Original Article

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Multimodality Approach in Management of Pressure Sore: A Systemic Review

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Abstract

Pressure sores are unyielding wounds proving a nightmare to treating physician and adding to financial burden and psychological distress of the patient and the care giver. Systemic multidisciplinary approach and multimodal intervention to treat the wound is essential to achieve favourable results. In our case report we highlight the various modalities of treatment that can be used for the treatment of such pressure sore and review other modalities that can be used to accelerate the wound healing process.

Keyword: Pressure Sore; Autologus Platelet Rich Plasma; External Tissue Expansion; Negative Pressure Wound Therapy.

Introduction

Pressure ulcers are caused when an area of skin and the tissues below are damaged as a result of being placed under pressure sufficient to impair its blood supply. People at risk of pressure ulceration include those with spinal cordinjuries, and those immobilised or with limited mobilitysuch as older people and people with acute or chronic conditionsthat might limit movement or bodily sensation, or both [1].

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Pressure sores classified according to severity of involvement into stages ranging from stage 1 of erythema to stage 4 with full thickness tissue loss with exposed muscle, tendon or bone.

Pressure sore management is a multidisciplinary approach involving treating physician, surgeon, physiotherapist, dietician and most importantly motivation of patient and patient attenders to get better.

Prevention of pressure sore is better than its treatment which is daunting task due to its chronicity, poor prognosis, multiple procedures and final implications on the family [2].

In this article we would like to highlight multi-modality approach of treatment of trochanteric sore in a paraplegic young male.

Material and Methods

22 year old male patient presented to Department of Plastic Surgery, JIPMER with history of traumatic paraplegia with wound over right trochanteric region since 3 months. On examination, patient was pale, malnourished with infected Stage 3 pressure sore right trochanteric region. Management was as follows

Patient specific concern:

1. Patient was pale and malnourished
2. Loss of bowel and bladder control
3. Bedridden due to underlying condition

Wound specific concerns

1. Infected wound over right trochanteric region
2. Pressure offloading

Patient was transfused blood and started on hematinics to improve hemaglobin from 6gm/dl to 12gm/dl. High protein diet (1.5gm/kg/day) and calorie intake of 30kcal/kg/day was started with help of dietician. Patient's bladder catheterised with 14F silicon catheter, and patient's attenders educated regarding bowel and bladder care. Patient was put on pneumatic bed with instructions for change of position every second hour. Antibiotics were started as per culture sensitivity Wound was assessed with digital planimetry score of 136cm^2 (Figure 1) and Bates –Jensen score of 47.

	Hydrojet debridement	APRP	ETWC	NPWT
Number of settings	6	12	12	12

Wound on presentation, specimen taken for culture sensitivity and hydrojet debridement done in stages which took 6 settings Figure 2. Once the infection load was reduced Autologus platelet rich plasma therapy was injected into the wound and margins Figure 3. External tissue wound contraction device in form of multiple hooks with cross rubber band were applied to margins along with negative pressure wound therapy Figure 4.

Improvement in wound was documented with photographic documentation, digital planimetry and Bates-Jensen score. Unhealthy wound was converted to healthy wound over duration of 3 months with digital planimetry score of 96cm^2 and Bates-Jensen score of 32, the raw area covered with Vastus lateralis muscle flap with meshed split skin graft Figure 5, 6. At 8 weeks flap and graft healthy Figure 7.

Fig. 1: Digital Planimetry

Fig. 2: Hydrojet Debridement

Fig. 3: Autologus platelet rich plasma injection

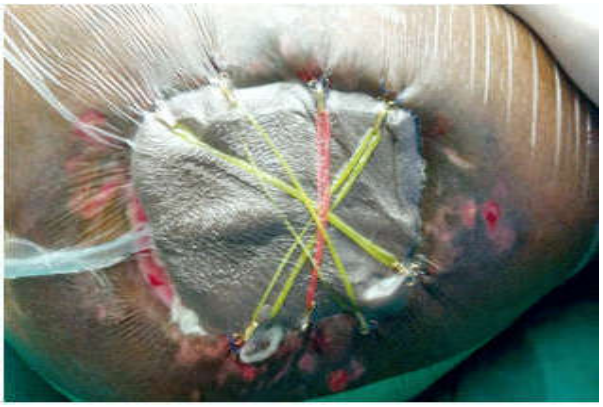

Fig. 4: External wound expansion device with NPWT

Fig. 5: Vastus Lateralis muscle flap

Fig. 6: Split skin graft cover

Fig. 7: Follow up at the end of 8 weeks

Discussion

Pressure sores are a challenging wounds to heal. An injured tissue undergoes inflammation, proliferation and maturation phase of healing but in pressure sores the wound is suspended in various phases of healing due to constant presence of inciting factor, pressure, poor general condition of the patient and added infection of the wound [3].

Pressure Care

Pressure off loading forms a major part of treatment of pressure sore. Support surface can be Constant low-pressure (CLP) devices which distribute pressure over a large area and include devices such as static air, water, gel, bead, silicone, foam, and sheepskin supports whereas Alternating-pressure (AP) devices vary the pressure under the patient, avoiding prolonged pressure over a single anatomic point.

Care giver plays an active role in positioning the patient and off loading the pressure [4,5].

Skin Care

Patient's skin to be assessed daily and cleansed with a pH-balanced cleanser. Soap and water to be avoided. Use emollients to maintain skin hydration. Minimize exposure to moisture (e.g., incontinence, wound leakage) [6].

Incontinence

The use of diapers or sanitary pads in conjunction with meticulous skin care is a reasonable option when compared to the risks associated with extended use of a urinary catheter.

Fecal incontinence, on the other hand, has been shown to be a risk factor for pressure sores. Conservative measures include diet modification and a wide variety of antimotility agents, including clonidine, cholestyramine, loperamide, codeine, diphenoxylate, and atropine. If medical management is unsuccessful, surgery may be considered, ranging from attempts at sphincterplasty to elective colostomy when other options fail [7,8].

Nutrition

A dietician should be consulted or be a permanent member of the treatment team to ensure the recommended protein (1.25–1.5 g protein/kg) and non-protein (30–35 Kcal/kg) supplementation is being administered. Despite improvement in secondary measures such as caloric intake, body weight, and serum nutritional markers, most studies have failed to find reduction in pressure sore rates [9].

Debridement

Assessing a wound for the timing and need of adequate debridement is vital. The patient can benefit from debridement when indicated with enzymatic, mechanical, biological (e.g. maggot therapy), or sharp debridement. Complete debridement is the crucial first step in the operative treatment of these lesions. After the initial excision the wound base should be palpated to identify any residual areas of woody, scarred tissues which require excision. Once the soft tissue has been debrided, the underlying bone must be evaluated and, if necessary, debrided. A bone biopsy can also be taken at this time if desired [10,11].

Infection

Pressure sores are source of polymicrobial infection which delays wound healing. The most common

organisms isolated from pressure ulcer in our study are Pseudomonas, Staphylococcus species and Escherichia coli. Antibiotics were instituted according to tissue culture reports.

Autologous Platelet Rich Plasma

Autologous Platelet Rich Plasma (APRP) is helpful in acceleration of wound healing. It consists of platelets with clotting and growth factors. Platelet derived growth factor (PGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EDF) and fibroblast growth factor (FGF) are released from platelets once activated. Because of properties of enhancing tissue regeneration and healing, APRP is used as an adjunct therapy [12].

External Tissue Expansion

A simple external tissue expansion device in form of hooks at the wound margins and elastic rubber band used to reduce the size of the wound using viscoelastic properties of the skin [13].

Negative Pressure Wound Therapy

The vacuum-regulation device provides continuous or intermittent controlled negative pressure to the wound through air-tight dressings, which arechanged every second or third day. Improves local blood flow, removed chronic edema, and reduced bacterial counts in the wound bed hence accelerates wound healing [14].

Reconstruction: The healthy raw area was closed by pedicled Vastus lateralis muscle flap with split skin graft. Flap settled well with no recurrence after 2months of procedure.

Conclusion

Pressure sores are challenging wound. It involves a multidisciplinary approach, patience and co-operation of care givers. Aim of treatment being early healing and mobilization of the patient, multiple modalities of treatment have to be used to achieve complete healing and prevent recurrence of the pressure sore.

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