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Role of Hybrid Reconstructive Ladder in Adult Scald Burns

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Abstract

The reconstructive ladder discusses progressively more difficult soft tissue coverage methods for wound coverage and healing. Regenerative medicine modalities can be added to conventional reconstructive methods, making it a hybrid reconstruction ladder, which may make it easier to achieve wound coverage at a lower 'rung'. We have used the hybrid reconstruction ladder in an adult patient with scald burns with significant clinical improvement.

Keywords: Hybrid reconstructive ladder; Scald burns; Adult.

INTRODUCTION

A burn is defined as a thermally induced traumatic injury to organic tissue. The most often reported thermal injuries in children under the age of 16 were scalds and contact burns.[1]

Burn injuries can have a significant impact on physical and psychological health, as well as heath related morbidity and mortality. Burn victims are more likely to have depression and other linked psychiatric issues, and severe burns can leave patients with substantial scars and painful contractures.[2] The term "reconstructive ladder" was created by plastic and reconstructive surgeons to describe the several levels of increasingly complex treatment for soft tissue disorders. At the bottom of the ladder, the surgeon would handle a clinical reconstructive problem by applying the most straight forward reconstruction approach.

As a more complex or effective solution was needed for a specific reconstruction challenge, the reconstructive surgeon would move up the ladder. Complex wound patterns have sparked efforts to create novel tissue regeneration techniques. These procedures, also referred to as hybrid reconstructions, combine regenerative medicine applications with traditional reconstruction methods. By limiting the disability and morbidity brought on by standard reconstruction, the hybrid reconstruction model helps to maximise function.[5]

MATERIALS AND METHODS

This study was conducted in the Department of

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Plastic Surgery, in a tertiary care centre in South India after getting the department ethical committee approval. Written and informed consent was taken from the patient for proposed treatment plan and clinical photography. The subject was a thirty three old female with alleged history of accidental scald burns over both thighs and abdomen. Hydro jet debridement, Vitamin D3 therapy, Autologous platelet rich plasma, Dry collagen scaffold dressing, Low level laser therapy (Fig. 1-6),

Fig. 1: Patient at presentation

Fig. 2: Hydrojet debridement

Fig. 3: Vitamin D3 with Cantella extract

Fig. 4: Activated platelet rich plasma therapy

Fig. 5: Low level laser therapy

Fig. 6: Heterografting with dry collagen sheet

Negative pressure wound therapy (Fig. 7), were used in the preparation of wound bed followed by split thickness skin grafting (Fig. 8).

Fig. 7: Negative pressure wound therapy

RESULTS

The wound healed well at the time of discharge. There was good graft take. There were no side effects noted.

DISCUSSION

Burn injuries, particularly severe burns, are accompanied by an immune and inflammatory response, metabolic changes and distributive shock that can lead to multiple organ failure. Scald injuries tend to appear more superficial initially, due to rapid dilution of the source and energy.[3]

Skin grafting, bone reconstruction, nerve repair or reconstruction, and vascular repair are some of the standard treatment modalities for injuries with significant composite tissue loss.[5,6] These traditional treatments could reduce a patient's functional ability and increase donor site morbidity.[7] This has led to increased use of regenerative medicine techniques to promote tissue regeneration and improve reconstructive and clinical outcomes.

Autologous platelet rich plasma is a treatment that contains fibrin and high concentrations of growth factors with the potential to improve the healing of chronic wounds. But the overall quality of evidence of autologous PRP for treating chronic wounds is low.[8]

Low level lasers that affect biological systems without using heat include those made of Krypton, Argon, He, Ne, and ruby. When the tissue chromophores are influenced by laser energy, the cytochromes in the mitochondria absorb the

Fig. 8: Split thicknes skin grafting

Fig. 9: Patient at discharge

laser radiation and convert them into energy by the cell (ATP), and created energy induces protein synthesis and acceleration or stimulation of cell proliferation.[11] The interaction of light with biological tissues is influenced by various factors, including wavelength, laser dose, and the tissue's optical characteristics. The structure, water content, thermal conductivity, heat capacity, density, and capacity to absorb, disperse, or reflect the released energy are examples of tissue qualities.[9]

Negative pressure wound therapy, also called vacuum assisted wound closure, refers to wound dressing systems that continuously or intermittently apply sub atmospheric pressure to the system, which provides a positive pressure to the surface of a wound. NPWT has become a popular treatment

modality for the management of many acute and chronic wounds.[10]

In our study too, regenerative techniques proved to be a great adjunct to standard reconstruction procedures in wound healing and overall clinical outcome.

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