Blisters in Diabetes

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Blisters initially form because the outer layer of the skin has become damaged. Fluid collects under the damaged layer of skin, initially cushioning the tissue underneath, protecting it from further damage and allowing it to heal. When the pressure of the fluid is too great it can create further damage to the underlying tissues. A blood blister usually forms when a small blood vessel close to the surface of the skin ruptures and blood leaks into a tear between the layers of skin. This can happen if the skin is crushed, pinched or squeezed very tightly. In the diabetic patient these are often seen in pressure areas.

Background

Many of the complications of diabetes are well studied but robust research documenting the cutaneous effects of the disease remains sparse. Very little literature is available on blisters in diabetes but they are often the first sign of underlying ulceration. In the neuropathic diabetic patient determining the cause of blistering can be challenging as these patients often have no recall of how the incident occurred. Blisters may be filled with either serous fluid, blood (blood blister) or pus (septic blisters).

They may be caused by:
- Excessive heat
- Excessive cold
- Friction (shear stress)
- Contact with chemicals i.e. detergent, solvents
- Allergic reactions to bites and stings
- Fungal infections
- Pressure sores

In the diabetic patient they may also occur spontaneously, so-called diabetic bullae. Typically these lesions develop most frequently over the toes, heels and occasionally on the anterior aspect of the shins. There is general consensus that it is most often adult males who are afflicted. The aetiology is unclear but it has been suggested that some patients may have a reduced threshold to frictional forces. An association with neuropathy and retinopathy has been found.

On the basis of epidermal and dermal cleavage levels there are three types of blisters:
- Spontaneous and non-scarring where there is intra-epidermal cleavage without acantholysis. These resemble blisters from burning and are several millimeters to several centimeters in size, contain serous fluid and are not surrounded by erythema
- The second type may be haemorrhagic and may heal with scarring and atrophy. The cleavage plane is below the dermo-epidermal junction.
- The third type consists of multiple non-scarring blisters on sun exposed and deeply tanned skin on the feet, legs and arms. Electron microscopy has shown the cleavage plane at the lamina lucida.

In addition bullous dermatosis may be seen in those patients with diabetic nephropathy.

When assessing a blister the following should always be ascertained before treatment:
- Is it tense or flaccid?
- What colour is it?
- What does it contain?
- What was the probable cause?

Small flaccid blisters may be wiped with an antiseptic and covered with a sterile non-adherent dressing. It is important that no adhesive is applied to the roof of the blister otherwise the blister roof will be removed together with the dressing whilst checking the progress of the lesion.

Large blisters (over 1 cm in diameter and all tense blisters) need to be drained. There is some debate regarding the best method of doing this. Whilst some of the literature suggests draining with a sterile syringe other sources feel that this is of limited value as the blister quickly reseals and refills. They suggest lancing with a scalpel, draining and applying an antimicrobial dressing. At present at our clinic such wounds are treated similarly to burns, the main objective being the prevention of infection.

To illustrate the difficulties of determining the pathology of the blisters three cases from the Multidisciplinary Diabetic Foot & Ulcer Clinic, Montana Hospital in Gauteng will be discussed.

Case history 1

Diabetic male, 60 years of age with uncontrolled glucose levels, developed blisters over the dorsum of the foot. The blisters completely covered all toes and extending 1 cm on to the plantar aspect of the foot. The patient reported that the blisters occurred spontaneously.
He became aware of the situation after seeing the dog lick his foot. Treatment comprised admission for intravenous antibiotics and drainage of the blisters. Two weeks later he underwent a balloon angioplasty and stent, and a surgical debridement was done. In addition, both the third and fourth toes required amputation. He is currently receiving Cuticell® Sorbact® dressings every two days. The wounds on the dorsum of the foot have almost completely healed whilst those over the toes are still in the process of healing. The team believes that these blisters were due to a third degree burn despite the patient having no recollection of such an incident.

Case history 2

A diabetic male 60 years of age, currently with controlled s-glucose, but with a long history of hyperglycaemia and peripheral neuropathy developed a large blister over the second, third and fourth metatarsal heads. When he arrived at the clinic the blister had burst and there was evidence of a deeper blood blister beneath the superficial blister. On discussing the development of the ulcer it was found that the patient had worn new innersoles provided by an orthotist prosthetist after using a gait analysis system. A plantar metatarsal pad had been placed in the shoe to improve toe function. Unfortunately the interphalangeal joints of this patient were no longer mobile and the plantar metatarsal pad created excessive shear stress. Initially treatment consisted of regular sharp debridement of the necrosed tissue followed by applications of Iruxol® and Askina® sorb. Once the base of the wound started granulating he received treatment with Contreet®.

Case history 3

A diabetic female 40 years of age, with poor glucose control, in renal failure, spontaneously developed large blisters over the dorsum of the foot. These appeared after an episode of excessive oedema of the foot. The wounds were treated with Contreet® after they became infected due to her poor general condition. The team believes that these wounds were Diabeticum bullosum linked to renal failure. The wounds on the dorsum of the foot successfully healed after four months; the wound on the toe took a further three months to heal due to bone exposure.

Conclusion

Blisters in the patient with diabetes may be from multiple causes. The challenge facing the wound care practitioner in the diabetic patient is correctly diagnosing the aetiology to prevent reoccurrence. In this way, secondary infection, which is a frequent complication in the neuropathic patient, will be prevented.

References: