Outpatient Minced split-thickness skin grafts for burn wounds

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Introduction

In Brazil, the high medical and hospital costs may restrict the quality of surgical treatment. The possibility of working in an outpatient basis, allowing immediate discharge and follow-up in the office, has a huge importance. Our hospital receive around 200 burn victims a year (only considering inpatients). Burns causing pain and suffering to patients lead to a great burden to the health system. Cure through conservative treatments is slow and often results in severe functional sequelae. Such conditions should generally be solved with split thickness skin grafts and rehabilitation. The grafts used may be laminar or meshed. The most known method that allows the greatest enlargement of the area to be grafted is the *meek* method, which was described in 1958 at the University of South Carolina (Meek, et al). After that, in 1964 Tanner described the mesh graft. Nowadays it is possible to use minced skin grafts to cover lesions, reducing the size of the donor sites and minimizing morbidity and postoperative complications. This procedure can be done both in inpatients and outpatients settings. This method can increase skin size up to 100 times from the donor area. (Hackl et al).

Objective

We wanted to explore the option of minced split-thickness skin grafting under local anesthesia in outpatients. The costs of grafting under general anesthesia, keeping the patients at the hospitals, are very high. We also wanted to verify if the method is easy to handle and the grade of pain during and after the procedure.

Methods

Nine burned areas were grafted. We used a non-powered, hand-held, dermatome and a non-powered, hand-held mincer was used for each procedure. The skin was expanded 10 times after mincing. The split-thickness skin graft was 12/ 1000 inch (0.3mm) thick and was minced into 0.8 mm x 0.8 mm pieces. The minced skin was applied evenly to the wound surface with a spatula without regard to the orientation of the individual pieces (dermal side up or down). The grafted areas were covered first with an interface of multiperforated silicone dressing and then with a 3mm thick layer of hydrogel over the burn wounds. A foam controlled hydration dressing was placed on top of this. Every two days post operatively, the foam and the hydrogel were changed without disturbing the interface dressing. The grafted area was covered first with a multi perforated silicone interface dressing (Mepitel ONE®) and then with a 3mm hydrogel layer over the burn wounds. Pictures were taken at every procedure and the pain scale was used. The surgeon evaluated this method considering the ease of use.

Figure 1: Xpansion Micro-Autografting®

Results

The nine burn wounds were completely reepithelialized at 2 weeks. There were no adverse effects from the any of the treatment components. The patients referred no pain and were very pleased with the small donor sites and the fact that this could be done on an outpatient basis. The surgeon considered an easy method to perform

Figure 2: Third degree burn. A) initial aspect; B) 15 days after skin grafting; C) 49 days after skin grafting

Discussion

Large-scale skin grafs have always caused great concern to the plastic surgeons, due to the need to have large donor sites available. The search for methods that can enlarge the grafts, in order to reduce the extension of the donor sites has always been a goal to be achieved. There are important concepts in tissue expansion, one of which is well known and idealized by Meek. Using a device that produces micro-fragments that leads the grafts to recover the lesion with numerous islands of partial skin, with greater expansion. His technique was modified after the introduction of meshers (Tanner), and was reintroduced later after being modified by the Dutch in the 1990s.

When applying skin grafts surgeons have always been concerned about the importance of placing the dermal face of the graft in contact with the wound bed. Such a procedure can sometimes be difficult specially when we use small pieces of skin. The use of the minced skin grafts, on the other hand, disregards such concern, since it does not cause any difference in the final results if the dermal side is up or down. Recent reports on minced skin grafts have shown that if they are kept in an ideal moist environment, they survive regardless of which face, dermal or epidermal, is in contact with the wound bed.

Nowadays the grafts can be manually fragmented, or much more precisely, using a device. This apparatus contains several parallel rotary cutting blades with designs for cutting the grafts in two perpendicular directions resulting in minced skin grafts, which together increase the possibility of covering a larger area, allowing an expansion rate of up to 1: 100,0 X. Expanding the Meek micrografting technique, which produced 4 mm × 4 mm grafts, the Xpansion® skin graft method produced even smaller grafts of 0.8 mm x 0.8 mm using a portable device. Further experiments were made with the hypothesis that the potential for reepithelialization is greater with smaller grafts.

Conclusion

Compared with the others methods we used before, always keeping the patients at the hospital we found this new method easy to perform and we concluded in this limited study of micrografting that it seems to be a useful and simple technique for outpatient skin grafting with a high success rate at a lower cost. We are already doing on bigger prospective study

REFERENCES
1. Meek CP. Successful microdermagrafting using the Meek-Wall microdermatome. Am J Surg. 1958;96:557–8.
2. Tanner, J.C.; Vandeput, J.; Olley, J.F. The Mesh Skin Graft. Plast Reconstr Surg. 1964 Sep;34:287-92.
3. Hackl F, Bergmann J, Granter SR, Koyama T, Kiwanuka E, Zuhaili B, et al. Epidermal regeneration by micrograft transplantation with immediate 100-fold expansion. Plast Reconstr Surg. 2012;129:443e–52e.
4. Singh M, Nuutila K, Kruse C, Dermietzel A, Caterson EJ, Eriksson E. Pixel Grafting: An Evolution of Mincing for Transplantation of Full-Thickness Wounds. Plast Reconstr Surg. 2016 Jan;137(1):92e-99e.
5. Danks RR, Laird K. Innovations in caring for a large burn in the Iraq war zone. J Burn Care Res. 2010;31:665–9.
6. Hackl F, Kiwanuka E, Philip J, Gerner P, Aflaki P, Diaz-Siso JR, et al. Moist dressing coverage supports proliferation and migration of transplanted skin micrografts in full-thickness porcine wounds. Burns. 2014;40:274–80.
7. Kreis RW, Mackie DP, Vloemans AW, Hermans RP, Hoekstra MJ. Widely expanded postage stamp skin grafts using a modified Meek technique in combination with an allograft overlay. Burns 1993;19:142-5.
8. Singh M, Nuutila K, Kruse C, Robson MC, Caterson E, Eriksson E. Challenging the Conventional Therapy: Emerging Skin Graft Techniques for Wound Healing. Plast Reconstr Surg. 2015 Oct;136(4):524e-30e.
9. Singh M, Nuutila K, Kruse C, Dermietzel A, Caterson EJ, Eriksson E. Pixel grafting: An evolution of mincing for transplantation of full-thickness wounds. Plast Reconstr Surg. 2016;137:92e–9e