

Blister management guidelines: collecting the evidence

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ABSTRACT

Opinions vary amongst health professionals regarding appropriate management of blisters on the feet in both the healthy and at-risk patient. The literature in this area is sparse, and what literature there is varies considerably regarding recommendations for blister management. Suggested treatments range from no intervention and leaving the blister intact to removal of fluid whilst keeping the overlying skin intact, or de-roofing the blister. The lack of evidence in this field creates differences of opinion and tension between health care professionals and suggests that further investigation is required in order to develop guidelines for best clinical practice.

This review article aims to evaluate the current literature and expert professional opinion for the management of blisters in the acute setting, with the aim of developing evidence-based guidelines.

INTRODUCTION

Blisters may be defined as a "... circumscribed epidermal elevation, usually containing a clear fluid"¹; however, they can be complicated by infection and thus the fluid may be purulent, cloudy or haemoserous in nature. They are a common problem both within and outside the hospital setting, and are the second most reported pressure complication seen during admissions, which may lead to patient harm and can be painful, debilitating and preventable². Shearing

and pressure are the major causes of pedal blistering; however, they are not the only cause. According to the Therapeutic Guidelines for Dermatology (2009) other common causes of blisters include bullous impetigo, insect bites, contact dermatitis and burns³. There are many other dermatological conditions which may also lead to their development; however, these are not as common.

Health professionals have a responsibility in being actively involved in pressure ulcer prevention and management, as stipulated by the Australian Wound Management Association's *Pan Pacific Clinical Practice Guideline for the Prevention and Management of Pressure Injury*⁴. Clinical guidelines for pressure ulcers provide evidence-based management strategies in all ulcer stages excluding those that present as blisters. In comparison, the evidence available for blister management is mostly a combination of anecdotal expert opinion and adaptation of the principles of wound bed preparation⁵.

Of particular interest in this review are those blisters that manifest in the feet, especially the high-risk foot. The high-risk foot describes those feet which are more likely to develop complications from comorbidities including, but not limited to, peripheral neuropathy, peripheral arterial disease, venous insufficiency, diabetes mellitus, infection, structural change and deformity. In the high-risk foot, blisters may develop from any of the causes noted above, as well as from friction/shear injuries, excessive pressure or secondary to diabetes (diabetic bullae).

This paper will consider the management of all blisters, with a particular focus on those blisters caused by pedal pressure.

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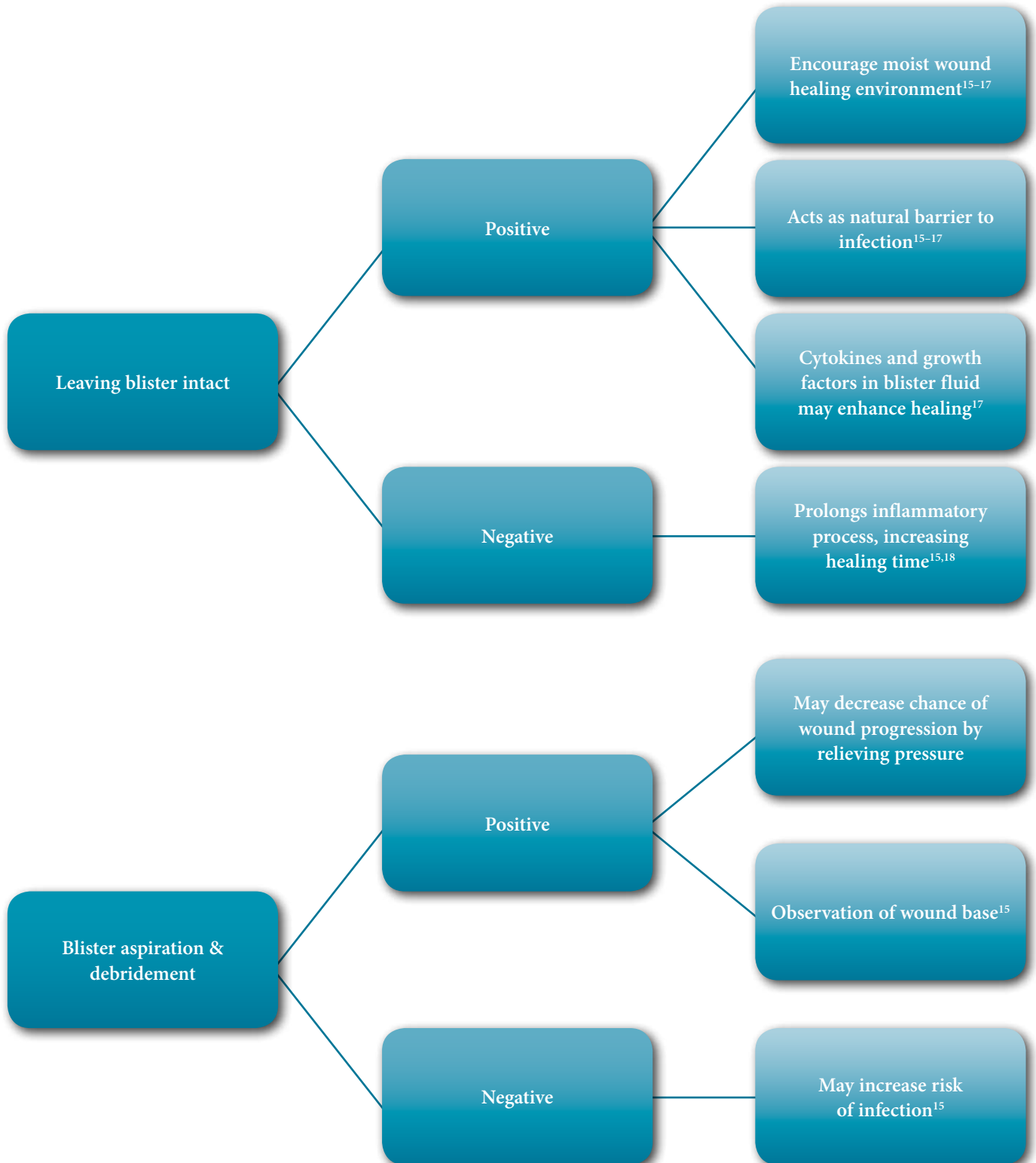
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Pressure ulcers are recognised worldwide as one of the five most common causes of harm to patients. They are defined as “... any lesion caused by unrelieved pressure that results in damage to the underlying tissue”⁶.

Pressure ulcers are classified into stages, as described by the National Pressure Ulcer Advisory Panel (NPUAP)⁷. Blisters tend to be the

result of trauma or friction injuries, rather than excess pressure. Their aetiology can be determined after a thorough patient assessment. Depending on their appearance, blisters can be classified using the NPUAP classification system. Blood blisters are blisters that contain blood, rather than serous fluid. They add a degree of difficulty to classify as their depth and the underlying tissue is much harder to define.



The major focus on blister management is whether blisters should be left in situ or de-roofed and drained. There are reasons for and against both actions.

LITERATURE

Data on pressure ulcer prevalence in Victoria has been collected over the past six years, in order to track the prevalence and efficacy of improved prevention and management strategies in the state. In the PUPPS 3 survey (2006) 84 different metropolitan and rural health services in Victoria assessed all current in-patients. A total of 6,936 patients were assessed. It was found that 17.6% of the total population surveyed had current pressure ulcers. Of these, 47.2% were found on the lower limb, with the heel being one of the two highest frequency sites for pressure ulcers⁶. The locations specific to the foot were broken down to: heels 25.2%, toes 10.6% and feet (excluding heels and toes) 6.0%. When the different stages of pressure ulcers were investigated further, 47.0% of all ulcers were recorded as Stage II⁶.

Similar results were obtained in the *WoundsWest: Wound Prevalence Survey* (2007), where all inpatients at 85 acute public health services in Western Australia were assessed. A total of 2,299 patients were assessed. It was found that 10.9% of the total population surveyed had current pressure ulcerations⁸. Of these, 38.6% were on the lower limb, again, one of two highest frequency sites for pressure ulcers noted in this survey. A total of 48.5% of ulcers were recorded as Stage II⁸.

The two studies showed similar results between all stages of pressure ulcers:

	PUPPS3	WoundsWest
Stage I pressure ulcers	40.4%	49.5%
Stage II pressure ulcers	47.0%	48.5%
Stage III pressure ulcers	5.9%	6.9%
Stage IV pressure ulcers	6.8%	7.3%
Unsure/unseen	-	5.3%

Podiatrists working in the acute setting are frequently called upon to manage blisters, which are commonly Stage II pressure ulcers. Essentially, the two major treatment modalities recommended are pressure offloading⁹ and the application of wound bed preparation principles⁵. There is little guidance as to actual treatment. There is a lack of consensus that not only produces variation in the care provided, but also creates an opportunity for intra and inter-discipline tension around the choice of management strategy.

Current literature around quality improvement in the health care system encourages and supports continual evaluation and improvement. Guth and Kleiner state that patient care is vitally important to health care providers and the health industry¹⁰.

Monitoring, evaluating and recording the quality of care provided in various settings can facilitate uniform standards of care provision to be established. This information provides the evidence that informs staff of areas for change and guides goal setting for future improvement.

The Australian Council of Healthcare Standards aims for improvement in the area of continuity of care as documented in EQuIP, an evaluation and quality improvement program. In particular the Standards include the following criteria “1.1.2 Care is evaluated by health care providers and when appropriate with the consumer/patient and carer”¹¹. The development of guidelines or policies on blister management would be a step towards making quality improvements in accordance with criteria in EQuIP 4.

METHOD

A systematic review of published literature, including randomised and non-randomised control trials, was conducted for 1980–2012 to find existing standards in this area. Pubmed, MEDLINE, EMBASE, CINAHL databases and Cochrane Library were searched. The following search terms were utilised in each database to gather data: blister, bullae, decubitus, pressure sore, pressure ulcer, pressure wound, decubitus ulcer, blister debridement, blister de-roofing, burns blisters, diabetes and blisters, diabetic foot and high-risk foot.

Findings from all databases were combined and duplicate articles were deleted from the search. All papers were included in the search.

Due to the little evidence available, a search for any guidelines for pressure ulcer management was also conducted.

A total of 42 relevant papers were found. Most of these were from publications focusing on burns-related blisters and their management. Very few of these articles specifically mentioned any treatment guidelines and few considered the high-risk patient or foot. The evidence available was based on expert opinion. There were no randomised or non-randomised control trials or evidence-based practice research publications.

A clinical guideline entitled “A consensus approach to wound care in epidermolysis bullosa”¹² has recently been published addressing the management of wounds in epidermolysis bullosa, a condition that can cause blistering. A group of international experts identified a lack of evidence in clinical guidelines for this specialised clinical field. This consensus document is based purely on expert opinion.

In general, the evidence available around blister management explored the basic principles of wound care. Identifying and controlling the underlying causes, moist-wound bed approach via the use of dressings and managing bacterial burden and pain were recommended for blister management¹³.

Given the paucity of published research, information from expert committee reports, expert opinion and/or clinical experiences of respected clinicians was sought and thus makes up the bulk of the information obtained. According to the National Health and Medical Research Council (NHMRC), this level of evidence is ranked as Level IV, the lowest level of evidence available¹⁴.

In order to gain a better understanding of how health professionals from different fields around the country manage this problem, a number of expert clinicians were canvassed, via email, for their practices in managing blisters on the foot. The health professionals were mainly from Victoria; however, there was representation from most other states and territories of Australia. A total of 20 clinicians were invited to respond, with 16 responding. Clinicians were selected on the basis of recommendations made by colleagues who have worked in the field of wound management for a considerable number of years. The list includes numerous clinicians with expertise in the field of wound management, including podiatrists, nurses and wound care consultants. The clinicians were informed that a literature review was being performed with the hope of developing evidence-based, best practice clinical guidelines around the management of blisters in the high-risk foot. No specific questions were asked

of the clinicians rather they were invited to pass on any department protocols, clinical guidelines or general practices employed for blister management and any considerations when treating blisters on the high risk foot.

RESULTS

The management of heel blisters is specifically mentioned in the Queensland Government's Pressure Ulcer Prevention and



Figure 1: Blister on plantar aspect of heel: Intact, haemorrhous filled, under low tensile strength, no clinical signs of infection.

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Management Resource Guidelines of 2004². The guideline suggests that the treatment of Stage II heel blisters is:

- Heel blister – minimal haemoserous fluid, no erythema or infection
 - Cover and protect with semi-permeable film
 - Review daily, leave dressing in situ for 1–2 weeks
- Heel blister – tense, moderate haemoserous fluid, no erythema or infection
 - Aspirate small amount of fluid to relieve tension
 - Cover and protect with semi-permeable film
 - Review daily, leave dressings in situ for 7–10 days
 - Debride non-viable tissue if blister ruptures



Figure 2: Blister on posterior aspect of heel: Intact, haemoserous filled, under high tensile strength, no clinical signs of infection.

It is notable that this guideline makes no mention of infected blister sites or patient pain. Additionally, the recommendations are based on expert opinion only.

Other guidelines focus on general wound management, as shown in the list below, but these principles can be applied to blister management¹⁹⁻²¹.

- Assess client condition¹⁹⁻²¹.
- Perform vascular assessment prior to debridement to determine if revascularisation is necessary and if debridement is contraindicated^{9,19,20,22,23}.
- Establish treatment goals¹⁹⁻²¹.
- Ensure adequate pain management prior to debridement².
- Debridement is indicated for removal of necrotic tissue in the presence of cellulitis, suspected infection or sepsis^{9,19-21,23,24}.
- Debridement is contraindicated in palliative management or in the presence of dry eschar, where there is Peripheral Arterial Disease (PAD)¹⁹.

- Debridement is contraindicated in the presence of PAD where there are no clinical signs of infection^{21,22,24}.

It is important to note that the term debridement is specific to ulcers, and is not always relevant for blister de-roofing or drainage.

In addition to wound management, these guidelines also discuss the importance of pressure offloading in order to prevent further trauma and to promote wound healing. This is particularly important in diabetic patients with neuropathy and peripheral arterial disease. The method of offloading depends upon the patients' physical characteristics, ability to comply and the location and severity of the blister⁹.

The anecdotal information received from key health professionals was also collated. The following list summarises the most common blister management practices amongst clinical experts:

Blister management

Figures 3–5.

Considerations when developing a treatment strategy

Generally

- Vascular status
- Pain
- Presence of sensory neuropathy
- Ability to undertake activities of daily living
- Age of blister
- General health, age and ambulatory status
- Compliance and competence of patient to attend wound dressings

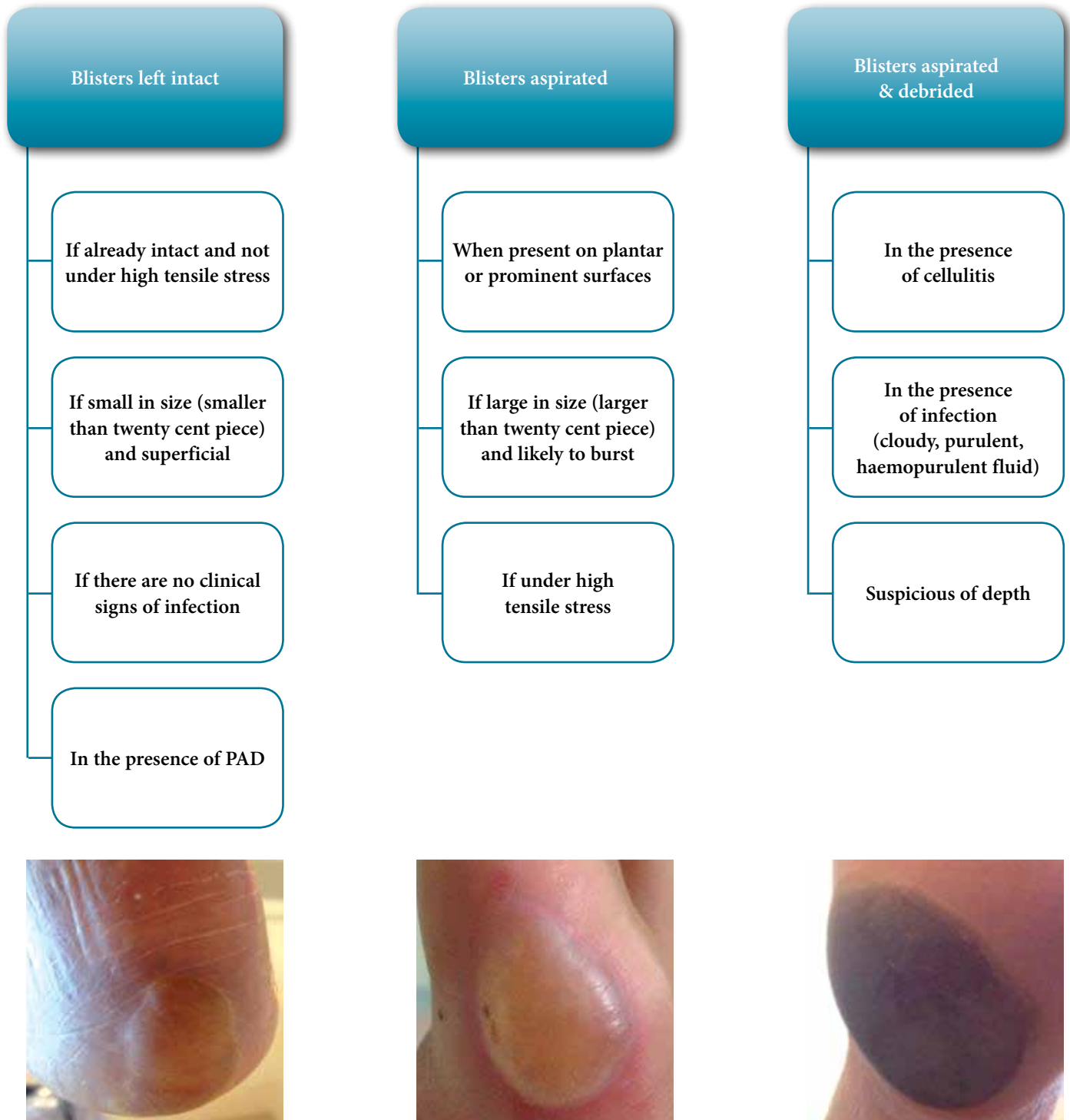
Specifically

- Location of blister
- Size of blister
- Height and fluctuance of blister
- Colour of wound fluid
- Ease of wound offloading

DISCUSSION

This literature review has demonstrated that there is little evidence to support any management option for blisters on the feet. The only guideline to consider blister management was found in the Queensland Government's Pressure Ulcer Prevention and Management Resource Guidelines of 2004, but the supporting evidence was of the lowest level and did not include any clinical trials².

When reviewing the opinions of the expert clinicians canvassed it was found that no guidelines or policies on blister management existed within their organisations. Their responses, while different,



Images from left to right:

Figure 3: Blister on posterior aspect of heel: Intact, small and serous filled.

Figure 4: Blister on medial aspect of hallux: Intact, larger size, serous filled, under high tensile strength.

Figure 5: Blister on posterior-plantar aspect of heel: Intact, large size, very thick dark red fluid, unable to visualise base to determine true depth.

had common themes in terms of treatment and factors to consider in relation to blister management. Additionally, all health professionals noted this is an area which requires further investigation.

Responses were received from 16 different clinicians with expertise in wound management, represented by the podiatry and nursing professions. Their opinions varied on what was best practice for blister management. General consensus was that it is not possible to generalise blister management. This is particularly so in the high-risk foot, as there are many factors that require consideration, the most important being clinical appearance of the blister, vascular supply and other co-morbidities.

CONCLUSION AND RECOMMENDATIONS

Research in management of blisters on the high-risk foot is almost non-existent. This makes it difficult for health professionals to base their clinical decision making on best practice in accordance with quality improvements stipulated by The Australian Council of Healthcare Standards (ACHS)¹¹. As a result, current practice varies from individual to individual and from centre to centre. The only consistent recommendation around management of blisters on the feet was that it should be case dependant and *not* generalised. All aspects of the patient's health should be considered prior to treatment. See flow chart for suggested blister management.

Treatment and management of blisters on the feet, whatever their aetiology, is problematic and without adequate research it is difficult to implement best practice care. Well designed clinical studies and investigation into the management of blisters on the feet is required to ensure the best possible outcomes for people with blisters on the feet.

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