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Closed Incision Negative Pressure Wound Therapy Assisted Full Thickness Graft Aite Wound Dressing to Prevent Surgical Site Infection

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Abstract

Closed incision Negative Pressure Wound Therapy (CiNPWT) which is a topical application of negative pressure over the wound plays a key role in healing and prevention of surgical site infections. We have used full thickness graft following post burn contracture release. We then applied negative pressure wound therapy over to this flap to assess its efficacy and safety in aiding healing.

Keywords: Closed Incision; Negative Pressure Wound Therapy; Full Thickness Skin Graft; Surgical site infection.

INTRODUCTION

Negative pressure wound therapy has changed the way of managing acute and chronic wounds. Usually after primary closure of the wound, the incision site is covered with an occlusive or semi-occlusive dressing. In recent years negative pressure therapy also has been tried for wound that has been surgically closed primarily, especially in cases that are at high risk of surgical site infection (SSI).[1,2] In this article we share our experience of closed incision negative pressure wound therapy (input) in full thickness donor site following post burn contracture release.

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MATERIAL AND METHODS

The study was conducted in a tertiary care hospital in south India. Informed consent obtained from the patient. This is a case report of the patient, who was a 21-year-old male with alleged thermal burns at 2 years of age over left hand. In our case, patient had contracture over left little finger with joint subluxation (Fig. 1). Post burn contracture release done along with K-wire fixation of the finger, followed by full thickness graft taken from left groin for the raw area post contracture release (Fig. 2 and 3). The VAC dressing was immediately applied after the donor site coverage and surgical closure had been completed (Fig. 4). The closed incision negative pressure is maintained postoperatively at -75 to -125 mm Hg. The donor site wound dressing was observed on post-operative day 7 during the hospital stay.


Fig 1. Post burn contracture left little finger


Fig 2. Post burn contracture release

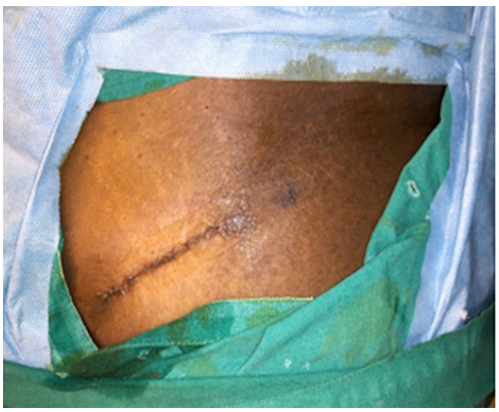
Fig. 3. Full thickness donor site after closure


Fig. 4. Ci-NPWT applied to the wound

RESULT

The application of closed incision negative pressure over full thickness graft donor site aided in the healing of the wound. No complications noted with this procedure. (Fig. 5)


Fig. 5. Post-operative day 7

DISCUSSION

Negative pressure wound vacuum therapy is a well known treatment for open surgical incisions that have become infected or have broken down. It has recently been the subject of new research on its use in closed surgical sites. Go moll et al. published their results using a similarly modified incision dressing in 2006, which was the first publication on closed incisions employing NPWT (ciNPWT).[3] Various mechanisms for NPWT have been proposed.

Macroscopic Effects of NPWT

- Creates and maintains a moist wound environment, shortens time to wound closure[4]
- Reduces wound oedema and reduces seroma formation
- Stimulates wound contracture through macro deformation
- NPWT stabilizes healing tissues through a bolstering Effect
- Provides oppositional forces to both superficial and deeper healing tissues
- Reduces size and complexity of the healing wound

Microscopic Effects of NPWT

- Increased expression of VEGF, IL-8 VEGF gradient increases toward the wound[5]

- Vigorous angiogenesis in a parallel fashion, oriented toward the wound compared to fewer tortuous new vessels observed in controls.
- Stimulates cell proliferation through micro-deformation.
- Decreases local blood flow in those tissues in closest proximity to the ROCF.
- Changes the colonizing flora of the wound, may increase or have no effect on overall bacterial load.
- Increased neovascularization.

There is a commercially available device for ciNPWT. These devices are expensive for routine use in hospitalized patients. We have used a simple way of applying input cost-effectively. NPWT is obtained over the graft donor site by VAC dressing. NPT maintains the wound's environment in a sub atmospheric pressure of about 120 mmhg.[6] The immediate postoperative application of NPWT helps in salvage of the soft tissue and flap. This NPWT helps by reducing the accumulation of oedema in the local tissue, removes Exudate and infectious materials from the wound bed. Which minimises the tension exerted over the suture. A study found that biomechanical mechanism found that NPWT reduced lateral tension and shared stress concentration at the sutures.[7] Constant negative pressure enhances the dermal perfusion, and granulation tissue formation beneath the flap. By the applying NPWT which creates the mechanical stress and reverse the tissue expansion and adhere the wound margins of the key stone flap so the wound dehiscence can be avoided. Frequent change of the wound dressing is also minimised by this VAC dressing. Certain experimental studies quote there is significant decrease in the bacterial load which prevents the surgical site infections.[8]

CONCLUSION

The various advantages of the CiNPWT plays a key role in aiding the surgical wound healing, along with the preservation of donor site with no complications.

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