Introduction

It is generally admitted that diabetic patients are much more susceptible to infections in all wounds. Since nearly all wounds are contaminated, we can assume the presence of bacteria (contamination) in diabetic wounds. It has been established that said bacteria are not attacked properly, which may result in a faster proliferation and, consequently, result in an infection.

In the literature some possibilities are pointed out to explain why the treatment of diabetic wounds is often more difficult than other chronic wounds.

1. The normal infection reaction would be further disturbed by a poor vascular reaction.
2. The normal granulocyte migration would be delayed.
3. Chemotaxis (attraction of cells by chemical substances) would develop less effectively in case of hyperglycaemia.
4. The same hyperglycaemia would reduce the granulocytes phagocytosis capacity.

Diabetic foot wound (Source: Year of Italy). The picture shows a typology of a wound. The wound bed has been dressed with a 'silk' dressing. The picture shows a type of dressing that is frequently found locally. The wound has been supplied with Elasto-Gel (0.7) and a diaper (0.9). The external side is protected with the dressing.

Everyone who is dealing with diabetic wounds should take care of infection prevention. The clinical signs are not so clear, and sometimes they are going bad before the patient or the caregiver have noticed something.

Diabetic foot wounds can often be explained by a lack of appropriate care, repeated trauma/pressure and a combination of these factors. Infection of diabetic foot occurs frequently and, according to Langer, it is of vital importance to the patient that the infection be quickly diagnosed and efficiently treated.

Diabetic patients must be careful not to injure even small wounds. Very soon after the injury of the skin in the lower extremities is damaged, the wound will be colonised by a series of micro-organisms. When an infection appears, it will generally be multi-bacterial. During the treatment of a diabetic foot wound it is essential for the wound to be treated adequately in order to prevent serious infections. Proper absorption of wound exudate and early debacteria are not attacked properly, which may result in a faster proliferation and, consequently, result in an infection.

In our search for such a dressing, our preliminary investigations indicated one approaches the requirements. The dressing is called Elasto-Gel and consists of 65% glycerine, 17.5% water and 17.5% polyacrylamide. The rate healing of the wound is not inhibited. The duplicity of the gel allows the dressing to easily remain in place for seven days whilst the patient keeps walking on it. Another aspect is its strong bacteriological action, due to its high glycerine contents . We know from other findings that hydrogel absorbs the wound exudate, but when doing so it concentrates the growth factors and the valuable proteins in the wound site. Thus, a layer forms, like a thin film, which can be found on the wound. This means that the dressing does not take up all the wound, but that, to the contrary, it keeps them concentrated at the very place where they are most needed.

When we now return to the specific situation of a diabetic foot wound, we think that the use of Elasto-Gel could reduce the risk of infection drastically. Indeed, in other wounds the bacteria which are present in the wound and even the most feared bacteria will not be able to proliferate any further. Therefore, we proposed that the same could be true for the diabetic ulcers. We also proposed that the glycerine would soften the callus, which usually appears around such wounds. 

For the dressing itself, it would bring about the necessary pressure suppression when it is placed on and around the wound. In order to prove the usefullness of this hydrogel dressing a clinical trial was conducted.

Materials and Methods

As wound care professionals we are looking for a dressing that helps us dealing with the presence of bacteria in diabetic wounds, since this is the major problem. Therefore we conducted a clinical trial with a promising glycerine based hydrogel.

The diabetic foot wound (Source: Year of Italy). The picture shows a typology of a wound. The wound bed has been dressed with a 'silk' dressing. The picture shows a type of dressing that is frequently found locally. The wound has been supplied with Elasto-Gel (0.7) and a diaper (0.9). The external side is protected with the dressing.

The same foot after 2 months treatment with Elasto-Gel. Notice the excellent condition of the wound. In the clinical trial, 131 diabetic patients were treated for their diabetic foot ulcer with Elasto-Gel and 134 patients were treated with a normal gauze dressing. Both groups did not differ significantly in any parameter.

The ELASTO-GEL: special dressing for diabetic foot wounds ?

The wound exudate is followed with a 10 x 10 Elastro-Gel dressing. The dressing is a hydrogel dressing of a gel. Its appearance somewhat like a pressure relieving mattress. The nurse is able to make it renters to between 3 mm and 3 cm. This dressing is used in the treatment of diabetic foot wounds.

As for the need for antibiotics and local antiseptic creams almost all patients were given systemic antibiotics (p < 0.01). Formation of callus is a classic experience in the treatment of diabetic foot wounds. We found that the glycerine hydrogel did soften the callus so that its formation did slow down and if present it was easy to remove.

In the experimental group only one patient was given systemic antibiotics. No antiseptic creams were used in the experimental group.

Five patients from the control group lost one or more toes.

The overall healing in the experimental group was significantly better than the ones in the control group (p = 0.05). Of those ulcers which healed there was no difference in the two groups.

Discussion

In the control group the most frequent used dressing was gauze and Betadine cream. In the experimental group we used in the cavities always an Alginate dressing.

We tried also to fill the cavity with a piece of the hydrogel, but this could only stay for one day. When using Algimates we could leave the dressing for over 5 days, which was determined by the amount of exudate produced by the wound. We always fill dead spaces, otherwise they dry out the wound and bacteria can proliferate causing infection. Dead spaces are dead. The hydrogel of Ca-alginate was easy in the hydrogel dressing. Patient comfort was better with Elasto-Gel. Elasto-Gel does not decrease the overall to inspect the wound when compared to non infected standard treated (moist) wounds. When using an antiseptic cream we believe that they do more harm than good because some of these products have the tendency to dry out the surface of the wound, which results in the formation of a dry crust on the wound surface. In this dry crust bacteria can develop and we know since the hydrogel dressing containing 65% glycerine is strongly bacteriostatic and this is the only reasonable explanation why we see almost no infection in the experimental group.

Conclusion

We believe that the glycerine hydrogel is a major contribution to the treatment of diabetic foot ulcers.

References