

CLINICAL EVALUATION OF AN ABSORBANT HYDROGEL DRESSING ON BURN WOUNDS.

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INTRODUCTION.

In this poster a clinical evaluation of an absorbent hydrogel dressing on burn wounds will be discussed.

Within a period of six months twenty patients with second degree burns (more than 10 % total body surface) were treated with an absorbent hydrogel dressing according to a alternative treatment regime. From those, 13 patients had deep second degree burn wounds and two of them had serious overall third degree burns. The rest was a mixture of all degrees. We had will first explain the standard treatment and it disadvantages. Secondly the alternative treatment regime will be discussed. Cases backup the story.

A. STANDARD TREATMENT

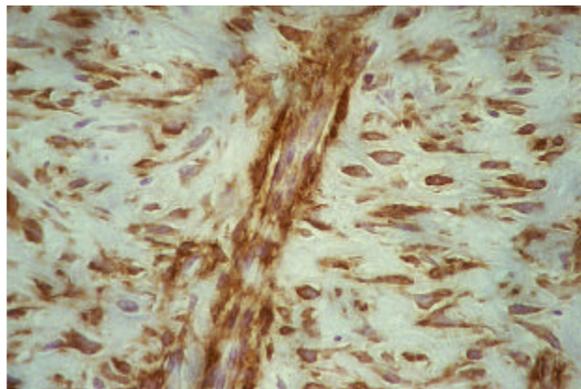
The standard treatment of burns in our setting has been; covering the wounds with Silversulfadiazine Cream (SSD) and dry cotton gauze. The Silversulfadiazine Cream was applied two or tree times a day after removal of the remnants.

The wound healing pattern for the SSD treatment is by most humans the same. Histopathological investigation of the wound (done by the Beverwijk Burns Research Institute, The Netherlands) shows a typical mixed aspect of eschar within granulation tissue and outgrowing epithelium. Disintegration of the crust starts after approximately one week post burn at the wound edges. Re-epithelialization, starting from the edges can be seen very soon. After some time, depending from the surface, approximately 14 days, the epidermis broadens and it gets a not expected and not explainable pseudo carcinomatous outgrowth. This seems typical with SSD and without consequences.

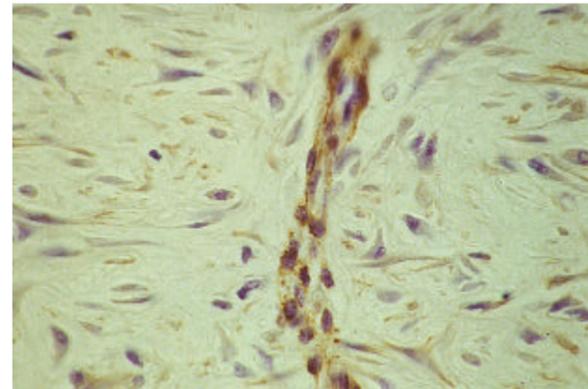
Histopathological data show that silver ions are irritating the tissue. As long as the scab exists the ions stay at the top of this scab. There they are disinfecting the wound without penetrating the scab. As soon as the scab breaks down, the ions get absorbed and can be traced in the blood. Silversulfadiazine has the potential to preserve viable dermal tissue but the epidermal regeneration is rather slow and irritated, while the formation of granulation tissue is pronounced with an abundance of myofibroblasts. Abundance of myofibroblasts is an indication of overactivity with greater chance of hypertrophic scarring (to much collagen production). The abundance is caused by secondary inflammation inside already healed tissue.

The remnants of hair follicles in the tissue become surrounded by silver ions with an inflammation as result. This abundance of myofibroblasts is a possible cause of hypertrophic scars.

Since we thus know that the silver ions in the cream are irritating to the tissue, we have preferred an alternative treatment in our clinic.



This is a histopathological picture of a burn wound treated with SSD showing an abundance of myofibroblasts. This is highly susceptible for the formation of a hypertrophic scar.



In this histopathological picture we see a burn wound treated with Elasto-Gel only. The presents of myofibroblasts is very low in comparison with the picture with the SSD treatment.

B. ALTERNATIVE TREATMENT.

Our alternative treatment begins for killing the germs on the burned skin with SSD, but then we cover the wound with large pieces of hydrogel (Elasto-Gel®, Southwest Technologies Inc.) without SSD. Elasto-gel consists out of 65 % glycerin, 17.5 % water and 17.5 % poly-acrylamid that acts as matrix. The first days these hydrogel sheets can be left for at least one to three days. As wound exudate diminishes the hydrogel sheet can be left for one week or longer.

Wound healing is enhanced and patient comfort is dramatically improved, compared to the old standard SSD and cotton gauze. Until now we have not had any sign of infection during the treatment with the hydrogel. The reason of no infection should be sought in the high concentration of glycerin in the dressing.

An investigation of "The University Of Miami School Of Medicine Department Of Dermatology And Cutaneous Surgery" shows that Elasto-gel is effective in reducing both the number of Pseudomonas Aeruginosa and the total number of bacteria. This suggests that Elasto-gel occlusion does not favorable support Pseudomonas Aeruginosa proliferation and may have significant implications for clinical use.

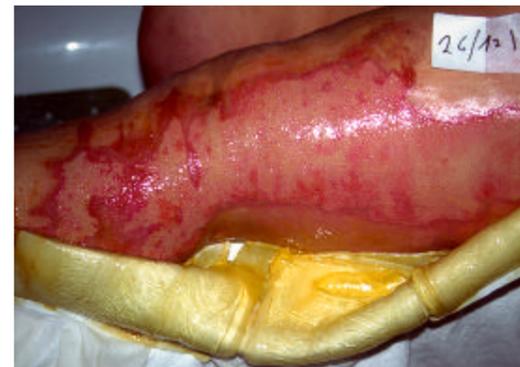
Because the healing resulted macroscopically in the absence of hypertrophic scars even three months after complete epithelialization, histopathological evaluation of a wound treated with this hydrogel will show no abundance of myofibroblasts.



Case 1. A 46 year old lady burn herself in the kitchen (hot water). The wound on admission in the hospital is shown below. Together with her arm more than 10% TBS was burned.



The blisters were removed from the wound and large pieces of Elasto-Gel were applied. The patient was send home because she wanted to be at home for Christmas. The dressing stayed 3 days on the wound. No pain was reported.



After 3 days the dressing was removed. Notice the moist healing environment and the calm inflammation.



The wound healed within 3 weeks. Result after 2 months, there is now sign of hypertrophic scarring. Due to the new thin epidermis one can see the venous plexus. As the epidermis thickens the color disappears.



Case 2. A 49 year old man burned his hands in a chemical factory with high concentrated acid. The picture below shows his hand on admission in the hospital.



The burned hands were dressed with a large 20 x 15 cm Elasto-Gel sheet. The dressing was cut till it fitted like a glove. These dressing remained 4 days on the wound.



After 9 days and two dressings changes the "glove" was still very well shaped around the hand covering the whole burned area. Small pieces of hydrocolloids were used to fit the glove.



9 days after the accident the wound is almost completely epithelialized. Only 2 dressing (20 x 15 cm) were needed to heal this burn wound. No infection was reported.

REFERENCES

Hoekstra M.J., Hupkens P., Dutrieux P., Bosch M.C., Brans A., Kreis R.W. A COMPARATIVE BURN WOUND MODEL IN THE NEW YORKSHIRE PIG FOR THE HISTOPATHOLOGICAL EVALUATION OF THE LOCAL THERAPEUTIC REGIMENS: