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Original Research Article

COMPARISON OF VAC DRESSING AND SOFRA DRESSING IN DIABETIC FOOT WOUND IN TERTIARY CARE HOSPITAL OF SOUTH PUNJAB

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Abstract: *Diabetic foot ulcers (DFUs) are a significant complication of diabetes, contributing to high morbidity and healthcare costs. Vacuum-assisted closure (VAC) therapy is a promising intervention for DFU management, but its adoption in Pakistan is limited.* ***Objective:*** *This study aimed to compare the effectiveness of VAC therapy and conventional Sofra dressing in managing DFUs in a tertiary care hospital.* ***Methods:*** *A prospective comparative study was conducted among 120 patients with Wagner grade 2 or 3 DFUs. Participants were randomly assigned to two groups: Group A (VAC therapy) and Group B (Sofra dressing). Data on wound surface area reduction, granulation tissue formation, and demographic variables were collected over four weeks. Statistical analysis was performed using SPSS version 26, with a p-value of <0.05 considered significant.* ***Results:*** *VAC therapy demonstrated superior outcomes compared to Sofra dressing. The mean wound surface area reduction was 45% in Group A and 25% in Group B. Granulation tissue formation occurred significantly faster in the VAC group (14.90 ± 9.11 days) compared to the Sofra group (29 ± 5.81 days) (p < 0.05). No significant gender differences were observed, but younger patients (<55 years) experienced slightly faster healing rates in both groups.* ***Conclusion:*** *VAC therapy is more effective than conventional Sofra dressing in reducing wound size and promoting faster granulation tissue formation in diabetic foot ulcers. These findings support the adoption of VAC therapy as a standard intervention for DFU management in Pakistan, despite resource limitations. Policy-level support and training are essential for its widespread implementation..*

Keywords: Diabetic foot ulcers, vacuum-assisted closure, Sofra dressing, wound healing, Pakistan, advanced wound care.

Introduction

Diabetic foot ulcers (DFUs) are a significant complication of diabetes mellitus, contributing to high morbidity and mortality rates worldwide. In Pakistan, the prevalence of diabetes has reached alarming levels, with over 19 million adults affected, making it the third-highest burden globally (1). Among these, DFUs remain a major challenge due to delayed diagnosis, inadequate healthcare infrastructure, and limited awareness about preventive measures (2). Effective wound management is critical in reducing the risk of amputations and improving patient outcomes (3).

Conventional dressing techniques, such as the use of antibiotic ointments like Soframycin, have been widely used for DFU management. However, these methods often show limited effectiveness in promoting wound healing, especially in complex or large ulcers (4). Recent advances in wound care have introduced vacuum-assisted closure (VAC) therapy, which utilizes negative pressure to enhance granulation tissue formation, reduce wound size, and remove exudates. VAC therapy has been extensively studied in high-income countries, showing promising results in accelerating wound healing and reducing infection rates (5).

In Pakistan, the adoption of VAC therapy remains limited due to high costs and a lack of trained healthcare providers. Local studies have highlighted gaps in the management of DFUs, with a reliance on conventional methods despite the availability of advanced techniques (6). For instance, Ahmed et al. reported that less than 10% of tertiary care hospitals in Pakistan use VAC therapy, primarily due to cost constraints and resource limitations(7). Comparative studies between VAC therapy and conventional dressing methods in the Pakistani context are sparse, underscoring the need for local evidence to guide clinical practice (8).

Globally, research has demonstrated the superiority of VAC therapy in promoting wound healing. A study by Malik et al. found that VAC therapy reduced wound size by up to 50% compared to 20% with conventional dressings over four weeks(9). Similarly, Khan et al. reported faster granulation tissue formation and shorter hospital stays among patients treated with VAC therapy (10). These findings support the integration of VAC therapy into standard wound care protocols, particularly for resource-limited settings like Pakistan.

This study aims to compare the effectiveness of VAC therapy and conventional Sofra dressing in the management of diabetic foot ulcers in a tertiary care hospital in Pakistan. By evaluating wound healing outcomes, this research seeks to provide evidence-based recommendations for optimizing DFU management in the local healthcare system.

Methodology

The study employed a prospective, comparative design to evaluate the effectiveness of vacuum-assisted closure (VAC) therapy versus conventional Sofra dressing in the management of diabetic foot wounds. Conducted at a tertiary care hospital, the study aimed to assess wound

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healing outcomes, including reduction in wound surface area and time to granulation tissue formation.

The study included 120 participants with diabetic foot wounds, who were divided equally into two groups: Group A received VAC therapy, and Group B was treated with Sofra dressing. Patients were selected using a convenience sampling technique. Inclusion criteria were adult patients aged 18–70 years with Wagner grade 2 or 3 diabetic foot ulcers and an HbA1c level ≤ 8%. Patients with active infection, ischemic ulcers, or co-morbid conditions such as renal failure were excluded.

Upon recruitment, written informed consent was obtained from all participants. Ethical approval was secured from the hospital's ethics review board prior to the commencement of the study. Baseline demographic and clinical data, including age, gender, ulcer grade, and HbA1c levels, were recorded. Wound surface area was measured in square centimeters using a transparent graph sheet before the intervention and at the conclusion of the treatment.

Group A received VAC therapy, which involved the application of a sterile, sponge-like dressing connected to a vacuum pump to create negative pressure over the wound. The dressing was changed every 48 hours. Group B received Sofra dressing, which involved the application of a Soframycin ointment-based dressing, replaced daily. Both groups received standard wound care protocols, including glycemic control, offloading, and nutritional support.

Data collection included pre-treatment and post-treatment wound surface area measurements and the duration required for granulation tissue formation. The intervention period lasted four weeks for both groups. Outcomes were stratified by age and gender to analyze any demographic influences on wound healing.

Data analysis was conducted using SPSS version 26. Descriptive statistics were used to summarize baseline characteristics, while independent t-tests were applied to compare wound healing outcomes between the two groups. A p-value of <0.05 was considered statistically significant. The reliability and validity of data collection instruments were ensured through standardized protocols and interobserver agreement.

Results

The study assessed and compared the efficacy of vacuum-assisted closure (VAC) therapy and conventional Sofra dressing in the management of diabetic foot wounds. The study included 120 patients, divided equally between two groups: Group A (VAC therapy) and Group B (Sofra dressing). The mean age of participants in Group A was 54.89 ± 6.23 years, while in Group B, it was 56.13 ± 7.44 years. Gender distribution revealed that Group A had 44 males and 16 females, and Group B had 40 males and 20 females. Both groups included participants with Wagner grade 2 and grade 3 ulcers, with a similar distribution between the groups (Table 1).

The mean wound surface area before treatment was slightly larger in Group A (25.09 ± 1.80 cm²) than in Group B (23.87 ± 2.1 cm²). Post-treatment, the wound area reduced significantly more in Group A (13.16 ± 1 cm²) compared to Group B (18.22 ± 1.8 cm²), with a reduction in wound surface area of 45% and 25%, respectively (Table 2). Granulation tissue formation was achieved more quickly in Group A, with a mean duration of 14.90 ± 9.11 days, compared to 29 ± 5.81 days in Group B.

The outcomes were further stratified by age and gender. No significant differences were observed in healing outcomes between male and female participants within each group. However, younger participants (aged <55 years) demonstrated slightly faster granulation formation than older participants (aged >55 years) in both groups.

The results demonstrate that VAC therapy is significantly more effective than Sofra dressing in reducing wound surface area and achieving faster granulation tissue formation in diabetic foot ulcers. These findings highlight the potential of VAC therapy as a superior option for diabetic wound management in clinical settings.

Table 1: Demographic and Clinical Characteristics of Participants

Variable	Group A (VAC, n=60)	Group B (Sofra, n=60)
Mean Age (years)	54.89 ± 6.23	56.13 ± 7.44
Gender (Male/Female)	44/16	40/20
Wagner Grade 2 Ulcers	35	36
Wagner Grade 3 Ulcers	25	24
Mean HbA1C (%)	7.2 ± 3.6	7.1 ± 2.9

Table 2: Wound Characteristics and Healing Outcomes

Variable	Group A (VAC, n=60)	Group B (Sofra, n=60)
Pre-treatment Wound Area (cm²)	25.09 ± 1.80	23.87 ± 2.1
Post-treatment Wound Area (cm²)	13.16 ± 1.0	18.22 ± 1.8
Reduction in Wound Area (%)	45%	25%
Mean Duration of Granulation (days)	14.90 ± 9.11	29 ± 5.81

Discussion

This study compared the effectiveness of vacuum-assisted closure (VAC) therapy and conventional Sofra dressing in the management of diabetic foot ulcers (DFUs) in a tertiary care hospital in Pakistan. The findings revealed that VAC therapy significantly improved wound healing outcomes, including a greater reduction in wound surface area and faster granulation tissue formation, compared to conventional Sofra dressing. These results align with global and regional studies, highlighting the advantages of advanced wound care techniques.

The mean reduction in wound surface area was 45% in the VAC therapy group, compared to 25% in the Sofra dressing group. These findings are consistent with Malik et al., who reported a 50% reduction in wound size with VAC therapy compared to 20% with conventional dressings in a similar four-week treatment period (11). This demonstrates that VAC therapy accelerates wound contraction through its ability to remove exudates, promote granulation tissue formation, and enhance vascularization (12).

Faster granulation tissue formation was observed in the VAC group, with an average duration of 14.90 ± 9.11 days, compared to 29 ± 5.81 days in the Sofra group. Apelqvist et

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al. similarly found that VAC therapy reduced the time to granulation tissue formation by approximately 40% compared to traditional dressing methods (13). This finding is particularly significant for the Pakistani healthcare context, where delayed wound healing often leads to prolonged hospital stays and higher healthcare costs (14).

The use of Sofra dressing showed moderate effectiveness but lagged behind VAC therapy in all measured parameters. Khan et al. reported similar outcomes, where conventional dressings provided adequate but slower healing, emphasizing the limitations of these techniques in managing complex wounds (15). Conventional methods rely heavily on local antimicrobial effects without addressing the underlying factors contributing to delay healing, such as reduced perfusion and persistent inflammation (16).

The study also highlighted demographic trends, with younger patients demonstrating slightly faster healing rates in both groups. This aligns with findings from Ahmed et al., who noted that age is a significant predictor of wound healing outcomes, likely due to better physiological reserves and reduced comorbidities in younger patients (17). Gender-based differences were not significant, consistent with global literature indicating that biological sex has minimal impact on wound healing processes (18).

The findings emphasize the need to incorporate advanced wound care techniques, such as VAC therapy, into standard DFU management protocols in Pakistan. Although cost and resource limitations are barriers to widespread implementation, evidence from this study and others highlights the long-term cost-effectiveness of VAC therapy by reducing hospital stays and preventing complications (19). Policy-level interventions to subsidize advanced wound care and enhance training for healthcare providers are crucial for optimizing DFU management in resource-limited settings (20).

Conclusion

This study reaffirms the superior efficacy of VAC therapy over conventional dressings in managing diabetic foot ulcers. These results contribute to the growing body of evidence supporting the adoption of advanced wound care technologies to improve patient outcomes in Pakistan and similar resource-constrained settings.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department Concerned. (IRBEC-TCHL-002219/2#)

Consent for publication
Approved

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Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

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Coordination of collaborative efforts.
Study Design, Review of Literature.
MUHAMMAD SABIR (Assistant Professor)
Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.
Conception of Study, Final approval of manuscript.
GHULAM YASEEN (Chief Consultant)
Manuscript revisions, critical input.
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References

1. International Diabetes Federation. IDF Diabetes Atlas, 10th Edition. 2021. Available from: https://diabetesatlas.org.
2. Basit A, Fawwad A, Qureshi H, et al. Prevalence of diabetes, prediabetes, and associated risk factors: Second National Diabetes Survey of Pakistan. BMJ Open. 2021; 11(2):e040276.
3. Lavery LA, Armstrong DG, Murdoch DP, et al. Risk factors for foot infections in individuals with diabetes. Diabetes Care. 2020; 43(3):594-601.
4. Rehman S, Malik T, Ahmed T. Challenges in diabetic foot ulcer management in Pakistan: A systematic review. J Pak Med Assoc. 2021; 71(5):1398-1402.
5. Apelqvist J, Armstrong DG, Lavery LA, et al. Vacuum-assisted closure therapy for diabetic foot wounds: A systematic review. Lancet. 2020; 396(10267):1778-1785.
6. Khan ZA, Zafar N, Ahmed R. Barriers to adopting advanced wound care techniques in Pakistan. Pak J Med Sci. 2021; 37(6):1432-1438.
7. Ahmed S, Khan S. Utilization of advanced wound care technologies in tertiary care hospitals in Pakistan. BMC Health Serv Res. 2020; 20(1):456.
8. Zafar N, Siddiqui M, Ahmed A. Comparative efficacy of wound care techniques for diabetic foot ulcers in resource-constrained settings. Int J Nurs Pract. 2020; 26(5):e12875.
9. Malik S, Rehman A. Efficacy of vacuum-assisted closure therapy in DFU management: A meta-analysis. J Wound Care. 2021; 30(4):273-280.
10. Khan AA, Siddiqui R. Role of advanced wound care techniques in improving outcomes for diabetic foot ulcers. Int Wound J. 2020; 17(5):1245-1252.
11. Malik S, Rehman A. Efficacy of vacuum-assisted closure therapy in DFU management: A meta-analysis. J Wound Care. 2021; 30(4):273-280.
12. Lavery LA, Peters EJ. Advances in vacuum-assisted closure therapy for diabetic wounds. Int J Wound Care. 2020; 19(5):567-574.

13. Apelqvist J, Armstrong DG, Lavery LA, et al. Vacuum-assisted closure therapy for diabetic foot wounds: A systematic review. Lancet. 2020; 396(10267):1778-1785.
14. Rehman S, Malik T, Ahmed T. Challenges in diabetic foot ulcer management in Pakistan: A systematic review. J Pak Med Assoc. 2021; 71(5):1398-1402.
15. Khan AA, Siddiqui R. Role of advanced wound care techniques in improving outcomes for diabetic foot ulcers. Int Wound J. 2020; 17(5):1245-1252.
16. Ahmed S, Khan S. Utilization of advanced wound care technologies in tertiary care hospitals in Pakistan. BMC Health Serv Res. 2020; 20(1):456.
17. Ahmed T, Khan Z, Malik A. Age-related differences in diabetic wound healing outcomes: Evidence from Pakistan. Pak J Health Sci. 2021; 40(4):123-131.
18. Zafar N, Siddiqui M, Ahmed A. Comparative efficacy of wound care techniques for diabetic foot ulcers in resource-constrained settings. Int J Nurs Pract. 2020; 26(5):e12875.
19. Khan ZA, Zafar N, Ahmed R. Barriers to adopting advanced wound care techniques in Pakistan. Pak J Med Sci. 2021; 37(6):1432-1438.
20. Mwita C, Marwa K. Non-pharmacological interventions in post-operative pain: Challenges in LMICs. Afr J Nurs Health Sci. 2020; 19(2):67-73.

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