

Role of Cadaveric Allograft Transplantation in a Tertiary Burns Centre

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Abstract

Non healing wounds are a major functional and financial burden to the patient and treating surgeon alike. Many methods of adjuvant wound therapy and wound bed preparation exist like Autologous Platelet Rich Plasma injection (APRP), Autologous Lipoaspirate injections (ALA), Bone marrow aspiration therapy (BMAT) etc. Several methods of temporary wound cover are available nowadays like integra, apligraf, collagen etc. Though such temporary dressing materials are available none can meet the biological properties of an allograft. Cadaveric allografts have long been used as a temporary wound cover in patients with extensive burns to reduce the morbidity and mortality in patients. In this article we describe the use of cadaveric allograft as a method for wound bed preparation in patients with non-healing ulcers in a tertiary burns centre.

Keywords: Allograft; Non-Healing Ulcer; Wound Bed Preparation.

Introduction

Chronic wounds represent a major portion of the general surgeon's as well as plastic surgeon's practice. Though often neglected, they continue to be a major functional and economic burden to the patient and the treating surgeon alike. Chronic wounds are

those wounds that do not show a 20-40% reduction in surface area with optimal treatment after a period of 2-3 weeks [1]. Post infectious raw areas, venous ulcers, diabetic ulcers and post burns raw areas all form a part of the spectrum of chronic wounds.

Many biological skin substitutes are available for the temporary cover of chronic wounds and for wound bed preparation. These include integra, collagen, biobrane, apligraf etc. Though many such materials have been used regularly for the management of chronic wounds, no better alternative has been found that can match the biological properties of cadaveric skin [2]. To make these materials less immunogenic, the cellular component needs to be removed from them leaving behind only the matrix or the immunogenic components of the skin like dendritic cells need to be removed if the epidermal - dermal components need to be used [3]. Cadaveric skin graft remains the standard method for temporary skin replacement in patients with extensive burns [4].

The tissue transplantation program was started by the Department of Plastic JIPMER in August 2016 with the purpose of providing an immediate source of cover for patients with major thermal burns and other chronic non healing wounds and to reduce their mortality and morbidity. In this article, the authors describe the use of allograft for the preparation of wound bed in 2 patients with chronic non healing wounds.

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Case Report

Case 1:

A 15 year old male patient, a known case of

40% electrical burns with bilateral below elbow amputation and multiple hypertrophic scars and keloids presented to the plastic surgery outpatient department with fever, pain and swelling over the pre-sternal region and a discharging sinus for two weeks. On examination the patient was found to have diffuse swelling measuring approximately 6x5 cm over the pre-sternal region with overlying skin erythema which was severely tender and fluctuant on palpation. After routine investigations incision and drainage of the abscess was done, 30 ml of pus evacuated, wound was packed and the patient was placed on negative pressure dressing. A week after the incision and drainage the patient developed a raw area of size 8x6 cm on the pre-sternal region which was covered with healthy granulation tissue.



Fig. 1: Post autografting picture showing 80% graft loss

The patient underwent split skin grafting for covering the raw area. Check dressing done one week later showed graft loss of 80% (Fig. 1).



Fig. 2: Allograft applied over the pre sternal raw area.

The patient was placed on negative pressure dressings and adjuvant therapies like autologous platelet rich plasma (APRP) was given but the wound showed no evidence of contraction or epithelisation. Three weeks following this patient

underwent allografting from a brain dead patient for cover of the pre-sternal raw area (Figure 2). The graft was harvested from the brain dead donor after doing all routine serological and microbiological investigations and transplanted onto the patient immediately after harvest.



Fig. 3: Contracting wound following application of autograft.



Fig. 4: Completely healed wound.

Check dressing done five days later showed 40% graft loss but the wound had contracted by around 20% (Fig. 3). A wedge biopsy was taken from the edge of the wound and sent for histopathological examination. A Masson's trichome staining was done which showed evidence of neo-epithelisation and granulation tissue formation below the epithelium. The wound continued to contract and completely healed after two weeks (Fig. 4). The patient was followed up for a period of one month with no post-operative complaints.

Case 2:

A 25 year old female patient presented to the casualty with history of 35% self-inflicted thermal burns over the lower part of the face, neck, bilateral upper limbs, chest and abdomen. The patient was resuscitated and placed on collagen dressing

and negative pressure wound therapy for wound management. Regular wound debridement and collagen dressings were done (Figure 5). Four weeks after admission the patient underwent allografting from a brain dead patient (Figure 6) and the wound over the neck and the right arm were covered. The graft was harvested from the brain dead donor after doing all routine serological and microbiological investigations and transplanted onto the patient immediately after harvest.



Fig. 5: Wound before allograft application.



Fig. 6: Allograft applied over the neck and right arm



Fig. 7: Healthy granulation after application of allograft with complete lysis of allograft

Check dressing done five days after allografting showed 80% graft uptake. Regular wound dressings were done and complete lysis of the allograft was noted 20 days after application with healthy red granulation tissue present over the areas where the allograft was applied (Fig. 7). The patient

underwent autologous split skin grafting for the residual raw areas (Figure 8) and complete wound healing was achieved two weeks later. The patient was followed up for a period of 3 weeks with no further complaints and complications.



Fig. 8: Post autografting

Discussion

The term 'allograft' refers to a graft taken from the same species, from a source that is not genetically identical. George Pollock first described the concept when he donated his own skin along with the patient's skin to treat burns wounds [5]. Though both grafts initially took, the allograft eventually disappeared from the wound. Ten years following this, it was Girdner who first described the use of cadaveric skin to cover burns wounds [6]. Following this many studies have been published about the use of cadaveric skin for the cover of burns wounds and other non-healing ulcers. The allograft limits wound infection and prevents protein, fluid and electrolyte loss from the wound decreasing the energy spent by the patient. It also reduces pain, improving the general welfare and psychological status of the patient and conserves autograft [7].

Though traditionally cadaveric skin has been used only for the cover of extensive burns wounds, many studies have been published regarding the use of cadaveric skin for wound bed preparation. Snyder et al. [3] reported the use of cadaveric allograft for the treatment of diabetic, venous, arterial, post traumatic, post scleroderma ulcers etc. the benefits noted by him include a substantial decrease in wound infection, desiccation and patient symptoms such as pain. Another study showed that following Mohs micrographic surgery, cadaveric skin may induce the formation of granulation tissue from the bed [8].

In our study, the cadaveric skin was transplanted on two patients for temporary wound cover and for wound bed preparation. In the first patient, there was no need for a permanent wound cover as the wound contracted rapidly following application of the allograft. The second patient had a wound that was unfit for grafting. The application of the cadaveric allograft enabled the formation of a bed of granulation tissue enabling the wound to be covered early with a skin graft reducing the morbidity that would have otherwise ensued.

Conclusion

The use of cadaveric skin as a temporary biological cover for chronic non healing wound is an efficacious method to prepare the wound bed enabling a more permanent solution for wound cover. It reduces the morbidity associated with the chronic wounds enabling the surgeon to obtain early coverage of these difficult to treat wounds.

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Disclosures: none

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