

THE EFFECT OF MEDIFOAM[®] DRESSING ON THE WOUND OF PENILE SURGERY

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Purpose : We evaluated the effect of Medifoam[®] dressing on penile surgical wound healing by comparing Medifoam[®] dressing with traditional gauze dressing method.

Materials and Methods : Of the patients who wanted penile surgery, we selected 20 patients with exclusion criteria. The exclusion criteria were infection, abnormal immune system or taking drugs which could disturb wound healing. The selected patients were dressed with Medifoam[®]. And the patients were followed up on postoperative day 1, 3, 5 and finally day 7 and the wound healing process was checked. On the final 7th day, we evaluated the relative pain amount, the ease to apply or remove, non-migratory nature of dressing material, and the surgeon's subjective comment. The comparison was done in all items with traditional gauze dressing method.

Results : On the 1st, 3rd, 5th, 7th postoperative days, clean wound was seen in 65%, 60%, 85%, 95% respectively and the rest patients showed only a little amount of serious discharge. No one had a dirty or purulent wound. In the pain item, 70% felt an average amount and 30% felt minimal amount. In the item of the ease to apply or remove, 15% showed excellent. 80% showed good and 5% showed average when compared with gauze dressing. In the non-migration item, 45%, 45%, 10% showed excellent, good, average respectively. In the surgeon's final subjective comment, excellent was 5%, good (better) was 90%, and so so was 5%.

Conclusions : The concept that moist wound healing is superior to dry wound healing is not new. But, in the penile surgery, we are still using gauze dressing method, that is, dry wound healing. Considering the comfortable, easy nature of moist dressing material such as Medifoam[®], the advantage will surpass the cost.

INTRODUCTION

Wound healing has been main concern for all surgeons. With medical advances, various materials and methods for better wound healing has been developed and applied. The dressing materials are very important in the wound healing and various materials have been used. Most commonly used materials were gauze or bandage-based dressing, that is, dry wound healing. This conventional wound dressing has been performed to keep wounds dry or open, based on a concept of dry wound healing. Such dry wound healing, however, has problems of taking a long wound healing time, painfulness, and leaving serious scars.

The concept of moist environment wound healing was introduced in 1960's and the superiority of moist environment wound healing had been proved in various aspects. It is preferred that wounds are treated to maintain appropriate moist environments in the wound, thereby preventing against external infections. This is achieved by the use of occlusive dressings or moist environment dressings. This method healed wound effectively. Accordingly, various dressing materials for moist environment wound healing were developed. Medifoam[®] (Hydrophilic polyurethane foam dressing), which was developed in Korea recently, has received the attention because of the advanced function in comparison with any other available products. In case of burn, moist wound healing method has been used. But, in the penile surgery, traditional dressing method with Furacin[®] ointment, vaseline and gauze are still used. Therefore, it should be considered to change more effective dressing material for penile surgery.

In this study, the effectiveness of Medifoam[®] (Hydrophilic polyurethane foam dressing) on penile surgical wound healing were compared and analyzed, versus the traditional dressing method.

MATERIALS and METHODS

This study was performed from March to May 2002, on 20 patients who had undergone penile surgery in Korea University Hospital and two other urology clinics. The number of patients for penile surgery in urology clinic was larger than in general hospital. The kinds of penile surgery were phimosisetomy (5 patients), dorsal neurotomy (5 patients) and penile augmentation (10 patients). After penile surgery, occlusive dressing with Medifoam[®] was preformed. The wound healing process was checked on day 1st, 3rd and 5th postoperatively, and dressing changes was performed on that day. On the final 7th day, wound status was checked finally during the dressing change. Following patients were excluded in this study : Patients with systemic infection, patients with suppressed immunity, patient administered with a medicine capable of influencing wound healing, and patients experiencing severe conditions over the whole body. The items for evaluation of Medifoam[®] efficacy were divided into three categories such as wound, function and the surgeon's subjective judgment. As for the evaluation of wound, the wound healing status was categorized as clean, a little serious discharge and purulent or dirty. The evaluation was performed on 1st, 3rd, 5th and 7th postoperative days. Also, the pain was categorized as a serious, moderate, slight and none. In the function, the ease of use (attachment, removal) was graded as very easy, easy, ordinary and difficult, and the fitness of dressing was evaluated as very good, good, moderate and not good. In the surgeon's final subjective judgment, considering wound healing time and changes of wound conditions (formation of epithelium, presence or absence of exudates, and presence or absence of infection), the surgeon compared Medifoam[®] with traditional dressings and evaluated as 4 classes : very good, good, same, and poor.

In this study, the standard of evaluation like "good or same" was established by comparing Medifoam[®] with traditional dressing method of gauze.

RESULTS

20 patients, who were not applicable to exclusion criteria, were involved in this study and the wound healing status in every treatment following surgery was shown on the Fig. 1.

In case of traditional gauze dressing, exudates were coagulated with hematomas at gauze. It caused inflammation and pain in the wound region since the newly generated epithelium was separated by shearing upon dressing change. However, in case of Medifoam[®], the status of wound healing was much clean compared by traditional gauze dressing.

As for the evaluation of pain, "moderate" and "slight" were 70% and 30% each compared by traditional dressing. In the item of the ease of use(application and removal), 15% showed "very easy" and 80% showed "easy" and 5% showed "moderate" when compared by gauze dressing. In case of fitness, 45% was "very good", 45% was "good", and 10% was "moderate". In the surgeon's final subjective judgment, 5% of "very good", 90% of "good", 5% of "same" and 0% of poor were demonstrated.

For the statistic analysis, each case was scored and evaluated like 0 point(ordinary, moderate, same), 1 point (easy, good, slight), 2 point (very easy, very good, none) and - 1 point (difficult, serious, not good). Then, paired T-test was performed. As expected, there were significant differences in all items(p value 0.00-0.01).

	Clean	A little serious discharge	Dirty or purulent
1 st & up	65% (13/20)	35% (7/20)	0.0%
2 nd	60% (12/20)	40% (8/20)	0.0%
3 rd	85% (17/20)	15% (3/20)	0.0%
4 th	95% (19/20)	5% (1/20)	0.0%

Fig. 1. The wound was checked during the healing process and the status was categorized as clean, a little serious discharge and dirty or purulent.

DISCUSSION

Wound healing might form the groundwork in the area of surgery. In order to heal the wound effectively, various methods had been developed and used. Traditionally, wounds have been managed with simple gauze and disinfectant, that is, dry wound healing. Since Winter GD presented a concept of moist environment wound healing in 1962¹, the idea of wound dressing has been changed. Over the past 40 years, numerous studies for moist wound healing therapies has been conducted, and moist wound healing has been shown to provide better healing rates and has proven to be more effective methods for wound healing. Moist environment wound healing is achieved by the use of occlusive dressings. Occlusion of wound can prevent dry of wound so that dessication, epithelium necrosis and eschar formation in the wound were not occurred. It also stimulated angiogenesis, promoted to dissolve the dead tissue and fibrin, and improved the reaction against target cell of growth factors. As a result, the epithelialization of wound was done more quickly.² It was known that occlusion of wound by the use of occlusive dressings led to reduction of pain. It was concerned that moist wound environment increased the risk of infection such as propagation of bacteria in the wound area by using some occlusive dressings. However, it was reported that the infection rate in the occlusive dressings was lower than that in open or traditional dressings generally.³ On the other hand, it was reported that the various wound dressings including hydrocolloid dressing not only provided the moist environment in the wound, but also they had antioxidant effects by creating hydrogen peroxide associated with acceleration or obstruction of cell differentiation according to concentration.⁴

Numerous types of dressing materials as occlusive dressing that are able to provide a moist wound healing environment have been available. Transparent film dressing materials, hydrocolloid dressing materials such as Duoderm[®], Replicare Ultra[®], Comfeel plus[®] and hydrocellular dressing materials such as Allevyn[®], and other various dressing materials such as absorptive wound filler, hydrogels, Alginates and collagens were developed.⁷ Since each dressing materials has its own characteristics in the practical management of acute or chronic wounds, choosing a dressing to meet the specific needs of the patient can often become confusing for the physician. It is not easy to choose and apply the most appropriate dressing materials to meet the individual wound of the patient.

Medifoam[®], which was developed recently in Korea, is more advanced than several available moist wound dressing materials in some functions. The several clinical

studies showed that Medifoam[®] was superior to the tradition wound dressing such as vaseline and gauze or other available moist wound dressing materials in the burn.^{8,9} Medifoam[®] has a three-layered structure consisting of a protective layer, a hydrophilic absorption layer, and a non-adherent, wound contact layer. The protective layer prevents invasion of infectious organisms into the wound and maintains optimal moisture vapor transmission. Absorption layer has an absorbing ability of 1,000%. It releases the wound healing accelerating agent to the wound regions gradually. The wound contact layer absorbs exudates or blood, prevents adhesion of wound region and keeps the moist environment. In comparing Medifoam[®] with Allevyn[®], the key difference between two dressings is that, upon application of Medifoam[®], the incidence of the separation of newly generated epithelium from contact layer is lower than Allevyn[®] because the pore size of the wound contact layer of Medifoam[®] (20 μ m) is much smaller than that of Allevyn[®] (100 - 2500 μ m). Fibroblasts or keratinocytes are infiltrated into the pores of the wound contact layer, thereby generating the epithelialization. Upon dressing change, the newly generated epithelium is separated by shearing, so being an obstacle to wound healing. In addition, the absorption rate of present available materials is 700% and it is less than that of Medifoam[®]. Also, since pH of the exudates of Medifoam[®] is lower than that of present materials, Medifoam[®] is more favorable in prevention of infection and healing of wound.

In this study, the superiority of Medifoam[®] on penile surgical wound healing by comparing with traditional methods such as Furacin[®] ointment, Vaseline and gauze was demonstrated. The dressing changes were performed every 2 days. However, as for Medifoam[®], considering the high absorption rate, it seems that there is no problem to reduce the frequency of dressing changes.

Dressing materials developed so far reach only the level of providing a moist environment. In the future, the products will be developed which accelerate the wound healing by allowing dressings to contain growth factors¹⁰ or the cultured artificial skin can be used as a substitute. The most appropriate decision regarding materials and methods for wound healing will be made for individual wound of the patient instead of the use of dressing uniformly.

CONCLUSION

Over several decades, it has been proved that moist environment wound healing is superior to dry wound healing. But, in the wound healing following penile surgery, traditional gauze-based dressing method(dry wound healing) is still commonly used. It was proved that the use of Medifoam[®] (Hydrophilic polyurethane foam dressing), which was developed for moist wound dressing in Korea recently, was better than the use of traditional gauze-based dressing method in the wound healing after penile surgery. Accordingly, it should be considered to change to advanced materials such as Medifoam[®] in terms of pain and healing effect. Also the studies for wound healing methods such as addition of growth factor or artificial skin should be implemented continuously.

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