Plastic Surgery **Case Report**
International Journal of Clinical And Diagnostic Research **ISSN 2395-3403**
Volume 5, Issue 6, Nov-Dec 2017

APPLICATION OF INDIGENOUS COST EFFECTIVE SPRAY DEVICE FOR APPLICATION OF MINCED EPIDERMAL-DERMAL GRAFT

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Abstract

For covering large raw areas especially in burn cases and donor sites of skin grafting to improve healing large size of skin grafts are required which may not be available in cases of burns or not acceptable by patients to donate large size of skin grafts. To solve this problem, size of the skin graft need to be increased. To increase the size of skin graft various techniques are existing like meshing, micro grafting, meek grafting, pixel graftingusing the specified devices. In the absence of these devices the easy method is to mince the graft mechanically using scissor or surgical knife, but has problem while applying without a device. This article discusses about a spray device for application of minced epidermal-dermal skin graft tested on a donor site of skin graft.

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Keywords: Minced Epidermal-dermal graft, spray device, donor site

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INTRODUCTION

Split skin grafting is one of the most commonly performed procedures. Usually the donor site of split thickness skin graft heals by secondary intention in 21 days when only dressing is done. But it may delay due to infection, seroma, hematoma etc. To reduce the healing time various

techniques used are application of autologous platelet rich plasma (APRP), collagen sheet etc. The best way to promote healing is to use autologous tissue like epidermal-dermal graft on the donor site. After harvesting of skin graft small amount of harvested graft is left behind after applying it on the recipient site, which can be applied back on the donor site to promote the healing. To increase the size of left over harvested skin graft mincing can be done by easily available scissors or surgical knife. To increase the area of coverage spray technique is useful for which a spray device is required. This article highlights the application of indigenously cost effectively prepared spray device tested on the donor site. [1,2,3,4]

CASE DETAILS

A forty-year-old male patient presented to plastic surgery department with history post burn raw area over upper limbs and trunk for 2 months' duration. The raw area was planned to be covered with skin grafting. The skin graft was harvested from thigh. The left-over skin graft after its application on the recipient site was minced using number 11 surgical knife. The minced epidermal-dermal graft was transferred in a sterilized (by ETO gas) bottle with saline. The bottle was closed with a screw cap with sprayer system with a tubewith nozzle tip wide enough to allow epidermal-dermal graft to come out comfortably as shown in Figure 1. After shaking the bottle, the epidermal-dermal graft was sprayed on to the donor site as shown in Figure 2. Due to spray effect the epidermal-dermal graft could be applied uniformly as shown in Figure 3. The donor site was dressed with conventional dressing. The donor site healed completely in 14 days.

Figure 1: Minced Epidermal-Dermal graft suspended in a bottle containing saline with sprayer system

Figure 2: Epidermal-dermal graft being sprayed on to the donor site

Figure 3: Uniform distribution of Epidermal – Dermal graft

DISCUSSION

By mincing the graft, surface area for epithelial proliferation is increased as length of proliferating margin is collectively increased for the minced grafts[1, 2]. As size of the grafts become very small, orientation (dermal side up or down) of the graft may not affect its survival as grafts survives by diffusion. [1, 2] By this method graft expansion ratio can get increased significantly (1:100 or more). The minced grafts forms neodermis and epidermis with end result comparable to SSG. [3] Cultured epithelial autografts also have been described for covering the raw areas. [5] But the resultant grafts are very fragile and have lack of structural support which makes the application more difficult. Moreover this technique is time consuming and is more costly. For achieving good results the epidermal-dermal grafts should be applied uniformly over the entire surface of raw area. This can be achieved by spraying technique as manual techniques result in clumping and wastage of the grafts. The sprayer for the application of epidermal-dermal grafts can be designed by assembling various components like bottle, sprayer with tube and cap with screw which is more cost effective (forty Indian rupees and approximately 0.80 dollars). We have used the similar assembled sterilizedbottle (by ETO Gas) with sprayer with nozzle tip wide enough to allow epidermal-dermal graft to come out comfortably. The bottle was shaken well before spraying. Compared to manually applying the minced grafts, we found this technique was easier and could provide uniform application of the grafts over the entire surface of the raw area and less time consuming.

CONCLUSION

Epidermal-dermal sprayer indigenously designed is a novel method for applying minced graft over raw area. It is cost effective, easy to use and can be sterilized easily. It helps in uniform distribution of a small amount of skin graft over a larger surface of

raw area. Large randomized controlled study is required to validate this spray device.

Conflict of Interest Statement-

There is no conflict of interest.

Informed consent was taken from the patient.

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