

Role of Hybrid Reconstructive ladder in Pressure Ulcer

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How to cite this article:

Jeevan Vijay Rajasekhar, Neljo Thomas, Ravi Kumar Chittoria/Role of Hybrid Reconstructive ladder in Pressure Ulcer/RFP Journal of Dermatology 2022;7(2):51-54.

ABSTRACT

A twenty five years old male with post traumatic post-surgical lower motor neuron type recovering paraparesis sustained bilateral ischial Grade-IV pressure ulcer. Hybrid reconstruction ladder was applied for the management of pressure ulcer. Here, in our study, we are evaluating the efficacy of hybrid reconstruction ladder in the management of pressure ulcers. This type of reconstruction is being reported first time in the literature.

Keywords: Hybrid reconstruction ladder; Pressure ulcers.

INTRODUCTION

Pressure ulcer is common in hospitalised patients. In acute care setting, the incidence is around 11%, where as in chronic setting, it is 3.5-50%. The incidence below the level of umbilicus is 96%. Ischial pressure ulcers are most common in paraplegics while sacral pressure ulcers are common in acute care settings. Unrelieved pressure equal to twice the end capillary pressure, i.e., 70 mm for 1-2 hrs leads to ischemia of overlying skin.¹

Various terms have been used to describe pressure ulcers. Bed sore is classical old terminology. Decubitus ulcer ('decumbre' - to lie down) doesn't

explain ulcers in sitting position. Pressure ulcer is the most accurate term in practice.²

Currently, pressure is the single most important factor leading to ischemia, necrosis and ulceration. This sequence is accelerated in other infections, diabetes and altered neurological status. Pressure ulcer reconstruction is conventionally being done using classical reconstruction ladder whereas our highlights the application hybrid reconstruction ladder which is being reported first time in the literature (internet search).

MATERIALS AND METHODS

This study was conducted in tertiary care center in department of plastic surgery after getting the department ethical committee approval. Informed consent was obtained for examination and clinical photography. The subject was twenty five years old male with post traumatic post-surgical LMN type recovering paraparesis sustained bilateral ischial Grade-IV pressure ulcer. Initial management included hydro jet debridement with Hb spray therapy (Fig. 2 & 3). Later he underwent Insulin therapy followed by prolotherapy (Fig. 4 & 5). The wound was later exposed to LLLT and finally

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Received on: 13.08.2022

Accepted on: 15.09.2022

heterografted to improve the graft take. (Fig. 6 & 7). The wound was later subjected to negative pressure wound therapy (Fig. 8). Finally, we used keystone

flap for closure of the wound without tension. (Fig. 9)



Fig. 1: Wound at presentation



Fig. 2: Wound being debrided with hydro jet



Fig. 3: Hemoglobin spray therapy



Fig. 4: Topical insulin being given (Insulin therapy)



Fig. 5: Prolotherapy of the wound



Fig. 6: Pressure ulcer undergoing Low level laser therapy



Fig. 7: Heterografting of pressure ulcer with collagen



Fig. 8: Negative pressure wound therapy being applied over the pressure ulcers



Fig. 9: Keystone flap done to give cover to the wound

RESULTS

The keystone flap covered the defect completely without tension and healed completely. (Fig. 10)



Fig. 10: Healed wound post hybrid reconstructive ladder day 41

DISCUSSION

Pressure ulcers (i.e., bed sores, pressure ulcers, pressure injuries, decubitus ulcers) are areas of localized damage to the skin and underlying tissue. They are common in the elderly and immobile, and costly in financial and human terms. Pressure-relieving support surfaces (i.e., beds, mattresses, seat cushions etc.) are used to help prevent ulcer development.³

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 laser radiation and convert them into energy by the cell (ATP), and created energy induces protein synthesis and acceleration or stimulation of cell proliferation. The interaction of light with biological tissues is influenced by various factors, including wave length, 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.^{4,5}

Negative pressure wound therapy (NPWT), 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.

Keystone is a peg shaped, main stone which supports the arch in Greek architecture. Because of the shape the flap designed is called a keystone flap. Keystone flap was initially described for lower extremity defects. There have been reports of the used of this design for trochanteric pressure ulcers. Since our patient had partial recovery of paraplegia, he walks with support and can be in sitting position for long time leading to ischial pressure ulcer. A versatile flap was required in this patient as he had recurrent pressure sore. We have used the type 1 keystone flap for the pressure ulcer since we felt the fasciocutaneous flap would give an adequate cover.⁶

CONCLUSION

In our study hybrid reconstructive ladder of pressure ulcers with keystone flap has shown to have favorable results in our experience managing pressure ulcers. With the available methods, there

was a noticeable improvement in the flap take and wound healing. Multicentric tests with a bigger sample size are required to support the hypothesis. We have found that hybrid reconstruction has been very useful in management of pressure ulcers but requires large scale randomized trials for large scale application to explore the potential of the same in pressure ulcers.

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