

The management of stagnating diabetic foot ulcers with a collagen dressing*

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Introduction:

Diabetic foot ulcers often become chronic and are prone to develop infection. A stagnating diabetic foot ulcer is described as an ulcer that fails to progress towards closure due to chronic inflammation. Treatment of these stagnating ulcers is to focus on debridement, modern wound-healing dressings and offloading (1).

Studies have shown that high levels of proteolytic activity and low levels of MMP inhibitors are detrimental to healing (2, 3). The aim for treatment is to correct the imbalance by reducing the amount of MMPs in the wound bed. This can be achieved by application of collagen based wound dressings as they can bind MMPs (2, 3).

Material and Methods:

Bovine collagen based wound dressings have been shown to reduce MMP-2 and MMP-9 levels helping to restore the physiological balance between MMPs and TIMPs (1-3).

Clinical efficacy of an aseptic produced bovine collagen dressing (*SC) was evaluated in a series of 20 case studies. Patients had stagnating diabetic foot ulcers that were free of necrotic tissue and/or slough and clinical signs of infection. The ulcers did not respond to standard treatment, which comprised debridement, moist wound healing dressings and appropriate footwear.

Patients were treated in both an in and out-patient setting. Dressing changes were on average twice weekly and took place at the discretion of the clinician depending on exudate production. Wounds were cleansed with saline using the wet to dry phase system. A **foam dressing was used as a secondary dressing to cover the collagen. Patients received appropriate off-loading of the affected area.

Results:

Two typical cases are presented in detail to illustrate the results.

In all 20 cases we observed an improved wound bed condition. The dressing was comfortable and easy to handle. When the ulcers started to epithelialize (on average after 10 days) *SC was discontinued and the foam dressing was now employed as a primary dressing.

Conclusion:

The stagnating diabetic foot ulcers that were treated with *SC moved towards epithelialization. In daily practice the use of *SC was shown to be easy, improving clinical outcomes, patient comfort and reducing pain.

Case 1:

The 64 year-old male has diabetes mellitus type II since 1998. Additional pathologies are retinopathy and severe neuropathy. Due to poor concordance his blood glucose levels were difficult to control, moreover he had no awareness of low blood glucose values. Laboratory tests: HbA1c 10% = 86 mmol/mol. He now receives insulin 4 times a day. Due to many recurrences he was extensively treated by the vascular surgeon and the rehabilitation outpatient department. Despite 6 months of treatment with contact casting the ulcer failed to close. He was then referred to the Diabetes Specialist Nurse (DSN). Wound treatment comprised SC covered with a secondary dressing. Offloading is achieved with felt as the patient refused to wear floss shoes. Removal of callus was performed weekly in the first 4 weeks, followed by once every 2 weeks for 3 months. As a result of this intensive therapy the ulcer had closed in 9 weeks. He then suffered scalds that healed after 6 weeks. After ulcer closure he was referred to an orthopedic shoemaker for customized orthopedic shoes. He now visits the DSN regularly to prevent ulcer recurrence and to repeat education regarding foot care and blood glucose values control. Fig 1 – 4.

Role of the DSN:

The diabetes specialist nurse is the intermediary between patient, internal medicine specialist and rehabilitation physician. She coordinates care, arranges referrals and conducts wound treatment. This way patients are screened, educated on prevention and receive adequate treatment. The approach has reduced hospital admittance by 50% and has decreased the number of amputations, as advocated by the St. Vincent declaration. The DSN has completed wound management courses (DWCS courses) and is trained in prevention and treatment of the diabetic foot patient (Fontys Hogeschool Eindhoven, Netherlands). The DSN has also completed a stage with a podiatrist, ensuring skills necessary for callus removal.



Fig 1: Situation upon the start of collagen treatment (*SC)



Fig 2: Ulcer status after debridement



Fig 3: The ulcer is closed after 9 weeks. On the same digit and inter-digit 2 and 3, second degree burns occurred during showering.



Fig 4: The burns are healed after 6 weeks.



Fig 5: At the start of the treatment



Fig 6: Status after 6 weeks of treatment



Fig 7: Status after 8 weeks of treatment. The ulcer is almost closed.

Case 2:

The 50 year-old female has diabetes mellitus type II since 2006. She is morbidly obese, has heart failure, retinopathy, neuropathy, limited joint mobility and hypertension. Abnormal fat spectrum, HbA1c (average blood glucose value of the last 6 to 8 weeks) 7.0% = 53 mmol/mol. Visit to the clinic with a recurrent ulcer. (fig.5) DM is controlled with insulin 4 times a day. Further treatment was started with oral antibiotics, weekly callus removal, offloading with padding material and mobilization according to clinical presentation. *SC was applied covered with a **foam. Complete ulcer closure was achieved in 10 weeks. Fig.7 The patient was referred to an orthopedic shoemaker for footwear and seamless socks, (8 pairs/year are reimbursed by the health insurers'). The patient is followed up by a DSN and visits the rehabilitation ward to prevent ulcer recurrence. Fig. 5-7

References:

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