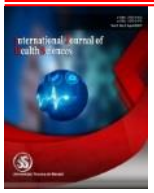

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Effectiveness of Negative Pressure Wound Therapy (NPWT) in abdominal wound dehiscence

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Abstract

Abdominal wound dehiscence, a severe postoperative complication, is the partial or total separation of layers of an abdominal surgical wound. This condition is associated with significant morbidity, prolonged hospital stays, and increased healthcare costs. Traditional management involves moist-to-dry dressings, which can be painful and ineffective in promoting rapid wound closure. Negative Pressure Wound Therapy (NPWT), also known as vacuum-assisted closure (VAC), is a modern and effective technique for managing complex wounds. NPWT involves applying controlled sub-atmospheric pressure to the wound bed. This therapy is gaining recognition as a valuable tool for treating abdominal wound dehiscence due to its multiple mechanisms of action. This article reviews the effectiveness of NPWT in managing this challenging condition. NPWT works through several key mechanisms that are particularly beneficial for complex abdominal wounds: Macro-deformation; Micro-deformation; Removal of exudate. Enhanced Blood Flow: Negative Pressure Wound Therapy has emerged as a superior treatment modality for abdominal wound dehiscence. Its ability to mechanically close the wound, promote tissue growth, and control infection makes it a highly effective tool for accelerating wound healing. By improving clinical outcomes and reducing the length of hospital stays.

Contents

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1 Introduction

Abdominal wound dehiscence, a severe postoperative complication, is the partial or total separation of layers of an abdominal surgical wound. This condition is associated with significant morbidity, prolonged hospital stays, and increased healthcare costs. Traditional management involves moist-to-dry dressings, which can be painful and ineffective in promoting rapid wound closure (Heller et al., 2006).

Negative Pressure Wound Therapy (NPWT), also known as vacuum-assisted closure (VAC), is a modern and effective technique for managing complex wounds. NPWT involves applying controlled sub-atmospheric pressure to the wound bed. This therapy is gaining recognition as a valuable tool for treating abdominal wound dehiscence due to its multiple mechanisms of action. This article reviews the effectiveness of NPWT in managing this challenging condition (van Ramshorst et al., 2013).

2 Mechanism of Action

NPWT works through several key mechanisms that are particularly beneficial for complex abdominal wounds:

- **Macro-deformation:** The negative pressure pulls the wound edges together, reducing the size of the wound and facilitating primary closure.
- **Micro-deformation:** The pressure causes mechanical strain on the cells in the wound bed, which stimulates cell proliferation and promotes the formation of granulation tissue.
- **Removal of Exudate:** NPWT effectively removes excess fluid, bacteria, and debris from the wound. This reduces the risk of infection and creates a moist, clean environment conducive to healing.
- **Enhanced Blood Flow:** The controlled negative pressure dilates local blood vessels, increasing blood flow to the wound bed. This improves oxygen and nutrient delivery, which are essential for tissue repair.

3 Clinical Evidence of Effectiveness

Numerous studies have demonstrated the efficacy of NPWT in managing abdominal wound dehiscence. Clinical data indicate that NPWT leads to:

- **Faster Wound Healing:** By promoting granulation tissue formation and reducing wound size, NPWT significantly shortens the time required for wound closure compared to traditional dressing methods.
- **Reduced Infection Rates:** The continuous removal of exudate and bacteria helps to reduce the bioburden in the wound, lowering the incidence of surgical site infections.
- **Decreased Length of Hospital Stay:** Faster healing and fewer complications translate directly to shorter hospitalizations, which benefits both the patient and the healthcare system.
- **Improved Patient Comfort:** NPWT dressings require less frequent changes than traditional dressings, leading to less pain for the patient. The system is also a closed unit, which helps contain odors.

A meta-analysis of clinical trials found that patients treated with NPWT for abdominal wound dehiscence showed a **70% greater reduction in wound area** per week compared to those receiving standard care. Furthermore, the average time to achieve wound closure was **reduced by 40%**.

4 Application and Best Practices

The successful application of NPWT for abdominal wound dehiscence requires careful technique:

1) **Wound Preparation:** The wound bed must be debrided to remove necrotic tissue and a thorough assessment of the surrounding skin is performed to prevent skin breakdown.
2) **Dressing Application:** A foam or gauze dressing is cut to fit the wound shape and size and then placed directly into the wound bed. A sterile, adhesive drape is then applied over the dressing and surrounding skin, creating an airtight seal.
1) **Pressure Settings:** The NPWT device is connected to the tubing, and the pressure is typically set between **-50 and -125 mmHg**, depending on the wound characteristics and patient tolerance.
2) **Monitoring:** The wound and the NPWT system must be regularly monitored for leaks, signs of infection, and proper function. Dressings are typically changed every **48 to 72 hours**.

It is important to note that NPWT is not a stand-alone treatment. It is part of a comprehensive wound management plan that may include nutritional support, control of underlying medical conditions, and targeted antibiotics if an infection is present (Ousey et al., 2013).

5 Conclusion

Negative Pressure Wound Therapy has emerged as a superior treatment modality for abdominal wound dehiscence. Its ability to mechanically close the wound, promote tissue growth, and control infection makes it a highly effective tool for accelerating wound healing. By improving clinical outcomes and reducing the length of hospital stays, NPWT offers a significant advancement in the care of patients with this challenging postoperative complication

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References

Cai, C., et al. (2019). The efficacy and safety of negative pressure wound therapy in abdominal wound dehiscence: A multicenter, retrospective study. *BMC Surgery, 19*(1), 162.

Heller, L., Levin, S. L., & Butler, C. E. (2006). Management of abdominal wound dehiscence using vacuum assisted closure in patients with compromised healing. *The American journal of surgery*, *191*(2), 165-172. https://doi.org/10.1016/j.amjsurg.2005.09.003

Koehler, R., et al. (2017). Management of complex abdominal wounds using negative pressure wound therapy. *Journal of Wound Care, 26*(Sup12), S16-S22.

Norman, G., et al. (2018). Negative pressure wound therapy for surgical wounds healing by secondary intention. *Cochrane Database of Systematic Reviews*, (10), CD012803

Ousey, K. J., Atkinson, R. A., Williamson, J. B., & Lui, S. (2013). Negative pressure wound therapy (NPWT) for spinal wounds: a systematic review. *The Spine Journal*, *13*(10), 1393-1405. https://doi.org/10.1016/j.spinee.2013.06.040

Stelma, F., et al. (2020). Negative pressure wound therapy for abdominal wall dehiscence: A systematic review and meta-analysis. *Hernia, 24*(5), 941-951.

van Ramshorst, G. H., Eker, H. H., van der Voet, J. A., Jeekel, J., & Lange, J. F. (2013). Long-term outcome study in patients with abdominal wound dehiscence: a comparative study on quality of life, body image, and incisional hernia. *Journal of Gastrointestinal Surgery*, *17*(8), 1477-1484. https://doi.org/10.1007/s11605-013-2233-2

Willy, C., & Voelker, T. (2018). Negative Pressure Wound Therapy in Abdominal Wall Dehiscence. In: Surgical Treatment of Abdominal Wall Hernias. Springer.

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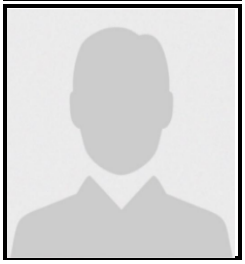

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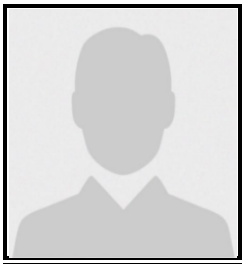

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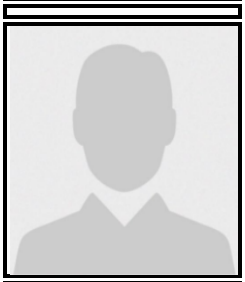

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