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EFFECTIVENESS OF VACUUM-ASSISTED CLOSURE OF A WOUND IN A TERTIARY CARE HOSPITAL

Surgery

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ABSTRACT

Introduction: Delayed wound healing causes significant health problem, particularly in older and immune-compromised adults. In addition to the pain and suffering, failure of the wound to heal also imposes social cost. Vacuum-assisted closure (VAC) therapy incorporates the use of negative pressure to optimise conditions for wound healing and requires fewer painful dressing changes and outcome is more better.

Materials and Methods: This was a retrospective study. Scheduled elective wound closure procedures were reviewed from May 2017 to April 2018.

Results: Out of 82 scheduled wound closure surgeries, 55 (68 %) were done by Vacuum-assisted closure (VAC) therapy. The study revealed the for management of pressure sores and ulcers, Significant difference could be detected between VAC and use of traditional gauze dressings. Wound managed with VAC significantly decreased by 31 % in surface area as opposed to those managed with saline-moistened gauze, which increased by 10.5% (p=0.004). VAC therapy appeared to be more effective than Opsite and bolster dressings in skin graft management. Patients managed with VAC had increased rate of reepithelialisation and fewer patients required repeat split thickness skin graft to the same site. VAC was more effective at treating various chronic and complex wounds than WM gauze, as there was a significantly greater reduction in wound volume, depth and treatment duration.

Conclusions: VAC is a good , more promising , simple to use and appears to be a promising alternative for the management of various wound types.

KEYWORDS

Wound Healing Surgery , Vacuum-assisted Closure, Effectiveness

Introduction

Wound healing, as a normal biological process in the human body, is achieved through four precisely and highly programmed phases: hemostasis, inflammation, proliferation, and remodeling. For a wound to heal successfully, all four phases must occur in the proper sequence and time frame[1].

Multiple factors can lead to impaired wound healing. In general terms, the factors that influence repair can be categorized into local and systemic. Local factors are those that directly influence the characteristics of the wound itself, while systemic factors are the overall health or disease state of the individual that affect his or her ability to heal.

The aim of this retrospective study was to analyze the effectiveness of Vacuum-assisted closure of a wound in a Tertiary Care Hospital in a multidisciplinary 600 bedded multispecialty public hospital in Delhi NCR.

Objectives

The objectives of the study were :

(a) To study the effectiveness of Vacuum-assisted closure of a wound

(b) To suggest its use in future wound healing Surgery.

Material & Methods

This was a retrospective cross-sectional study of all types of elective surgical procedures of wound closure . Scheduled elective general surgical procedures were reviewed from theatre records and MRD from May 2017 to April 2018, were audited retrospectively. The level of significance was set at P<0.05. Data were compiled, entered in Microsoft Excel sheet & by using SPSS version 19 and analyzed by descriptive statistics.

Results:

All data were analyzed by using Microsoft Excel sheet & by using SPSS version 19 and analyzed by descriptive statistics. The cancellation rate by surgical specialties was reported as mean and 95% CI by the Wilson method using Confidence Interval Analysis software 2.1.2 (Trevor Bryant, University of Southampton, UK) and compared using Chi squared analysis. The level of significance was set at P<0.05. Out of 82 scheduled wound closure surgeries, 55 (68 %) were done by Vacuum-assisted closure (VAC) therapy. The study revealed the for management of pressure sores and ulcers, Significant difference could be detected between VAC and use of traditional gauze dressings. Wound managed with VAC significantly decreased by 31 % in surface area as opposed to those managed with saline-moistened gauze, which increased by 10.5% (p=0.004). With VAC, the average ulcer area decreased by 39-42 % over an average of 20 days. VAC therapy appeared to be more effective than Opsite and bolster dressings in skin graft management. Patients managed with VAC had increased rate of reepithelialisation and fewer patients required repeat split thickness skin graft to the same site. VAC significantly increased the rate of reepithelialisation in skin grafts compared with Opsite dressing (p≤0.011).



Fig 1 & 2 : Gastrocnemius Muscle Flap & SSG

VAC was more effective at treating various chronic and complex wounds than WM gauze, as there was a significantly greater reduction in wound volume, depth and treatment duration. Very few patients treated with VAC required repeat split thickness skin grafts (STSG) to the same site compared with grafts managed with bolster dressings (4% versus 18%, p=0.042). Complication recorded were delayed healing (19.6 %) , periwound maceration (19.1%), periwound cellulitis (4.2%) , Graft Failure (3.9 %) and deep space infection (3.8%) . Other complication reported were Pain and discomfort when suction is applied initially , Bleeding, Allergies to the adhesive drape, Excoriation (chafing) of the skin if foam is not correctly cut to size and Fulminant or incipient skin necrosis.



Fig 3 & 4 : Post- vac / wound debridement & Healed wound at discharge



Fig 5 & 6 : Wound lower limb before and after Vac Dressing

Discussion

Delayed wound healing is a significant health problem, particularly in older adults[2]. In addition to the pain and suffering, failure of the wound to heal also imposes social and financial burdens. Vacuum-assisted closure (VAC) therapy, which has been developed as an alternative to the standard forms of wound management, incorporates the use of negative pressure to optimise conditions for wound healing. It can be used for the early management of acute trauma or when other more conventional conservative methods have failed. A vacuum assisted system may help wound heal more quickly by:

- Decreasing redness and swelling (inflammation)
- Draining excess fluid from the wound
- Helping draw together wound edges
- Increasing blood flow to your wound
- Keeping your wound moist and warm
- Reducing bacteria in the wound
- Reducing swelling

VAC system offers some other advantages over other types of wound care. It may decrease overall discomfort. The dressings usually need changing less often. And they may be easier to keep in place.

The vacuum-assisted closure (VAC®) device (KCI, San Antonio, TX) was pioneered by Dr Louis Argenta and Dr Michael Morykwas[3] in 1993. It is a development from the standard surgical procedure, which uses vacuum-assisted drainage to remove blood or serous fluid from an operation site to provide a drier surgical field and control blood flow[4] . In VAC therapy, the application of topical negative pressure (vacuum) removes blood and serous fluid, reduces infection rates (closed/sealed system creates a hypoxic environment) and increases localised blood flow, thereby supplying the wound with oxygen and nutrition to promote accelerated healing[5]. Alternative names for VAC include topical negative pressure, sub-atmospheric pressure, sealed surface wound suction, vacuum sealing and foam suction dressing[6].

Indication of VAC assisted wound therapy[7] include:

- abdominal dehiscence
- animal bites
- burns
- diabetic foot ulcers
- donor sites
- exposed tendon in lower limb trauma
- extravasation injury
- fasciotomy wounds
- fistulae
- flap salvage
- frostbite
- hand injuries
- Hidradenitis Suppurativa
- osteomyelitis.
- pressure sores
- pressure ulcers
- skin graft fixation
- spinal cord injuries
- sternal wound breakdown

Vacuum therapy is contraindicated in patients with malignancy in the wound, untreated osteomyelitis, fistulae to organs or body cavities, presence of necrotic tissue and those with exposed arteries or veins. It is recommended that extra care should be taken for patients with blood dyscrasias (an imbalance of components of the blood), and patients on anticoagulants or with actively bleeding wounds[6].

Advantages of VAC assisted wound therapy include:

- Availability of portable VAC® devices.
- Enhanced dermal perfusion (blood flow to the wound).
- Provision of a closed, moist wound healing environment.
- Reduced bacterial cell count.
- Reduced frequency of dressing changes, thus reducing nursing time for wound care and increasing patient comfort
- Reduced hospital length of stay .
- Removal of interstitial fluid to allow tissue decompression.

Conclusion:

With appropriate training to ensure appropriate and competent use, VAC is simple to use and appears to be a promising and better alternative for the management of various wound types with lower complication and faster healing.

Source of Support: Nil
Conflict of Interest: None

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