nutritional deficits will have an adverse effect on healing. All patients with pressure ulcers should be formally assessed by a dietician and supplementation introduced where appropriate. Randomized control trial data have suggested Vitamin C supplementation may have a positive effect on ulcer healing.[10]

Dressings

Dressings should maintain a moist wound environment to encourage healing whilst providing adequate control of wound exudate to protect the surrounding skin. Additionally, dressings can also facilitate autolytic debridement and have antimicrobial characteristics.

When indicated, semi-transparent films can be used on category I lesions (unbroken skin). Semi-permeable transparent films are generally used on category I ulcers to protect areas at risk of moisture or sheer damage and foam dressings can provide extra protection for at risk areas, although they do not redistribute pressure. Alginates absorb up to 20 times their weight in water and are useful in wounds and cavities with a high exudate. Conversely, hydrogels are mostly composed of water and are of more use in dry, shallow, minimally exuding ulcers.

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