Managing pressure sores

Iain A Hunter

John Davies

Abstract

Management of pressure ulcers accounts for a significant proportion of healthcare resources. Pressure ulcers (or sores) are caused by pressure-induced necrosis of soft tissue and as such 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 is the mainstay of prevention. Multiple adjuncts to pressure ulcer resolution such as pressure relief systems, nutritional supplementation, pharmaceutical 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 any 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 comorbidity and treatment should be applied in the context of the patient's overall likely clinical outcome and prognosis.

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

Introduction

A pressure ulcer is localized 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] These usually occur over weight bearing bony prominences such as the sacrum (most common), 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[1] classifies pressure ulcer severity according to the degree of tissue loss (Table 1).

Epidemiology

In 2012, the prevalence of pressure ulcers in UK was estimated to be approximately 7%.[2] Due to the chronicity of such wounds, their management represents a significant demand on healthcare resources. A 2012 UK study estimated the cost of treatment for a category IV pressure ulcer to be approximately £40,000[3] and previous studies have suggested that the overall annual cost burden for pressure ulcers to the NHS to be as high as £2.1 billion.[4] Pressure ulcer development in hospital patients and in the community is now utilized as one of the baseline indicators of the quality of care provided, monitored nationally in the UK by external safety agencies.

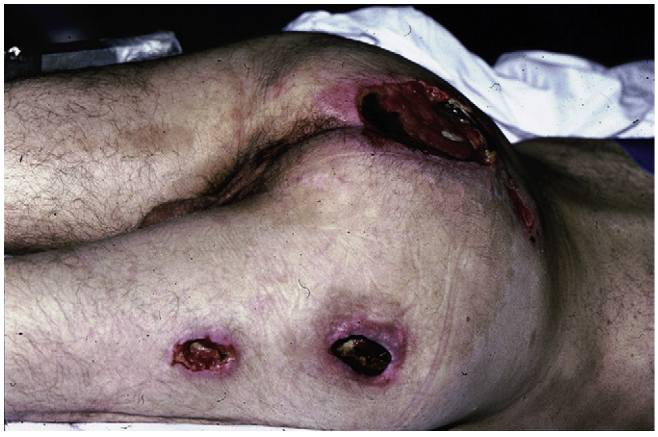

Figure 1 Multiple category III and IV pressure ulcers in a paraplegic patient.

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 an end of life situation surgical intervention is unlikely to be successful or have any significant positive impact on a patient's quality of life and should be avoided.

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

European Pressure Ulcer Advisory Panel grading system for pressure ulcer classification

Category I	Intact skin with non-blanchable erythema of a localized area usually over a bony prominence. Discoloration 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-sanginous 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 tunneling

Table 1

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

John Davies *MBChB MRCS MD is a Higher Surgical Trainee at Castle Hill Hospital, Hull, UK. Conflict of Interest: none declared.*

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

the skin's tolerance to pressure. These include 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 (including NICE guidance) are based on limited randomized controlled evidence but mostly derived from non-controlled retrospective data sources[6,9–11] However, the basic principles of management are based on rational theory by experts within the field. New UK NICE guidelines are currently under development.

The multifactorial aetiology of pressure ulcers has evident implications for treatment. In order to promote healing, remediable causative factors must be attended to, while contributory metabolic and physiologic abnormalities should be optimized. 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.

Pressure relief

Pressure is the main initiator of ulcer formation. The effects of pressure can be reduced by regular repositioning, effecting pressure relief for 5 minutes every 2 hours and using suitable beds or cushions. Other basic interventions include patient mobilization, the use of profiling beds to minimize the effect of shear and the use of visco-elastic foam mattresses and cushions. Specialized dynamic pressure-relieving beds/mattresses and overlays are employed in higher risk and immobile patients, supported by randomized controlled evidence.[12] Low air loss beds reduce pressure by alternating the inflation of separate air compartments whereas air-fluidized bead beds effectively float the patient on an air-fluidized bed of glass beads in an attempt to eliminate shear, friction and pressure. They also have the

The Waterlow score

WATERLOW PRESSURE ULCER PREVENTION/TREATMENT POLICY

RING SCORES IN TABLE, ADD TOTAL. MORE THAN 1 SCORE/CATEGORY CAN BE USED

BUILD/WEIGHT FOR HEIGHT		SKIN TYPE VISUAL RISK AREAS		SEX AGE		MALNUTRITION SCREENING TOOL (MST) (Nutrition Vol. 15, No. 6 1999 – Australia)
AVERAGE		HEALTHY	0	MALE	1	A – HAS PATIENT LOST WEIGHT RECENTLY YES – GO TO B NO – GO TO C UNSURE – GO TO C AND SCORE 2 B – WEIGHT LOSS SCORE 0.5 – 5kg = 1 5 – 10 kg = 2 10 – 15 kg = 3 > 15kg = 4 unsure = 2
BMI = 20–24.9	0	TISSUE PAPER	1	FEMALE	2	
ABOVE AVERAGE		DRY	1	14 – 49	1	
BMI = 25–29.9	1	OEDEMATOUS	1	50 – 64	2	
OBESE		CLAMMY, PYREXIA	1	65 – 74	3	
BMI > 30	2	DISCOLOURED GRADE 1	2	75 – 80	4	C – PATIENT EATING POORLY OR LACK OF APPETITE 'NO' = 0; 'YES' SCORE = 1 NUTRITION SCORE If > 2 refer for nutrition assessment / intervention
BELOW AVERAGE		BROKEN/SPOTS GRADE 2–4	3	81 +	5	
BMI < 20	3					
BMI=Wt(kg)/Ht(m)²						

CONTINENCE		MOBILITY	
COMPLETE/ CATHETERISED	0	FULLY	0
URINE INCONT.	1	RESTLESS/FIDGETY	1
FAECAL INCONT.	2	APATHETIC	2
URINARY + FAECAL INCONTINENCE	3	RESTRICTED	3
		BEDBOUND e.g. TRACTION	4
		CHAIRBOUND e.g. WHEELCHAIR	5

SPECIAL RISKS			
TISSUE MALNUTRITION		NEUROLOGICAL DEFICIT	
TERMINAL CACHEXIA	8	DIABETES, MS, CVA	4–6
MULTIPLE ORGAN FAILURE	8	MOTOR/SENSORY	4–6
SINGLE ORGAN FAILURE (RESP, RENAL, CARDIAC)	5	PARAPLEGIA (MAX OF 6)	4–6
PERIPHERAL VASCULAR DISEASE	5	MAJOR SURGERY or TRAUMA	
ANAEMIA (Hb < 8)	2	ORTHOPAEDIC/SPINAL	5
SMOKING	1	ON TABLE > 2 HR#	5
		ON TABLE > 6 HR#	8
MEDICATION – CYTOTOXICS, LONG TERM/HIGH DOSE STEROIDS, ANTI-INFLAMMATORY MAX OF 4			

SCORE
10+ AT RISK
15+ HIGH RISK
20+ VERY HIGH RISK

#Scores can be discounted after 48 hours provided patient is recovering normally

Figure 2