

Role of Allograft in Necrotizing Fasciitis

Deepak Sharma¹, Ravi Kumar Chittoria², Barath Kumar Singh P³

How to cite this article:

Deepak Sharma, Ravi Kumar Chittoria, Bharath Kumar Singh P. Role of Allograft in Necrotizing Fasciitis. Int. Phy. 2024;12(1):07-10.

Abstract

Necrotizing fasciitis is an infection of subcutaneous tissue and fascia which may spread rapidly to deeper tissue and surrounding tissue which may cause damage to the tissue and present as a localized infection and fulminant septic shock with high mortality rate.¹ Necrotizing fasciitis will undergo extensive wound debridement of the necrotic tissue which may create huge raw area with severe morbidity to the patient. Skin Allograft can be used as a biological dressing to cover the wound as a bridge till the wound bed and general condition of the patient get improved has been found to be effective in wound bed preparation. This study highlights our experience in wound bed preparation using Allograft as an adjuvant in a case of necrotizing fasciitis.

Keywords: Allograft; Wound bed preparation; Necrotizing fasciitis; Management.

INTRODUCTION

Necrotizing soft tissue infections (NSTIs) include necrotizing forms of fasciitis, myositis, and cellulitis. These infections are characterized clinically by fulminant tissue destruction, systemic signs of toxicity, and high mortality.¹ Accurate diagnosis and appropriate treatment must include early surgical intervention and antibiotic therapy. Several different names have been used to describe the various forms of necrotizing infections; this is related in part to naming based on clinical features

rather than surgical or pathologic findings. The degree of suspicion should be high since the clinical presentation is variable and prompt intervention is critical. The lay press has referred to organisms that cause NSTI as flesh-eating bacteria.² There is sufficient evidence to conclude that healing of necrotizing fasciitis is accelerated by Allograft. Though it is well-established therapy in the armamentarium of wound management, its role in wound bed preparation before cover by skin graft or flap has not been studied well. Allograft has been found to be effective in wound bed preparation but has not been reported in literature. This study highlights our experience in wound bed preparation using Allograft in a case of necrotizing fasciitis.

Author Affiliation: ¹Junior Resident, ²Professor, ³Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

E-mail: drchittoria@yahoo.com

Received on: 20.11.2023

Accepted on: 15.03.2024

MATERIALS AND METHODS

This study was conducted in the department of plastic surgery in a tertiary care center after obtaining the departmental ethical committee approval. Informed written consent was taken from the patient. The study is a prospective observational type done on a 60-year-old male with



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known co-morbidities including hypertension & coronary artery disease with ejection fraction of 25%. Patient presented with raw area (Fig. 1) over left lower limb & perineum of one month duration. He was apparently well one month back when he developed multiple blebs over left lower limb & perineum which ruptured leaving raw area with rapid progression of wound infection with foul smelling discharge. He was diagnosed with clinically as a case of necrotizing fasciitis. He underwent multiple debridement in referral surgery department after that he was referred to department of plastic surgery for further wound care. There are various modalities of regenerative wound care out of which here we used allograft skin (Fig. 2) as a regenerative modality for wound care. We decided to carry out tangential excision and biological coverage of the raw area of the granulating wound. Option of skin allograft was explained to the parents. Written informed consent was obtained from both the relatives and the patient. The allograft skin was taken from the traumatic amputated upper limb in emergency from another patient and was stored. The graft was kept in tissue culture medium at 4 degrees Celsius and transferred to the recipient operation

theatre. Fresh skin allograft was applied over the patient's wounds (Fig. 2). Allograft was minimally meshed (hand meshing) to cover the raw area of the wound. The graft was taken well initially (Fig. 3) and then started showing signs of rejection from 21th postoperative day. It got completely peeled off on 25th and the wound was fully granulated well (Fig. 4) by that time and patient general condition improved for autograft from opposite thigh. The patient responded well to the allografting and did not develop hypovolemia, electrolyte abnormalities, or any wound infection during the course of treatment.

RESULTS

After allograft, patient responded well to the allografting and did not develop hypovolemia and other electrolyte abnormalities, or any wound infection during the course of treatment. The Allograft applied took well on the patient. The allograft was rejected and got peeled off on day 25 and wound granulated well without any slough and patient general condition improves by that timeplanned for autografting from opposite leg. (Fig. 4)



Fig. 1: At admission with extensive necrotizing fasciitis of left lower limb



Fig. 2: Allograft applied over the thigh wound



Fig. 3: Allograft take well post-operative day 14



Fig. 4: Day 25 post allografting wound granulated well with rejection of allograft

DISCUSSION

Necrotizing fasciitis is a rare but life-threatening condition, with a high mortality rate (median mortality 32.2%) that approaches 100% without treatment. Numerous conditions are associated with this pathology, such as diabetes mellitus, immunosuppression, chronic alcohol disease, chronic renal failure, and liver cirrhosis, which can be conducive to the rapid spread of necrosis, and increase in the mortality rate. The diagnosis of NF is difficult and the differential diagnosis between NF and other necrotizing soft tissue infections more so. However, the clinician should do their utmost to secure the diagnosis of NF, as a delay in diagnosis can be fatal, and septic shock is inevitable if the disease remains untreated. The characteristic of NF is the clinical status change over time.¹ The early clinical picture includes erythema, swelling, tenderness to palpation, and local warmth; once the infection develops, the infection site presents skin ischemia with blisters and bullae. The diagnosis of NF can be secured faster with the use of laboratory-based scoring systems, such as the

LRINEC score or the FGSi score, especially in cases of Fournier's gangrene. However, the diagnosis is definitely established by performing explorative surgery at the infected site. Management of the infection begins with antibiotic treatment. In the majority of cases with NF (70–90%) the reasonable pathogens are two or more, suggesting the use of broad-spectrum antibiotics. The value of antibiotic treatment in NF is relatively low, and early and aggressive drainage and debridement is required. In NF of the extremities, the clinician should consider amputating the infected limb, although this will not reduce the risk of mortality. Finally, postoperative management of the surgical wound is important, along with proper nutrition of the patient.¹

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. Though both grafts initially took, the allograft eventually disappeared from the wound.² Ten years following this, it was Girdner who first

described the use of cadaveric skin to cover burns wounds. Following this many studies have been published about the use of allograft skin for the cover of burnswounds 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.³ It also reduces pain, improving the general welfare and psychological status of the patient and conserves autograft. The allograft skin has been used only for the cover of extensive burns wounds for wound bed preparation. Snyder *et al.* reported the use of allograft for the treatment of diabetic, venous, arterial, posttraumatic, post scleroderma ulcers etc. The benefits noted by him include a substantial decrease in wound infection, desiccation and patient symptoms such as pain.^{4,5} In our study, the skin was transplanted on patient for temporary wound cover and for wound bed preparation. In our patient, we applied allograft as a wound cover to reduce the wound area to reduce the morbidity of the patient which was harvested from the traumatic amputated upper limb in road traffic accident. The patient improves rapidly following application of the allograft. The use of Allograft skin in wound management has greatly improved the results of post operative management. Human skin allograft effectively reduces water, electrolyte, and protein loss from the wound and reduces energy requirements of the body and thus decreases morbidity related to necrotizing fasciitis. Clinical indication of skin allograft⁶ use in Necrotizing fasciitis are the following:

- Coverage of extensive full-thickness wounds.
- Coverage of widely meshed skin autografts.
- Healing of partial-thickness wounds.
- Wound bed preparation and testing for later acceptance of autograft.

Human skin allograft effectively reduces water, electrolyte, protein loss from the wound and reduces energy requirements of the body.⁷ In our patient, we have used allograft for the same reason. Allograft relieves pain and controls infection more effectively than collagen dressing. Skin allograft can be harvested from the torso, hips, thighs, and upper calves of the diseased donor.

CONCLUSION

In our study we found that allograft was useful in promoting granulation and Wound bed preparation avoiding pain and risk of infection from frequent dressing changes. The limitation of the study includes that it is a case report with a single center study with no statistical analysis. Further randomized controlled studies are required to validate the efficacy of the allograft in the Wound bed preparation of necrotizing fasciitis wound.

Conflicts of interest: *None*

Authors' contributions: *All authors made contributions to the article*

Availability of data and materials: *Not applicable*

Financial support and sponsorship: *None*

Consent for publication: *Not applicable*

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