Management of Complex Wound with a New Hydrogel

Case Report of a traumatic wound treated with a new hydrogel (***Elasto-Gel ™***, Southwest Technologies, Inc.)

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Introduction

Traumatology is the field of many surgical disciplines. After some quite difficult surgery comes the time for professional wound care. Sometimes poor wound care can destroy almost perfect surgery. The extension and the poor general condition of the patient sometimes complicate wound healing. Therefore, we are convinced that doctors and nurses should learn more about the possibilities in traumatic wound care.

We would like to present a case report which highlights the statement above.

The Case

A 56 year old male had crushed his right leg under a heavy truck, which was driven by his son. The son, who panicked by trying to free his father's leg from under the wheels, made the injury even worse when he backed over the leg, and pulled and tugged to free him. The patient was taken to the nearest hospital, where the doctors decided to amputate his right foot.

The son would not agree with the doctors and drove 100 miles to our hospital where he asked the orthopedic surgeon not to amputate the foot. The surgeon stabilized the fracture and performed a fasciotomy to relieve the pressure from muscles and nerves. The operation was a success, and the plastic surgeon was asked to take care of the wound management. This was not an easy task.

One week after the operation, several necrotic spots became visable. The whole right inner ankles, the point at which the fasciotomy wound started, was a black necrotic area. The right outside ankle was one big black eschar. On the tibia were several black spots (see figures 1 and 2).

The wound care story started at this point. (It was at this point, we, the wound care team, became involved.)

Other Important Problems

- The man was an unknown diabetic (discovered after his accident)
- Normal anesthesia and pain relief medication caused coma
- Because functionality of the ankle joint was necessary, rehabilitation should start as fast as possible; this was to occur while wound healing was in progress.

Consequences for the Wound Management

So the man should have only surgery if really necessary; wound care should be conducted without pain medication. Because of the diabetic state, infection of the wound was a possible serious threat. Wound care and rehabilitation must be performed at the same moment. We needed a dressing that could perform the following things (exhibit the following properties):

1. Cover the entire lower leg and foot (it became one continuous wound).
2. Keep out micro-organisms.
3. Because the presence of several kinds of wounds, (hard black necrosis, yellow soft necrosis, granulating fasciotomy) the dressing should be compatible with other dressings such as Intra-Site Gel, sugar, DuoDERM®, Comfeel®, Flammazine . . .
4. The would should be kept moist.
5. The dressing must remain on the wounds for a few days.

Objectives

1. The hard necrosis must be softened and removed as fast as possible.

2. Granulation tissue should be promoted.
3. Donor skin grafts when wounds are fully granulated.
4. Infection prevention at any cost.
5. Reduce nursing labor cost by using dressings that could remain several days on the wounds.
6. Keep functionality of the feet.

Solutions

To enclose the leg and the foot we used ***Elasto-Gel ™*** 30cm x 30cm (Figure 3). This new hydrogel was able to keep the wound moist and was thin enough to put the patients leg in a WALKER (. . . . . .). With this Walker rehabilitation could start shortly after the operation. Initially we tried to manage the wound with the ***Elasto-Gel ™*** alone. For the granulating parts (fasciotomy) the ***Elasto-Gel ™*** did well, but the hard black necrosis did not soften quickly enough.

Most hydrogel sheets do pump the exudate away, but do not soften the necrosis quickly enough. The only hydrogel (to our knowledge) that does soften (rehydrate) hard black necrosis fast is Intra-Site gel (Smith & Nephew). We are able to combine both gel without problems. After 4 days we opened the dressing and we were able to cut the black eschar open. Under this thick layer we discovered extensive fat necrosis, which was washed away with Chlorhexidine, 0.05% in water (ICI Farmaca). Once this fat necrosis was removed, in some areas the bone became visible. With the wounds now opened, we could reach from one wound to the other with our medical instruments, a distance of – cm. In a very short time (approximately – days), we removed most of the necrosis. We elected to remove this necrotic tissues as quickly as possible, because this dead tissue is a substrate for bacteria.

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Since the patient could not be treated with pain relief medication, the necrosis as soft as possible so it could be removed with pincet and scissors.

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Once most of the black eschar was removed, sugar paste was used to stimulate the growth of granulation tissue. DuoDERM® and Comfeel®, both polysaccharides like sugar are known to stimulate granulation tissue. At this time, x days after treatment began, we had a good picture (assessment) of the extent of the injury. The tendons of the peroneus longus became visible. The extension of the wounds made debridement a difficult task, but with the cautious surgical technique and extensive nursing care, no further damage was done. In combination with ***Elasto-Gel ™*** , we used sugar, DuoDERM® (ConvaTec, Inc.), or Comfeel® past (Coloplast, Inc.) for further stimulation of granulation tissue (Figure 5). The combination dressings were used for – days. At this state of healing, copious amounts of exudate was produced by the wound (Figures 6 and 7). Without DuoDERM® or sugar paste, ***Elasto-Gel ™*** was able to absorb or hold all the fluid hours without serious leakage. We could keep the ***Elasto-Gel ™*** on the wound for a minimum of two days and a maximum of six days without removing it.

Rehabilitation was begun on day – and continued throughout the wound care treatment. After just 5 weeks, the plastic surgeon could treat all the wounds with homografts and the patient experienced complete recovery and full use of his leg and foot.

Summary of Treatment

1. Flammazine / gauze – x days
2. ***Elasto-Gel ™*** – x days
3. ***Elasto-Gel ™*** / Intra-Site Gel – x days
4. Surgically debride
5. ***Elasto-Gel ™*** / Sugar / DuoDERM® / Comfeel® – x days
6. ***Elasto-Gel ™*** – x days
7. Graft
8. Cover with ***Elasto-Gel ™*** – x days

Discussion

The objectives were reached. At no time did the wound show signs of infection. It was remarkable that the wound never exhibited a bad odor. ***Elasto-Gel ™*** seems to be able to absorb and eliminate the formation of bad odors and stop bacterial growth in the wound.

Elasto-Gel ™ provided a protective padding and pain control. Removal of the ***Elasto-Gel ™*** dressing was always simple, cut the tape and lift off the gel sheet. The cost for nursing labor was seriously reduced in comparison with the initial treatment with Flammazine and cotton gauze.

Due to the occlusive effect of ***Elasto-Gel ™*** , the wound was kept moist, so autolysis of necrosis

and stimulation of granulation tissue occurred at acceptable rates. The compatibility with other dressings is a definite advantage, because in complex wound care the wound are all in different stages of healing and require different dressings. Since each stage requires different dressings for the best results, the combinations of dressings should not interfere with each other.

Intra-Site Gel appears to be more effective for softening black necrosis. Sugar paste, DuoDERM® or Comfeel® with ***Elasto-Gel ™*** seems to perform autolysis without infection risks. As the yellow slough disappears the underlying granulation improves with these polysaccharides. ***Elasto-Gel ™*** was also able to control lots of exudate, which was either absorbed or contained under the dressing. We waited to graft until all the wounds were fully granulated, because there were too many risks involved with frequent anesthesia.

Three months after the accident, the man was able to drive his truck again. (Results 6 weeks after grafting – (See Figures 11 and 12). The figures with the dates included were prepared from video film recordings of the wound dressing changes.

Conclusions

Elasto-Gel ™ is a convenient, effective wound covering, which exhibits many unique advantages compared to other dressings. Some of these include: compatibility with other medications and wound treatment products, simplicity of application and removal, control of odor, protective cover, pain reduction, available in large sizes, and provides a moist healing environment.

References

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