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A Randomised controlled trial comparing vacuum assisted therapy vs conventional moist wound therapy

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Abstract

Background: *Vacuum assisted closure (VAC) therapy is a relatively new Technology to manage acute and chronic wounds. It is also known as TNP (topical negative pressure) VST (vacuum sealing technique) and SSS (sealed surface wound suction).(1) In this study, negative pressure was applied by vacuum assisted control therapy system in acute traumatic wounds and bed sores. Efficacy of this therapy was compared to the moist wound therapy.*

Aim: *The purpose of this therapy was to evaluate efficacy of vacuum assisted controlled therapy(Group I) compared with moist wound therapy(Group II) in acute traumatic wounds(Gustillo and Anderson class III B) and chronic(>6 weeks) bed sores of grade III or IV*

Methods: *A total of 42 patients were randomly allotted to either the vacuum assisted control therapy group or moist wound therapy group.All patients were assessed in terms of the time taken by the granulation tissue to appear and also time to ready for surgery or secondary healing.Analysis was done with SPSS and t-test and chi square test.*

Result: *There was a significant reduction(P value <0.05) in the time taken by a wound to be ready for surgery or secondary healing in wounds treated with vaccum assisted controlled therapy(19.5days)compared with moist wound therapy(46 days).Granulation tissue was first appeared at an average of 9 days in wounds treated with vaccum assisted controlled therapy and at an average of 17 days in wounds treated with moist wound therapy.*

Conclusion: *Vacuum assisted closure (VAC) therapy reduces the duration of surgery or secondary healing and thus reduces the hospital stay. So it is an economical, safe and effective procedure.*

Keywords: *Bed sore ; Gustillo and Anderson; Moist wound therapy; Vacuum assisted closure therapy;*

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I. Introduction

In Vaccum Assisted therapy, controlled negative pressure is applied to the wound either continuously or intermittently.This therapy is also known as TNP (topical negative pressure) VST (vacuum sealing technique) and SSS (sealed surface wound suction. It is a non-invasive adjunctive therapy system that promotes wound healing by removing fluid from open wounds, reducing edema, promoting the formation of granulation tissue and also reducing levels of bacteria.It appears to be useful in diabetic ulcers, acute and chronic wounds and pressure sores, burns, necrotising fasciitis, and sternal wounds. The treatment technique for open wounds based on negative pressure was developed in Germany and the United States during the 1990s.The VAC was first investigated by Morykwas and Argenta et al. in 1997(4) The open wound is covered with polyurethane ether foam with the pore size of 400-600 mm.this pore size is thought optimal for tissue growth and ensures that the negative pressure will be equally applied to each and every part of the wound.A suction tube is embedded in foam.(4) An adhesive drape is then applied over the foam including 3-5 cm of surrounding intact skin to provide an air-tight film.thus this technique converts an open wound into a controlled closed environment.The suction tube is connected to a control unit by which the primary negative pressure(80-12 mm of mercury) on the surface of the wound can be applied either continuously or in cycles. The suction tube is also connected to a container for the collection of fluid in the control unit.the dressing is routinely changed after 48-72 hrs.

Adverse effects include skin irritation from the adhesive drape and odor from canister or suction tube or both after long term use.It also includes increased pain and sensitivity to dressing.Gawn-nulla et al have also reported the occurrence of Toxic Shock Syndrome in one patient after Vaccum Assisted Therapy treatment. So, we conducted a prospective randomized controlled study of 40 patients to evaluate the effect of vacuum-assisted closure (VAC) therapy dressing on open fracture wounds in comparison with the conventional moist wound dressing.

II. Methods

Our study was conducted in Department of Orthopaedics, Employees State Insurance Hospital, Basaidarapur, Delhi in the period of October 2014 –march 2017.All patients were made to understand. In their local language and informed consent was obtained before randomizing into the two groups in our study a total of 42 patients were randomly allotted to either vacuum assisted therapy group or moist wound therapy group using random number generator.one patient from each group was lost to follow-up.so finally, 20 patients were studied in each group.

Inclusion criteria were persons between the age of 20-60 years, the presence of an open fracture wound type IIIB based on Gustilo-Anderson classification, grade III or IV bed sore, and accessible clean wound after debridement. Exclusion criteria were type I, II or IIIA and IIIC based on Gustilo-Anderson classification, grade I and II bed sores, malnutrition,systemic disease, peripheral vascular disease dermatological disease like psoriasis, and previous osteomyelitis. Patients aged less than 20 or more than 70 years, pregnant or nursing mothers, and on medications, such as corticosteroids, immunosuppressive agents or chemotherapy, were not included. Wounds of all the patients included in the study underwent meticulous debridement initially.All the patients were divided into two groups. Group I patients underwent vacuum assisted therapy and group II patients underwent moist wound therapy.

In patients of vacuum assisted therapy, sponge foam with the pore diameter of 400-600mm was placed on the wound. Then the wound and surrounding intact skin were covered by an adhesive drape.(Fig.-1) A suction tube was inserted in the dead wound space through the foam and the outer end of it was connected to the suction device that applies negative pressure at 125 mm intermittently for 5 minutes 5 minutes on and two minutes off.(Fig.-2) Wound dressings were changed usually every 48 hours and necrotic tissue and slough were also removed.

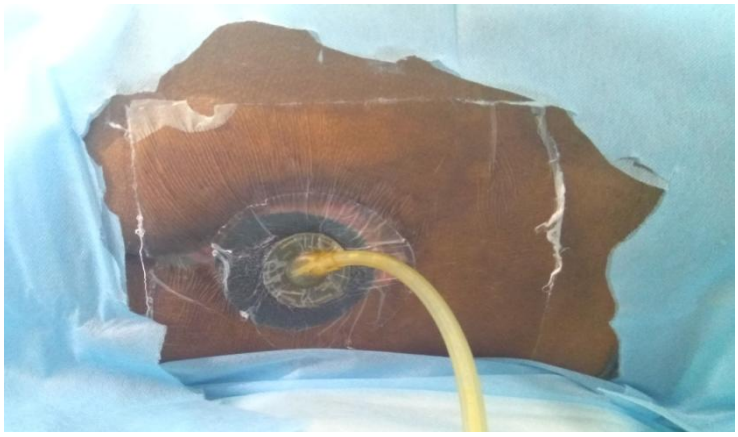

Fig.-1-Dressing of wound for VAC therapy

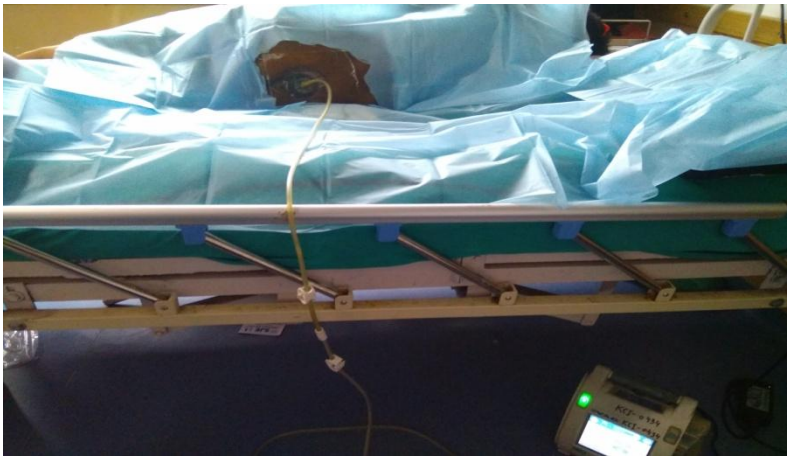

Fig.2-Vacuum unit

In control group patients were treated with conventional dressings.wound was covered with saline soaked dressing twice a day and necrotic tissue and slough were removed. Standard antibiotic regimens and oral analgesics were administered to all of the patients. Ulcers were treated until the wound was closed spontaneously, or ready to undergo surgery or secondary healing. Time taken by the granulation tissue to appear was noted.The time till the wound is ready for surgery or secondary healing from the commencement of therapy was also recorded in all patients. All participants were followed up throughout the study.(Fig.-3 and Fig.4)

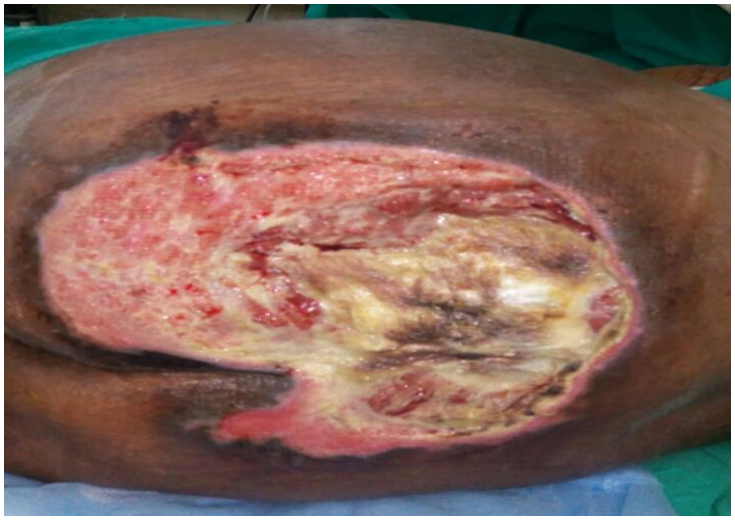

Fig.3-wound at the commencement of

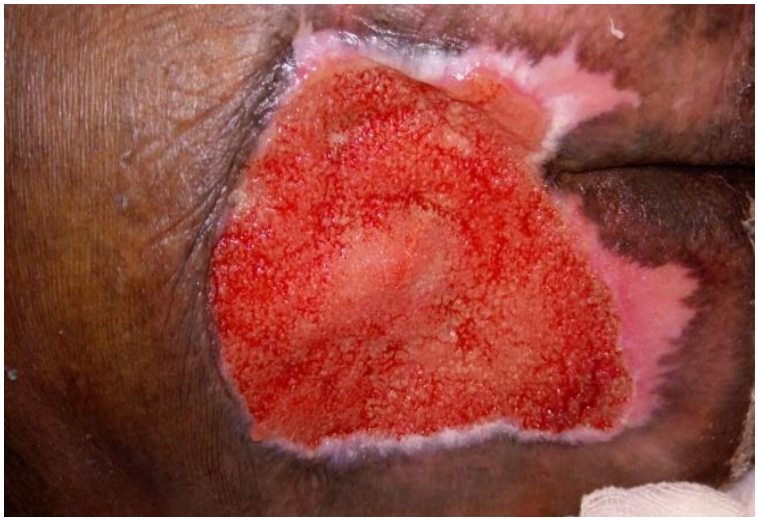

Fig.-4 wound after Vaccum

Data were entered in SPSS 14 and analyzed. Categorical variables were analyzed by using the Pearson's Chi-square/Fisher's exact test. Two groups were compared using Student's t-test. P-Values of <0.05 were considered to be statistically significant.

III. Result

In this clinical trial study, 42 patients were enrolled and were divided into two treatment groups.one patient from each group was lost to follow-up.So, finally, 20 patients in each group were evaluated. 12 patients(30%) were female and 28 patients(70%) were male. There was no significant difference at the commencement of therapy between the two groups. Average time taken by granulation tissue to appear in vacuum assisted therapy was 9 days, while in moist wound therapy patients it was 17 days.This shorter time interval was statistically significant(<0.05).The time taken by the wound to be ready for surgery or flap coverage or secondary healing in vacuum assisted therapy was only 19.5 days while it was 46 days in moist

wound therapy.this difference in duration was also statistically significant(<0.05).There was no case of increased pain or sensitivity to adhesive drapes.

IV. Discussion and conclusion :

The use of Vacuum assisted therapy has increased in last few decades.Various papers have been published in the literature since then.In 2008, P. Vikatmaa et al reviewed the literature for effectiveness and safety of Negative Pressure Wound Therapy and concluded that effectiveness of this therapy is at least as good as or better than local wound treatment.However, they also reported a shortage of reliable research data on effectiveness of Negative Pressure Wound Therapy(7) We studied the effectiveness of Vacuum assisted therapy on acute traumatic wounds grade IIIB and chronic Bed sore of grade III and IV of more than 6 weeks duration.both the type of wounds are difficult to heal and requires the prolonged stay in hospital on conventional moist wound therapy.So, there is a necessity of an alternative procedure which is safe, noninvasive and effectively decreases the time taken by the wound to be ready for the secondary procedure. In we found that Vacuum assisted therapy significantly shortens the duration of time taken by wound for the secondary procedure.Our study results were comparable to the results of a study done by McCallon et al in which they reported that time taken by wound for the secondary procedure in Vaccum assisted therapy was 22.8 and in conventional wound dressing 42.8 days.This difference was statistically significant(P valu<0.05)(8) We conclude that Vacuum assisted therapy is a safe and effective procedure to promote granulation tissue and to prepare the wound in shorter duration for the secondary procedure.

References

[1]. Banwell PE, Teotl L. Topical negative pressure (TNP): the evolution of a novel wound therapy. J Wound Care 2003;12(1):28–30.
[2]. Vacuum-assisted closure versus conventional dressings in the management of diabetic foot ulcers: a prospective case-control study Ali M. Lone, MS1, Mohd I. Zaroo, MCh1, Bashir A. Laway, DM2*, Nazir A. Pala, MD2, Sheikh A. Bashir, MCh1 and Altaf Rasool, MC Diabetic Foot & Ankle 2014, 5: 23345.
[3]. Fleischmann W, Lang E, Russ M. Treatment of infection by vacuum sealing. Unfallchirurg 1997;100:301e4.
[4]. Morykwas MJ, Argenta LC, Shelton-Brown EI, McGuirt W. Vacuum-assisted closure: a new method for wound control and treatment: animal studies and basic foundation. Ann Plast
[5]. Surg 1997;38:553e62.
[6]. Argenta LC, Morykwas MJ. Vacuum-assisted closure: a new method for wound control and treatment: clinical experience. Ann Plast Surg 1997;38:563e76
[7]. Gwan-Nulla DN, Casal RS. Toxic shock syndrome associated with the use of the vacuum assisted closure device. Ann Plast Surg 2001;47(5):552–554
[8]. P. Vikatmaa, V. Juutilainen, P. Kuukasja¨rvi, A. MalmivaaraNegative Pressure Wound Therapy: a Systematic Review on Effectiveness and SafetyEur J Vasc Endovasc Surg (2008) 36, 438e448
[9]. 8. McCallon SK, Knight CA, Valiulus JP, Cunningham MW, McCulloch JM, Farinas LP. Vacuum-assisted closure versus saline-moistened gauze in the healing of postoperative diabetic foot wounds. Ostomy Wound Manage 2000;46:28e34.

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