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A Comparative Study Of Vacuum-Assisted Dressing And Conventional Saline Dressing In The Management Of Diabetic Ulcer In Thanjavur Medical College Hospital.

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ABSTRACT

Diabetic foot is a public health problem that has the potential to become a pandemic worldwide, especially in India. The novel dressing method VAC dressing, promises to reduce the morbidity associated with diabetic foot ulcers. The study aims to compare the efficacy of vacuum-assisted dressing versus conventional saline dressing in managing diabetic ulcers by evaluating changes in clinical wound parameters and assessing the impact on the duration of hospital stay. Thirty patients were enrolled. Group A patients received two settings of VAC dressing in addition to conventional wound therapy, while Group B patients were treated with conventional wound therapy and wound debridements alone. The study involved collecting detailed patient histories, performing basic blood tests, and examining diabetic ulcers for surface area and Wagner's grading. Both groups received standard care, including antibiotics, regular dressings, debridement, nutritional correction, and sugar control. Observations included red granulation tissue, wound contracture, and healing with eligible patients undergoing split skin grafting and closure for infection resolution and contracture. The VAC group showed significantly improved wound healing compared to the wound debridement group, with 30% achieving >75% granulation and 23.3% achieving 75% granulation ($p<0.0001$). The VAC group had a higher rate of infection resolution and progression to split skin grafting and closure (66.7% vs. 26.7%; $p=0.002$). The VAC group also demonstrated better graft uptake ($p=0.011$) and reduced hospital stay ($p<0.0001$). Patients who received VAC therapy had statistically better wound healing, with better development of granulation tissue, better rates of wound contracture, more patients becoming candidates for skin grafting, and better uptake of skin grafts post-surgery.

Keywords: Diabetic foot ulcer, diabetes, wound debridement, negative pressure wound therapy, vac dressing, wound healing.

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INTRODUCTION

Diabetic foot ulcers (DFUs) are a prevalent complication of diabetes mellitus and account for significant morbidity, mortality, and healthcare expenditures. Itisestimatedthat19–34%ofpatients with diabetes are likely to be affected with a DFU in their lifetimes, and the International Diabetes Federation reports that 9.1–26.1 million people will develop Faunally [1]. A benign looking ulcer in a patient with diabetes often ends up in amputation. A study in the United States reported that 38% of all the amputations were associated with DM. This can lead to severe morbidity and mortality. Therefore, DFU puts enormous financial burden on the patient and the health care services, even though it is preventable. The successful DFU management strategies involve intensive prevention, early assessment and aggressive treatment by a multi-disciplinary team of experts. The aim of this review is to discuss the current diagnostic and management options for diabetic foot ulcer [2]. Conventional dressing is the standard method; however, maintaining a moist wound environment is difficult. Subsequently, various hydrocolloid wound gels, growth factors, enzymatic, hyperbaric oxygen therapy, cultured skin substitutes, and other wound therapies have been advocated debridement compounds These therapies are not only expensive but also don't show sufficient scientific evidence in favour of their efficacy [3]. The studies it is obvious that VAC Therapy is effective treatment method for diabetic foot ulcers and it is commonly used method in developed countries but limited international and local data is available which actually compares the efficacy of these two methods. Therefore, this study was designed to be carried out at large tertiary care center with adequate sample size to compare VAC with conventional dressing for wound healing of diabetic foot ulcers [4]. The VAC technique is simple. It involves the application of an open - pore foam dressing to the wound. This foam dressing is then sealed using transparent adhesive drape. A negative pressure or suction force is then applied across the wound via a drainage tube embedded in the foam [5].

Objective

To compare the outcome of vacuum-assisted wound closure (VAC) versus conventional wound dressing in diabetic foot ulcers.

MATERIALS AND METHODS

This prospective comparative study at Thanjavur Medical College involved 60 patients with diabetic foot ulcers, randomly assigned to two groups: Group A (VAC therapy) and Group B (wound debridement alone). The study aimed to compare the efficacy of VAC therapy with conventional treatment. Inclusion criteria included diabetic ulcers larger than 5 cm and patients aged 20-80 years. Both groups received standard care, including antibiotics and blood sugar control, with Group A additionally receiving two VAC sessions. Key parameters assessed included granulation tissue development, number of debridement, hospital stay duration, and graft success. Data collected included patient history, ulcer size, Wagner's grade, and blood tests. The study focused on evaluating VAC therapy's effectiveness in improving wound healing compared to traditional debridement.

Statistical Analysis

Descriptive statistics, including mean ± SD for continuous data and percentages for categorical data, were analyzed using SPSS (v21.0) and Microsoft Excel.

RESULTS

This study compared the effectiveness of Vacuum-Assisted Closure (VAC) therapy to conventional wound debridement in treating diabetic foot ulcers (DFUs). A total of 60 patients were enrolled, with 30 patients in each group. The demographic analysis revealed that the majority of patients in both groups were male (83.3%) and in the 41-60 age range (76% in the VAC group, 70% in the debridement group). The two groups had similar baseline characteristics regarding diabetes treatment, with 92.6% of VAC group patients on oral hypoglycaemic agents (OHAs) and 69% of debridement group patients on OHAs Most ulcers were Wagner grade 2, with one patient in the debridement group having a grade 4 ulcer.

The VAC group demonstrated superior wound healing. Thirty percent of patients in the VAC group achieved more than 75% granulation, compared to only 6.7% in the debridement group ($p<0.0001$).

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Furthermore, 66.7% of VAC patients progressed to split skin grafting compared to 26.7% in the debridement group (p=0.002), with significantly better graft uptake in the VAC group (p=0.011).

VAC therapy also resulted in a significantly shorter hospital stay, with 40% of patients discharged within 15 days, while 63.3% of debridement patients stayed longer than 21 days (p<0.0001). The VAC group required fewer debridement (4.03 ± 1.07) compared to the debridement group (7.67 ± 2.14) (p<0.0001).

Table 1: Distribution of Age, Sex, Diabetic treatment profile and wagers grade between both groups

		Intervention group		P value
		VAC	Wound debridement	
		Count	Count	
Age	<40	2	3	0.614
	41 – 50	14	9	
	51 – 60	9	12	
	>61	5	6	
Sex	Female	5	5	1
	Male	25	25	
Rx for DM	Insulin Basal	2	5	0.145
	Insulin Plain	0	1	
	Irregular	0	3	
	OHA	25	20	
Wagner's Grade	1	1	0	0.254
	2	27	29	
	3	2	0	
	4	0	1	

Figure 1: Comparison of percentage of granulation achieved between both groups

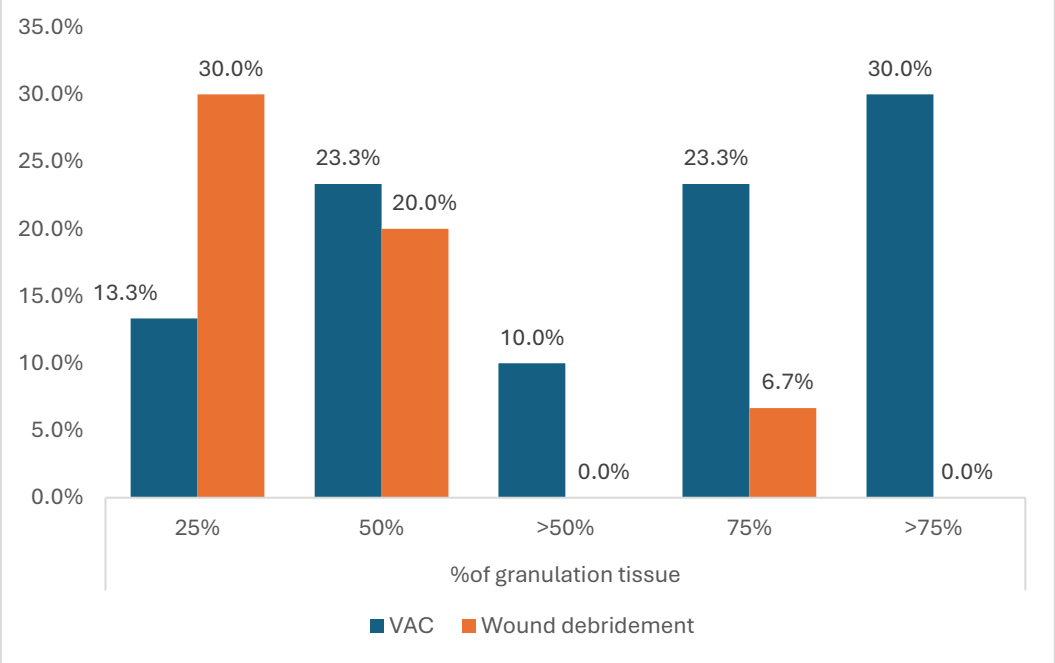

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Figure 2: Comparison of Graft Uptake between both groups

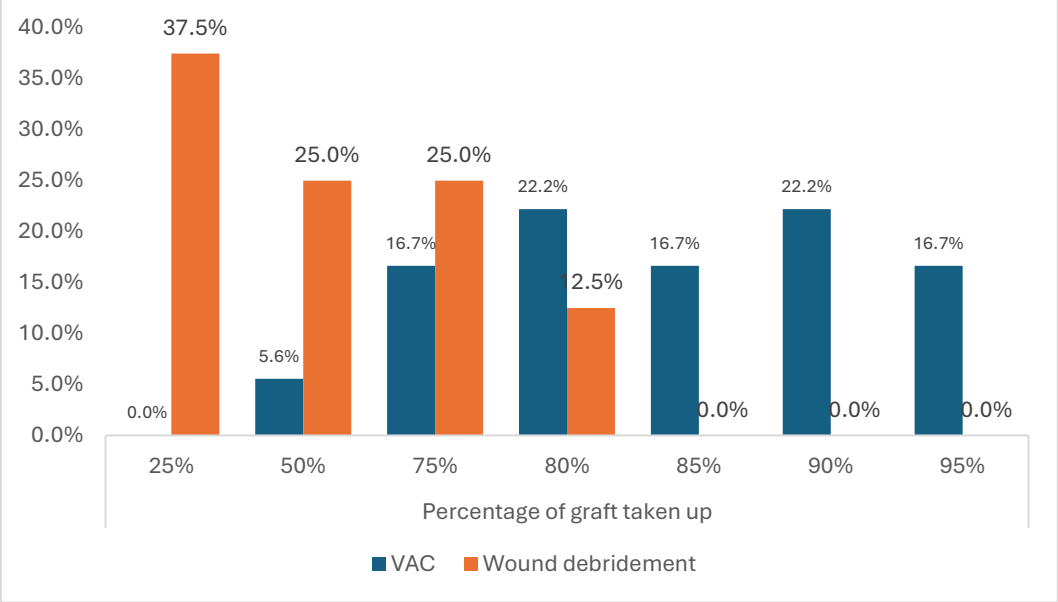

Table 2: Comparison of hospital stay between both groups

		VAC	Wound Debridement	P Value
No. of days stay in hospital	<15	12	2	<0.0001
	16 – 21	18	9	
	>21	0	19	

Although ulcer size, diabetes duration, and certain biochemical parameters (hemoglobin, random blood sugar, albumin) did not show significant differences between groups, the VAC group showed significantly better outcomes in terms of wound healing, infection resolution, and graft success. These results suggest that VAC therapy is a more effective treatment for diabetic foot ulcers, improving healing, reducing hospital stays, and minimizing the need for additional surgical interventions.

DISCUSSION

This study compared the effectiveness of Vacuum-Assisted Closure (VAC) therapy and traditional wound debridement in treating diabetic foot ulcers (DFUs). A total of 60 patients were enrolled, with 30 in each group. Both groups had similar demographics, with a predominance of male patients (83.3%) and most aged 41-60 years.

The VAC group showed significantly better outcomes in granulation tissue formation, with 30% of patients achieving more than 75% granulation compared to just 6.7% in the debridement group ($p<0.0001$). This was in line with previous studies showing that VAC accelerates wound healing. The VAC group also required fewer surgical debridement (4.03 ± 1.07) compared to the debridement group (7.67 ± 2.14) ($p<0.0001$), reducing the need for invasive interventions and associated pain.

VAC therapy also improved skin graft outcomes, with 66.7% of patients progressing to grafting, compared to 26.7% in the debridement group ($p=0.002$). Among those who received grafts, the VAC group had significantly better graft uptake ($p=0.011$), with no patients exhibiting less than 50% uptake.

Additionally, the VAC group had a significantly shorter hospital stay. All patients were discharged within 21 days, with 40% leaving within 15 days. In contrast, 63.3% of debridement patients stayed longer than 21 days ($p<0.0001$).Despite similar levels of glycaemic control and other secondary parameters like

haemoglobin and albumin, the VAC group demonstrated superior wound healing outcomes, suggesting that VAC's benefits extend beyond glycaemic control.

Overall, VAC therapy significantly outperformed traditional debridement in improving healing, reducing hospital stays, and enhancing graft success, supporting its use as a standard treatment for DFUs

Limitations

Our study involved a small sample size of patients from a single centre. Moreover, the comparison between VAC therapy and debridement alone was not standardized for ulcer size and duration. We have also not studied the effect of the number of VAC applications on the results obtained and chose to observe the uniformity of the two dressings. Further large-scale and multi-centric studies should be conducted to accurately determine the efficacy of VAC dressings and establish guidelines,

CONCLUSION

Patients who received VAC therapy had statistically better wound healing, with better development of granulation tissue, better rates of wound contracture, more patients becoming candidates for skin grafting, and better uptake of skin graft post-surgery. It also reduced morbidity by reducing the length of hospital stay and the number of formal debridement's required. VAC therapy can be drafted into regular protocols for the treatment of chronic diabetic wounds and to reduce associated morbidity.

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Medical Research Unit, Thanjavur Medical College and Hospital, Thanjavur

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