University Journal of Surgery and Surgical Specialties

ISSN 2455-2860 Volume 2 Issue 4 2016

OUR EXPERIENCE WITH NEGATIVE PRESSURE WOUND THERAPY, AN USEFUL RECONSTRUCTIVE TOOL IN WOUND MANAGEMENT

RAJESWARI B BALAKRISHNAN
Department of Plastic Reconstructive Surgery,
MADRAS MEDICAL COLLEGE AND GOVERNMENT GENERAL HOSPITAL

Abstract :
Some wounds may be difficult to manage despite the options of skin grafting, local flaps or microvascular free tissue transfers. Some patients may not be the candidates for these procedures. Some wound beds are not amenable for these treatments because of poor wound beds and inadequate granulation. Argenta et al first described a vaccum-assisted closure. This method of wound care promotes granulation, promotes wound contracture, and decreases bacterial count. This method is successful even in treating grade III B open fractures that may have required a local muscle flap or a microvascular free tissue transfer. The significant improvement in the wound bed, however makes the reconstructive procedure easier. We tried this method in our patients with acute and chronic wounds, where immediate reconstruction was not able to apply for varied reasons, both local and systemic. We found this as a useful tool for the treatment of variety of wounds to achieve early closure with less hospital stay, cost, and less morbidity

Keyword :negative pressure, wound healing, early wound coverage.

INTRODUCTION:

A wound is the microcosm of the patient. Most wounds will heal with minimal intervention in a healthy individual. Conversely, the incidence of non healing wounds is higher in patients with systemic diseases, particularly who are hospitalised. (eg: diabetic ulcers, venous ulcers, pressure sores, infective non healing wounds). A solid foundation in the basics of wound care is imperative to treat the broad spectrum of wounds, encountered by plastic surgeons and to make sense of the advances in wound treatments that have been made or are on the horizon.[1] The importance of proper wound care in maximising rates of limb salvage, and factors such as convenience to the patient and practitioner have evolved

as valid variables that should be addressed when choosing a wound-care modality. Vaccum assisted closure is the one, new in the armamentarium of managing wounds of **both acute and chronic nature.**

LITERATURE REVIEW:

It is also called negative pressure wound therapy, in which vacum is created at the wound bed by the use of special instrument, where the maximum negative pressure kept around 125 mm Hg. [2.] (range 75 – 125 mmHg) The negative pressure that was created at the wound surface, promotes wound healing by three ways.decrease of edema.increase in vascualrity,removes the fluid, carrying the organisms (decrease in bacterial load), as well as removes deleterious enzymes from the wound.

Many chronic wounds are characterised by the presence of collagenases and matrix metallo proteinases and other proteases related to inflammatory cells, and bacterially derived proteases, which serve to degrade nascent matrix proteins and growth factors.[3,4,5] By removing the wound fluid and bacteria that inhibit wound healing, NPWT modifies the wound microenvironment toward one more conductive to healing. In addition, the cyclic compression and relaxation of the wound tissue likely stimulates mechano transductive pathways that result in increased growth factor release, matrix production, and cellular proliferation,[6,7] and by all means improve granulation, there by the wound heals spontaneously or coverd by SSG or flap cover. This is less expensive than conventional management of complex wounds. The technique is relatively simple, and reproducible, with easy learning curve.

TECHNIQUE:

After thorough saline wash of the wound and antiseptic cleaning ,wound covered with sterile foam, porous dressing.[7] On top of the foam a tube with multiple holes in it, is kept,(we commonly use the Ryle's tube) and the whole dressing including the exit of the tube from the wound covered by sterile adhesive sheet in order to create a completely air tight dressing, so that while creating vaccum there won't be any air leak.[8] This is connected to vaccum pump with canister, in which the fluid loaded with organisms as well as the deleterious enzymes and the tissue fluid from edematous wound bed,getting colected. The dressing changed at 48 hour interval.[9]

VAC Apparatus:

INDICATIONS:[10,11]

1 Post trauma wounds.

2 Decubitus ulcers.

3 Venous ulcers.

4 Diabetic ulcers.

5 Over skin grafted areas to retain the graft.

6 Dehised surgical wounds.

CONTRA INDICATIONS:

1 Malignancy.

2 Bleeding wounds.

3 coagulation disorders.

4 ischaemic wounds.

5 in adequately debrided and badly infected wounds.

6 wounds with fistulas connecting bowel.[12]

MATERIALS AND METHODS:

In two years period , March 2012 to Feb 2014 we tried this method in about thirty five patients, in our instituition .

They were about nine females, and twenty six males.

Nature ofwounds, we treated,

Diabetic ulcers – post debridement and neuropathic trophic ulcers-9

Post traumatic -7

Pressure sores -13

Venous ulcers`-6

The chronic nature of the ulcer (duration) was about six weeks to 22 weeks.

The size between 5 X4 to 12 X 10 with depth between 1cm to 6 cm.The time taken for the ulcer to granulate well and ready for coverage, was from seven days tomaximum 17 days.

Representative case 1 Representative case 2

Representative case 4
Representative case 3

Representative case 5
Representative case 6

In all these patients in first 48 hours the VAC applied continuously. There after kept intermittently with every one hour of running and 10 to 30 mts of rest period during day time and at night the machine operated only for the wounds very deep with running hours of 4 hours and rest of two hours depending upon patient's and operator's comfort. Complications like flare-up of infections, acute bleeding from wound was nil. The maximum comfort in using this in patients with pressure sore where the change of position opposite to the ulcer bearing area did not arise because patient can be able to lie down in the same side of ulcer with foam , seal , and tubing in situ with machine is on.[13]

DISCUSSION:

Delay in wound healing contributes to social and financial burden to the patients, with frequent hospital stay, visits and increase cost of treatment also.

Vaccum assisted closure therapy is an alternative to the routine wound management. It optimises the wound state with less hospital stay, and few dressings, it promotes good granulation tissue and decrease the bacterial load, thereby early wound closure can be achieved by either secondary suturing, STSG, flap cover. The complication with this therapy is few like flare-up of infections, bleeding . But, has the advantages, like, less cost, minimal days of hospital stay, less time for treatment by the surgeon,and in some cases patient will be allowed to ambulate, with continuing treatment, and the ward staff can be trained for application,and monitoring there by the surgeon's time is saved

Conclusion:

VAC therapy for management of not only the chronic wounds but also the acute wounds inachieving early raw area coverage, is definitely an important mile stone in the management of wounds. It is applicable for all size wounds with any depth except that the cavity should not have any vessels which will bleed because of suction by vaccum. Also in any contours it is applied, but in deep wounds, it should be filled with sponge, for effective suction. It is temporary measure, where time is available for surgeon to plan for the ideal, permanent reconstructive option. And the patient's acceptance for the permanent procedure and time given for the patient to mobilise fund to meet his expense. Even at initial look of wound itself, we start the VAC therapy if we feel that if it left to settle on its own, will take long days. And it is highly useful in managing pressure sores where the skin available for repeated rotation flap is not available, and the sore managed in the position on the side of lesion itself, than other methods where change of position is needed , and in some cases where proper care not taken in changing the position at right time , may promote ulcer at new site. Also easily applicable and effective in the raw area management of scalp.

Finally inspite of it is not a very new technique, we shared our experience to encourage young and enthusiastics surgeons who are fond of microvascular free flaps in the management of complex wounds, to the high success rate with this low cost, less morbid, patient and practitioner friendly method of management.

BIBLIOGRAPHY :

1 Eginton MT, Brown KR, Seabrook GR, et al. A prospectiverandomized evaluation of negative-pressure wound dressingsfor diabetic foot wounds. Ann Vasc Surg 2003;17(6):645-9.

2) Banwell PE, Teotl L. Topical negative pressure (TNP): theevolution of a novel woundtherapy.J Wound Care 2003;12(1):28-30.

3) Morykwas MJ, Argenta LC, Shelton-Brown EI, et al. Vacuumassistedclosure: a new method for wound control and treatment:animal studies and basic foundation. Ann PlastSurg 1997;38:553-62.

4) Leong M, Phillips LG. Wound Healing. Townsend CM,Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery.19th ed. Philadelpia; Elsevier; 2012:151-77.

5) Barbul A, Efron DT. Wound healing. Brunicardi FC. SchwartzPrinciples of surgery. 9th ed. New York. McGraw Hill; 2010:209-33.

6) Galiano RD, Mustoe TA. Wound Healing.. Mulholland, Michael W, Lillemoe, Keith D, Doherty,

Gerard M, Maier, 56 Ronald V, Upchurch, Gilbert R. In Greenfield's Surgery: Scientific principles and practice. 4thed . Philadelpihia; Lippincott Williams & Wilkins; 2006

7 Armstrong DG, Lavery LA, Frykberg RG, et al. VAC therapy appears to heal complex DFU. Abstract presented at the 2nd World Union of Wound Healing Societies Meeting, July 8-13, 2004; Paris, France

8) Lazarus GS, Cooper DM, Knighton DR, et al. Definition inN Am 2003; 83 (3):192-195.

9) Joseph E, Hamori CA, Bergman S, Roaf E, Swann NF,Anastasi GW. A prospective randomized trial of vacuumassisted closure versus standard therapy of chronic non –healing wounds. Wounds. 2000;12(3):60-67.

10) Lionelli GT, Lawrence WT. Wound dressings. Surg ClinN Am 2003; 83 (3):192-195.

11) Bowler PG. Wound pathophysiology, infection and therapeutic options. Annals of Medicine. 2002; 34(6): 419-427.

12) Lee HJ et al. Negative pressure wound therapy for soft tissueinjuries around the foot and ankle. Journal of OrthopaedicSurgery and Research 2009, 4:14

13) Argenta LC, Morykwas MJ. Vacuumassisted closure: A new method for wound control and treatment: Clinical experience. AnnPlast Surg 1997; 38(6): 563 -76.