



THERAPEUTIC OUTCOME OF VACUUM ASSISTED CLOSURE (VAC) DRESSING THERAPY FOR THE MANAGEMENT OF NON-HEALING NON TRAUMATIC & TRAUMATIC WOUND

General Surgery

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ABSTRACT

INTRODUCTION- Wound healing is a complex, dynamic process and delayed wound healing significant health problem in India. Various type of surgical methods have been developed for wound healing such as Advanced Wound Care Therapies(AWCT),Myo cutaneous or fascio cutaneous tissue transfer, Standard dressing Therapy,etc. VAC therapy is non invasive therapy using for management of large chronically infected wounds more recently used in treatment of traumatic wounds and delayed healing wounds.

AIM- Aim of this study is to evaluate functional outcome of vaccum-assisted closure(VAC) dressing therapy for management of non healing traumatic & non traumatic wounds.

MATERIAL & METHOD- Our study was conducted in 100 patients in civil hospital,Ahmedabad from June 2018 to June 2019.Out of 100 patients,50 patients are male and 50 are female.mean age ranging from 20 to 60 years.VAC dressing therapy applied for non healing non traumatic wound and traumatic wound.

RESULTS- Out of 100 wounds taken in the study,90 patients showed reduction in wound surface area.56 patients underwent split thickness skin grafting,20 patients developed secondary wound healing,4 patients were taken for flap closure.10 patients showed failure of response later on subjected to redebridemnt or Amputation.

DISCUSSION- In our study,44% patients showed granulation after 3rd day,72% after 6th day,90% after 9th day.Our study showed that VAC dressing therapy increases the vascularity and rate of granulation tissue formation compared to standard wound dressing therapy.

CONCLUSION- VAC dressing provides sterile and controlled envioment to large wound surface by controlled application of sub atmospheric pressure and prepares wound for closure through split thickness skin grafting and secondary closure in short time leading to less overall morbidity with decresed hospital stay.

KEYWORDS

Vaccum assisted closure(VAC), trumatic and non traumatic wound, non healing wounds

INTRODUCTION

Wound healing is a complex, dynamic process and delayed wound healing is significant health problem in India. In addition to pain and suffering, Failure of wound to heal imposes Social & financial burdens. Clinically, chronic wounds may be associated with pressure sore, trauma, venous insufficiency, diabetes, vascular disease, or prolonged immobilization. Various type of surgical methods have been developed for wound healing such as skin grafts, local rotation flaps, Advanced Wound Care Therapies (AWCT) and myo-cutaneous or fascio-cutaneous tissue transfers, Stander dressing therapy etc. Vacuum assisted closure (VAC) dressing therapy, may also be known as negative pressure wound therapy or Micro deformational wound therapy, which has brought a revolution in wound care since past 20 years. This method was first described by Fleischmann et al. in 1993 .VAC dressing therapy is a Non-Invasive therapy. It is a Therapeutic technique using a vacuum dressing to promote healing in Acute or Chronic (non healing wounds, traumatic wounds) and enhance healing of First & Second Degree Burns. It involves controlled application of sub-atmospheric pressure to local wound environment, using a sealed wound dressing connected to a vacuum pump. Initially developed in the early 1990s, for the management of large, chronically infected wounds that could not be closed in extremely debilitated patients, the use of vacuum-assisted closure (VAC) dressing therapy has been more recently used in the treatment of non-healing and traumatic wounds.

AIM

Aim of our study is to evaluate functional outcome of Vacuum-Assisted Closure (VAC) dressing therapy for the management of non-healing wounds and traumatic wounds.

MATERIAL AND METHODS

- My study was conducted on 100 patients in the Department of General surgery, Civil hospital, AHMEDABAD from JUNE 2018 to JUNE 2019.
- Out of 100, 50 are male and 50 are female patients.Mean age ranging from 20 to 60 years for both gender.

DISTRIBUTION OF PATIENT

	NO.
• CHRONIC WOUND	46

• POST TRAUMATIC	34
• DEGLOVING INJURY	10
• PRESSURE ULCERS	6
• NECROTIZING FASCITIS	4

Inclusion Criteria

- Wounds with exposed bone and tendons.
- Partial thickness burns.
- Chronic pressure ulcers and non-healing ulcers.
- Traumatic wounds.
- Neuropathic ulcers.

Excluding Criteria

- Ulcers over the extremities with peripheral vascular disease.
- Fistula to organs or body cavities.
- Acute burns.
- Untreated osteomyelitis.
- Wound with exposed blood vessels or organs.
- Presence of necrotic tissue.
- Malignancy in wound.
- Patients with hemorrhagic disorders.

Materials Required

- Autoclaved sponge foam (double autoclaved at pressure of 20 PSI, 250°F for 30 min)
- Tegaderm /opsite /plastic cover/surgical glove of appropriate size/ Ioban
- Disposable syringes (10 cc, 20 cc, 50 cc), romovac suction drain, mucus suckers, pedal suction apparatus, portable electrical suction machine
- Suction catheter/Ryle's tube/infant feeding tube
- Transparent adhesive tape/micropore
- Plastic sheet

VAC PROCEDURE

Any dressings from the wound were removed and discarded. A culture swab for microbiology was taken before wound irrigation with normal saline. Necrotic tissues were surgically removed and adequate hemostasis was achieved. Prior to application of the drape, it was essential to prepare the peri wound skin and ensure that it was dry. Autoclaved Sponge foam which is normally available at hardware

stores of 8 mm thickness is taken and is cut in to shape of the wound with slightly larger size than the wound. A suction catheter/Ryle's tube with adequate number of fenestrations made depending upon the wound size is placed in between the two sponge layers and the whole wound area is sealed with tegaderm/opsite adhesive Ioban drape covering the foam and tubing and at least three to five centimeters of surrounding healthy tissue to ensure a seal and the suction catheter on the other end is connected to vacuum creating device and is charged. The suction machine is cleared of drainage and recharged with vacuum after each clearance at timely intervals. The negative pressure applied will be from -75 mm Hg to -200 mm Hg depending upon the type of modality used to create the vacuum. VAC Dressings are changed at intervals of 48-72 h depending upon the amount of exudates drained, leakage from the sealed area due to fluid logging in and also upon the state of the wound and pictures of the wound and measurements are taken. The VAC dressing therapy are done till the granulation tissue of the wound fills till to the skin surface and left to healing by secondary intention or as secondary method of wound closure as secondary suturing, flap repair, split skin grafting.



RESULTS

NO OF VAC DRESSING	GRANULATION	PERCENTAGE
AT PRESENTATION	0	0%
1st	52	52%
2nd	72	72%
3rd	80	80%
4th	90	90%
FAILURE OF RESPONSE	10	10%

TYPE OF WOUND CLOSURE	NO OF CASES	PERCENTAGE
DIRECT CLOSURE	10	10%
FLAP CLOSURE	4	4%
SECONDARY HEALING	20	20%
STSG	56	56%
FAILURE OF RESPONSE	10	10%

BACTERIAL GROWTH	VAC PATIENTS(N=100)			
DAYS	DAY 0	DAY 3	DAY 6	DAY 9
PRESENT	100	60	12	0
ABSENT	0	40	88	100

DISCUSSION

The VAC device was first pioneered by Dr.Louis Argenta and Dr Michael Morykwas in 1993.The optimum level of negative pressure appears to be around 75-125 mmHg.The application of controlled levels of negative pressure accelatesh healing in many different type of wound.

MECHANISM OF ACTION

- Promotes granulation tissue formation
- Stimulates localised blood flow
- Prevents colonization bacterial colony
- Provides moist environment for healing
- Reduces localised edema
- Enhances epithelial migration
- Applies uniform negative pressure to promote wound contraction

Our study showed that in VAC dressing therapy after day 3, there were 40% of patients who had no bacterial growth, and on day 7 there were 88% of patients who growth, whereas in saline-wet-to-moist patients only 12% of patients had no bacterial growth on the 8th day. There have been similar studies by Morykwas and Argenta, Banwell et al and Morykwas et al. Which showed clearance of bacteria from infected wounds using VAC dressing therapy. Thomas first postulated that application of mechanical stress would result in angiogenesis and tissue growth. Unlike sutures or tension devices, the VAC dressing therapy can exert a uniform force at each individual point on the edge of the wound drawing it toward the center of the defect by mechanically stretching the cells when negative pressure is applied. Our study showed that VAC dressing therapy increases the vascularity and rate of granulation tissue formation compared to standard wound dressing therapy. The highly significant increase in the rate of granulation tissue formation of sub atmospheric pressure-treated wound is postulated to be due to transmission of the uniformly applied force to the tissues on the periphery of the wound. These forces both recruit tissues through visco-elastic flow and promote granulation tissue formation. Standard wound dressings adhere to devitalized tissue and within four to six hours the gauze can be removed, along with the tissue, as a form of mechanical debridement. This method of wound care has been criticized for removing viable tissue as well as nonviable tissue and being traumatic to granulation tissue and to new epithelial cells. For the treatment with VAC dressing therapy, many factors to be considered in view of goal of treatment, type of dressing, suction pressure application. For different types of wounds, there is different amount pressure protocols and the duration of treatment changes. In acute wounds, it is beneficial to start within 48 h initially with continuous suction followed by intermittent suction therapy. For chronic wounds they benefit more by continuous VAC dressing therapy. Short and intermittent VAC dressing therapy shows improved tissue response than compared to the continuous effect, but it may not be applicable for all types of cases. Intermittent VAC dressing pressure may not be tolerated by some patients due to discomfort. The optimal pressure to be applied for improvement of the wound is not yet currently known, there are different studies with application from -75 mm Hg to -150 mm Hg pressure and achieved good healing responses. Frequent change of vacuum dressings may be required for wounds with increased risk of infection.

CONCLUSION

VAC dressing therapy provides sterile and controlled environment to large, educating wound surfaces by controlled application of sub-atmospheric pressure. Application of sub atmospheric pressure after the initial debridement to the wounds results an accelerated rate of granulation tissue formation, an increase in local functional blood perfusion, and decrease in tissue bacterial levels. VAC dressing prepares wounds for closure through split skin grafting and secondary closure in short time leading to less overall morbidity with decreased hospital stay. In our study Vacuum assisted closure (VAC) dressing therapy appears to be beneficial for the treatment of non-healing wounds and traumatic wounds.

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