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Original Research Article

Comparative study between VAC dressing and Conventional dressing in non-healing Wound

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Abstract

Background & Methods: The aim of the study is to comparison between VAC dressing and Conventional dressing in non-healing Wound. VAC or conventional dressings were applied alternatively to the patients. All patients underwent detailed clinical examination and relevant investigations and the wounds were thoroughly debrided and the ulcer dimensions as well as the surface area assessed. Before the start of VAC therapy, after initial debridement, the wound was photographed with a ruler placed beside the wound. A double layer of polyethylene sheets was held firmly in place over the wound, and an outline of the wound was traced using a permanent marker.

Results: The mean graft uptake of group A and group B was 93.4±5.99 and 91.67±6.2 respectively. There was significant difference between the groups as per student t-test ($p<0.05$). The mean percentage of granulation tissue formation in group A was 94.38±5.03 and in group B was 91.9±4.81, which is found to be statistically significant ($p<0.05$).

Conclusion: VAC is more successful in achieving granulation of tissues in patients with diabetic foot ulcer as compared to conventional dressing. Now we have got the evidence in favour of VAC for management of dressing in non-healing Wound. Now in future, we will implement the use of VAC instead of conventional method of dressing in non-healing Wound.

Keywords: VAC, Conventional, non-healing & Wound.

Study Design: Comparative Study.

1. INTRODUCTION

Chronic wounds are wounds that fail to heal in the normal healing phases of inflammation, proliferation, and maturation (1). They represent a heterogeneous group of wounds of multiple cause and conditions, such as pressure ulcers, diabetic ulcers, venous stasis ulcers, vasculitic ulcers, and chronic non healing wounds resulting from trauma or dehisced surgical wounds. The use of NPWT has profoundly changed the management of these patients, who often are poor surgical candidate and have failed previous operations. Such wounds often area burden to caregivers, because of the multiple frequent dressing changes, and are incapacitating to the patient (2).

Acute and chronic injuries are a significant cause of morbidity and poor quality of life. They affect a minimum of 1% of the population and represent a big risk factor for hospitalization,

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amputation, sepsis, and even death. The treatment of large wounds remains a significant challenge to practitioners, a cause of pain and discomfort to the patients, and is costly (3).
The development of a wound infection depends on a complex interplay of many factors. If the integrity and protective function of the skin is breached, large quantities of various cell types will enter the wound and initiate an inflammatory response. The classic signs of redness, discomfort, swelling, elevated temperature and fever may characterize this. This process ultimately aims to restore homeostasis (4). Not only do they need hospitalization but also to morbidities like amputation of the limb and at times, even death and from the patient's view, therapy for the wound is discomforting and painful to the patient (5).
Now, this controlled wound wherein vacuum can be created through the perforated plastic tubing with a suction machine and the whole apparatus was developed into what is now referred to as vacuum-assisted closure (VAC) (6).

2. MATERIAL AND METHODS

Present study was conducted at Index Medical College Hospital & Research Centre, Indore for the period of 01 Year, study cases and controls selected from the general surgery wards. 20 Patients in each group, Group A VAC dressing & Group B Conventional dressing.
After debridement of the wound, VAC dressing is applied after the bleeding gets stopped. Pre VAC and post VAC C & S is taken. Dressing is given for 72 hours and intermittent suction is given for ten minutes in an hour, daily for 12 hrs with a negative pressure ranging from 100 to 125 mm of mercury. Rest of the time drain of the VAC dressing connected to the Romo vac suction drain. Doppler study to assess the vascularity of the limb before the procedure and x- ray taken to rule out ostemyelitis. Control group patients are given with conventional dressings.
Patient selected for VAC therapy undergoes wound debridement and haemostasis is achieved. Pre VAC culture and X-ray to rule out active osteomyelitis is taken. A piece of pre sterilized foam (about one cm in thickness) is cut to the size of the wound and is placed on it.
VAC or conventional dressings were applied alternatively to the patients. All patients underwent detailed clinical examination and relevant investigations and the wounds were thoroughly debrided and the ulcer dimensions as well as the surface area assessed. Before the start of VAC therapy, after initial debridement, the wound was photographed with a ruler placed beside the wound. A double layer of polyethylene sheets was held firmly in place over the wound, and an outline of the wound was traced using a permanent marker. The layer in direct contact with the wound was discarded.

Inclusion Criteria:
1. Patients with chronic foot ulcer (diabetic/burn patients).
2. Patient willing to give informed consent
3. In case of diabetic patients- diabetes mellitus is defined as per World Health Organization (WHO) criteria of age and duration of therapy 1. Age ≥35 years
2. Absence of insulin requirement in the first 5 years after diagnosis.

Exclusion Criteria:
1. Critically ill patients
2. Patient refusal
3. Any evidence of underlying bone osteomyelitis
4. Malignancy

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3. RESULT

Table 1: Age Distribution of patients

Age	Group A	Percentage	Group B	Percentage
20-40	06	30	04	20
41-60	09	45	08	40
461-80	05	25	08	40
Total	20		20	

Table 2: Gender Distribution

Gender	Group A	Percentage	Group B	Percentage
Male	14	70	13	65
Female	06	30	07	35
Total	20		20	

There was male preponderance in both the groups (70% and 65% respectively) while there were 30 and 35% female patients in group A and group B respectively.

Table 3: Numbers of debridement

Debridement	Group A	Percentage	Group B	Percentage
00	11	55	08	40
01	07	35	10	50
02	01	05	02	10
Total	20		20	

11 (55%), 07(35) and 01 (05%) patients of group A underwent 0, 1 and 2 debridement respectively. 08(40%), 10(50%) and 02(10%) patients of group B underwent 0, 1 and 2 debridement respectively.

Table 4: Distribution of graft take up

Grafts	Group A	Percentage	Group B	Percentage
91-100	19		10	
81-90	01		09	
71-80	-		-	
61-70	-		02	
51-60	-		-	
41-50	-		-	
31-40	-		-	
Total	20		20	

The mean graft uptake of group A and group B was 93.4±5.99 and 91.67±6.2 respectively. There was significant difference between the groups as per student t-test ($p<0.05$)

Table 5: Comparison of granulation tissue fill-up percentage between groups

Granulation fill-up (%)	Group A	Percentage	Group B	Percentage
≤80	00	00	00	00
81-90	04	20	08	40
91-100	16	80	12	60
Total	20		20	

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The mean percentage of granulation tissue formation in group A was 94.38±5.03 and in group B was 91.9±4.81, which is found to be statistically significant ($p<0.05$).

4. DISCUSSION

The time to complete wound healing was significantly better in the VAC therapy group as compared to conventional dressing. Similar results were obtained when comparison was done between the two groups stratifying the patients based on ulcer size (7). The time to complete healing in VAC group was significantly better in both DFU of <10 cm and ≥10 cm compared to the conventional dressing group; however, efficacy was more evident in the DFUs <10 cm ($P < 0.0001$) than the DFUs ≥10 cm ($P = 0.0042$). This can be attributed to the fact that time to healing is directly proportional to the size of the ulcer (8).

In a study by Armstrong and Lavery, median time to complete closure was 56 days in VAC therapy group against 77 days in the conventional saline dressing group.[10] Blume *et al*. demonstrated that a greater proportion of DFUs who received VAC therapy achieved complete skin closure or 100% reepithelization.[11] Singh *et al*. showed mean time to complete wound closure of 41.2 days and 58.9 days in VAC therapy group and conventional group, respectively.[12] Vaidhya *et al*. in a similar Indian study of sixty patients with DFU showed a time to healing of 17.2 days in VAC therapy group as compared to 34.9 days in conventional dressing group (9).

In the present study, the duration of hospital stay was minimum of 12 days and maximum of 48 days in group A and minimum of 22 days and maximum of 58 days in group B. The mean duration of hospital stay in group A and group B was 21.8±7.61 and 26.47±9.55 days respectively. There was significant difference between the groups as per student t-test ($p<0.05$), the mean percentage of granulation tissue formation in group A was 93.23±5.03 and in group B was 90.6±3.81, which is found to be statistically significant ($p<0.05$). This is in concordance to the studies of Nagaraj, Priyatham, Koppad and Richhariya et al (10).

In our study the mean graft uptake of group A and group B was 94.3±5.99 and 90.97±6.2 respectively. There was significant difference between the groups as per student t-test ($p<0.05$). Priyatham and Koppad et al noticed similar observations in their studies (11).

5. CONCLUSION

Thus we conclude in our study, VAC is more successful in achieving granulation of tissues in patients with diabetic foot ulcer as compared to conventional dressing. Now we have got the evidence in favour of VAC for management of dressing in non-healing Wound. Now in future, we will implement the use of VAC instead of conventional method of dressing in non-healing Wound.

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ISSN: 0975-3583, 0976-2833 VOL14, ISSUE7, 2023

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