

Role of Closed Incision Negative Pressure Wound Therapy in Skin Grafting

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Abstract

Surgical site infection (SSI) results in substantial morbidity and costs. Various guidelines are there to reduce the incidence of SSI. Recently application of negative pressure to a surgically closed wound has also emerged as a way of preventing this complication. The commercially available devices for this are usually too costly and preclude its uses in developing countries. In this article we share our experience of using NPWT in cost effective manner in case of skin graft donor site.

Keywords: NPWT; closed wounds; incisional negative pressure wound therapy; surgical site infection; skin graft; non-adherent gauze; SSI; neovascularization

Introduction

Negative pressure wound therapy has changed the way of managing the acute and chronic wounds [1,2]. Various randomized control trial has established its role in management of chronic wounds and in acute complicated wound [3]. Usually after primary closure of the wound, the incision site is covered with occlusive or semi occlusive dressing. In recent years negative pressure therapy also has been tried for the wound that has been surgically closed primarily, especially in cases that are at high risk of surgical site infection (SSI) [4,5]. In this article we share

our experience of closed incision negative pressure wound therapy (ciNPWT).

Methodology

This study was conducted in the department of plastic surgery in a tertiary care centre. This study was conducted in January 2021. Informed consent was taken. The patient was a 28 years female who was undergoing full thickness skin graft (FTSG) harvesting for coverage of raw area. To cover the raw area, FTSG was taken from groin region (Figure-1), and donor site was closed primarily (Figure-2).



Figure-1. Raw area after harvesting of FTSG



Figure-2. Primary closure of the wound

As the patient was at high risk of SSI, a decision was made to apply a customized ci-NPWT. A sterile sponge was taken of appropriate size. A small caliber suction tube with multiple holes was passed through it. A single layer of non-adherent gauze was placed on closed incision

site. The sponge with suction tube in-situ was placed on incision site. An adherent transparent occlusive dressing was placed. Continuous negative pressure of 100mm of Hg was applied for seven days (Figure-3).



Figure-3. Closed incision site covered with a foam and transparent adhesive dressing

The patient was assessed daily for any systemic sign of infection. Daily inspection through transparent dressing was done to look for any soakage, erythema of skin localized tenderness or swelling. Dressing was removed after 7 days and operative site was assessed.

Result

After application of ciNPWT, daily assessment was done, no any systemic or local sign of infection was noted. The dressing was removed and surgical site was inspected after seven days. The wound was healed well (Figure-4). Sutures were removed on next day. No wound dehiscence was noted.

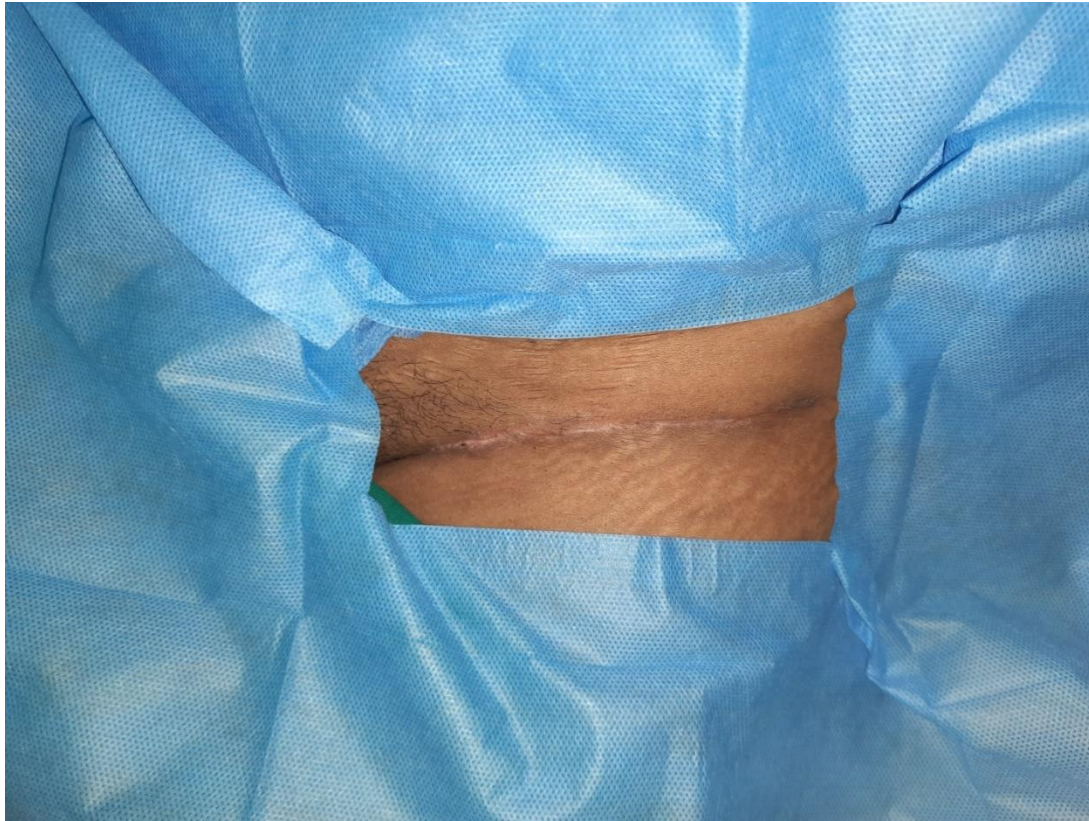


Figure 4. Well healed wound without any complication

Discussion

Despite advances in surgical practice, surgical site infections (SSI) are frequent complications in patients who undergo surgery. The cause of SSI may be pre-operative, intra operative and post-operative [6]. There are multiple factors that predispose the patient of SSI like-malnutrition, anemia, hypoproteinemia, smoking, DM etc. Preventive measures should be taken at every step to control it. NPWT has recently been emerge as a strategy to reduce the SSI, particularly in high risk patient [7,8]. Apart from this, wound closed under tension may also be benefited with ciNPWT.

Negative-pressure wound vacuum therapy has an established treatment for open surgical incisions following infection or breakdown. Recently there has been been the focus of new investigation in its use in closed surgical site. The first publication regarding closed incisions using NPWT (ciNPT) was in 2006 when Gomoll et al published his results utilizing a similarly modified incisional dressing. Various mechanisms has been proposed for NPWT [9].

Macroscopic Effects of NPWT

- Creates a moist wound environment, shortens time to wound closure
- Reduces wound edema and reduces seroma formation

- Stimulates wound contracture through macro deformation

Microscopic Effects of NPWT

- Increased expression of VEGF, IL-8 VEGF gradient increases toward the wound
- 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 are commercially available devise for ciNPWT. These devises are expensive for routine use in hospitalized patient. We have used simple way of applying ciNPWT in cost effective manner.

Conclusion

SSI is a common problem; all preventive measures should be taken. In this study we found that ciNPWT may be useful in avoiding infection at FTSG donor area. But since it is a single case study, definite conclusion cannot be made. Large randomized control trials are required to confirm the efficacy of NPWT in surgically closed wound.

Declarations

Conflicts of interest

None.

Authors' contributions

All authors made contributions to the article

Availability of data and materials

Not applicable.

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Consent for publication

Not applicable.

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