DIABETIC FOOT INFECTION CONTROLLED BY IMMUNOMODULATING HYDROGEL CONTAINING 65% GLYCERINE


Introduction

It is generally accepted 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 attached 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 trauma/pressure and a combination of these factors. Infection of diabetic foot wounds is often more difficult than other chronic wounds.

2. 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 would happen in diabetic foot wounds. We also proposed that the glycerine would soften the callus, which usually appears around such wounds. As for the dressing itself, it would bring about the necessary pressure suppression when it is placed on and around the wound. In order to proof the usefulness of this hydrogel dressing a clinical trial was conducted.

3. The normal infection reaction would be further disturbed by a trauma/pressure and a combination of these factors. Infection of diabetic foot wounds is often more difficult than other chronic wounds.

4. ELASTO-GEL: special dressing for diabetic foot wounds?

Summarising the data above, we found that an ideal dressing for diabetic foot wounds needs to have the following characteristics:

- strong to resist the pressure resulting from walking while wearing a shoe;
- does not disturb the wound bed when removed;
- able to keep the growth factors supplied in place, i.e. on the wound bed;
- able to modulate serious infectious reactions.

The investigations indicated one approaches the requirements. The dressing is called Elasto-gel and consists of 65% glycerine, 17.5% water and 17.5% polysacryl. The rate healing of the wound is not inhibited. The durability of the gel allows the dressing to easily remain in place for seven days while the patient keeps walking on it. Another aspect is its strong bacterical action, due to its high glycerine contents.

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 would be true for the diabetic ulcers. We also proposed that the glycerine would soften the callus, which usually appears around such wounds. As for the dressing itself, it would bring about the necessary pressure suppression when it is placed on and around the wound. In order to proof the usefulness of this hydrogel dressing a clinical trial was conducted.

Clinical Trial (dry gauze treatment versus moist hydrogel treatment)

Method: Fifteen patients with diabetic foot ulcers were treated with the hydrogel dressing and cleansed with a dermal wound cleanser. The control group (n=14) was treated with a dry gauze and the wounds were treated twice a day and irrigated with chlorhexidine 0.05% solution. Patients were allocated to treatment groups according to a pre-prepared randomisation listing. If the patient was a diabetic and had a wound on his foot (neuropatic or not) they were taken into the trial. Necrotic, infected wounds and patients who already had been amputated a toe were not excluded. Only the patients who were under a systemic antibiotic regime were excluded from the trial.

Before starting treatment, all patients received information on the purpose of the study and gave a written consent. At each dressing changing the stasis of the ulcer and surrounding skin was assessed and the nurse also observed the ease of removal and application of the dressing. The wounds were photographed after every four weeks. At the end but also during of the trial, the patients were interviewed about the comfort of the dressing and whether there was any pain on removal.

Table 3. Overall healing time (n = 8 patients)

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As for the need for antibiotics and local antibiotic creams almost all patients in the control group did use antibiotic creams. In addition, 6 of them were given systemic antibiotics (x < 0.001).

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

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

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Discussion

In the control group the most frequent used dressing was gauze and Betadine. As we filled the cavity with the piece of the hydrogel, but this could only stay for one day. When using Alginates we could leave the dressings in 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 deadly. The removal of exudate was easy in the hydrogel group. Patient comfort was better with Elasto-Gel. Elasto-Gel does not increase the overall healing time 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 the bacteria can grow and the diabetic foot ulcer is impaired is these creams are often causing infections in our experiences. The hydrogel dressing consisting of 66% glycerine is strongly bacteriostatic and is the only reasonable explanation why we saw almost no infection in the experimental group.

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Conclusion

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

References


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